







Power BI





TABLE OF CONTENTS

Chapter 1: Introduction to Business Analytics
What is Business Analytics?5
Metrics
Examples of Commonly Used Metrics6
Types of Analytics8
Descriptive Analytics
Diagnostic Analytics
Predictive Analytics
Prescriptive Analytics
Business Analytics Continuum
Data and Information
CHECK FOR UNDERSTANDING
Chapter 2: General Enterprise Data Flow
How does data get transformed into information in an enterprise?
Data Sources
Enterprise Data Warehouse
Reporting Tools
3-Tier Architecture
Data Reliability17
Relational Databases and the Star Schema19
The Star Schema20
CHECK FOR UNDERSTANDING22
Business Analytics Applications/Tools23
Analytics Using Spreadsheets23
CHECK FOR UNDERSTANDING42
Dedicated Business Analytics Tools44
Chapter 3: Statistics
Measures of Central Tendency



Business Analytics and Data Visualization with Power BI	Power BI
Mean	45
Median	45
Mode	45
easures of Dispersion	45
Range	46



Creating a Report75
Collaboration Options
Workspace Membership108
Dashboards
Publishing Results
The Power BI Mobile App113
Exporting Reports
Generate a QR Code for the Report116
The Shared With Me Tab117
Publishing with Apps
Mobile Layout
Mobile Layo <mark>ut fo</mark> r Reports
Mobile Layout for Dashboards
CHECK FOR UNDERSTANDING:
Chapter 5: Capstone Project
Additional Tips for Creating the Capstone
Visualize your (imaginary) client
Put yourself in the shoes of your (imaginary) client
Begin with the End in mind
Three Years of Historical Data
Power BI Samples

Power BI





Chapter 1: Introduction to Business Analytics

Everyone makes decisions. A graduating Senior High School might want to decide on what college to enroll to. He might choose to forego college for now and find a part-time job. He might even decide to have a "gap" period to collect his thoughts and plan out his future more. Not every decision is as potentially life-altering as the above example. A mother will be making groceries and is torn between two milk brands. Which should she choose? An office worker has the choice to use Grab to hail a ride to work or he can commute to work using public transportation. He might even opt for a taxi, whichever might come first. Whichever he chooses would be the result of a quick opportunity cost analysis in his head: he might go for Grab if he has an urgent meeting, for example.

Everyone makes decisions. This is doubly so for businesses. Businesses fail and prosper with the decision making of its leaders. The question then becomes: **How would the leaders make the best, most sound decision?** There was a time when managers and executives just went with decision-making using their "gut feeling" based off their past experiences. Wouldn't it be better when decisions are made based off quantifiable parameters, supported by facts? This way, the ability to create decisions is always backed by the company's numbers: past, present, and projected future. This venture, while sound, is easier said than done. A company in today's internet-connected world generates tons of data daily. How do you make sense of it all? What is relevant, and what is unnecessary noise? How do you cut the wheat from the chaff? This is where **Business Analytics** comes in.

What is Business Analytics?

Business Analytics, or just **analytics**, is the use of data, information technology, statistical analysis, quantitative methods, and mathematical or computer-based models to help managers gain improved insight about their business operations and make better, fact-based decisions¹. The term is often used interchangeably with **Business Intelligence**. In some cases, **Business Intelligence** is used to refer to the overall practice of data analysis in a business context, while **Analytics** refers to the deeper, more advanced methods of analyzing data. Either way, it is a process that involves data, the tools to gather and interpret it. In practice, the tool to properly disseminate the information to the key stakeholders is also included.

Business Analytics is primarily a decision-making tool. Some common decisions include:

- 1. Pricing Decisions
- 2. Decisions to target consumer segments (age, gender, etc.)
- 3. Merchandising Decisions (what brands, quantity to buy, etc)
- 4. Location Decisions (where to establish a new branch, for example)

And many others that affects a business' operations, supply chain, distribution, finance, human resources, and more².

Business Analytics is used to gather data and churn it into actionable items to create strategic and tactical decisions. Here are some uses of Business Analytics:

1. Measure the "Customer Service Level" of a distribution firm. It measures the company's ability to service their customers from the moment the sales order has been placed, up to the moment the goods arrive at their doorstep.

¹ James Evans, Introduction to Business Analytics, (Pearson Education, 2013), 3.

² Evans, Intro to BA, 4

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph



- 2. Measure the "Overall Equipment Efficiency". It measures the effectiveness of a production line of machines.
- 3. Quantify the abilities of athletes to make a championship-ready team.

The above is a list of just some examples where data is taken and transformed into a measurable and quantifiable markers with which to base strategies off. These measurable and quantifiable items are called **Metrics**.

Metrics

As described in the previous section, **Metrics** are measures of quantitative assessment commonly used for assessing, comparing, and tracking performance or production³. Simply put, it takes whatever **Measure** in the organization's data and applies calculations and comparisons to them. **Measures**, in turn, are the raw numerical data. Any data item that can be subject to the four basic arithmetic operations is considered a measure. This is an important distinction, as data can come in many forms, and even if a piece of data is purely numerical, it does not automatically mean that it is a measure. For example, Employee Codes can be purely numerical to denote hiring order. Even if it is purely numerical, it makes no sense to add up Employee Numbers.

Metrics come in a wide range and can vary between companies and industries. There are some that are industry standards, but more often than not, they are customized to an individual company's specific needs and outcomes. Executives, and managers, in particular, use them to create strategic and tactical decisions in order to achieve their goals. Because a metric can come from nearly any data point in an enterprise, its ability to state a quantifiable target, and the company's position in relation to that target at any given point in time is one of the most important characteristics a **metric** should have.

Generally, executives and managers seek to have a dashboard, where different **Key Performance Indicators** are gathered in the same place. These are specific metrics that help measure a company's success. This helps simplify analysis and opens up discussions in strategy meetings by having a single interactive page displaying all the relevant metrics.

Examples of Commonly Used Metrics

- 1. Sales vs. Targets one of the most universal basic metrics. It simply shows the difference between actual sales numbers against the target figure. If the Sales Figure is below the Target Figure, then something needs to be done.
- Current Period Sales vs. Previous Period Sales used as a measure of sales over various periods of time. Due to economic forces like inflation, Sales Figures are usually expected to grow over time to counter act it, however, it still depends on the targets set during the planning meeting usually done near the start of the company's year. Examples include Yearto-Date Sales vs. Year-to-Date Last Year Sales and Year-on-Year Sales Analysis.
- 3. Sales vs. Returns when a product that has been sold is returned at an unsellable state (rat bites, packaging is too deformed, water damaged, etc.) it will automatically count as a loss to

³ Julie Young, 'Metrics', *Investopedia.com*, https://www.investopedia.com/terms/m/metrics.asp, (accessed 6th May, 2019).

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph



the company. This metric will allow the company to monitor how much of the products sold actually get delivered without issue to its customers. Too many returns on a particular product make and model might point to a problem from the supplier/warehouse/delivery process or too many returns from a particular customer might indicate a problem with that customer. This is separate from the **Returns vs Target Returns** metric.

- 4. Sales vs. Invoice for large companies, the sales process is more than just the face-to-face exchange of money and goods between two parties. In this way, we can think of the Sales numbers as the "expected sales" value, while the Invoice numbers are the "actual sales" value that will count towards the company's profits. There is usually a time difference between the time an order is placed and the actual billing of said order. Because billing will only be counted for actual goods/services delivered, there will be instances where only partial billing will be done while the remaining goods/services will be delivered on a later date. This metric will help keep track of those partial billings so that 100% fulfillment can be achieved.
- 5. **Truck Utilization** distribution companies deliver products from their warehouse to their clients. Using a truck for deliveries represent an expense in terms of labor, vehicle maintenance, and fuel. Each truck has its own rated dimensions and maximum weight rating. This metric will help maximize how each truck is used: making sure that it is close to full capacity (in terms of dimensions and weight) and have routes that will serve the most customers coming to and from the distribution center.
- 6. **Customer Segmentation** knowing the customer is one of the quickest ways to expand a business' earning potential. This metric will enable the business to know which of their customers make up the bulk of sales. Customers can be segmented by Gender, Age, Location, Industry, etc. Knowing the customer segmentation and the performance of each segment will help create a more focused marketing campaign.
- 7. **Hiring Rates** Hiring Managers and Staff are usually evaluated at the rate they are able to process applicants from initial interview to final contract signing. This metric will help them monitor applicants and how they get past each stage of hiring to figure out if new hiring practices should be relaxed or be more stringent.
- 8. Occupancy Rate measures the rate at which rooms are reserved in Hotels. This helps the management figure out just how much of their rooms are used by customers. At the same time, if expressed as a function of time, it will help determine lean and peak seasons for the business, which helps set expectations and help ease preparations when a sudden influx of occupants appear.
- 9. Service Level Agreement SLA's are used in IT Support Organizations to keep track of support tickets and team utilization. It gives an idea of how effective the organization is by getting the number and kind of tickets (from low priority to show stopper) and the average response time. Each kind of ticket has its own window wherein it will need to be solved. An effective

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph



organization is one where each kind of ticket is resolved within this window. Any misses will open up discussion on what exactly happened and what will need to be done to avoid such misses in the future.

10. Lead Summary – a marketing campaign will have different ways to generate leads when trying to drum up interest on a product and/or brand awareness. Methods include internet ads, television ads, print ads, on-premise events, etc. Knowing which method yields the most responses will help focus company resources in the method with most impact.

These metrics will typically be expressed from the Top Level, that is, the total number for the whole company. They can then be **drilled down** to multiple levels. For example, the **Sales vs. Target Metric** can be drilled down to a **Per Brand** level to evaluate the performance of account managers, then drilled down again to **Per Item** to see which items or SKU (Stock Keeping Unit, pronounced "skew") are actually turning a profit.

Types of Analytics

There are three types of Analytics. Each one attempts to answer key questions that a business might encounter:

Descriptive Analytics

The starting point of doing analytics for businesses. It uses data to understand the past and current business performance and make informed decisions⁴. The metric examples provided previously all fall under **Descriptive Analytics**. It is the most common and most understood form of Business Analytics.

Descriptive Analytics uses already-existing data from the enterprise. It collects and consolidates data and transforms them into meaningful information displayed as charts and tables to monitor performance. It is also the most reliable, as it uses data that is considered final and is already recorded into the system. It answers the Question/Activity: "What has happened?"

Diagnostic Analytics

Diagnostic Analytics can be considered as the "Next Step" to Descriptive Analytics, in that after finding out WHAT happened, further analysis is made to figuring out WHY it happened. It attempts to find out the reasoning behind certain results.

Diagnostic analytics is usually performed using such techniques as data discovery, drill-down, data mining, and correlations. In the discovery process, analysts identify the data sources that will help them interpret the results. Drilling down involves focusing on a certain facet of the data or particular widget.

For example, you see the total sales report and your company is turning a profit. While you are happy that there are profits, you are disappointed that the target profit projected earlier in the year was

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph

⁴ Evans, Intro to BA, 6



not met. You will have to then decide to investigate a little further. You look into the breakdown of the figures by slicing and dicing the data. You look at the numbers for each department and product/service that serve as revenue drivers. You look at expenses. You also look at the monthly break down of data and try to see if there were any significant events that coincided with dips in sales or if the dips were normal due to seasonality by consulting prior years' data.

Predictive Analytics

Predictive Analytics analyzes past performance in an effort to predict the future by examining historical data, detecting patterns or relationships in these data and then extrapolating these relationships forward in time⁵. This is the next step in Analytics Implementation for an enterprise, and cannot exist without Descriptive Analytics, because past data needs to exist first, before extrapolation can happen and patterns emerge.

Statistical Methods are used extensively for data exploration in Prescriptive Analytics. Regression, Correlation, and projection are used constantly in order to derive information from past data. An insurance firm, for example, can use **Predictive Analytics** to find out how likely a new customer will file a claim based on various factors such as Age, Gender, Preexisting Conditions, and the like. It can also determine which factor has the biggest impact, and charge premiums accordingly.

Predictive Analytics aims to answer the question "What will happen?"

Prescriptive Analytics

Prescriptive Analytics uses optimization to identify the best alternatives to minimize or maximize some objective⁶. In the real world, there are a lot of variables that are seemingly random that can have an impact on the bottom line. For this reason, "What-if?" analyses are made in order to determine the impact of these different variables, and by how much. However, because there are a lot variables, usually greater than the ability of a human to process, it is considered the Holy Grail of analytics. Employing the mathematical and Statistical methods in Predictive Analytics in conjunction with Machine Learning and Artificial Intelligence will allow businesses to sift through inordinate amounts of data in addition to being able to automatically make recommendations from the insight gained.

Prescriptive Analytics aims to answer the question "Out of all these alternatives, what should we do?"

Various tools exist that cater to the different kinds of Analytics. Some tools are capable of serving all kinds, while others specialize in one aspect. Usually they also come with a visualization aspect that will help in the quick interpretation of results.

⁵ Evans, Intro to BA, 6

⁶ Evans, Intro to BA, 7

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph





Business Analytics Continuum



In terms of Business Analytics Capabilities, businesses will *ALWAYS* start with Descriptive Analytics. Once enough data is in place, and enough people are comfortable with using Business Analytics, it can then move on into Predictive and Prescriptive Analytics.

In the above image, the graph to the left of the vertical dotted line is the domain of Descriptive Analytics. It is the starting point of Business Analytics in an enterprise. Then, as the company's capabilities mature and more and more people start to use the Analytics tools afforded them, only then will they move on to doing Predictive and Prescriptive Analytics. This does not mean that Descriptive Analytics is going to be ignored. Descriptive Analytics will always have its place simply due to the reliability of the information that can be gleaned from the company's historical data.

The biggest issue facing the use of Business Analytics in an enterprise is **adoption**. Dedicated Business Analytics tools cost additional investment in software, hardware, and human resources. All of these mean additional costs for the enterprise. New tools also typically have a connotation where a lot of technical expertise is needed to use them effectively. While not necessarily false, users tend to put up a resistance to using them due to this. For this reason, most Business Analytics tools in the market stress "**Self Service BI**." The aim is to empower Business Users to create meaningful reports straight from their enterprise data sources all without the help of the IT department, or at the very least, minimal intervention from IT.

⁷ https://blogs.sap.com/2016/08/29/predictive-analytics-changing-the-game-for-sap-oem-partners/





Data and Information

In this Information Age where everything and everyone is connected, data is one of the, if not the most important resource a company can have. There are **2.5 quintillion bytes** of data created every day, with the pace still increasing with the advent of the Internet of Things (IoT)⁸. The amount is staggering, and it is difficult to truly comprehend just how much of it is created through daily consumption at work and during our leisure time. Some have even remarked that **Data is the New Oil**⁹. The analogy is made to emphasize data's importance to the digital frontier, much in the same way oil paved the way for much of human progress during the industrial revolution.

Much like Oil, however, **data by itself is useless**. Because there is so much of it at any given time, it takes skill to filter out the noise in order to derive insight that will benefit businesses to make informed decisions. Data must be subject to different analysis methods so that information can be gleaned from it. This information will then become the basis of an Action Plan that will make up the bulk of a business strategy.

As an illustration of how Data gets transformed to Information for the benefit of the user, look no further than Spotify. Spotify has a Weekly Discover Playlist that makes recommendations on what to listen to based on your musical preferences. But how is the Discover Playlist built? The simple act of listening to a song in Spotify generates a lot of data about you:

- 1. The title of the song
- 2. The artist
- 3. The genre
- 4. The artists and songs you search for

Just to name a few. All that data is then fed to an algorithm that collates and consolidates that data for any given listening session and Spotify will generate a playlist that will contain new songs and artists, more likely those you have never heard of before or only have passing familiarity with (which is the point of a Discover Playlist) that is approximated from your tastes and listening habits. The moment you start using Spotify is the moment you start producing data as a consumer.

In online shopping, whenever you browse for items you may want or put it in your shopping cart, you will be shown what other people bought that are related to the item you are viewing. Sometimes, bundles involving your item are shown, and in some cases, it will show a discounted bundle. These are just some ways that companies nowadays use data to enhance the User Experience and increase their own revenues at the same time.

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph

⁸ Bernard Marr, 'How Much Data Do We Create Every Day? The Mind-Blowing Stats Everyone Should Read', *Forbes.com*, https://www.forbes.com/sites/bernardmarr/2018/05/21/how-much-data-do-we-create-every-day-the-mind-blowing-stats-everyone-should-read/#4451973260ba, (accessed 7th May, 2019).

⁹ https://www.economist.com/leaders/2017/05/06/the-worlds-most-valuable-resource-is-no-longer-oil-but-data





I. IDENTIFY THE TYPE OF BUSINESS ANALYTICS.

- 1. The CEO wants to understand the impact of an advertising campaign by comparing the current sales from last year.
- 2. In a meeting, there was a review of business performance to find problems or areas of opportunity.
- 3. The manager wants to see the number and types of complaints resolve for the first quarter.
- 4. The sales agent sent a report classifying the customers into different segments.
- 5. A team of market researchers estimates the total revenue that will be generated thru the marketing campaign executed by the company.
- 6. In the third quarter, the manager created a chart showing the possible movements of prices of their products on the 4th quarter.
- 7. Sales manager created a technique that computes the demand for next year.
- 8. The company is developing a tool that helps to determine the best pricing to maximize revenue.
- 9. The broker uses software to define the optimal mix of investments in a stock portfolio.
- 10. The manager wants to know the amount to be deducted to the advertising expenses in order to increase profit.
- II. What are other examples of Metrics/KPI's? What are they monitoring and how important are they to a company's success?
- III. If you were an owner of a company/enterprise, how will you implement Business Analytics?







Chapter 2: General Enterprise Data Flow

Now that a basic understanding of Business Analytics has been established, it is time to learn how data actually travels inside an enterprise so that it can be transformed into useable information, and in turn, actionable items.

Business Analytics implementation in an enterprise is not a venture that can be done alone. It is a collaborative effort that involves multiple teams from multiple departments constantly communicating with each other in order to figure out the information needed by the main stakeholders. Determining the information is the starting point of an implementation, which will dictate which data will actually be conducive for the desired analysis.

How does data get transformed into information in an enterprise?



Data Sources

An enterprise's data needs grow bigger and bigger as the business scales up. Due to this, the machines (servers and clients) bought to address data needs a few years ago might no longer be enough to address the need today, yet they are system-critical that taking them offline even for a bit could create an operational scenario where the business users won't be able to transact, which makes the data for reporting to the higher ups no longer accurate or no longer available. There are three main categories of data sources in an Enterprise.

ERP Systems

In an ideal world, ALL of an enterprise's data is fed into its ERP System and all reports are obtained directly from it. However, the real world makes it difficult because in the end, ERP Systems are still just machines, with their limited (not infinite) capacity and processing power. An ERP System might also not be able to address an enterprise's needs as the company grows larger. This means that the company will



then have to procure a new ERP System, or upgrade its current one, which requires a significant investment.

An ERP System makes extensive use of Master Data to help keep track of Business Partners and Items. Usually the maintenance of these is assigned to key people, who will be the ones to manage the creation of new Master Data or the updating of such. Lastly, when new equipment is bought or an existing ERP System is upgraded, the company might need to schedule a little bit of down time to implement them. The ERP System is unavailable at these times, so these will need to be scheduled ahead of time, and concerned parties will need to be informed so they can work around it (adding System Memory, for example, requires for the system to be shut down first before new Memory Modules can be installed).

Other Databases

Sometimes, due to geographical or cost constraints, a branch of the company might be physically impossible to connect to the corporate network. This means that they can't use the ERP System without resorting to workarounds. One such workaround is to maintain a separate database that records all transactions for the day. At the end of the day, the database will upload the collected data to the ERP system.

In other instances, databases might be part of a legacy system that is still being used. It might be integrated into a Business Process that is system-critical, and current Cost/Time/Technical constraints mean that they can't be assimilated to the ERP system just yet. In order to be able to decommission these systems, the business process and the data they produce must be integrated to the ERP. If this is impossible, then an **Enterprise Data Warehouse** will be required to consolidate their data. This will require additional cost in time and manpower, as it is a project that will require specialized knowledge in both the legacy system AND the ERP/EDW (This is an example of Data Migration).

Flat Files

As mentioned before, in a perfect world, all of an enterprise's data is going to be present in the ERP, for instant extraction and reporting. However, in reality, there is a process in place so that data within it cannot be tampered with. Transactions will usually have an approval process to help keep out doubtful and fraudulent records, while Master Data is managed by key employees. However, there are some instances where a branch is in such a remote location that an internet connection is not available. This is where Flat Files come in. Transactions for that branch will be recorded in a flat file, later to be sent to the Head Office for processing and consolidation.

Flat files are usually Excel or delimited text files that business users create in order to make their own reports when needed. Delimited text files are usually either **tab-delimited or comma-separated value (CSV)** files. These files can still be opened in Excel, though tab-delimited files might need a few extra steps before it can be read (though because they are text files, Notepad will also do). In order to keep an accurate enterprise-wide report, these will have to be formatted in such a way that it can be uploaded back into the ERP or Enterprise Data Warehouse.

Enterprise Data Warehouse

While the ERP system has some built-in reporting functionality, it is far from a complete solution. The most obvious limitations are the fact that custom reports are difficult to create, and data visualization capabilities are lacking, if present at all. What's more, the reporting functionality will also consume system memory in order to be processed. This can have an adverse impact on its ability to transact, especially if





large, detailed reports (per customer or per item, or worse, both) are needed. An **Enterprise Data Warehouse** is needed in order to work around these limitations.

The **Enterprise Data Warehouse** is built in order to consolidate the disparate data sources so that only the data necessary for reporting will actually be used. Consolidating data is an important aspect of **Business Analytics**, because first and foremost, above even facilitating data analysis, is concerned with delivering "a single version of the truth". That is, an accurate representation of the business, from any view point. From an implementation standpoint, this will require the following:

- 1. New hardware that will become the server hosting the Data Warehouse. It must be connected to the corporate network.
- 2. A dedicated project team from the Enterprise Side made up of Business Users.
- 3. A dedicated project team either from the Enterprise IT Team or an external organization who will be responsible for setting up the environment.

Building an **Enterprise Data Warehouse** is a massive undertaking that can take weeks, months, even years to complete, depending on how large the target scope is. In order to build an **Enterprise Data Warehouse**:

- 1. The Business Users will need to determine the reports they want to derive from their data sources.
- 2. The Business Users will then convene with the IT Team in order to iron out the technical requirements (Blueprinting). This includes providing information on business processes and where the data can be obtained. This could take a few days to a few weeks.
- 3. Once the IT Team has worked out the actual requirements needed by the Business Users, it is time to implement the EDW to those specifications.
- 4. Testing will follow for data accuracy with the help of the Business Users.

Because it is on separate hardware, it usually follows a daily "load schedule" during off-peak hours, usually midnight or very early morning, where the previous day's transactions will be loaded into it. It is scheduled during off-peak hours because those times are usually the ones where the ERP especially, is not being used.

Note that the EDW is at its core a large database. If the scope starts becoming too large, it may be advisable to create another one that will have its own purpose, but uses the same Data Sources. Hardware may be powerful enough to host multiple Data Warehouses in the same machine. **SAP Business Warehouse** is a tool to help build Data Warehouses, as is **SAP Data Services**. Note that the actual implementation is highly technical, so the Business Users are not expected to actually help build the EDW, rather the IT Team might defer to them occasionally to ensure correctness and accuracy, and clarify some other things that did not come up during Blueprinting.

Reporting Tools

Once the **Enterprise Data Warehouse** has consolidated and sorted out the individual data elements required by the Business Users, it is time to recombine them into a report that will then allow analysis by the Business Users to help keep track of the status of the business. Because the **Enterprise Data Warehouse** is essentially a large Database, it is likely that technical column names are still used instead of more common, Business-friendly terms. For example, a database column that represents a



Business Partner's last name is called "INDIV_FNM" or some such. This doesn't really make sense from the Business User's perspective, as the name doesn't immediately make sense. To help alleviate this, a **Semantic Layer** is set up as a sort of "translator" so that the Business User can immediately understand what the data is, by allowing them to see technical terms as business terms.

One other bottleneck in reports creation and Data Analysis is the complexity of extracting data from the EDW for analysis. It used to be that the Business User will have to request data from the IT Team. This provides a lot of delays in information. For one, the actual extraction might take some time, and the fact that the IT person may not be all that well-versed in Business Lingo, which will affect the quality of data. If it's wrong, he will have to re-extract the data. All of those delays, and that's not even counting the delays from having to wait for response E-mails!

One of the defining features today in Business Analytics Tools is what's called **Self-Service BI**. In addition to the **Semantic Layer**, reporting tools are created with an easy to understand interface (usually drag-and-drop actions make up the majority of interactions) so that the Business User will be empowered to create their own reports. It covers easy extraction from the Data Warehouse to Report Creation to Publishing, without or with minimal help from IT. This helps with the timely flow of information, as reports can be created in an instant by the Business User alone.

Another aspect of Business Intelligence is the quick dissemination of reports to their intended audiences. It is for this reason that specialized tools also usually come with the ability to log in to a platform where reports can be published. Examples of Reporting Tools (BA Tools, really) will be covered in a future section¹⁰.

3-Tier Architecture

An enterprise does not only have one single landscape. An enterprise cannot depend on just one because they need a contingency plan when something inevitably breaks. Imagine what will happen to the enterprise if for example, an incorrect configuration was pushed into the system that caused it to crash. Since there is no longer a system to transact to, the whole company's data is at a standstill. To prevent such an accident from occurring, companies will ideally have three of the landscapes: **Development (DEV), Quality Assurance (QAS**, pronounced "kwas") and **Production (PRD**, pronounced "prod", as in the first syllable).

PRD is the most critical of the three, as it contains "live data". It is the system that is used in the day-to-day transactions of the company. A lot of redundancies might be required for this landscape, as it is needed for the proper function of the enterprise. As such, its physical hardware tends to be the most powerful of the three. Downtime for it must be reduced as much as possible due to its operational importance.

DEV, as its name states, is for development purposes. When a new report needs to be created or a change in configuration needs to be made, it should be done here first. If the report runs (data is correct and completes at a timely manner) or the configuration does not result in catastrophic failure, they will be rolled up and applied/promoted to **QAS**. If everything is in order in **QAS** after further testing, that is the only time they will finally be promoted to **PRD**.

¹⁰ Especially in the case of an external team creating a Business Analytics solution, they will provide sufficient training and documentation to the Business Users and EDW Custodians, so the system can be maintained and used in their absence.

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph



These three landscapes does not need to be aligned with regards to data. That is to say, the data in PRD need not be present in DEV for development purposes. However, ideally, all reports, objects and software configurations should match. This is because in a BA environment, as long as a report is properly configured, it will be able to get the updated data as long as the "object" representing that data is present. Also, promotion from **PRD** going back to **QAS** and **DEV** isn't permitted.

Other enterprises has a 4th, off-premises landscape known as **Disaster Recovery (DR)**. This is essentially a copy of **PRD** that is placed separate from the other three landscapes. It will act as a contingency when **PRD** becomes subject to catastrophic failure (usually through accidents and Acts of God). As such, it is important to keep the data between these two aligned, to minimize downtime.

Data Reliability

The one inviolable rule when working with numbers and computers is this: **"Garbage in, Garbage Out"**. Some people say "Numbers don't lie", but that is incomplete, because the veracity of the numbers must be taken to task before calculations are made need to be considered before any definitive statements can be made. This is a constant challenge with Analytics. As the data travels and transforms through the enterprise, something might get lost or unintentionally changed, and tracking down these anomalies will have significant impact on the correctness of the reports being produced. Because if one item is inaccurate, are the other items that came with it also affected? It is for this reason that **Clear Communication** is a must not just within the company, but with everyone involved in a Business Analytics Project. Sometimes these can be easily traced, other times, not so much. The following are just some ways inconsistencies can be introduced:

- Inconsistent Terminology A department might refer to an SKU as a "Product" and another might refer to it as "Material". This extends to more than just the labels. The "Product" department might be using only the first 5 characters of the SKU's Code for their reporting, while the "Material" department might need the whole 20-character string for their own reporting. In that case, both must be present and accounted for.
- 2. Rounding Errors and Truncation Consider the number of decimal places a given piece of numeric data has. As it travels from the Source to the EDW to the Reporting Tool, it will have to be encoded into different formats. Potential side effects include Rounding Errors. This could cause final numbers to deviate from the source.

Data Sou	rce				Reporting	Tool		
Item	Quantity	Price	Sales		ltem	Quantity	Price	Sales
Item A	717	12.456	8930.952		Item A	717	12.46	8933.82
Item B	873	13.764	12015.97		Item B	873	13.76	12012.48
Item C	478	11.332	5416.696	>	Item C	478	11.33	5415.74
Item D	631	9.389	5924.459	\neg	Item D	631	9.39	5925.09
Totals			32288.08	•	Totals			32287.13

As can be seen in the above example, simply rounding the Price column had a significant enough effect that the displayed total has been changed. These are just for four items. Imagine the impact if the whole ERP system was considered! Errors like these are usually given special considerations if the discrepancies can be proven to be from rounding errors.

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph





Truncation will have the same effect (though more pronounced), however, instead of rounding the number, decimal places are outright omitted:

Data Sou	rce				Iruncatio	n		
Item	Quantity	Price	Sales		ltem	Quantity	Price	Sales
Item A	717	12.456	8930.952		Item A	717	12.45	8926.65
Item B	873	13.764	12015.97		Item B	873	13.76	12012.48
Item C	478	11.332	5416.696	>	Item C	478	11.33	5415.74
Item D	631	9.389	5924.459	\neg	Item D	631	9.38	5918.78
Totals			32288.08		Totals			32273.65

Be careful how decimal places are considered.

3. **NULLs and Zeroes** – Null Values represent "nothing". However, in computing, Nulls and Zeroes are considered as different entities. This can have an impact on the evaluation of conditional formulas and averages.

Nulls	Zeroes		Zeroes	
Department	Expenses		Department	Expenses
Purchasing	1000		Purchasing	1000
Sales	2500		Sales	2500
Marketing			Marketing	0
Manufacturing	3000		Manufacturin	ig 3000
Average	2166.667		Average	1625

- 4. Incorrect Inputs this is where the concept of "Garbage In, Garbage Out" is very apparent. While ERP Systems usually have a built-in way to reject incorrect inputs (inputting letters in a field that only accepts numbers), some legacy systems don't have this functionality. Even worse still are the "technically correct" inputs that get accepted but are gibberish (nonsense data and fields left blank that shouldn't be). Data cleanup to ensure consistency is a lot of work, and should only be done as a last resort. The best way to avoid Garbage Inputs is to put policies in place that will ensure correctness.
- 5. Outright Data Discrepancies A company usually has some tactical decisions (particularly marketing) where promos and bundles of their products and services will be joined together, in order to take advantage of a gap in the market or a season, to increase sales. Since the bundles consist of different products, it also has an impact on inventory. In other cases, a trial run of a new product is made available to the market to test its viability. This situation means that a new Item should be present in the ERP in order to reflect their numbers properly. However, because they are a special case that had to be created quickly, they are for internal use only for the departments responsible. These will have to be later pushed into the ERP in order to get a more accurate reading on the enterprise as a whole.

Again, prevention is better than cure. It is always better to prevent an issue from arising in the first place, rather than trying to fix it when it does show up.





Relational Databases and the Star Schema

The Relational Model is the first data model that can be fully described mathematically. All data (fields/columns) is represented in terms of tuples (rows/record), grouped into relations. It is the most common way to store and access enterprise data, as it uses some form of Structured Query Language (SQL).

The usage of primary and foreign keys denote relationships between tables. Data can be obtained from multiple tables to produce one tuple of data by JOINing tables via their keys. SQL, initially pushed as the standard language for relational databases, deviates from the relational model in several places. The current ISO SQL standard doesn't mention the relational model or use relational terms or concepts. However, it is possible to create a database conforming to the relational model using SQL if one does not use certain SQL features.



Storing data obviously takes up space, and the more space needed to store data, the more expensive it is for the enterprise to maintain (mainly, it will need to purchase additional hard drives and other storage media). Take for example the following table:

Transaction ID	Customer ID	Customer Name	Product ID	Product Description	Amount
000001	CU\$0001	Huey Santiago	PROD0001	BKUdon	250
000002	CU\$0001	Huey Santiago	PROD0001	BK Udon	250
000003	CUS0001	Huey Santiago	PROD0001	BK Udon	250
000004	CUS0002	Diana Fajardo	PROD0002	Spam_Musubi 5	50
000005	CUS0002	Diana Fajardo	PROD0003	Coke In Can	70
000006	CUS0002	Diana Fajardo	PROD0004	Kakiage	60

Having to repeatedly state the Customer Name and Product Description after every transaction will take up a lot of space. It is for this reason that these kinds of data are represented by an ID-Description pair to make it easier to create relations and JOIN tables together to save space. The above table can then be expressed as the following:







Instead of just relying on one table to show all of the data, we break it down to three tables. Please note that the names were arbitrarily assigned:

- 1. TXN records all transactions that is encoded into the system.
- 2. CUS_MAS stores all customer information.
- 3. PROD_MAS stores all product information.

If we want to see the name of the customers who bought products, we only need to JOIN the TXN and CUS_MAS tables. This saves space because we don't have to show the customer names all the time in the TXN Table, and allows for more flexible reporting.

The Star Schema

A schema or logical data model is a representation of the abstract structure of domain information. It is often expressed as a diagram, and is used as foundation to designing database structures. There are many different kinds of schemas, but the most-commonly used one in enterprise computing is the Star Schema.

A **Star Schema** is the simplest approach used in designing enterprise datawarehouses. It is comprised of a **Fact Table** (usually just one) referencing any number of **Dimension Tables**.



A **Fact Table** records measurements for a specific event. These are typically referred to as **Transaction Tables** that contain very granular numeric data. In addition to this numeric data (typically

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph



amounts and quantities), it will also contain surrogate keys that define its relationships to many **Dimension Tables**, which contain descriptive data. In an enterprise, an "event" can be any sale that occurs.

A **Dimension Table** by contrast will contain less records than **Fact Tables**. They don't contain transactions, rather, they contain descriptive information like Customer Information, Addresses, Date and Time, etc. The data they contain are sometimes referred to as **Master Data**. In an enterprise, there will be dedicated custodians for this kind of data because they should follow a strict process to add/edit them, as they can change the view of the enterprise data.

In other words, enterprise **measures** can be derived from the fact tables.

Relationships in the schema (**JOIN**ing tables) is dictated by **Keys** within the tables. **Keys** ensure that each row of data within the table is unique. These are typically "ID" columns that automatically increment, the more rows are populated, using some sort of algorithm. They can consist of a single or multiple columns, to ensure uniqueness. **Keys** can also be **Primary** or **Foreign**, depending on the context or view. For example, in the figure below, think of each table as a building, and we are in **F_SALES**. In **F_SALES**, there is the **CUST_ID** column, which is a part of **F_SALES** primary key. The same column name is present in **D_CUSTOMER**. Since we are inside **F_SALES**, we can say that the **CUST_ID** column in **D_CUSTOMER** is a foreign key, and vice-versa. It is important to note that what matters when **JOIN**ing multiple tables is not the name of the columns, but rather their contents. For example, if **CUST_ID** in **F_SALES** contains the "CUST1000" value, then that same value should also be in **CUST_ID** in **D_CUSTOMER**. The names are kept similar so that the Database Administrators and designers will have an easier time maintaining the RDBMS.



Power Bl





CHECK FOR UNDERSTANDING

- 1. What are the three major components of the System Landscape?
- 2. How does data travel in an enterprise so that meaningful reports can be derived?
- 3. Why is an Enterprise Data Warehouse needed?
- 4. What reliability issues would you suspect if there are small numerical discrepancies from one part of the System Landscape to another?





Business Analytics Applications/Tools

Business Analytics Applications are mainly concerned with the Reporting Tools part of the System Landscape. Their main uses are the creation of reports, and the dissemination of such reports. The former is a basic functionality, while the latter is a part of a suite of applications.

Analytics Using Spreadsheets

A Business Analytics tool, at its most basic, should be able to display data in tabular form and enhance presentations with charts, graphs, and other visual elements. To this end, a simple **Spreadsheet** application, like Microsoft Excel, can do the job. It is bare bones and lacks some of the user-friendly features and automation found in dedicated Business Analytics tools, but offers other benefits:

- 1. Due to its ubiquity (Excel in particular), it can be expected to be present in almost any corporate environment.
- 2. Even if it is a little "simplistic" compared to dedicated tools, it is very robust. Good reports can be achieved with **a bit of time and effort**.
- 3. Familiarity with it will help facilitate easier communication with the IT Team when more complex data is needed.
- 4. Dedicated Business Analytics Tools usually have a feature to export their data and/or results into Excel, so that they can be subject to other analyses or offer interoperability between tools, or if the intended recipient has no access to the dedicated tools.

Data visualization and analysis techniques will be discussed in detail on a later topic. This section will be more concerned with walking through Spreadsheet Basics and some time-saving techniques.

Spreadsheet Basics – Workbooks and Worksheets

The main file of a Spreadsheet Application is known as the **Workbook**. When an "Excel File" is mentioned, it is referring to the workbook. A workbook can contain multiple Worksheets. These are individual "tabs" within the workbook that allows for multiple analyses in any one given file.



Spreadsheets work simply by encoding data in individual cells, then processing said data using formulas.



FILE	Н	OME	INSE	ERT P	AGE LAYOUT	FORMULA	s data	REVIEV	/ VIEW					
Paste	👗 Cut 🗎 Co ؇ For	: py ▼ mat Pa	inter	Calibri B I	• 11 <u>U</u> • .	• A A • <u>A</u> •	= = =	⊗r. €≣ 3 ≣	🚏 Wrap Text 🔁 Merge & (Center 🔹	General ♀ % ・	▼ 00. 0.⇒ 0.€ 00.	Conditional Formatting ▼	Format as Table ~
	Clipboa	rd	Ga.		Font	5		Alignn	ient	5	Number	5		
A1	-	:	\times	/ fx	Formula B	ar								
	Α		В	С	D	E	F	G	Н	I	J	K	L	М
1														
2	۱				-									
3					┶	Individual	Cells							
4				_										
5	1													
6														
7	• Cur	rently	Selec	ted										
8	Cel													
9														

Data/Formula is input in the Formula Bar. Input can be triggered by either **Double-clicking the Cell**, or **Selecting the Cell then clicking on the Formula Bar, or Selecting the Cell and typing on the keyboard.**

Spreadsheet Basics – Inputting and Propagating Formulas

A column or row of a spreadsheet typically uses a single, uniform formula for that whole row or column (unless specifically for presentation purposes). Take for example a simple calculation to get the Sales Amount:

	А	В	С	D	
1	ltem	Price	Qty	Amt	
2	Item A	39.53	1,660.00	65,619.80	-

Column A contains the Item Names, Column B their corresponding prices, and Column C their Quantities Sold. To get the Total Amount in Column D, you simply need to multiply the cells in Column B with Column C, resulting in the following formula for Cell D2:



Formulas always need to start with the **equal sign**. To minimize errors when creating formulas, once the equal sign is typed, any cell selected with the mouse will automatically be added into the formula. Note that Spreadsheets have built-in functionality to reject formulas that are syntactically incorrect. Also, PEMDAS order of operations still apply. Now that we have a calculation for a cell in column D, it is time to propagate the formula to the rest of Column D:



ltem	Price	Qty	Amt
Item A	39.53	1,660.00	65,619.80
Item B	69.02	1,771.00	
Item C	94.19	1,491.00	
Item D	69.29	2,652.00	

To do this, Select Cell D2

D2	-	: × 4	<i>fx</i> =	32*C2
	А	В	С	D
1	ltem	Price	Qty	Amt
2	Item A	39.53	1,660.00	65,619.80
3	Item B	69.02	1,771.00	
4	Item C	94.19	1,491.00	
5	Item D	69.29	2,652.00	

Notice the small box on the lower right hand corner of the cell. Move the mouse cursor to it until it turns into a small black cross, then double click. For as long as there is contiguous data on column C, the formula will be propagated until a blank on Column C is encountered (the formula for Cell D3 will become B3*C3, and so on).

A	D2	-	: × -	<i>fx</i> =	32*C2	
		А	В	С	D	
FIK	1	ltem	Price	Qty	Amt	ľ
	2	Item A	39.53	1,660.00	65,619.80	
	3	Item B	69.02	1,771.00	122,234.42	
	4	Item C	94.19	1,491.00	140,437.29	
	5	Item D	69.29	2,652.00	183,757.08	

Alternatively, Cell D2 can be copied, then select Cells D2 to D5, then paste. This can be a little tedious though, if the data set is larger.

Excel is smart enough to retain correct cell references. If, for example, a new column of data has to be input between columns B and C, the formula is automatically adjusted. Also note that cells on other worksheets and other workbooks can be selected and used in formulas. A properly built Excel worksheet can accommodate changes in data without having to re-create or change a formula.

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph

ower Bl



E2	~	: × ~	f _x	=B2*D2	
	А	В	С	D	E
1	ltem	Price		Qty	Amt
2	Item A	39.53		1,660.00	65,619.80
3	Item B	69.02		1,771.00	122,234.42
4	Item C	94.19		1,491.00	140,437.29
5	Item D	69.29		2,652.00	183,757.08

Spreadsheet Basics – Copying and Pasting Cells

When a cell is copied, everything about that cell is copied, with the most obvious aspect being the Formula and the Formatting. However, there will be some instances where only the value of the cell is needed (like when creating a "Summary" worksheet and you don't want other people to see how a number is derived, due to a proprietary/trade secret). In this case, a **Paste Special** functionality is available in order to facilitate this.



Spreadsheet Basics – Functions

Functions allow for easier formulas and extends their abilities beyond just simple arithmetic. These include simply getting sums, cumulative sums, **conditional sums**, averages, conditional statements, and looking up values in a table among others. For Example, instead of adding each cell in column D individually to get the sum, the SUM Function can be used. One benefit of this is that if a new row/s is added between rows 2-5, it will be factored in to the total, as the cell references adjust automatically.

Power Bl



D6	-	: × .,	$f_x = s$	SUM(D2:D5)
	А	В	С	D
1	ltem	Price	Qty	Amt
2	Item A	39.53	1,660.00	65,619.80
3	Item B	69.02	1,771.00	122,234.42
4	Item C	94.19	1,491.00	140,437.29
5	Item D	69.29	2,652.00	183,757.08
6	Total			512,048.59

Sometimes an auto-complete dropdown box appears when typing a formula:

	С	D	E	F	G	Н		J	K	L
-	=i									
	🚱 IF	^	Checks wh	nether a con	dition is met	, and returns	s one value if	TRUE, and a	another valu	e if FALS
	6 IFERROR									
	6 IFNA									
	IMABS									
		Y								
	- C IMARGUM	ENT								
		JAIE								
	MCOSH									
	F IMCOT									
	E IMCSC									
	M IMCSCH	~								

A short	descript	tion	of what	t the f	function	does	also	appears.	. As	the f	ormu	la is	typed	, more	help	text
appears	that sho	ows t	the synt	ax of t	he form	ula be	ing ty	/ped.	N	0			GY	7		

Raw Data Sheet

Before working on data analysis, data should be extracted from its source first. When data is extracted from a Database or ERP system through a query, the result will be **Columnar Data**, that is, data comes in columns, with the very first row containing not data, but column names. It is best to leave this sheet alone, and just do the analyses on separate worksheets. Also, this form of data is going to be the most likely format when data needs to be uploaded back into the ERP or Database, because **Tab-delimited** and **Comma-separated Values** text files also use this format.

The reason for keeping a separate worksheet for the Raw Data is simply for report reusability. If the report layout is fixed and is expected to be delivered at set dates, a properly built workbook that uses the appropriate formulas and functions will only need to update this worksheet, saving a lot of time because the workbook will not have to be rebuilt every single time new/updated data is available.



Groupings

Brand

Brand

Brand

Brand

Brand

Brand

Brand

Brand Brand

Brand

Brand

Brand

Brand Brand

Brand Brand

Brand

Brand

Brand

Brand

Brand

Brand

Brand Brand

Brand

Year	Item Name	Doc. Total
2006	IBM Infoprint 1312	26450
2007	IBM Infoprint 1312	68250
2008	IBM Infoprint 1312	12500
2009	IBM Infoprint 1312	14000
2010	IBM Infoprint 1312	125000
2006	IBM Infoprint 1222	16825
2007	IBM Infoprint 1222	24750
2008	IBM Infoprint 1222	4250
2009	IBM Infoprint 1222	3025
2010	IBM Infoprint 1222	62500
2006	IBM Infoprint 1226	35887.5
2007	IBM Infoprint 1226	39487.5
2008	IBM Infoprint 1226	6000
2009	IBM Infoprint 1226	6150
2010	IBM Infoprint 1226	93750
2006	HP Color Laser Jet 5	31187.5

51062.5

13187.5

156250

22800

88900

4250

8000

125000

11500

Conditional Statements

One of the most common situations that come up with data organization is grouping data. For example, a company needs to segment its customers by the amount of spending to see which of them are the biggest patrons. This information will then be used for promos, special offers, and the like.

2007 HP Color Laser Jet 5

2008 HP Color Laser Jet 5

2009 HP Color Laser Jet 5

2010 HP Color Laser Jet 5

2006 HP Color Laser Jet 4

2007 HP Color Laser Jet 4

2008 HP Color Laser Jet 4

2009 HP Color Laser Jet 4

2010 HP Color Laser Jet 4

		А	В	С	
A	1	Customer	Spend	Classification	
	2	Jensen Gunnar	36,765.00		
	3	Chana Lorita	73,304.00		
r i k	4	Rikki Bartolomej	46,343.00		UGY
	5	Ariadna Jamie	13,937.00		
	6	Candyce Hyginus	81,811.00		
	7	Emelia Aton	49,192.00		
	8	Sinem Jaynie	87,204.00		
	9	Itsasne Borghildr	67,315.00		
	10	Percival Yissakhar	55,935.00		
	11	Maiara Gayelord	28,819.00		
	12	Alison Yevpraksiya	53,177.00		
	13	Nebuchadnezzar Hanna	66,046.00		
	14	Pearl Praveen	18,344.00		
	15	Arti Maristela	21,657.00		
	16	Ferdi Pratik	62,486.00		
	17	Tomas Erkin	89,506.00		
	18	Baldur Emilia	71,390.00		
	19	Ananta Leofflæd	14,455.00		

At the moment, there are only two classifications: if a Customer is spending more than 50,000 he is classified as a Top Spender, otherwise, he is a low spender. Doing this manually is tedious and error-

Power BI



prone, particularly when there are hundreds or thousands of records that need to be sorted out. To easily do this, the **IF-THEN-ELSE Construct** is used. The **IF-THEN-ELSE Construct** tests a condition, then decides on a course of action whether the condition is true or not.

			Conditi	on Value	e if True	Value if False
C2	• E 🗙	$\checkmark f_x$	=IF(B2>	50000, "Top S	pender", "Lo	ow Spender")
	А		В	С	D	E
1	Customer	Spe	nd C	Classification		
2	Jensen Gunnar	36	,765.00	Low Spender		

Once the formula is set, it's just a matter of propagating it (note that to denote and return words and text values, the value if true/false should be inside quotations):

		A	B	C
	1	Customer	Spend	Classification
	2	Jensen Gunnar	36,765.00	Low Spender
	3	Chana Lorita	73,304.00	Top Spender
	4	Rikki Bartolomej	46,343.00	Low Spender
	5	Ariadna Jamie	13,937.00	Low Spender
	6	Candyce Hyginus	81,811.00	Top Spender
	7	Emelia Aton	49,192.00	Low Spender
	8	Sinem Jaynie	87,204.00	Top Spender
	9	Itsasne Borghildr	67,315.00	Top Spender
	10	Percival Yissakhar	55,935.00	Top Spender
	11	Maiara Gayelord	28,819.00	Low Spender
	12	Alison Yevpraksiya	53,177.00	Top Spender
	13	Nebuchadnezzar Hanna	66,046.00	Top Spender
	14	Pearl Praveen	18,344.00	Low Spender
	15	Arti Maristela	21,657.00	Low Spender
	16	Ferdi Pratik	62,486.00	Top Spender
	17	Tomas Erkin	89,506.00	Top Spender
	18	Baldur Emilia	71,390.00	Top Spender
	19	Ananta Leofflæd	14,455.00	Low Spender
FIRST		NTE		\mathbb{N} (0)

However, sometime in the future, as the business grows, there will be more and more customers and further segmentation will be needed: if a customer spends less than 30,000 he will be a Low Spender. Greater than 80,000 is a Top Spender. Anything not covered by the first two conditions will be Mid Spenders. To do this, the formula from before will need to be changed and expanded. For more complex conditions (two or more conditions resulting in different outcomes), the **NESTED IF Construct** is used. This means that another **IF-THEN-ELSE construct** can be used in the Value if False part of the formula (note the parentheses):



ower Bl



	А	В	С
1	Customer	Spend	Classification
2	Kiyoko Lamya	91,670.00	Top Spender
3	Sari Demir	34,442.00	Mid Spender
4	Miléna Ernesta	70,722.00	Mid Spender
5	Luba Stigr	91,927.00	Top Spender
6	Calixtus Nephele	76,225.00	Mid Spender
7	Xeno Severin	40,030.00	Mid Spender
8	Malik Tonka	18,409.00	Low Spender
9	Naz Ferdinanda	71,349.00	Mid Spender
10	Vita Xquenda	97,709.00	Top Spender
11	Mandlenkosi Ioana	59,664.00	Mid Spender
12	Octávio Rajib	62,115.00	Mid Spender
13	Chandrakant Aubrie	53,973.00	Mid Spender
14	Zlatan Ælfnoð	87,223.00	Top Spender
15	Zselyke Tarmo	20,644.00	Low Spender
16	Utu Zavanna	80,948.00	Top Spender
17	Nirmal Sa'd	72,424.00	Mid Spender
18	Titus Leonard	50,471.00	Mid Spender
	e de la construcción de la constru		

Note that conditional statements are also integral to Dedicated Business Analytics tools. Their Syntax might differ, but the base concept is the same: **Test Condition**, do one thing if true, do another thing if false.

Lookup Values and Locking Cell References

Consider the previous example. Another column after Classification needs to be added to our data. In addition to the Top/Mid/Low Spender classes, a numeric code needs to be assigned to them as well: 10 for Top, 20 for Mid, 30 for Low. Another Nested If construct can be used, but in real life, these classifications can eventually number in the tens, hundreds, and thousands. In addition, maintaining a Nested If construct can be a grueling process, especially every time a new classification gets added. For a bit of an easier time doing this, the **VLOOKUP Function** will be used:

		Α	В	С	D	E	F	G
	1	Customer	Spend	Classification	Class Code		Classification	Class Code
	2	Kiyoko Lamya	91,670.00	Top Spender			Top Spender	10
	3	Sari Demir	34,442.00	Mid Spender			Mid Spender	20
	4	Miléna Ernesta	70,722.00	Mid Spender			Low Spender	30
	5	Luba Stigr	91,927.00	Top Spender				
	6	Calixtus Nephele	76,225.00	Mid Spender				
	7	Xeno Severin	40,030.00	Mid Spender				
	8	Malik Tonka	18,409.00	Low Spender				
	9	Naz Ferdinanda	71,349.00	Mid Spender				
	10	Vita Xquenda	97,709.00	Top Spender				
	11	Mandlenkosi Ioana	59,664.00	Mid Spender				
	12	Octávio Rajib	62,115.00	Mid Spender				
	13	Chandrakant Aubrie	53,973.00	Mid Spender				
	14	Zlatan Ælfnoð	87,223.00	Top Spender				
	15	Zselyke Tarmo	20,644.00	Low Spender				
	16	Utu Zavanna	80,948.00	Top Spender				
	17	Nirmal Sa'd	72,424.00	Mid Spender				
	18	Titus Leonard	50,471.00	Mid Spender				

Another table is created containing the classification and corresponding code (ideally the other table is not in the same sheet as the raw data). Then the **VLOOKUP Function** is created on Cell D2:





ower Bl

			this table	e/group of c	ells					
	Value to Look for If the value is found, how many column corresponding value?									
D2 \cdot : \times f_x =VLOOKUP(C2,F2:G4,2,0) $-$ 0 denotes to look for										
	А	В	С	D	exact mate	F	G			
1	Customer	Spend	Classification	Class Code		Classification	Class Code			
2	Kiyoko Lamya	91,670.00	Top Spender	10		Top Spender	10			
3	Sari Demir	34,442.00	Mid Spender			Mid Spender	20			
4	Miléna Ernesta	70,722.00	Mid Spender			Low Spender	30			
г	Links Catsu	04 007 00	T C							

If the value is not found in the lookup table, the function returns an #N/A:

	Α	В	С	D	E	F	G
1	Customer	Spend	Classification	Class Code		Classification	Class Code
2	Kiyoko Lamya	91,670.00	Top Spenderr	#N/A		Top Spender	10
3	Sari Demir	34,442.00	Mid Spender			Mid Spender	20
4	Miléna Ernesta	70,722.00	Mid Spender			Low Spender	30

Unlike the previous example, however, the formula can't be propagated without any changes:

	D2	• : × ·	√ <i>f</i> x =\	LOOKUP(C2,F2	:G4,2,0)			
		А	В	С	D	Е	F	G
	1	Customer	Spend	Classification	Class Code		Classification	Class Code
	2	Kiyoko Lamya	91,670.00	Top Spender	10		Top Spender	10
	3	Sari Demir	34,442.00	Mid Spender	20		Mid Spender	20
	4	Miléna Ernesta	70,722.00	Mid Spender	#N/A		Low Spender	30
	5	Luba Stigr	91,927.00	Top Spender	#N/A			
	6	Calixtus Nephele	76,225.00	Mid Spender	#N/A			
5	7	Xeno Severin	40,030.00	Mid Spender	#N/A			
	8	Malik Tonka	18,409.00	Low Spender	#N/A			
	9	Naz Ferdinanda	71,349.00	Mid Spender	#N/A			
	10	Vita Xquenda	97,709.00	Top Spender	#N/A			
	11	Mandlenkosi Ioana	59,664.00	Mid Spender	#N/A			
	12	Octávio Rajib	62,115.00	Mid Spender	#N/A			
	13	Chandrakant Aubrie	53,973.00	Mid Spender	#N/A			
	14	Zlatan Ælfnoð	87,223.00	Top Spender	#N/A			
	15	Zselyke Tarmo	20,644.00	Low Spender	#N/A			
	16	Utu Zavanna	80,948.00	Top Spender	#N/A			
	17	Nirmal Sa'd	72,424.00	Mid Spender	#N/A			
	18	Titus Leonard	50,471.00	Mid Spender	#N/A			

What happened? Select Cell D3, and click on the formula bar:



SU	м – і 🗙	✓ fx =∨	/LOOKUP <mark>(C3,F3</mark>	:G5,2,0)			
	A	В	С	D	Е	F	G
1	Customer	Spend	Classification	Class Code		Classification	Class Code
2	Kiyoko Lamya	91,670.00	Top Spender	10		Top Spender	10
3	Sari Demir	34,442.00	Mid Spender	3:G5,2,0)		Mid Spender	20
4	Miléna Ernesta	70,722.00	Mid Spender	#N/A		Low Spender	30
5	Luba Stigr	91,927.00	Top Spender	#N/A			
6	Calixtus Nephele	76,225.00	Mid Spender	#N/A			

Because of the way the propagation works, even the references for the lookup table moved, and it will only get worse the further down we go. To counteract this, the references of the Lookup Table must be **Locked In** before the formula is propagated. To lock cell references and prevent them from moving when a formula is propagated, simply add a **\$** sign to the cell reference in the formula:

\$F3	Locks the Column	
F\$3	Locks the Row	
\$F\$3	Locks the Cell	
-		

The **\$** sign can be typed into the formula, or by pressing F4 on the keyboard to cycle through the configuration when the cursor is on the cell reference.

	D2		\times	s fx	=VLOOK	UP(C2,F2:	G4,2,0)	
		А		В	Select th	eCell	D	
	1	Customer		Spend	Class	ification	Class Cod	e
\wedge	2	Kiyoko Lam	ya	91,670.	.00 Top S	pender	1	.0
	3	Sari Demir		34,442.	00 Mid S	pender	2	0
Click on the form bar and select Ce								_
						Clic bar	k on the f	formu t Cell
SU	M	• X	🖌 fx	=VLOO	KUP(C2,F2	Clic bar 2:G4,2,0)	k on the f	formu :t Cell
SU	M	• : X	✓ fx B	=VLOO	KUP(C2,F2	Clic bar 2:G4,2,0) Ip_value, t a	k on the f	formu ct Cell
SU 1	M	· · · · · · · · · · · · · · · · · · ·	✓ fx B Spend	=VLOO VLOO Class	KUP(C2,F2 DKUP(looku ssification	Clic bar 2:G4,2,0) Ip_value, ta Class Co	and select and select able_array,	formu c Cell
SU 1 2	M Custom Kiyoko	- : X A her Lamya	✓ <i>f</i> _x B Spend 91,670	=VLOO VLOO Clas	KUP(C2,F2 DKUP(looku sification Spender	Clic bar 2:G4,2,0) Ip_value, ta Class Coo (UP(C2,F	k on the f and selec able_array, de 2:Q	t Cell
SU 1 2 3	M Custom Kiyoko Sari Der	▼ : × A her Lamya mir	 ✓ fx B Spend 91,670 34,442 	=VLOO VLOO Clas 0.00 Top 2.00 Mid	KUP(C2,F2 DKUP(looku sification Spender Spender	Clic bar 2:G4,2,0) p_value, ta Class Co (UP(C2,F	k on the f and selec able_array, de 2:G 20	formu st Cell





							Pre	ess F4		
		SU	м -	: X	✓ fx	=V	LOOKU	P(C2.SFS2	:G4.2.0)	
				^	P					
		1	Customer	4	Spend	_	Classifi	P(lookup_	value, table_	
		2	Kivoko La	mva	91.670	.00	Top Sp	ender (C	2.\$F\$2:G4	
		3	Sari Demir		34,442	.00	Mid Sp	ender	20	
		٨	Milána Er	a a a ta	, ררד חד	00	Mid Co	andar 📕	4NI/A	
								Do the s	ame for G	4
	SUN	N	•	\times	✓ f _x	=\	VLOOK	UP <mark>(C2,\$</mark> I	\$2:\$G\$4	2,0)
			A		В		VLOOK	(UP(look)	ip value ta	ble a
	1	Cus	tomer		Spend	_	Class	ification	Class Cod	le
	2	Kiyo	oko Lamv	а	91,670	.00	Top S	pender	\$2:\$G\$4.	2,0
	3	Sar	i Demir		34,442	.00	Mid S	ipender		20
	4	Mil	éna Ernes	ta	70,722	.00	Mid S	pender	#N/A	_
	C	іЬ	o Ctior		01 017	00	Top	nondor	#N1/A	
en the formula ca	n be	pro	opagated	:						
	4		A		В			С	D	_
	1	С	ustomer		Spend		Class	ification	Class Cod	e
	2	K	iyoko Lam	iya	91,670	0.00	Top S	spender	1	0
	3	Sa	ari Demir		34,442	2.00	Mid S	pender	2	0
\wedge	4	N	Illéna Erne	esta	70,722	2.00	Mid S	pender	2	0
A	5	L	uba Stigr		91,92	1.00	Top S	pender	1	
	6	C	alixtus Ne	phele	/6,225	5.00	Mid S	pender	2	0
FIR	/	X	eno Sever	in -	40,030	J.00	Mid S	pender	2	
	8		alik Tonk	a	18,409	9.00	LOW	spender	3	0
	9		az Ferdina	anda	/1,349	9.00	IVIId S	pender	2	0
	10	V	ita xqueno	ai ta	97,709	9.00	TOP S	pender	1	0
	11		landlenko	si loana	59,664	4.00	Mid S	pender	2	0
	12		ctavio Raj		62,115	5.00	Mid S	pender	2	0
	13	5 C	handrakar	nt Aubrie	53,973	3.00	Mid S	pender	2	0
	14	∔ ZI 	latan Ælfn	00	87,223	3.00	Top S	spender	1	0
	15	Z	selyke Tar	mo	20,644	4.00	Low	Spender	3	0
	16	b U	tu Zavann	а	80,948	3.00	Top S	pender	1	0
	17		irmal Sa'd	•	72,424	1.00	Mid S	pender	2	0
	- 18	3 Ti	itus Leona	rd	50,471	1.00	Mid S	pender	2	0

Depending on how the data is organized, **HLOOKUP** might be needed (Lookup Values in the table horizontally). Another way is to use **INDEX** alongside the **MATCH** Function.



Formula Evaluation

There are times when we are handed a large Excel File with huge, sprawling formulas. Sufficient documentation about what formulas do what and in what order is hard to come by, and the only Expert is on Leave. To help with figuring out what the formulas do, Excel has a built-in function known as Formula Evaluation, under the Formulas Ribbon.

FILE	HOME	INSERT	PAGE LAYC	UT1	FORMULA	S DATA	REVI	EW VIEV	N						
fx Insert Function	AutoSum	Recently Fina Used ~	ancial Logica	A I Text	Date & Time *	Lookup & Reference *	θ Math & Trig *	More Functions *	Name Manager	\bigcirc Define Name ▼ \neg Use in Formula ▼ \square Create from Selection	값 Trace Precedents . 값 Trace Dependents . 값 Remove Arrows 2 .	 Mage Show Formulas ✓● Error Checking ⑥ Evaluate Formula 	Watch Window	Calculation Options *	Calculate Now
			Functi	on Librar	y					Defined Names	Form	mula Auditing			Calculation

This functionality will let the user see step-by-step how a formula arrives to its final value for any given cell.







Evaluate Formula		?	×
Reference:	E <u>v</u> aluation:		
Sheet1!\$D\$2	= 10		^
			×
To show the result of the	underlined expression, click Evaluate. The most recent result appears italicized.		
	Restart Step In Step Out	<u>C</u> los	se .

Notice how on each step, the underlined section gets evaluated first. That is how you can get an idea on how the order of operation goes.

Rapid Prototyping

There are times when Business Users will need to ask IT for help when it comes to data, especially if that data is unavailable. This is in addition to the creation of data that can be used to illustrate KPI's on new report prototypes. Other times still, report Proof-of-Concepts is needed by Managers. For these types of activities, we will use all we learned from the previous sections.

First, decide on the type of data needed, then create a columnar format of this data, populating the first row with the column names. Next, populate the columns. Text data like Customer Names and Items (usually the lowest, most detailed data) usually also need to be grouped. Consider the following:

\wedge		Α	В	С	D	E	F
	1	Item Group	Item Code	Item Name	Month	Week	Sales
2 1	2						
	2						

We will want to create a report prototype that will display the weekly Sales of each Item Group, but will need to be able to drill down to the individual item level if need be. The Monthly Totals should also be visible when needed. It has been decided that for the prototype, the months for the first Quarter of the Year (January to March) will be enough, with each month having data for four weeks. For this exercise, we will make 10 items. First, assign the weekly designation:

	А	В	C	D	E	F
1	Item Group	Item Code	Item Name	Month	Week	Sales
2					1	
3					2	
4					3	
5					4	

Next, assign the Month.



	А	В	С	D	E	F
1	Item Group	Item Code	Item Name	Month	Week	Sales
2				1	1	
3				1	2	
4				1	3	
5				1	4	

Repeat this sequence, but increment it for each month.

	Α	В	C	D	E	F
1	Item Group	Item Code	Item Name	Month	Week	Sales
2				1	1	
3				1	2	
4				1	3	
5				1	4	
6				2	1	
7				2	2	
8				2	3	
9				2	4	
10				3	1	
11				3	2	
12				3	3	
13				3	4	

Now we have all the data required for one Item, so assign an Item Code and an Item Name for this block of data.


	А	В	С	D	E	F
1	Item Group	Item Code	Item Name	Month	Week	Sales
2		A100000	Special Homey Lomi	1	1	
3		A100000	Special Homey Lomi	1	2	
4		A100000	Special Homey Lomi	1	3	
5		A100000	Special Homey Lomi	1	4	
6		A100000	Special Homey Lomi	2	1	
7		A100000	Special Homey Lomi	2	2	
8		A100000	Special Homey Lomi	2	3	
9		A100000	Special Homey Lomi	2	4	
10		A100000	Special Homey Lomi	3	1	
11		A100000	Special Homey Lomi	3	2	
12		A100000	Special Homey Lomi	3	3	
13		A100000	Special Homey Lomi	3	4	
		1				

Assign Sales Figures. To create a consistent random sales figure, uses the **RANDBETWEEN** function. **RANDBETWEEN** selects a random integer between a stated low and high figure.

	F2	· ·	$\times \checkmark$	<i>fx</i> =RANDBETWEE	EN(1000,50	00)	
		А	В	С	D	Е	F
	1	ltem Group	Item Code	Item Name	Month	Week	Sales
	2		A100000	Special Homey Lomi	1	1	4084
	- v						
Λ		А	В	С	D	E	F
A	1	Item Group	Item Code	Item Name	Month	Week	Sales
	2		A100000	Special Homey Lomi	1	1	4365
5	3		A100000	Special Homey Lomi	1	2	2320
	4		A100000	Special Homey Lomi	1	3	2922
	5		A100000	Special Homey Lomi	1	4	4516
	6		A100000	Special Homey Lomi	2	1	2042
	7		A100000	Special Homey Lomi	2	2	2958
	8		A100000	Special Homey Lomi	2	3	3511
	9		A100000	Special Homey Lomi	2	4	2471
	10		A100000	Special Homey Lomi	3	1	3007
	11		A100000	Special Homey Lomi	3	2	1498
	12		A100000	Special Homey Lomi	3	3	4621
	13		A100000	Special Homey Lomi	3	4	4069

Propagating the formula will change the value in Cell F2. This is due to the **RANDBETWEEN** function. Copy this whole block of Cells (B2 to F13) then paste below it, but assign different Item Codes until we have 10 items. **To lock in the values, copy the cells, then paste as value** (this can be done last, after making entries for all the items). It is important that no **RANDBETWEEN** formulas be left behind when done. Using varying bottom and top values will allow for simulation of different sales figures.

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph

Power Bl



	Α	В	С	D	E	F	
1	Item Group	Item Code	Item Name	Month	Week	Sales	
2		A100000	Batangas Lomi	1	1	3984	
3		A100000	Batangas Lomi	1	2	4618	
4		A100000	Batangas Lomi	1	3	4427	
5		A100000	Batangas Lomi	1	4	2393	
6		A100000	Batangas Lomi	2	1	3442	
7		A100000	Batangas Lomi	2	2	1119	
8		A100000	Batangas Lomi	2	3	3429	
9		A100000	Batangas Lomi	2	4	4987	
10		A100000	Batangas Lomi	3	1	4440	
11		A100000	Batangas Lomi	3	2	2164	
12		A100000	Batangas Lomi	3	3	3614	
13		A100000	Batangas Lomi	3	4	2531	
14		A100001	Chicken Mami	1	1	1979	
15		A100001	Chicken Mami	1	2	1846	
16		A100001	Chicken Mami	1	3	3655	
17		A100001	Chicken Mami	1	4	2282	
18		A100001	Chicken Mami	2	1	1181	
19		A100001	Chicken Mami	2	2	1121	
20		A100001	Chicken Mami	2	3	3786	
21		A100001	Chicken Mami	2	4	3176	
22		A100001	Chicken Mami	3	1	3773	
23		A100001	Chicken Mami	3	2	2448	
24		A100001	Chicken Mami	3	3	4683	
25		A100001	Chicken Mami	3	4	1849	
26		A100002	Special Pancit	1	1	1730	
27		A100002	Special Pancit	1	2	3161	
28		A100002	Special Pancit	1	3	3665	
29		A100002	Special Pancit	1	4	3380	
30		A100002	Special Pancit	2	1	4395	

Next, assign an Item Group. This can be hard coded, but to simulate real life usage, where items are seemingly grouped randomly at first glance, we will be creating a lookup table (although as illustrated previously, **Conditional Constructs** can also be used).

	- I	J	К	L	
	Item Group	Item Code	Item Name		
		A100000	Batangas Lo	mi	
		A100001	Chicken Mar	ni	
		A100002	Special Panc	it	
		A100003	Goto Lugaw		
		A100004	Pork with To	ofu	
		A100005	Beef Pares		
$A \cup$		A100006	Fried Siomai		
		A100007	Bulalo		
FIRST_		A100008	Chopsuey		G
		A100009	Chicken and	Pork Adobo	<u> </u>

Use **RANDBETWEEN Function** to make three groupings:



I	J	К
Item Code	Item Group	Item Name
A100000	2	Batangas Lomi
A100001	2	Chicken Mami
A100002	1	Special Pancit
A100003	1	Goto Lugaw
A100004	3	Pork with Tofu
A100005	1	Beef Pares
A100006	1	Fried Siomai
A100007	3	Bulalo
A100008	3	Chopsuey
A100009	1	Chicken and Pork Adobo

Next, use the VLOOKUP Function to assign the item group in our main table:

A2	-	:	\times
----	---	---	----------

fx =VLOOKUP(B2,\$I\$2:\$K\$11,2,0)

С F Α В D Е Item Group Item Code Item Name Week Month 1 Sales 2 2 A100000 **Batangas** Lomi 1 1 3984 3 **Batangas** Lomi A100000 1 2 4618 4 A100000 Batangas Lomi 3 4427 1

Power BI



	Α	В	С	D	E	F	
1	Item Group	Item Code	Item Name	Month	Week	Sales	
2	2	A100000	Batangas Lomi	1	1	3984	
3	2	A100000	Batangas Lomi	1	2	4618	
4	2	A100000	Batangas Lomi	1	3	4427	
5	2	A100000	Batangas Lomi	1	4	2393	
6	2	A100000	Batangas Lomi	2	1	3442	
7	2	A100000	Batangas Lomi	2	2	1119	
8	2	A100000	Batangas Lomi	2	3	3429	
9	2	A100000	Batangas Lomi	2	4	4987	
10	2	A100000	Batangas Lomi	3	1	4440	
11	2	A100000	Batangas Lomi	3	2	2164	
12	2	A100000	Batangas Lomi	3	3	3614	
13	2	A100000	Batangas Lomi	3	4	2531	
14	2	A100001	Chicken Mami	1	1	1979	
15	2	A100001	Chicken Mami	1	2	1846	
16	2	A100001	Chicken Mami	1	3	3655	
17	2	A100001	Chicken Mami	1	4	2282	
18	2	A100001	Chicken Mami	2	1	1181	
19	2	A100001	Chicken Mami	2	2	1121	
20	2	A100001	Chicken Mami	2	3	3786	
21	2	A100001	Chicken Mami	2	4	3176	
22	2	A100001	Chicken Mami	3	1	3773	
		et I					

We now have a prototype for our RAW Data. Further analyses can then be done on other sheets based off it. This data can be extended by adding more Item Codes (appended at the bottom), span more months, and by adding more date/time dimensions such as Year and Day of Month. Other columns such as a **Customers Column** will allow a simulation of transactions to show who bought what.

Macros and Add-ins

Macros are programming constructs that allow certain actions to be done automatically and repeatedly. In Excel, macros can be recorded and/or programmed manually using the built-in developer tools. The programming language used is VBA. To access the Macros, the **Developer Ribbon** must be enabled. Add-ins are additional code that extends the functionality of Excel (some Business Analytics Tools use Add-ins to allow smooth integration with Microsoft's Office Suite). Note that for the purposes of this course, Macros and Add-ins are not going to be discussed beyond this point. It is included here to illustrate the fact that they are another option because they have a way different scope, and programming is an altogether different skillset.



I	FILE HO	DME INSER	T PAGE LAYOUT	FORMULAS DATA	REVIEW VIE	EW	DE	VELOPER	1				
Vi: Ba	sual Macros	Record Ma Dse Relativ Macro Sec Code	re References urity	s COM Add-Ins dd-Ins C	Properties	9	Source	Map F	Properties Ision Packs Sh Data XML	Export	Docum Pane Modi	hent el	
Ν	12 🔹	: × 🗸	f_x										
	А	В	С	D	E		F	G	н	1	J	К	
1	PLA	N WIZARD	USE THIS SHEET	TO ADD PLANS									
3	Group												
4	Select Type	of Plan:	Composite Group										
5													
6	Plan Name	Carrier Name	Plan Number	In-Network Deductible	Coinsurance %	Coj	pay	Max OoP	Benefits				
7	BCBSGa PO	BCBSGa	POS 4000/30%/6350	\$4,000 / \$8,000	70% / 60%	\$35	5 / \$50	\$6,350 / \$	\$250 Ded	- \$15 / \$35	/ \$70 / 25	5% Max \$2	250
8							_						
9	Composit	e Plan Rates		Composite Pla	n Rates		Clic	k me to Ar	d the	3			
11	Coverage Tier	Rate		Age	Rate		Chic	plan!	ad the				
12		2		1	1			-					
13	EE	1		2	1								
14	ES	1		3	1			Click me t					
15	EC	1		4	1		Alph	abetize th	e Plans				
16	FAM	1		5	1		in t	he Drop-de	owns!				
17				6	1								
18				7	1								
19	1			1 8	1 1	1							

- 1. The developer ribbon will allow access to Macros (this is not enabled by default).
- 2. Macros, at its most basic, will allow basic actions to be repeated via a custom keyboard shortcut. Recording macros help with this.
- 3. Custom buttons were added. Whenever a button is pressed, the attached macro is executed.

Aicrosoft Visual Basic	or Applica	tions - 20141126 - UAT v0.2.xlsm [design]					-	×
Eile Edit View Insert	Format	Debug Run Tools Add-Ins Window Help						
N	5 48 9	🖭 🕨 🗉 🚾 🤡 🐨 🐨 🕫 🕼 Ln 1, Col 1						
Project - VBAProject	-							
	2014	1126 - UAT v0.2.itism - Sheet17 (Code)						
E Sheett (Det a	Plan	Nonatata (Atua)	T-Bab.					
Sheet10 (Pl.	E	1 20141126 - LIAT v0.2 vism - Sheet1 (Code)						
Sheet11 (Pl	1 In	CirBianks	- Click			<u> </u>		
- E Sheet13 (CC	E	Drivate Sub ClaPlanks Click()				-		
- E Sheet14 (CC	1	ClearBlanks			<u>^</u>			
- E Sheet16 (CC	E	End Sub						
Sheet17 (PL	1	Brinster Bub GetBerBetell (1) ob()						
	F	TotFam						
- 🗑 Sheet4 (Plai		End Sub						
Sheet5 (Plai								
< >		Private Sub PopSum_Click()						
Properties - PonSum		End Sub						
PopSum CommandButton -		Private Sub Worksheet_SelectionChang	e(ByVal Target As Range)					
Alphabetic Categorized		Dim 1200m AS Long						
(Name) PopSum		Dim 1DVType As Long						
AutoLoad False		lZoom = 70						
AutoSize False		1ZoomDV = 120						
BackColor BackStyle 1 - fmBackStyle		IDVIYDe = 0						
Caption Generate Sun		Application.EnableEvents = False						
Enabled True		On Error Resume Next						
Font Calibri		lDVType = Target.Validation.Type						
Height 56.4		On Error GoTo errHandler						
Left 1448.4		If 1DVType <> 3 Then				*		
Locked True MouseIron (None)	L	With ActiveWindow				▶ //.		
MousePointer 0 - fmMouseF	10	It .Zoom <> 1Zoom Then			- 1			
Picture (None)		≥≡ (▶ <i>I</i> ii			
PicturePosition 7 - fmPicturel								
PrintObject True								
Shadow False								
TakeFocusOnC True								

Power Bl



CHECK FOR UNDERSTANDING

For the following exercises, use the <u>Excel Rapid Sample.xlsx</u> workbook.

1. Create a copy of Sheet 2 and Rename it into "RAW DATA TX"

24	۷	HIDDOOT	CHICKEH Mathi						
25	2	A100001	Chicken Mami						
26	1	A100002	Special Pancit						
27	1	A100002	Special Pancit						
28	1	A100002	Special Pancit						
29	1	A100002	Special Pancit						
30	1	A100002	Special Pancit						
2.4			a 1 I a 1						
-	Sheet2 RAW DATA TX +								
READ	READY								
-									

2. In the RAW DATA TX Work Sheet, Change "Item Group" column name to "Item Group Code", then add a Column Beside it. Name it Item "Group Name".

	А	В	С	D	E	F	G
1	Item Group Code	Item Group Name	Item Code	Item Name	Month	Week	Sales
2	2		A100000	Batangas Lomi	1	1	3984
3	2		A100000	Batangas Lomi	1	2	4618
4	2		A100000	Batangas Lomi	1	3	4427

3. Assign the following Item Group Names:

		Item Group Code	Item Group Name	
		1	Everyday Specials	
Δ		2	Noodle Dishes	Ņ
		3	Beef and Veggies	
	RGT			

- 4. Add a new column beside Month. Name it Month Name and assign the correct values.
- 5. Create a new Worksheet. Name it "Summary".
- 6. In the Summary Sheet, create tables that will display the following:
 - a. The total sales for each month
 - b. The Monthly total sales for each Item
 - c. The total sales for each Item Group
 - d. <u>THE FORMULAS MUST BE ABLE TO ACCOMMODATE NEW INSERTED ROWS</u> <u>AUTOMATICALLY</u>

• BONUS POINT INCENTIVES:

• Add a single line of data for a new month at the bottom of RAW DATA TX for item A100000:

160	-	Everyddy opeeldio	1100000	CHICKCH WHAT OTK MUODO	<u> </u>	indi chi		LLLU
121	1	Everyday Specials	A100009	Chicken and Pork Adobo	3	March	4	4446
122	2	Noodle Dishes	A100000	Batangas Lomi	4	April	1	1000

• The totals for 6c should automatically reflect this change.



• Add two charts that will show the contribution of each month to the total sales, and a comparison of each product's performance.

		А	В	С	E	F	G	Н	
	1	MONTHLY SUM	MARY		Ť –	MONTHLY TOTALS PE			
	2	Month	Sales		ITEM CODE	ITEM NAME	Month	Sales	6B
	3 Janua	ry	118,284.00				January	15,422.00	
	4 Febru	ary	111,461.00	6A	A100000	Batangas Lomi	February	12,977.00	
	5 Marc	า	130,828.00				March	12,749.00	
	6 Gran	d Total:	360,573.00				January	9,762.00	
	7				A100001	Chicken Mami	February	9,264.00	
	8	PER ITEM GRO	DUP				March	12,753.00	
	9	ltem Group	Sales	6C			January	11,936.00	
	10 Every	day Specials	183,748.00		A100002	Special Pancit	February	12,445.00	
	11 Nood	e Dishes	73,927.00				March	14,749.00	
	12 Beef	and Veggies	103,898.00				January	12,026.00	
	13 Grane	l Total:	361,573.00		A100003	Goto Lugaw	February	11,361.00	
	14						March	16,491.00	
	15						January	15,196.00	
	16				A100004	Pork with Tofu	February	8,298.00	
	17						March	10,773.00	
	18						January	10,315.00	
	19				A100005	Beef Pares	February	11,747.00	
	20						March	13,450.00	
	21					Fried Siomai	January	9,494.00	
	22				A10006		February	10,765.00	
	23						Iviarch	12,391.00	
	24				4100007	Pulala	January	12,589.00	
	25				A100007	Duialo	March	13 856 00	-
	27						lanuary	11 167 00	
	28				A100008	Chopsuey	February	9 858 00	
	29						March	10 750 00	
	30						January	10.377.00	-
	31				A100009	Chicken and Pork Adobo	February	13.335.00	-
	32						March	12,866.00	
	33					GRAND TOTAL:		360,573.00	
	34								•
	35								
	26	Shoot2			ummany [
			NAW DATA		buillinary	_ (+)			
	$\mathbf{\nabla}$								
TIP: Use the other of the	option	s in the HOI	VIE Ribbo	on to h	elp with	<u>formatting</u>			
FILE HOME INSERT PAGE LAYOUT	FORMULAS	DATA REVIEW VIEW							Sign in 🔍
Calibri 11	• A A =	🛛 🔤 🗞 - 📑 Wrap Text	General		Norm	al Bad Good			Fill * Sort & Find &
v v Format Painter B I U v ⊞ v ≤	<u>- A -</u> ≡ :	= = € = ₹ 🖽 Merge & Ce	enter * 🛂 * % *	50 +50 Formatt	ing * Table *	Calculation Check Ce	v inser	v v	Clear * Filter * Select *
ciippdard 🕫 Font	5	Alignment	G Number	6		styles		Cells	Eating ^

NOTE: The Bonus Incentives will use features that were intentionally NOT discussed in the previous topics.





As good a tool Excel is, it has some shortcomings, two of which have huge operational implications on data accuracy and timely reporting.

First, to get data into a spreadsheet will require a few intermediary steps until the data becomes available. For example, something as simple as extracting data from ERP then pasting it to the Raw Data sheet can present data accuracy concerns, because the extracted data (either as a text file or an Excel File) could be tampered with prior to its input to the Raw Data Sheet.

Next, to get the report to its intended recipients with updated data. While updating a well-built spreadsheet is just a simple case of pasting new data in the Raw Data Sheet, it will still require human intervention. Not to mention, the report will have to be manually sent through e-mail as an attachment. In case of an emergency, neither can be done because the resource/report developer is not available. He may be on vacation or is currently handling a personal emergency.

Dedicated Business Analytics Tools answer these two concerns and offer much more additional features. They typically make "**Self Service BI**" their main point. That is, to empower the Business User to create their own reports from data directly obtained from the Enterprise sources.

There are a lot of vendors for Business Analytics solutions. Microsoft, SAP, Oracle, SAS, Tableau, and the like are just some examples. Some offer a "full stack" solution, that is, they offer products across the three layers: ERP, Data Warehousing, and Reporting (such as SAP and Microsoft). Others focus on a specific area (such as Tableau). For this courseware, we will be having a chapter dedicated solely to Microsoft Power BI.







Chapter 3: Statistics

Statistics is the practice or science of collecting and analyzing numerical data in large quantities, especially for the purpose of inferring proportions in a whole from those in a representative sample. It is used in almost all analyses in order to derive insights like projections ("considering our sales figures for the past 10 years, what figures can we expect for the next 5?") and how different sets of data affect each other ("does age have an impact on IT certification pass rate?").

Measures of Central Tendency

Central tendency (or measure of central tendency) is a central or typical value for a probability distribution. It may also be called a center or location of the distribution. Colloquially, measures of central tendency are often called averages. The term central tendency dates from the late 1920s.

The most common measures of central tendency are the arithmetic mean, the median, and the mode. A middle tendency can be calculated for either a finite set of values or for a theoretical distribution, such as the normal distribution. Occasionally authors use central tendency to denote "the tendency of quantitative data to cluster around some central value."

Mean

The Arithmetic Mean is the sum of all measurements divided by the number of observations. In other words, this simply an average of the data.

Median

The Median is the "midpoint" of our data that separates the upper and lower half of the data set. The median and the mode are the only measures of central tendency that can be used for ordinal data, in which values are ranked relative to each other but are not measured absolutely. For Manual Median calculation, the data should be arranged from Lowest to Highest, then we take the data point that appears in the middle. This is straightforward for datasets with odd-numbered items. For even-numbered data sets, we take the average of the two middle items.

Mode

The Mode the most frequent value in the data set. This is the only central tendency measure that can be used with nominal data, which have purely qualitative category assignments. For Mode, note that the Excel function cannot resolve ties (that is, multiple items that appear the same amount of times as each other). The data returned will be the first item it detects to have the most instances. There are ways to resolve ties, but most will involve multiple functions and array formulas, which are out of the scope of this course.

Measures of Dispersion

The central tendency of a distribution is typically contrasted with its dispersion or variability; dispersion and central tendency are the often characterized properties of distributions. Analysis may judge whether data has a strong or a weak central tendency based on its dispersion. Dispersion (also called variability, scatter, or spread) is the extent to which a distribution is stretched or squeezed.





Range

The Range is simply the difference between the smallest and largest data point in the set. Note that it is very susceptible to outliers. For example, a 10-item data set where the smallest value is 1 and the largest value is 1000. In this case, the range of this data set is 999, which is a bit misleading because there are only 10 items in the data set. In these instances, we will need to use other measures of dispersion to confirm and/or derive better findings.

For implementation in Microsoft Excel, there is no one function that will return the Range of values for a given data set, so we use MAX() to get the largest data point and MIN() to get the smallest data point and their difference will become the range.

Mean Absolute Deviation

The Mean Absolute Deviation is the average of the absolute deviations from a central point. It is a summary statistic of statistical dispersion or variability. In simpler terms, on average, how far are the data points from the mean (the Absolute Deviation from the Mean)? Take for example, two data sets:

- Set 1: {2,2,4,4}
- Set 2: {1,1,4,6}

They will have the same mean (3), but visualizing it on a number line will show us that the data from Set 2 will seem to be more spread out compared to Set 1. In order to quantify this information, we can use the Mean Absolute Deviation. There are three steps to calculate it:

- 1. Obtain the Mean.
- 2. Get the summation of the absolute value of the difference of each data point and the mean.
- 3. Divide the summation by the number of observations.

In the example above, Set 1 has a MAD of 1, while set 2 has a MAD of 2. With this, we can say that Set 2 is more spread out due to the bigger Mean Absolute Deviation.

Variance

Variance is another way of measuring the spread between numbers in a data set. Similar to Mean Absolute Deviation, it measures how far each number in the set is from the mean. To find the Variance of a given data set:

- 1. Work out the Mean
- 2. Get the summation of the square of the difference of each data point and the mean.
- 3. Divide the summation by the number of observations

By itself, variance is not often useful because it does not have a unit, which makes it hard to measure and compare. If for example, if you are looking at a data set of lengths in meters, the variance will be expressed in meters squared, which is not a unit of distance. For a better illustration of dispersion, the next measure can be used.



Standard Deviation

Standard Deviation is simply the square root of the Variance. It is the most commonly used measure to express dispersion. To find the Standard Deviation:

- 1. Work out the Mean
- 2. Get the summation of the square of the difference of each data point and the mean.
- 3. Divide the summation by the number of observations
- 4. Get the square root of the quotient.

If for example, the data set is composed of measurements of length in meters, the variance will be expressed in meters squared (m²). However, because the standard deviation means getting the square root of the variance, it is expressed in the same units as our data set, which gives us an easier time seeing how spread out the numbers are.

In a normal distribution, we can expect 68% of the values to fall within one standard deviation from the mean, 95% within two standard deviations, and 99.5% within 3 standard deviations. This is known as the Empirical Rule.

Quantiles

Quantiles are cut points dividing the range of a probability distribution into continuous intervals with equal probabilities, or dividing the observations in a sample in the same way. There is one fewer quantile than the number of groups created.

Quartiles, Deciles, and Percentiles

Quartiles divide (cut) the data into 4 parts. Deciles cut into 10, while Percentiles divide into 1% segments.

The first quartile is the median of the first half of the data set and marks the point at which 25% of the data values are lower and 75% are higher. The third quartile is the median of the second half of the data set and marks the point at which 25% of the data values are higher and 75% lower. Quartiles are often used as a measure of spread of the data in what is called the *interquartile range (IQR)*. The IQR is simply the difference between the third quartile and first quartile. While on its own the IQR is not a very useful measure, it can be useful when comparing the spread of two different data sets that measure the same phenomenon.

One example of the use of deciles is in school awards or rankings. Students in the top 10% — or highest decile — may be given an honor cord or some other recognition. If there are 578 students in a graduating class, the top 10%, or 58 students, may be given the award. At the opposite end of the scale, students who score in the bottom 10% or 20% on a standardized test may be given extra assistance to help boost their scores.

Percentiles divide the data set into groupings of 1%. Standardized tests often report percentile scores. These scores help compare students' performances to that of their peers (often across a state or country). The meaning of a percentile score is often misunderstood. A percentile score in this situation reflects the percentage of students who scored at or above that particular group of students. For example, students who receive a percentile ranking of 87 on a particular test received scores that were equal to or





higher than 87% of students who took the test. For those who do not understand these scores, they often mistake them for the score the student received on the test.

Note that because the Mean is the average of the data set, it also represents the 2-quantile, because it separates the top half and the bottom half of the data. It's also the 2^{nd} Quartile, 5^{th} Decile, or 50^{th} Percentile.

Standard Score (z-score)

A z-score, or standard score, is a way of standardizing scores on the same scale by dividing a score's deviation by the standard deviation in a data set. It measures the number of standard deviations a given data point is from the mean. To calculate the z-score of a particular data point:

- 1. Obtain the difference of the data point and the mean.
- 2. Divide this difference by the standard deviation.

A z-score can be negative or positive. A negative z-score indicates a value less than the mean, and a positive z-score indicates a value greater than the mean. The average of every z-score for a data set is zero.

The Standard Score is used in conjunction with a Standard Normal Distribution table to calculate probabilities. For example, Molly earned a score of 940 on a national achievement test. The mean test score was 850 with a standard deviation of 100. What proportion of students had a higher score than Molly? Calculating Molly's standard score reveals that it is 0.9. Assuming a Standard Normal Distribution, a standard score of 0.9 is equivalent to a probability of 0.816 in a Standard Normal Distribution Table. This means that there are 18.4% (1-.816) of students who scored higher than Molly.

Coefficient of Variation

The coefficient of variation represents the ratio of the standard deviation to the mean, and it is a useful statistic for comparing the degree of variation from one data series to another, even if the means are drastically different from one another.

In finance, the coefficient of variation allows investors to determine how much volatility, or risk, is assumed in comparison to the amount of return expected from investments. Ideally, if the coefficient of variation formula should result in a lower ratio of the standard deviation to mean return, then the better the risk-return trade-off. Note that if the expected return in the denominator is negative or zero, the coefficient of variation could be misleading.

There is currently no Excel Function to directly take the Coefficient of Variation, however, there are functions that will enable us to get the Mean and Standard Deviation, which in turn makes getting their ratio trivial.

Skewness

Skewness refers to distortion or asymmetry in a symmetrical bell curve, or normal distribution, in a set of data. If the curve is shifted to the left or to the right, it is said to be skewed. Distributions can





Correlation

Correlation is a statistical measure that expresses the extent to which two variables are linearly related (meaning they change together at a constant rate). It's a common tool for describing simple relationships without making a statement about cause and effect.

A correlation coefficient of +1 indicates a perfect positive correlation. As variable X increases, variable Y increases. As variable X decreases, variable Y decreases. A correlation coefficient of -1 indicates a perfect negative correlation. As variable X increases, variable Z decreases. As variable X decreases, variable Z increases. A correlation coefficient near 0 indicates no correlation. When analyzing correlation, we should expect that the value will fall between -1 and 1. A perfect correlation coefficient may indicate some errors in the methodology or in the data gathered.

One thing to remember is that **Correlation does not equal Causation**. For example, when looking at a scatter plot showing altitude and temperature, we can say that there is a relationship between Temperature and Elevation. We can only say that the temperature gets lower as altitude rises, but not high altitudes cause lower temperatures and vice-versa.



Power Bl





Chapter 4: Data Visualization

Making information more easily digestible through Data Visualization

People are visual creatures. It has been found that the human brain can identify images in as little as 13 milliseconds¹¹. Not to mention, recalling information seems to be a whole lot easier if a reference visual is attached to it. To illustrate this point, try out the following Exercise:

1	Company	Month	Actual Sales	Target
2	ASUS	1	4021	1484
3	ASUS	2	3560	1103
4	ASUS	3	4703	4526
5	GIGABYTE	1	1371	4140
6	GIGABYTE	2	3279	4223
7	GIGABYTE	3	4872	2368
8	PALIT	1	1864	4427
9	PALIT	2	3641	1281
10	PALIT	3	3758	1850
11	ASROCK	1	4747	2634
12	ASROCK	2	4529	1266
13	ASROCK	3	2042	3807
14	MSI	1	2673	1572
15	MSI	2	1755	5061
16	MSI	3	1239	3491
17	ACER	1	3322	2295
18	ACER	2	1418	2969

In preparation for an upcoming marketing promotion, you are then tasked to determine the following:

1. The brand with the highest sales and when

2. The brand with the lowest sales and when

3. The bottom 3 brands in terms of sales in February

How long did it take? Now determine the same from the following:

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph

¹¹ Anne Tafton, 'In the Blink of an Eye', *MIT News Office*, http://news.mit.edu/2014/in-the-blink-of-an-eye-0116, (accessed 28th May, 2019).



Business Analytics and Data Visualization with Power BI





How long did it take compared to before? And take note, the previous examples were just for 18 rows of data. A company needs way more than that for analysis!

It should then come to no surprise, that 90% of the information processed by the brain comes from a visual source¹². The ability to present data in a more digestible manner allows for better engagement with the audience, and hold their attention. It also helps them recall information after the presentation has been delivered. In fact, it has been found that **Presentations using Visual Aids were found to be 43% more persuasive than unaided ones¹³.** As the internet-connected world expands, data visualization will only become a more sought-after skill so that businesses can make more sense of the tons upon tons of data they gather and generate every day.

In addition to persuasion and to help hasten analysis, visualizations also help in tracking business statuses and determine strategies and tactics. For example, a business has four departments that directly generate revenue. The year is almost over and the various stake holders are having a Strategic Planning meeting for the next year. Each department's revenue is then compared with their targets:



From the chart, we'll see that the College and Public Departments has been able to achieve and even exceed their targets while SHS and Corporate fell short. From here, it is easy to call for an investigation on what exactly happened to them during the previous year in order to pin the root causes

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph

¹² http://www.t-sciences.com/news/humans-process-visual-data-better

¹³ Persuasion and the Role of Visual Presentation Support: The UM/3M Study, (D. R. Vogel, G. W. Dickson, and J. A. Lehman, p.1



on why the targets weren't achieved. It is important, however, to keep in mind that the revenue of the department is composed of multiple products and services. Because of this, the CEO of the company asked to see the per product breakdown of the College Department:



Looking at the big picture, the College department was able to exceed their targets, but looking into more detail, we can see that the BA and Other Certs products fell way short of their targets, and the overall performance of the department was bolstered by the ERP and CCNA Products. This is unsustainable in the long run, and the BA/Other Certs must be investigated to learn the root cause of their performance. Strategies will then be formulated to play into the department's strengths and to avoid the weaknesses and pitfalls that led to poor performance. This is why when doing analyses, it is always prudent to **Question the Obvious**. Things might not be as straight-forward and clear-cut on first glance, and a different view might present itself upon deeper investigation.



Power Bl





Representing Data with Charts

Using charts allows users to transform tabular data into a graphical representation. It makes analyses easier to digest and helps retain audience's attention. There are many different types of charts, and not all of them are created equal. Some are more suited to display certain types of information compared to others. For example, a chart best for monitoring trends over time might not be the best choice to show contributions to a whole. The following are just some of the different charts that can be used to display data:

Bar/Column Charts



Bar charts represent data using horizontal rectangles. They are invaluable for quickly conveying a comparison between values of a series of data. In the above example, we can infer at least two important pieces of information: which genre of movie generates the most revenue relative to other genres (going by the size of the bar), and on which state relative to other states (going by the color of the bar). Column charts convey the same information, only the orientation is different:







Genre

Family

Gam

Hor

Drama

Comedy



In the above example, the revenue is expressed as a 100% value for each genre, and shows the contribution of each genre to the total.

Power BI





Line Charts



Line Charts provide a useful means for displaying data over time¹⁴. You may put more than one line in the chart to monitor multiple data sets in the same time frame. Be sure to do so sparingly because it can make the chart look cluttered, and defeat the purpose of simplifying data analysis.



¹⁴ Evans, Intro to BA, 56

Power BI







The **Combination Column-Line Chart** combines the properties of both line charts and column charts. **They allow for analyzing trends and comparisons at the same time**. The most common usage is to monitor sales performance over time. In the example above, the target is expressed as a line chart while the revenue is expressed as a column chart. If the column exceeds the line chart, then the performance was great because the target was surpassed.

Pie Charts

For any given set of data, we are usually interested in finding out the relative proportion of each data source to the total¹⁵. For this **Pie Charts** are used. This is done by expressing the total as a circle, then partitioning it into different slices. The bigger the slice, the greater the contribution to the whole.



Be very particular with the data being analyzed when using a pie chart. If there are too many slices, it will look cluttered, and you will also have to factor data labels if necessary.

Power Bl

¹⁵ Evans, Intro to BA, 56



Scatter Charts show the relationship between two variables. To construct a scatter chart, we need observations that consist of pairs of variables (numeric data points)¹⁶. For example, a college student will have different grades per semester per subject, midterms and finals, in particular. The chart will show if the grade for the midterms is an indication of the grade in the finals.



Power BI

¹⁶ Evans, Intro to BA, 58

¹⁷ Evans, Intro to BA, 59







There are many other kinds of charts used for analyses. Some charts even use geographical data so that any of the other kinds are laid out on a map to see a quick summary for the different regions used by the business. Some of these charts will be seen in the later topic, which is the hands-on activity on how to use SAP Lumira.





Data Visualization using Microsoft PowerBI

Microsoft Power BI is a Self-Service BI Solution developed by Microsoft. It was first released in 2011 and is now one of the premier BI Solutions in the world, implemented across over 35,000 companies all over the world spanning multiple different industries. It offers a lot of flexibility of access to report creation, data analysis, and report publication.



It is a collection of software services, apps, and connectors that work together to turn your unrelated sources of data into coherent, visually immersive, and interactive insights. Whether your data is a simple Microsoft Excel workbook, or a collection of cloud-based and on-premises hybrid data warehouses, Power BI lets you easily connect to your data sources, visualize (or discover) what's important, and share that with anyone or everyone.



Ways to Access Microsoft PowerBI

There are multiple ways to use Power BI:

 Power BI Desktop – the application is installed in the local machine, either by using a dedicated installer or downloading from the Microsoft Store. It offers some advanced utilities such as data clean up, data modelling, and other advanced analysis options (such as the usage of DAX functions to enable more advanced Statistical Analysis) and the like. All of these on top of the ability to create and publish reports.





 Power BI Service – the application is accessed via the Power BI Portal. The user will need to log on using his/her account and from there access the report creator. It is cloud-based, so for as long as the user has an internet connection, he can access his work through a web browser (even mobile devices). This is also where the main collaborative functions, such as Workspaces are found.

Data Visualization	n Microsoft Fo x	× 🖨				0 - 0
< → C +	app.powerbi.com/home?tenant=903580d9-2f5a	-44c3-9d0f-4ae42615ff97&UPN=huey@fasttr			*	🖈 🗟 Incognito
	🐨 🙍 💩 🖛 🥶 🗟 CDG Teamup 🧧	CompTIA CertMaster 📅 CompTIA Labs 🧲 Ci	ompTIA CertMast 📀 CompTIA CHOICE P 🚈 FIT PTD	Automation 🛛 👝 CDG Files - OneDrive 🔢 👖 FIT Moodle 🧯	🍯 📼 SAP AFO Tutorial 📕 SAP Predictive Anal	» 🗄 Reading I
III Power Bl	Home				Triak 🖉 Search 🛛 🎯	± ? © 🤇
III Power BI III III III III III III III III III III	Home Home	euel ghts to make data-driven decisions Tr.Huny Workspace s How to create reports s How to create reports	CDG Demo Report A lepor	e service View and understand a Power B repo	Med days left P Search P	↓ ? ⊕ ↓
	© 9 min read	© 6 min read	© 6 min read	© 3 min read	©3 min read	
7	Recents Shared with me M	tv apps			See all	8

3. Power BI Mobile App – a free-to-download app (available in both iOS and Android platforms) where the user can log in using the same account he uses for Power BI Service. This mobile app is one of the main ways users can consume (not create) published reports. This will allow

Power BI





managers and other employees of an enterprise to be able to check up on different reports even if their computer is unreachable.



For this courseware, we will be using Power BI Service and the Mobile App.

Getting Started

In order to start using Power BI Service and its collaboration options, you will need a Power BI Account with a Pro License (this should have already been provided via e-mail). For a Power BI Business user, there are 5 building blocks they will need to get familiar with. These are:

- 1. Visualizations a type of chart built in Power BI.
- 2. Data Sets a container of data. These can come from a variety of sources, including files and databases.
- **3. Reports** one or more pages of interactive visuals, text, and graphics. A single page is often dedicated to answering a central area of interest.
- 4. Dashboards a single page that uses visualizations to tell a story. It contains much of the same elements as a **Report**. However, t is different from a **Report** in that the single page can contain visuals from different separate reports. This allows different key areas from different reports to be much more easily seen in a single page.
- 5. Apps a way to bundle and share related dashboards and reports together.



Collectively, these building blocks are referred to as **Content.** Report creation in Power BI Service usually has the following workflow:



A typical workflow will usually involve all the building blocks. A *designer* (yellow boxes) collects data from a **dataset** and creates a **report**. After which, the *designer* will publish the findings via creation of **dashboards and apps** so that the *business user* (black box) can take action.

It is important to note that *designer* and *business user* in this context refer to roles as seen from Power BI. The *designer* is responsible for the creation of **content** and the *business user* is responsible for its consumption and analysis. In most cases, the *business user* relates requirements to the *designer* so that the report can be built to certain specifications. In some cases, employees in an organization are trained on how to use Power BI so

that said employees can act as BOTH *designer* and *business user*. This allows the enterprise to save up a bit on licensure expenses.

Screenshot and Mobile Device Disclaimer

Please note that because Power BI is under continuous development by Microsoft so that new features will be implemented, there might be some discrepancies with the screenshots and there might not be an exact match with what can be seen on-screen. The screenshots are taken using Google Chrome web browser, so when following along, it would be best to use it on the user's end as well (be it on a computer or mobile device). Also, please note that the user experience was designed for usage with a computer's web browser in mind. There will be some differences in usability when Power BI Service is accessed via the browser on a mobile device. If a mobile device will be used for creating reports, it will have to be used in landscape mode, and please note that for almost all mobile devices, right-click is mapped to the tap-and-hold gesture, with the right-click menu appearing after the user lets go of the screen.

Setting up your account

#	Activity	Expected Outcome
1	Check your e-mail for the message about your Power BI Account	Reply Reply All @ Fernend @ IM Twit 2767/2021 429 PM Microsoft on behalf of your organization <ms-noreply@microsoft.com> Account information for new or modified users To</ms-noreply@microsoft.com>
		A user account has been created or modified User name: Temporary password: Here's what to do nexe: Share this information with your users. Share they've signed in with their temporary password, they can create their own by following the instructions on the sign in page.

Power Bl



2	Open your browser and go to the following link: <u>https://powerbi.microsoft.com</u> Click on "Power BI Service" and log in using your credentials For Mobile Users, click on the	
	button with three horizontal lines then select "Power BI Service" and log in using your credentials.	Find clarity when you need it most Empower lam members to discover insights hidden in your data with Microsoft Power BI Sart free 2 Sart free 2 Sart free 2 Try free Bay now
2.2	It is also advisable to request the desktop version of the site. Go to the browser settings and turn on Desktop site. Notes: This is to try and make the on-screen elements adjust automatically. The exact name and location of this option might change depending on the make and model of the device, the browser used, and the version of the browser.	
3	After supplying your username and password, you will encounter this message. Click on Next. Notes: The next steps will involve using both the browser and the Authenticator App.	Microsoft Help us protect your account Microsoft has enabled Security Defaults to keep your account secure. Learn more about the benefits of Security Defaults Skip for now (14 days until this is required) Use a different account Learn more Next

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph









code on the browser.

on the browser.

6

Sign in

Add account

GA)



CANCEL

Back

Next

OR ENTER CODE MANUALLY

6.1 If you can't scan the QR Code for any reason, there should be an option to enter the code manually at the bottom of the Authenticator App.

> You will then be prompted to manually type a Code and URL.

The Code and URL can be found in the Web Browser, by clicking the Can't Scan Image? Button.

Click Next on the browser when you are done inputting the code and URL.

Dode Can't scan image?

Enter the following into your app: Code: 680285643 URL: https://mobileappcommunicator.auth.microsoft.com/mac/MobileAppCommunicator.svc/37209725 7 D



7	You will then be testing the sign in. Approve the sign in on the mobile app in order to get the following screenshot. Click on Next	Keep your account secure Your organization requires you to set up the following methods of proving who you are. Microsoft Authenticator Image: Colspan="2">O Notification approved
0		Back Next
8	Click on Done	Keep your account secure Your organization requires you to set up the following methods of proving who you are. Success! Ereat job! You have successfully set up your security info. Choose "Done" to continue signing in Default sign-in method: Done
9	If an error is encountered, simply restart the browser, then try logging in again. A C A FIRSTIN	Imauthorized × + ← → C Powerbi.microsoft.com/auth/unauthorized/ ← → C Powerbi.microsoft.com/auth/unauthorized/ Formation in the image of the





Navigating the Interface

Logging In

#	Activity	Expected Outcome
1	Launch your web browser	
	Notes:	Google
	Majority of log in steps are a repeat of the initial account setup process in the previous section. Ignore this section if you are already logged in.	Conceptions
2	Go to the following link:	• # # # # # # # # # # # # # # # # # # #
	https://powerbi.microsoft.com	Find clarity when you need it most
	Click on "Power BI Service" and log	Empower taan mendens to decover inside hidden is your data with Monord Rever IE.
	in using your credentials	
2.1	For Mobil <mark>e Us</mark> ers, click on the	
	button with three horizontal lines	Microsoft Power BI
	then select "Power BI Service" and	
	log in using your credentials.	Dverview V Products V
		Find clarity when
		you need it most
		Empower team members to discover insights hidden in syour data with Resources Microsoft Power BL
		Start free > Power BI service
		Try free
	ACA	
2.2	It is also advisable to request the	
	desktop version of the site. Go to	Microsoft Power BI
	the browser settings and turn on	≥ ρ (§) ≥ Downloads
	Desktop site.	🖈 Bookmarks
	Notes:	Find clarity when Fine share
	This is to try and make the on-screen elements adjust	you need it most you B Find in page
	The exact name and location of this option might change	Empower team members to discover Empower insights hidden in your data with Microsoft Power BI.
	depending on the make and model of the device, the browser used, and the version of the browser.	Start free >
		¢ Settings
		Help & feedback O 105 MB saved





3	After logging in you should be	See See Sectore (Moscolin For K) About X 🕀
5		😌 🖓 🐨 📲 appointencommentencemente 🔮 🤘 🦉 🖉 🔯 🔯 🖉 🖉 🖉 🖉 🔅 🔤 COS Temus 🧧 CompTA Certifiate: 📲 CompTA Leits: C CompTA Certifiat. 🗞 CompTA CHICE P. 🗉 ITI TO Automation. 🛳 COS Files - OneDine : Ital ITI Moude 🛒 🛩 SAPAP
	redirected to the Home Page on a	III Power BI Home Toylett
	new browser tab.	
		Good morning, Reuel
	Note: what you see on your screen will differ from the	Pind and share actionable insigns to make data-driven decisions
	screenshot here. If it is the first time you logged in, you will not	+ Favorites + frequents
	see any Favorites + frequents entries, for example.	
		Demo Workspace - My workspace MicroOctagon Test Upload CSV CDG Demo Report HT - ABETH
		A [*] CDG Databased Sample p ² Q Workspace Q Workspace A Report Q Workspace A Report
Δ	Click on the button with three	← → C app.powerbi.com/home
-	best established to also had a set	🨝 🎐 💶 📝 👿 🏹 🝐 🛩 🏟 📻 CDG Teamup 🙋 CompTIA CertMas
	norizontal lines to show what each	
	button in the Navigation Pane is	::: Power Bl Home
	for	Hide the navigation pane
		G and many David
		Good morning, Reu
		Find and share actionable insigh
		© Recent >
		+ Create
		Favorites + frequents
		Datasets
		😨 Goals
		× ·
		H' Apps
		Perior Workspace - My with me CDG
		🖵 🤤 Wi
		SV Deployment pipelines
		D Learn
		Getting started with Power BI
		Workspaces Power Bl basics Sample reports
		🕲 Demo Workspace 🗸

The Navigation Pane contains the following options:

- 1. Home the default screen that appears after logging in. It contains the following sections:
 - a. Content that you have *Favorited* and access frequently
 - b. Basic Tips on how to get started using Power BI
 - c. A list of the various content you have access to
 - d. Recommended Apps
- 2. **Favorites** you can put a star on certain content to tag it as a Favorite. Any content that is tagged as such will appear here.
- 3. **Recent** contains the different content that has been recently accessed.
- 4. Create allows the user to start making reports and other content.
- 5. **Datasets** contains the different **datasets** that the user has access to.
- 6. **Scorecards** allows the measurement of achievements towards goals and subgoals. *This is out of the scope of this courseware.*
- 7. **Apps** contains the different **Apps** that the user has access to.
- 8. Shared with me contains the different reports and dashboards that you are granted access to by other users.

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph



- 9. **Deployment Pipelines** allows for the management of content creation and deployment. *This is out of the scope of this courseware*.
- 10. Learn a central hub for Power BI Training. Allows the user to access the technical documentation for Power BI.
- 11. Workspaces contains all the different Workspaces the user has access to. Including the ones they created themselves or assigned to them by other users.
- 12. **My Workspace** a personal workspace for the user. Any content created here can only be accessed by the user and no one else.

We will now begin creating some content in Power BI Service. Please note that for all screenshots from this point on, **the Navigation Pane will be collapsed**.

Creating the Workspace and Dataset

#	Activity	Expected Outcome		
5	In the Navigation Pane, select	::: Power Bl Learn		
	Workspaces then click on Create a			
	Workspace. The Create a	in Pr		
	Workspace Panel should appear on	Search BI t		
	the right side of the screen.	© 20210504 All Demo		
		+ 20210505 LPUB Demo		
	My Workspace_can_be_accessed by clicking on the topmost option.	C 20210526 - FEUC		
	The workspace feature will require a PRO License. Accounts given to students will have a PRO License attached Power RI has	20210526 UL		
	many different licensing schemes that are out of the scope of the	P 20210528 CEU Demo arn		
	aiscussion in this courseware.	RR 20210601 HAU		
		1 20210601 OLFU		
		Workspace name Workspace name Name this workspace name		
		20210608 STI Demo		
		20210615 USLS sin Describe this workspace		
		20210616 NTC ^{ior P}		
	FIKSI IN	Demo Workspace - CDG		
		FIT - ABETH Advanced V		
		FIT - Adrian		
		FIT Nelgen		
		FIT- REA		
		FIT-CARLO 2		
		7 Create a workspace Save Cancel		



BI		Power	BI
BI	- II J	1000001	

6	Give the Workspace a name and description. You can add an image	Create a workspace
	to represent this workspace if you want. Click Save	Workspace image Tupload 3 (Optional) Delete
		Workspace name
		Available
		Description Huev Sample Workspace 2
		Learn more about workspace settings
		Advanced 🗸
		4
		Save Cancel

The **Workspace** is a place for multiple users to collaborate with each other. All **content** inside a **workspace** can be interacted with by all the different users that are granted access to it. The kind of interaction users have available to them will depend on the kind of **membership** that has been granted to them by the **Workspace Creator**. We will discuss how to add users and **membership** at a later topic.

It is also important to note that **Naming Conventions** will play an important part in managing **workspaces and content**. This will help the user have an idea of what and when a piece of content, particularly reports, are sorted. A common convention is to use affixes in addition to the descriptive title of a report. For example, a "Sales Report" is being used by the Department Manager. If the manager wants to have a separate versions of the "Sales Report" for different periods of time and specific products, the report name can be the following:

<Date Created>_Sales Report_<Product Name>

With <Date Created> following the YYYY-MM-DD format. We will now create the dataset that will be the basis of our Sample Report.

	#	Activity	Expected Outcome
--	---	----------	------------------



7	In the Workspace, click on New then click on Dataset	 ≥ 20210617-Huey Huey Sample Workspace ★ + New 1 ∴ Heport Visualize your data → Paginated Report Build a paginated report ⊙ Dashboard Build a single-page data story 2 ○ Dataflow Prep. clean, and transform data ○ Dataflow Prep. clean, and transform data ○ Streaming dataset Build visuals from real-time data ○ Dypose a file Open a.pbix, r.dl. xlsx, or .csv in Po
8	There are multiple options for getting data. Under Files, click on Get. Note: for the purpose of this courseware, we will be using Files as the data source.	Construction Construction Con
9	Click on Local File. A new window should open Navigate to the Sales Data MicroOctagon Hub Sample.xlsx file and click on Open. Click on the Import button on the left to finalize the creation of the Dataset.	Power BI SOUST Aboy Image: Soust Aboy
		Imperf Excel data into Power BI Imperf Excel file to Power BI Imperf to file data in your workshow in your care router hown II Imperf to file to Power BI Imperf To To Uplad your Excel file to Power BI Imperf To To Imperf to the data in your workshow in your care router hown II

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph

Power BI





 Back in the Workspace, there should be the Dataset, represented by an orange cylinder icon [□]. By default, a blank Dashboard (represented by a gauge icon 	20210617-Huey Hury Sample Workspace • New ~ We updated the look of workspaces Take a tour, and we'll show you how to get around. All Content Datasets + dataflows • Name Type Owner Refresh Image: Sales Data MicroOctagon Hub Sample Dataset 20210517-Huey 6/17/21, 1
) will also be created.	Name Sales Data MicroOctagon Hub Sample Sales Data MicroOctagon Hub SamplexIsx

File Considerations

There are two main file options when using a File as a Dataset: **CSV Files (*.csv)** and **Excel Files (*.xlsx)**. **CSV Files** are basically text files that can be opened in Spreadsheet applications like Microsoft Excel. For the both of them, they should exhibit the following properties so that they can be used as a **dataset** in Power BI:

- 1. The very first row of data should be the column name
- 2. The data should be columnar. That is, data should be a vertical table.

In order to create a CSV File, create it in Excel first, then save it as a CSV file:

X Save As				×		
$\leftrightarrow \rightarrow \cdot \uparrow$	> This PC > OS (C:) > Users > ASUS > Desktop	ې 5 🗸	Search Desktop			
Organize 🔻 Ne	w folder			• 🕐		
💻 This PC	^ Name	Date modified	Туре	Size ^		
3D Objects	2020 PubCorpo CompTIA Training Atten	26/11/2020 8:42 AM	File folder			
Desktop	Cloudswyft	15/12/2020 3:41 PM	File folder			
Documents	Lumira Installers for VM Deployment	17/04/2021 8:01 AM	File folder			
Developed	Outlook Calendars	20/04/2021 10:44 PM	File folder			
Downloads	data.xlsx	06/05/2021 1:56 PM	Microsoft Excel W			
J) Music	FIT Academy's Program Satisfaction Surv	26/04/2021 10:06 AM	Microsoft Excel W			
Pictures	Presentation Planners Core 1 and Core 2	05/11/2020 2:55 PM	Microsoft Excel W			
Videos	SAP B1 Lab Schedule Form.xlsx	04/01/2021 10:08 AM	Microsoft Excel W	×)	ЦU	UJ)
💶 OS (C:)	v <			>		<u> </u>
File name:	Table Test.xlsx			~		
Save as type:	Excel Workbook (*.xlsx)			~		
Authors:	Excel Workbook (*xlsr) Excel Macro-Enabled Workbook (*xlsrn) Excel Binary Workbook (*xlsb) Excel 97-2003 Workbook (*xlsb) XML Data (*xml) Single File Web Page (*nmt,*nmtml) Web Page (*nmt,*nmtml) Web Page (*nmt,*nmtml) Excel Macro-Enabled Template (*xltrn) Excel Macro-Enabled Template (*xltrn) Excel Macro-Enabled Template (*xltrn) Excel Macro-Enabled Template (*xltrn) Microsoft Excel 5.0/95 Workbook (*xls) CSV (Gomma delimited) (*xsr) GSV (Gomma delimited) (*xsr) Excel Macro-Enabled Template (*xltrn) Microsoft Excel 5.0/95 Workbook (*xls) CSV (Gomma delimited) (*xsr) Excel Macro-Enabled Template (*xltrn) Text (Macintosh) (*xsr) CSV (MS-DOS) (*xsr) DIF (Data Interchange Format) (*.dif) SYLK (Symbolic Link) (*.sls) Excel Add-in (*xlan) PDF (*.pdf) XPS Document (*.xps) Strict Open XML Spreadcheet (*xlsr)					


		r		Α	В	·		7-		
Test Col	1 Test Col 2		1	Test Col 1	Test Col 2	CTRI+T	Create Table ? X		Test Col 1	Test Col 2 🔻
Bran 1	Prod 1		2	Bran 1	Prod 1		Where is the data for your table?		Prop 1	Brod 1
Bran 2	Prod 2	$ \sim$	3	Bran 2	Prod 2				Bran 1	Prod I
Bran 3	Prod 3	$\mathbf{\nabla}$	-	Bran 2	Drod 2		-3A31.3D30		Bran 2	Prod 2
Bran 4	Prod 4		-		PIOUS		My table has headers	~	Bran 3	Prod 3
Bran 5	Prod 5		5	Bran 4	Prod 4			H	Bran 4	Prod 4
brand	FIGUS		6	Bran 5	Prod 5		OK Cancel		Bran 5	Prod 5
			7		Ι Τ	4-	On Current		1	

You will not be asked what to import (2nd pic of Step 10 in the table above) if a **CSV** file is used as a **dataset**. Try making a CSV version of **Sales Data MicroOctagon Hub Sample.xlsx.**

Quick Insights

Even before creating our own **reports** based off the data contained in the **dataset**, we can immediately glean some information about our data. This is done by getting Quick Insights.







The Lineage View STIN TECHNOLOGY

As teams collaborate and more content is created inside a workspace, it can be a daunting task to keep track of which datasets affect which reports and dashboards. Luckily, there is an option to see this exact information in Power BI Service by using the **Lineage View**.

|--|



 Hover the mouse on the Sales Data MicroOctagon Hub Sample dataset. Click on the More Options Button, then select View Lineage. Iname 1 Type Sales Data MicroOctagon Hub Sa. I attacts + dataflows Sales Data MicroOctagon Hub Sample dataset. Click on the More Options Button, then select View Lineage. Sales Data MicroOctagon Hub Sample dataset. Create report Create report Create paginated report Delete View Insights Security Rename Settings Manage permissions 2 View Image The user will be shown a list of all other content that will be impacted. 	
Data MicroOctagon Hub Sample dataset. Click on the More Options Button, then select View Lineage. Image is the select of the	
dataset. Click on the More Options Button, then select View Lineage. Image:	
Options Button, then select Image: Analyze in Excel View Lineage. Image: Create paginated report Create paginated report Delete View Insights Security Rename Settings Manage permissions View Insights 2 View Insights all other content that will be impacted. Image:	
View Lineage. Create report Create report Delate View Insights Security Rename Settings Manage permissions 2 Vew lineage	
16 The user will be shown a list of all other content that will be impacted.	
16 The user will be shown a list of all other content that will be impacted.	
16 The user will be shown a list of all other content that will be impacted.	
16 The user will be shown a list of all other content that will be impacted.	
16 The user will be shown a list of all other content that will be impacted.	
16 The user will be shown a list of all other content that will be impacted.	
16 The user will be shown a list of all other content that will be impacted.	
16 The user will be shown a list of all other content that will be impacted.	
16 The user will be shown a list of all other content that will be impacted.	
all other content that will be impacted.	×
impacted.	
	Reports Dechoords
	Veners 🗇 🛛 Vens 🗇
17 Other content such as the animation of the second secon	
dashboard can be accossed	
directly as well from this view	
directly as well from this view.	
Sales Data MicroOctagon Hub Sa Sales Data MicroOctagon Hub Sa Refresheet 6/17/21, 13034 PM Sales Data MicroOctagon Hub Sa Soles Data MicroOctagon Hub Sa	
isn't shared yet and there is only one dataset, but the	
lineage (an quickly become a sprawi. Especially when reports start getting made.	

Creating a Report ST IN TECHNOLOGY

Reports are collections of visualized data. It is the main way of conveying information and analysis of **datasets**. The following section will walk through the Report Creation Interface and how to use certain Visualization types.

# Activity Exp	ected Outcome
----------------	---------------



18	Hover the mouse on the Sales	All Content Datasets + dataflows	
_	Data MicroOctagon Hub Sample dataset. Click on the More	Name Sales Data MicroOctagon Hub Sa ()	1 Type Dataset
	Options Button, then select Create report.	Image: Sales Data MicroOctagon Hub Sample.xlsx 2	Analyze in Excel Create report Create paginated report Delete View Insights Security Rename Settings
			Manage permissions View lineage
19	The Report Creation Interface	Prove BI - ROUTER? Flory For V. Start - Teaching over. Under land -	Marine Planet C & A 7 0 €
	should appear.	e 0 1	Image: Termine and the second sec
		Build visuals with your data Select or days fields have the Fields pare onto the re	pot Convext:
		2 + 1 Papel P	

The Report Creation Interface

Before proceeding with the creation of the sample report, here is a short description of the interface and its elements:

Res. Marcola Mathema 1	-		
The View Reading view Mobile layout 1 C Ask a question of cipitore C liesk box V2 shapes C consumerations C Net	efresh 🔲 Duplicate this page	🗟 Save 🚿 Pin to a dashbo	ard 🕫 Chat in Teams \cdots
Prev Makeagement Contraction Instant op spage En backet Instant op spage En backet Instant op spage En backet Instant op spage Instant op	freih □ Opplicate his page ♥ Filters 3	See	del 0 Chat in Teams → → → Fields 5 > JP Search Image: Search Image: Search Image: Image: Search Image: Search Image: Image



- 1. **Menu Bar** save the report using the File option, and the ability to change how the report is being viewed, along with allowing the user to insert some other elements in the report such as text boxes and editing how the different visualizations interact with each other.
- 2. **Report Canvas** this is where visualizations are laid out and formatted.
- 3. Filters Pane sets options on limiting the displayed data in the report.
- 4. Visualizations Pane contains two parts: The first one is where the user can select visualizations to put into the Report Canvas. The bottom part is where the properties of the selected visualizations can be changed. This bottom part is context-sensitive (options change depending on the selected Visualization). It can contain up to three tabs: Fields, Format, and Analytics.
- 5. **Fields Pane** contains all the data fields that were in the dataset. Power BI automatically assigns the field names as they appear in the top row of the data source.
- 6. Page Options allows to add, delete, rename, and duplicate pages.
- 7. Workspace Link allows the user to quickly go access the currently selected workspace.

The report creation process is as follows:

- 1. Select the visualization by clicking on the desired type in the Visualizations Pane.
- 2. Select data to be included in the visualization by ticking the checkbox in the Fields Pane. If the user needs more control over the order of fields, drag and drop the Field from the Fields Pane to the Field Tab of the Visualizations Pane.
- 3. Resize and format the visualization.
- 4. Repeat steps 1 to 3 until all desired visualizations are complete. Be sure to save often!
- 5. Publish the Report.

Let's create a sample report to get familiar with the interface and the creation process.

Creating our First Report

#	Activity	E	spected Outcome
20	First, we want to see a		III Power BI 20210617-Huey
	comparison of the different Brands in terms of Profits		Show the navigation pane 3 view Mobile layout
			Select or drag fields to populate this visual
	In the Visualizations Pane ,	Visualizations >	й
	select Stacked Column Chart.		©
			+
	The Chart Template should		0
	appear in the canvas		8
	The ten your of visualizations contain variations of the		P
	Column Chart Visualization	🖹 🌠 🚫 ···	x ^A V E







24

25

26

27



You can now drag either of the knobs or type in the month range to change the displayed data.

Slicers are a kind of Filter. There will be a more detailed discussion on Filters on a later topic.

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph









The Format Tab of the Visualization Pane



The **Format Tab** (represented by the Paint Roller icon) allows the user to change how a visualization looks like in the report. Its contents is context-sensitive; that is, it will change depending on what visualization is selected. If no visualization is selected, then it will be referring to the **Report Canvas** instead.

There are a multitude of options available for the user to change, with each of them being rolled up into different categories within that visualization. For example, if your report requires you to

show the daily trend over a whole year period (as is the case in our line chart), then it might be good to add Zoom Sliders so the user of the report has the option of narrowing down the displayed data without having to depend on Slicers and filtering:



Formatting reports usually takes up a lot of time, especially if they will be published for public consumption. The **Format Tab** gives the user very fine control on how the overall report will end up looking like. In some visualizations, like the **Matrix** and **Table Visualizations**, they offer an additional tool for analysis in the form of **Conditional Formatting**. More on this later.



Generally, using the format tab involves toggling an option on or off, then clicking on the down arrow on the category to bring up additional controls. The following are some of the common options that are used:

- 1. Legend affects whether the Legend is shown, and where it is placed in the visualization.
- 2. Title allows the user to change the auto-generated visualization title.
- 3. Data Colors allows the user to change the color scheme of the data selected by Power BI.
- 4. **Data Labels** affects whether the Data Labels are shown in the visualization, how it is placed, and the kind of information shown.

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph



Stacked Bar Chart

Constant line

Pie Chart

87 Q

Analytics features aren't available for this visual. Learn more

87Q

- 5. **Border** affects whether the border of the visualization is shown or not and how it will appear. Using this is very helpful because it can more easily show where visualizations start or end.
- 6. **Shadow** same concept as the Border, but appears fancier, as it adds a shaded effect on the edge of the visualization.

The Analytics Tab of the Visualization Pane

Line Chart

✓ Trend line

✓ Min line

✓ Max line

Average line

Median line
 Percentile line
 Forecast
 Eind anomalie

8 7 Q

Y-Axis Constant Lin

X-Axis Constant Line



The **Analytics Tab** (represented by the magnifying glass icon) gives the user additional tools to help in the analysis of data. It allows for the creation of additional data markers to denote information that is not found within the data.

Like the other tabs, this is context-sensitive, and navigating and using it is almost the same as using the **Format Tab**. As you can see, for Stacked Bar Charts there is only one option, Pie Charts have no options at all, and Line Charts have quite the plethora of options including Forecasting and Finding Anomalies.

The next portion of the activities will be on using these options, particularly the Forecasting capability for Line Charts.

#	Activity	Expected Outcome
33	We want to see which Brands	Profit by Brand and Month
	average.	Visualizations >
	In Page 1 of the report, select	
	the Profit by Brand	
	Visualization then in the	🖬 📅 🔛 🔕 🖬 Kapita
	Visualization Pane, change its	🚱 👯 🙉 123 📰 💽 Steteters
	type to Clustered Bar Chart	
		ом 2м 4м ем том том том
34	Remove the Month Legend by	Profit by Brand Ø ♥ ₪ ···
	going to the Fields Tab of the	
	Visualization Pane then pressing	Axis
	on the "x".	Brand VX
		Legend Coper
		Month VX Streter
		Values Court
		Profit VX



35

36

37

Question/Activity:

What happens when you change the **Slicer** to cover the months of April to June (Months 4 to 6)?



5M

Answer:

10M

15M

Profit

20M

25M

30M

35M



38	Next, we want to see where our	Percentile line
	next three months.	✓ Search
	Go to Page 2 of the report	✓ Trend line + Add
	where the Line Chart is located.	V Y-Axis Constant Line Forecast length
	Select it, then In the Analytics	V X-Axis Constant Line Point(s)
	Option.	V Min line Ignore last
		V Max line 0 Point(s)
	Click on Add. This will enable the properties that will allow us to	Average line Confidence interval
	add a Forecast on the	V Median line
	visualization.	V Percentile line Auto Point(s)
		V Forecast Apply
		V Find anomalies
39	Because we want to see the	∧ Forecast 1
	forecast for the next three	Forerast 1 ×
	months and the data we are	
	looking at is daily data, set the	Forecast length Search
	Forecast length to 90.	90 1
	Change the Seasonality to 20	Point(s) V General
	than click on Apply	Ignore last
	then click on Appry.	0 Point(s) V X axis On
	To make the data more visible,	
	go to the Format Tab, and	Confidence interval V Y axis On
	enable the Zoom Slider .	95% V Seconda Off O
	Feel free to change the properties of both the Forerast and	Seasonality
	Zoom Slider. Change the values in the Forecast properties and see what happens to the visualization.	30 Point(s) 3 V Zoom sli On —
	Power BI uses a proprietary Exponential Smoothing method to create forecasts.	2 Apply V Data colors
40	You should now be able to much	Profit by Date Sold P 20
	more easily see the details of the	
	forecast by using the zoom slider	~ _ / _ _ _ _
	on the x-axis.	- III MAN MAN MANN MILWAN
	Note that you will need to have a time-based dimension on the x-axis of the visualization in order to be able to use the Forecasting functionality.	

Data distributions tend to follow a pattern. Any values in the data that fall away from this pattern is referred to as an "Anomaly". Power BI has a built-in algorithm that can help the user find these



anomalies, and even provide potential explanations to them. These can then be added to the report if the anomaly is judged to be particularly egregious, and attention must be called to it.

#	Activity	Expected Outcome
40	Duplicate Page 2 of the report and resize the line chart to make it a bit smaller. Rename the page to Page 3. Make sure that the Zoom Slider is set in such a way that the totality of the data is present.	
41	While the line chart is selected,	A Forecast 1
	go to the Analytics tab and	
	remove the Forecast by clicking	Forecast 1 × + Add
	on the X. <u>Forecasts and</u>	Forecast length Sensitivity
	Anomaly Detection cannot be	90 70 %
	enabled at the same time in the	Point(s) V
	<u>sume visuanzation</u> .	lanore last
	Expand the Find Anomalies	O Point(s) Explain by
	option, then click on Add. This	Add data fields here
	should enable the properties for	Confidence interval Apply
12	Anomaly Detection.	Profit by Date Sold $\land \lor \lor \boxtimes \cdots$
42	properties, look at the line chart	Q
	There should be now additional	3M 09/24/2020 Profit 220145135
	markers in it that denote which	Expected value 803,661.65 Expected maxwells \$11,913.03 Expected maxwells \$11,913.04
	values are deemed anomalous.	2M
		ом
		-1M 1/m 2020 May 2020 Jul 2020 Sep 2020 Nov 2020
		OO





FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph





45	Question/Activity:	Answer:
	What happens if you increase	
	the Sensitivity property from 70	
	to 90?	

The Q&A Visualization

Sometimes, we have an idea on what kind of information we want in our report but we are not quite sure how to express it in a visual way. The **Q&A Visualization** allows the user to ask the data some questions, using some suggestions from Power BI, or by using Natural Language. Using this visualization can allow the user find other avenues of data analysis.

#	Activity	Expected Outcome
46	Add a new page to the report. In	Visualizations >
	OSA Besize it and click Show	
	all Suggestions	Ask a question about your data
		Try one of these to get started
		😰 🤁 🙉 😰 📄 🔤 maximum profit count item descs
		Show all suggestions
47	The list of Power Bl's	C Ask a question about your data
	suggestions should be displayed.	total profit over time how many brands are there
	Find average net sale for each	total cost of sale by year sales data MicroOctagon sold
	region. This will change the	sales data MicroOctagon sort sales data
	visualization displayed into a bar-	hub samples sorted by MicroOctagon hub samples brand by item group
		total morp by region average net sale for each region
	If you are not satisfied with the	Show fewer suggestions
	resulting visual, you can just	average net sale for each region each region each region
	remove the question from the	Showing results degate that adds date florestocktopen hult admited are in and for existing results in a second addition of the second admited are in and O
	text box and start over.	Metro Manila Average of Metro Manila
	If you are caticfied with the	Carite
	result you can permanently	Devao
	convert it into that visualization	Cebu 0K 50K 100K
	type by pressing the debutton	Average of Net Sales Is this useful?
	near the upper right corner of	Average of Net Sales by Region 🖉 🖂 …
	the visual.	Metro Manila
		Cavite
	Note that the Q&A Visualization itself has its own options for its Format Tab. If you like the resulting visualization	S Tadoban
	and want to change some aspects of its display, make sure to convert it first. Otherwise you will only see formatting	Davao
	options for the Q&A Visual itself.	Cebu
		0K 50K 100K
		Average of Net Sales

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph





Text Boxes and the Smart Narrative Visualization

Some reports will be published for consumption by people other than members of the enterprise; like infographics that will be used as marketing materials. Because these reports will need to be printed on a physical page, obviously, that means its intended audience will not have access to the additional tools within Power BI such as tooltips to help facilitate analysis. These kinds of reports will require worded explanations to make them easier to read and interpret. In Power BI, these can be done using **Text Boxes**.



FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph



51 On the top of the Menu Bar, click on Text Box. The blank space in the canvas will be Make the text box about this size populated by a text box. Resize it so that it becomes smaller. Inputting text is all just a matter of clicking on the text box and typing in the worded Whenever you explanation. Segoe UI ▼ 10 ▼ A × B / U ≣ ≡ ≡ ∞ want to edit text boxes, an + Value IΞ Re additional menu will appear on the text box element. 52 These textboxes can be input The Total Profit for MicroOctagon Hub is Seace UI ✓ 10 ✓ A ✓ B / U = = = @ with dynamic text that changes I≣ Review + Value certain Values when the data is filtered. Type in The Total Profit form MicroOctagon Hub is then click on + Value. This will open up the extended The Total Profit for MicroOctagon Hub is 53 ~ ▲ × B / U ≡ ≡ ≡ ☜ menu where you can input the + Value IE Review dynamic text. Create a dynamic value that updates with your data How would you calculate this value Getting Dynamic Values works a Total Profit little bit like the O&A Total Profit visualization, but instead it is 83,433,785,10 limited to just displaying text as 5% General ✓ \$ ✓ % 9 💥 Auto ☆ … opposed to a wider array of Name your value visualizations. # Value Save Cancel In the How would you calculate this value field, type in Total Profit then click on Save. 54 When reviewing the text while The Total Profit for MicroOctagon Hub is editing the report, any piece of 83,433,785.10. dynamic text is going to be highlighted. Feel free to tinker with the formatting properties and the kinds of text that you can produce. Again, if it doesn't produce the exact value you wanted, you might want to 55 Question/Activity: Answer: In addition to the Total Profit, The brand with the Most Net Sales is ASUS, you want to add an explanation equal to 114,304,077.70. that will show which brand has the highest Net Sales and by

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph



	how much. How do you phrase		
	it using text boxes?		
	C C		
	Hint: two additional Values must be created. The preview of the value might also not show the final correct value until after it is saved.		
56	Question/Activity:	Answer:	
	What happens when you change		
	the Month coverage from April		
	to June to July to September?		
57	It is a good practice to give	Segoe UI 🗸 10 ▾ A ヾ B / U 🗮 Ξ Ξ ☜	
	descriptive names to Values	+ Value IE Review 2	
	(Standard Naming Conventions	Create a dynamic value that undates with your data	
	cans help with this). This is	How would you calculate this value	
	because for any given text box,	Total Profit	
	you can Review the different	Result	
	Values you created, and will	90,867,672.47	
	make it easier to know which	Ceneral S 76 7 36 Auto	
	Value serves which purpose.	Name your value	
		# Value	
		L Save Cancel	
58	The Beview Tab will allow you to		-
50	add edit and delete Values that	Segoe UI 10 A B / U ■ Ξ Ξ @	
	you have created	+ Value IE Review	
	you have created.	Review and edit the values in your narrative	
		✓ #Value	
		✓ #Value 2	
		✓ #Value 3 Ø ① ①	
		Show auto-generated values Close	

Power BR can also automatically create a summarized worded explanation for certain visualizations. This is done by using the **Summarize** function in certain visualizations' right-click menu, or by converting visualizations into a **Smart Narrative** text box. Note that while these are two different methods, they will both end up creating a **Smart Narrative** text box.

#	Activity	Expected Outcome
59	Still on page 5 of the report,	Profit by Brand >> 것 같 ::
	select the bar chart, right click	A5U5
	on it then click on Summarize .	MS
		Lenovo
		Acer Acer
		Kingston 2 Summarize Copy •
		Steelune
		Солиг
		om tom zom som Prefit

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph





FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph



Card and Table/Matrix Visualizations and Numeric Aggregation

There are some cases where we want to put a focus on Numeric Data. For example, we want to put an emphasis on a single number of importance in a Dashboard, or when we want to show the quantitative comparisons. For showing Totals or single numbers of importance, we can use the **Card Visualization** for quantitative comparisons, we can use the **Table** (single category) or **Matrix** (multiple categories) Visualization.

#	Activity	Expected Outcome
64	Create a new page in the report. Name it Page 6 . We want to see the Total of Profit and monitor its value.	Visualizations >
	In the Visualizations Pane , add a Card visualization. Add the Profit Field in the visual.	Image: Second seco
65	By now you may have noticed the downward arrow in the Fields Tab for the different fields in the visualization. This allows us to change the Aggregation of numeric fields (how each individual values are combined and shown). These include basic statistical functions like standard deviation, variance, and median.	Profit ✓ × Contention Profit ✓ × Remove field Drill through Rename for this visual Cross-report ✓ Sum Off O Average Keep all filters Minimum On ✓ Add drill-through fields Count (Distinct) Count Standard deviation Variance Median Profit ✓ ×
66	Next, we want to see the Profit and Target of each Item Group . We will be using the Table Visualization so that the values will be displayed. Click on any white space in the Report Canvas , then in the Visualizations Pane , click on Table .	Visualizations > Image: Im

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph



67	Add the Item Group, Profit, and	
	Target fields.	Item Group Profit Target
	-	Backpack 1,943,028.30 1,618,370.00
	Try experimenting with how the visualization behaves if	Headset 14,797,300.90 11,205,246.96
	you add more fields. Typically, you use Tables to much	Keyboard 10,753,690.17 9,200,210.02
	category, like the one in this example.	Memory 3,380,578.76 2,613,853.20
	You can also drag and drop the different fields in the	Misc 963,486.22 655,343.15
	Values portion of the Fields Tab to rearrange the ordering	Mobile Devices 20,308,099.90 15,551,246.00
	of the table's columns	Mouse 6,446,486.71 4,964,299.14 Mouse Pad 850,733,43 613,598,46
		Total 361,181.497.42 297.652.659.49
68	Question/Activity:	Answer:
	The Table is currently sorted in	
	ascending order by item group.	
	Change it so that the table is	🖉 🖓 🖸 … 👘 Chat in Teams
	arranged such that the highest	Item Group Profit Target
	profit is displayed first?	Laptop 301,738,093.04 251,230,492.56
		Mobile Devices 20,308,099.90 15,551,246.00 🕞 Show as a table
	Hint: The option to do so can be found in the Visualization	Headset 14,797,300.90 11,205,246.96
	itself, and not in the different tabs of the Visualization	Keyboard 10,753,690.17 9,200,210.02
	Pane.	Mouse 6,446,466,71 4,964,299,14 Gottight
	This is the first time this option is brought up. This exercise	Backpack 1.943.028.30 1.618.370.00
	detail.	Misc 963,486.22 655,343.15
		Mouse Pad 850,733.43 613,598.46 ↓2 Sort ascending
		Total 361,181,497.42 297,652,659.49 Sort by
69	Question/Activity:	Answer:
	We need another table that will	
	allow us to see and compare the	
	Profit generated by each of the	
	company's Sales People per	Sales Person nuary February March April May June July August September October November December To Aperh 342,554.45 194.415,10 219.390,05 420.599.40 163.395.54 196.228,17 330.180,94 215.366.30 340.260,28 229.229.51 111.727.57 198.618.82
	Month. How do we create this	Ana 95590.20 147,416.62 125,137.10 153,417.37 143,445.51 266,447.6 101,417.63 146,813.4 151,652.34 81,1752.03 191,015.39 Carlota 155,655.10 166,015.44 201,041.69 145,755.65 133,069.12 200,006.67 101,311.465.33 146,575.34 151,652.34 151,052.34 101,012.42 240,930.47 Ohin 277,274.431 356,014.47 94,042.37 151,077.61 377,130.86 594,040.39 557,009.62 407,375,47 433,833.44 413,833.54 42,042.39 240,930.47 113,214.54 240,930.47 113,214.54 443,943.74 113,214.54 240,930.47 113,214.54 240,930.47 113,214.54 240,930.47 113,214.54 240,393.47 113,214.54 240,393.47 113,214.54 240,393.47 113,214.54 240,393.47 113,214.54 240,393.47 113,214.54 240,393.47 113,214.24 240,393.47 113,214.24 240,393.47 113,214.24 240,393.47 113,214.24 240,393.47 113,214.24 113,214.24 113,213.24 113,214.24
	chart? Also rearrange Page 6 as	Donita 3267/25629 1944/275.98 1285/52424 910/216.61 1.885/720.10 1.623.649.25 1250.857.27 1.695.664.50 2.171/210.52 743.216.12 699.476.67 1.572.047.49 1 Hemite 16660.04329 703.082.34 1355.032.47 3476.65073 4739.11672 1447.055.66 442.747.59 2852.4475 15 5341.452.09 1330.739.00 1987.756.53 33768.248 2 Hemite 16660.04329 703.082.34 1355.032.47 3476.65073 4739.11672 1447.74739 11672 1452.041.210.210 1987.245.53 33768.248 2 Hemite 16660.04329 703.082.34 1352.032.47 3476.65073 4739.11672 1447.74739 11672 1452.0421.210.2102.0102.0102.0102.0102.0102
	chart: Also rearrange rage of as	Jocel 394/500/75 134/850/35 300/067/64 114/755/25 227/654/04 112/29997 174/184/94 2003/055/14 209/832.32 41/0375/38 33/01/464 165/953/46 Junime 4/67/2465/04 176/72/45/04 176/72/72/45/04 176/72/45/04 176/72/45/04 176/72/45/04 176/72/45/04 176/72/45/04 176/72/45/04 176/72/45/04 176/72/45/04 176/72/45/04 176/72/72/45/04 176/72/72/45/04 176/72/72/45/04 176/72/72/45/04 176/72/72/72/72/72/72/72/72/72/72/72/72/72/
	seemin the expected outcome.	ber 340,580.00 137/05146 1251.033 640,580.00 1224.0550.00 2440,550.00 2340,550.00 230,500.00 730,646.00 610,620.00 6 Marrin 340,580.00 134,520.00 240,550.00 1250,550.
	Hint: Use the Matrix Visualization. Whereas tables are	Mggy 3153/87/9 364385.56 370.6973/1 274.100.46 242.790.45 201.856.85 11588.57 422.582.70 450.105 267.264.23 280.050 458.797.0 Mgg 677.823.57 274.158.10 459655.29 770.103.77 221.102721 420.878.27 431.0454 264.338.48 31.046.278 334688.86 4381.701.39 17.79551.85 3 Demon 2110.055 1 454.198.198.148.66.01 3 11.04018.6 40.0151 1 124.0791 431.1454 264.338.48 31.046.278 334688.86 4381.701.39 17.79551.85 3 Demon 2110.055 1 454.198.198.148.66.01 3
	commonly used to compare multiple values on a single category. Matrixes are used to compare values across	Network Liszkulasi Network Liszkulasi Network
	multiple categories	Rey 200305022 432467280 5003200.70 435472982 50050540 2399073501 309534515 310025030 5100220200 4.07016103 5391937/0 4 Total 0.8059810.05 27,488,212.20 33,578,063,55 28,014,396.80 33,662,624.04 21,756,764.26 26,255,453.92 28,908,465.87 35,703,752.67 27,413,561.85 35,944,709.22 32,595,682.07 34
	This is the first time this option is brought up. This exercise	Rem Group Profit Target ∅ ∑ ≦2 ··· Laptop 301.738.093.04 251.230.492.56 <
	is meant to encourage exploring the interface in greater	Mobile Devices 20.20.00/99/90 15.551.346.00 Headset 14.797.300.90 11.205.246.96 Keyboard 10.753.546.07 92.00.210.02
		Mouse 6.446.456.71 4.964.299.14 3661.18M
		Misc 963.44522 655.343.15 Profit Moure Pad 650.731.43 613.698.46
		Total 301,181,497.42 (297,652,653.49
70	Question/Activity:	Answer:
	What happens if you add the	
	Region field to the Rows of the	
	Matrix. under the Sales Person	
	field?	
	iiciui.	



Highlighting values in a table when they reach certain thresholds is a quick way to analyze data. Having values highlighted in this way is an easy method of being able to quickly analyze data "at-a-glance". In Power BI, these options can be found in the **Formatting Tab** of the **Visualizations Pane**.

#	Activity	Expected Outcome
71	Still on Page 6, select the Matrix	Conditional formatting
	visualization from the Report	✓ Search
	Canvas and go to the	✓ General Profit ✓
	Formatting Tab. Expand the	V Style Background color
	Conditional Formatting options.	✓ Grid Off O
		✓ Column headers
	There are multiple options for	✓ Row headers Font color
	Conditional Formatting. We will	✓ Values Off O—
	Option	V Subtotals Data hars
		✓ Grand total
	Note that Conditional Formatting is only available for the	✓ Field formatting
	Table and Matrix Visualizations.	✓ Conditional formatting
		✓ Title Off O— Off O—
		V Backgro On
72	Select the field where the	
	Conditional Format should be	
	applied (in this case only Profit is	Protit
	Background color option to add	Background color
	the conditional format	On —●
	The color scheme of the	
	visualization should update.	Seles Preson February March April May June July August September October November Desember # Aben 116441510 215993005 43505940 16623554 330.10634 21536530 360.20202 29322631 1172/257 19862862 30270644 # Aben 11474662 125314651 3454340 10172630 1556324 8117020 1993359 35273641
	Lighter colors mean lower	© Curkos 186/06/41 201041/69 14673563 108/08/12 201008/87 103/453 14677271 140/03/97 158/20164 11027221 240530/00 1366/24130 © Colin 350/4779 360/1479 360/1479 4554/257 81 1777618 35731058 554/453 55740556 2407742 4293/8797 41588555 4720592 44776164 © Donis 1564/25554 125554/24 1910216161 108572010 16254/0258 125085727 165664/90 217121032 7423142 09478/76 157204764 191044149 I Nemma 2010224 1155534/24 24166/2012 4721472 142755558 122085727 165664/90 217121032 7423142 09478/76 15720478 191049149
	values, while darker colors mean	K-Hay 100966027 10226534 229713989 426521542 22552971 32044419 529581211 3204499 539581211 227526951 535412642 17454772 20 Kon 1376515 2205714 1147525 225524541 1722972 1741449 2017515 2017514 20175123 310444 15554 235541204 Latoma 37587825 310444 21147542 127245151 466565 2155614 2315554 20175123 4017515 310444 151475 Latoma 37587825 310444 21147542 127245151 466565 2155614 2315556 23150424 3511255 Kon 13757854 1276371207701 1201458 31017113 53104714 2511255 Kon 13757854 12014715 20171158 31017113
	higher values.	Memi 21/17/14/a P14422/20 20.01111 42/05/047 21/15/04/0 21/15/20
	For Adaptive Viewaliantiana way and and adapt fields that	III (Hemi 11)(3)(2)(1) 3)(2)(2) 2)(2)(2)(2) 2)(2)(2)(2)(2)(2)(2)(2)(2)(2)(2)(2)(2)(2
	are used as values in the visual.	Ener 1000/1218 2002/1214 1/12/12200 44/24/463 1/12/1210 2/24/21100 1/12/1210 1/12/1210 2/20/2210 2/20/2210 Ener 1000/12111 1/25/2210 1/20/2210 1/20/2210 2/20/2210
73	The default color scheme is blue.	Background color - Profit ×
	To change the color and/or	Format by Apply to
	other properties of the	Colorsonale v Videos only v Based on field Default formatting ©
	Conditional Format, in the	v Astro v
	Formatting Tab, click on	Conditional formatting
	Advanced Controls.	Profit Cherging
		Background color Color Spectrum Preview
	Change the colors for the	On —●
	Lowest and Highest Values. The	Advanced controls Laammer OK Cavel
	the proview	
	the preview.	

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph





The above method is the automatic way of adding conditional formats. That is, we let Power BI decide what is "low" and what is "high" and everything in between (AKA formatting by **Color Scale**). This might not be applicable in every situation because the enterprise usually have their own ways of judging values. That is to say, they have their own **rules** on how they classify values.

	#	Activity	Expected Outcome
--	---	----------	------------------



76 In the Table Visualization, we 3,027,056.4 3,027,056,44 1,503,739,64 1,965,421,83 4,817,691,66 664,742,30 367,661,88 8,225,278,23 2,561,091,43 26,244.76 208,008.67 337,913.86 can see that Laptops represent a disproportionately large value Huey Jocel 21334586 9666800 170 167.64 200000 170 167.64 200000 170 167.64 200000 170 170 167.64 200000 170 177.64 200000 170 177.64 200000 170 177.64 200000 170 177.64 200000 170 177.64 200000 170 177.64 200000 170 177.64 200000 170 177.64 200000 170 177.64 200000 170 177.64 200000 170 177.64 200000 170 177.75 177.64 200000 170 177.75 177.64 200000 170 177.75 177.64 200000 170 177.75 177.64 200000 170 177.75 177.64 200000 170 177.75 177.64 200000 170 177.75 177.64 200000 170 177.75 177.64 200000 170 177.75 177.64 200000 170 177.75 177.64 200000 170 177.75 177.64 200000 170 177.75 177.64 200000 170 177.75 177.64 20000 170 177.75 177.64 20000 170 177.75 177.64 200000 170 177.75 177.64 200000 170 177.75 177.64 20000 170 177.75 177.64 200000 170 177.75 177.64 20000 170 177.75 177.64 20000 170 177.75 177.64 20000 170 177.75 177.64 20000 170 177.75 177.7 compared to the item groups. Add a **Slicer** into the report canvas, format it to be horizontal orientation, and use Rey Total it to select all item groups 20,308,099,90 15,551,246,00 14,797,300,90 11,205,246,96 10,753,690,17 9,200,210,02 6,446,486,71 4,964,299,14 3,380,578,76 2,613,853,20 1,943,028,30 1,618,370,00 other than Laptop. 59.44M Mou Use the CTRL+Click method to select multiple categories 850,733.43 613,598.46 59.443 404.38 46 422 166.93 in the slicer 77 Still on Page 6, select the Table Conditional formatting visualization from the Report Item Group Canvas and go to the Background color Formatting Tab. Expand the Off O-Conditional Formatting options. 78 Select the **Profit** field then Conditional formatting Toggle the Background color option to add the conditional Profit \sim format. Background color On ---Click on Advanced Controls Advanced controls For Table Visualizations, because there is only the Value field, you have to select which one you will apply Conditional Formatting to. Unlike Matrix, you can also apply Conditional Formats to non-numeric valu the Advanced Controls 79 In × Background color - Profit window, change the Format By Format by Apply to option from Color Scale to Rules. Values only ~ Rules This will display the rule editor Summarization near the bottom half of the Sum of Profit Sum screen. Rules $\uparrow\downarrow$ Reverse color order \$+\$ New rule \checkmark 0 Number \checkmark then \square \checkmark \land \lor ×If value is greater than or equal to 💙 0 Percent 💙 and is less than For this exercise, we will make the following rules to denote what are low, medium and high profits: Low: belongs to the bottom 33% of the 1. values 2. Medium: belongs to the values between 33% and 66% High: Above 66% 80 Create the first rule, then click 11 Reverse color order + New rule on OK to see the results. ▼ 33 Percent ▼ then ■ ▼ $\land \lor ×$ If value is greater than or equal to 💙 0 Percent 💙 and is less than OK Cancel Learn more



	Item Group Profit Target
	Mobile Devices 20,308,099.90 15,551,246.00
	Headset 14,797,300.90 11,205,246.96
	Keyboard 10,753,690.17 9,200,210.02
	Mouse 6,446,486.71 4,964,299.14
	Memory 3,380,578,76 2,613,853,20
	Misc 963.486.22 655.343.15
	Mouse Pad 850,733.43 613,598.46
	Total 59,443,404.38 46,422,166.93
81 Go back to the Advanced	
	If value is greater than or equal to 💙 0 Percent 💙 and is less than 🔍 33 Percent 💙 then 🔳 🔨 🗘 🗴
controls and click on the	If value is greater than or equal to 🗴 33 Percent 🗸 and is less than 🔹 66 Percent 🗸 then 📕 🔹 🛧 🗸 X
+ New rule button Croata tha	
bullon. Create the	in value is greater than or equal to V 100 Percent V and is less than or equal to V 100 Percent V then V 100 Percent V
rest of the rules.	Item Group Profit Target
	Mobile Devices 20.308.099.90 15.551.246.00
Click on OK to apply the	Headset 14,797,300.90 11,205,246.96
conditional format	Keyboard 10,753,690.17 9,200,210.02
	Mouse 6,446,486.71 4,964,299.14
	Backpack 1,943,028,30 1,618,370,00
	Misc 963,486.22 655,343.15
	Mouse Pad 850,733.43 613,598.46
	Total 59,443,404.38 46,422,166.93
22 Question (Activity)	Ancwart
62 Question/Activity.	
Use Conditional Formatting to	Anobile Devices 20,209,000,00, 15,551,246,00
format the rest of the fields so	Headset 14,797,300.90 11,205,246.96
that each row follows the same	Keyboard 10,753,690.17 9,200,210.02
color	Mouse 644948071 439429514
	Backpack 1,943,028.30 1,616,370.00
	Misc 963,496,22 655,343,15 Mource Pad 850,733,43 613,598,46
Hint: In the Advanced Controls, you can change the field	Total 59,443,404.38 46,422,166.93
just repeating steps 79-81.	
83 Question/Activity:	
what happens when you include	
all item groups in the coverage	
of the data?	
Hint: Click twice on any button in the slicer to ensure that	
the data selection includes all item groups.	





The Filters Pane

√ Filters	>
✓ Search	
Filters on this visual	
Profit	
is (All)	
Sales Person	
is (All)	
Add data fields here	
Filters on this page	
Add data fields here	
Filters on all pages	
Add data fields here	

A **Filter** allows the user to limit the data being displayed in the report. There are three elements by which a user can apply a filter: the visualization only, on the whole page (all visualizations in that page are affected), or on the whole report (all pages are affected).

Throughout this courseware so far, we have applied the usage of **Slicers**. Think of **Slicers** as filters that are applied to the whole page, but is used to provide interactivity by allowing the viewer of the report to dynamically change the data coverage in real time. These ones in the **Filter Pane** however, are static. However they come with more options on how data is evaluated than **Slicers**, so they are still very useful. Note that fields that are not displayed in the visualization can still be used as **Filters**.

#	Activity	Expected Outcome	
84	Add a new page to the report. Name it Page 7. In this new report, create a Stacked Column Chart with the Sales Person and Profit Fields	Profit by Sales Person	
85	The included fields in the visualization will automatically populate the Filters on this Visual section. The filters themselves can be clicked to show the options available for editing. The kind of Filtering options will depend on whether the field is numeric or alphanumeric.	▼ Filters ● > ✓ Search ✓ Filters Filters on this visual Profit ← A is (All) ● Sales Person is (All) ● Add data fields here ● And ○ Or	
86	In the Filter Pane, under Filters on this Page, add the Item Group field by dragging and dropping it from the Fields Pane. Let us now try filtering by the Item Group.	Filters Visualizations Search Filters on this visual Filters on this page Filters on all pages Filters on all pages Filters on all pages	

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph





FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph



One of the quickest ways to decide on what areas to focus on is to know the top and bottom performers based on different KPI's or Metrics. This allows the analyst to quickly zoom in on areas of improvement, and see which parts of the business is performing nicely. In Power BI, Rankings can be implemented on a per-visualization basis using filtering options.

#	Activity	Expected Outcome
# 91 92 92	Activity Under Filters on this visual, expand Sales Person, and select Top N as the filter type. This will update the editable options. The Top N visualization only appears for dimensions. Under Show Items, input 5 in the text box, then under By value drag and drop the Profits field into it. Next, click Apply Filter. Because we had to drag and drop the Profits field, this means that we can rank visuals according to different measures, not just by the ones in the visualization already. The aggregation of the value can also be change the ranking so that the Bottom 5 Sales People	Sales Person is (All) Filter type ① Basic filtering Basic filtering Basic filtering Basic filtering Top N Sales Person is (All) Filter type ① Top N Show items Top N Show items Top N Show items Top N Show items Top N Show items Top N Advanced filtering Basic filtering Top N Show items Top N Show items Top N Apply filter Apply filter Apply filter Apply filter Apply filter Apply filter Apply filter By value By value B
94	Bottom 5 Sales People according to Profit will be shown. The result will be blank. Why is this? Question/Activity: How do we solve this so that the bottom 5 performers can be seen? Hint: there are additional options pertaining to the filter itself when editing them: in the Filters Pane.	Answer:

Working with Hierarchies

A hierarchy is a logical grouping of data. It allows for the organization of data in an orderly manner befitting of the needs of the enterprise. For example, a multi-national corporation arranges its data by



geography to better focus on the peculiarities for each region, so as to avoid a "one size fits all" analysis and take various other environmental factors in mind. A hierarchy may looks something like this:



Generally, the lower you go on the hierarchy, the more detailed and granular the data can get, and vice-versa. In Power BI, hierarchies are created when adding multiple dimensions in certain options in the **Fields Tab**. This is best used when creating an interactive dashboard to include as many perspective views using the same chart but on different dimensions (referred to **drilling up** or **down**), allowing the user to condense a lot more information in one visualization. Remember that hierarchies are a logical grouping/organization of data. They don't have to follow the above example completely.

#	Activity		Expected Outcome
95	Add a new page in the report.		「Profit by Brand
	Name it Page 8.	Axis	ASUS
		Brand ~	MSI
	Add a Stacked Column Bar	Item Group 🗸 🗸	Lenovo
	visualization. Under the Axis	Sales Person 🗸	X I Ba Acer
	field, add the Brand, Item	Legend	Kingston
	Group, and Sales Person fields.	Add data fields here	Steelseries
	Under Values, add Profit.	Values	Conser
		Profit ~	0M 20M 40M 60M 80M 100M 120M 140M
96	Near the top part of the	Profit by Brand	↓↓↓ ☆ ♡ ⊠ …]
	visualization, there will be		
	additional options available.		
	Click on the single down arrow.		

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph



97	The down arrow should now be	
	highlighted and change color.	Т ♥ ↓ ↓ х т Б …
	This is the indicator that drill	
	down mode is turned on. Click	
	it again if you want to disable	
	drill down.	
98	To start drilling down on the	Profit by Brand
	data, simply click on a bar. Click	A015
	on the MSI bar.	
		B Acces
	What happened? 1. The title of the visualization changed.	Kegita
	 The categories in the Y-Axis changed. The up arrow is no longer areved out. 	Steharies Keyboard
	indicating that the current view is not the	Consir
	4. A brand Filter was added in the Filters for this viewelisation	0M 20M 40M 60M 80M 100M 120M 140M 0M 20M 40M 60M 80M 100M
99	Click on the Laptop Bar.	[Profit by Brand and Item Group 🕺 🔿 🐨 🖓 Trofit by Brand. Item Group and Sales Person ү 💿 니 슈 숏 文 없 …]
	What happened?	Lastra
	again.	
	3. An Item Group Filter was added in the Filters for this visualization	
	Clicking on the Up Arrow allows you to go up one level in	Said and a said and a said and a said a s
	added by drilling down.	Keyleard Hernie
		0M 20M 40M 60M 80M 100M 0M 5M 10M 15M 20M 25M 30M 35M
100	There are additional options	· ↓ ↓ ↓ ☆ ♂ ⊑ …
	available when drilling down.	Profit by Item Group
	Go back to the top level of the	Makila Daviana
	hierarchy (the Brands must be	
	in the Y-Axis) then click the	Headset
	button with two parallel down-	Keyboard
	arrows.	G Mouse
		Memory
		Backpack
		Misc
		Mouse Pad
		0.0bn 0.1bn 0.2bn 0.3bn Profit
101	Question/Activity:	Answer:
	What happened to the chart?	
	••	
102	Question/Activity:	Answer:
	Is this behavior different from	
	our initial drill down activity?	
103	Let's try and see what the final	
	option for drilling down is.	
	-	





	Go back to the top level of the hierarchy, then click on the forked downward arrows.	Profit by Brand and Item Group ASUS Laptop MSI Laptop Acer Laptop ASUS Headset Corsair Keybeard ASUS Keybeard Corsair Keybeard ASUS Keybaard ASUS Keybaard ASUS Keybeard ASUS Keybeard AS
104	Question/Activity: What happened to the chart?	Answer:
105	Question/Activity: Is this behavior different from our previous drill down activity?	Answer:

Setting up Interactivity

Over the course of the previous activities, we have seen Power BI's ability to give a good interactive experience to the report user: Slicers allow the user to change data coverage in real time, and Drill Downs allow the user to create different perspectives on the same data. Being able to change how and what data is displayed in visualizations allow the user to develop sleek reports that allows for great analysis and presentation without having to rely on a lot of pages and a lot of charts. For this section, we will look into how to tweak the interactivity between visualizations. Note: by default, all visualizations inside a report page can interact with each other.

#	Activity	Expected Outcome
106	Let's go back to Page 1 of our report. Click on the ASUS bar. Notice what happens on the Pie Chart.	Profit by Brand Asso Asso Asso Beneficing Constitution Strettering Constitution Strettering Constitution Strettering Constitution Strettering Constitution Strettering Constitution Strettering Constitution Strettering Constitution Strettering St





This simple setup allows the user to highlight the sections of the Pie Chart that refer to the different brands in the Bar Chart. The reverse is also true. Selecting different slices of the pie will highlight the profits on those specific regions in the Bar Chart:



There is another option for displaying data other than highlighting between visualizations. It is also possible to **Filter** instead of highlight. Interactions between visualizations can even be disabled altogether. This is achieved by **Editing Interactions**.

#	Activity	Expected Outcome
108	In the Menu Bar , select Visual	🖵 Ask a question 🧠 Explore 🗸 👌 Text box 😥 Shapes 🗸 🖻 Buttons 🗘 📋 Visual interactions 🌱 🖒 Refresh 🗍 Dup
	Interactions and toggle Edit	Learn more about trial expiration & Edit interactions 2 On
	Interactions.	Net Sales by Region Drilling filters other visuals On
109	Select the Bar Chart by clicking	Net Sales by Region
	on any white space inside the	
	visualization.	
	A new set of controls (usually in the upper left hand corner) should appear on the other visualizations in the page.	59.86M (19.06%) 66.17M (21.07%)

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph



		Profit	_k, Ø
110	There are three options for the Pie Chart: Filter Highlight None. The selected visualization will not impact this visual. Click on the Filter Option. 		
111	Select ASUS in the Bar Chart	Profile by Brand	
112	Question / Activity		
	What happened to the data in the Pie Chart?		
113	Go to Page 8 and add a Net Sales by Region Pie Chart beside the Bar Chart.	Profit by Brand Image: Construction of the second sec	Region Midto Manila Cavite © Cavite © Cable © Cable
114	On the Bar Chart, make sure that it is set to the highest level in the hierarchy (Brands on the Y-Axis) and that Drill Down is turned on.	Profit by Brand Image: Construction of Constructio Construction of Construction of Construction of Con	Region Artero Mania Cavite Colu Cavita

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph





115	Double Check that the Bar Chart highlights data in the Pie Chart.	Net Sales by Region
116	Select the ASUS bar.	Profit by Brand and Item Group
117	Question/Activity: What happened to the Pie Chart?	Answer:
118	In the Menu Bar , click Visual Interactions and Turn off Edit Interactions.	□ Visual interactions ∨ ① Refresh □ Dup So Edit interactions 2 ● Off Drilling filters other visuals On

When using Drill Downs, it will override the interactivity settings. If this is not the kind of interaction that is needed, then it is possible to turn this option off by selecting **Visual Interactions** and turning off **Drilling filters other visuals**.

•					J	 F		. D				VI			
	_	_		_				$\hfill\square$ Visual interactions \checkmark	🖔 Refresh	🗖 Dupl		_			
	F		R	S	Τ		N	😓 Edit interactions		On On	\bigcirc		\bigcirc	G	Y
								Drilling filters oth	er visuals 🖲) Off					

This will essentially set interactivity between a Drill Down visual and other visualizations in the page to None.

Other Types of Visualizations

If the kind of visualization required is not present in the **Visualizations Pane**, then other Power BI users and Developers might be able to help you find it.

#	Activity	Expected Outcome			
118	In the Visualizations Pane, click	Visualizations >	Get more visuals		
	on Get more visuals button	▤ਘ롣ы≡ш			
	then click on Get more visuals		Import a visual from a file		
			Remove a visual		
		E7 ⊞ ⊞ E ² +¶ ₽ <u>V</u> ◇	Restore default visuals		

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph



119	A new window will open that will display a list of the different	Power BI Visuals AppSource My organization
	available apps. You can search	Adorins may access personal and document information, by using an adorin, you agree to its remissions, License items and rhivacy rolicy.
	for the visualization you want	Sort by: Recommended ~
	by using the Search function of	Category Bullet Chart 🐲
	different esterories	Editor's Picks A bar chart with extra visual elements to provide additional context. Useful for tracking goals
	different categories.	Advanced Analytics
	Click on Add to include your	Data Visualizations Word Cloud 🏟
	desired visual in the list. In this	Filters content for the set of th
	example let's add the Bullet	Infographics
	Chart.	KPIs Infographic Designer 🌮 Add
		Maps ★★★★☆ Power Bl Certified
	This will cause Power BI to	Time Tornado chart 🍖
	download/import the added	Comparing the relative importance of variables
	visualization.	****
120	Once done, the visualization	Manaliantiana
	will appear beneath the list of	Visualizations
	default visualizations.	
	This is just for demonstrating the option to get custom visualizations. Using the Bullet Chart is not part of the	
	courseware.	
121	If the visualization is no longer	Visualizations > Get more visuals
	needed, it can be removed.	
		🗠 🖄 🗟 📓 🔐 📓 Import a visual from a file
	In the Visualizations Pane, click	🕼 🖶 🗈 🕲 🔛 Remove a visual
	on Get more visuals button	📴 🌐 🖻 🥶 🖵 -
122	then click on Remove a visual	
122	A new window containing all	Select visuals to remove ×
	visuals. Select the ones to	visual from the current report. If a removed visual is not pinned to the visualizations pane, to use it again in the future, you'll need to import it.
	remove then click Pemove	Bullet Chart 2.0.1 associated tiles: 0
	remove, then click Kemove	
	Click Remove from the	
	confirmation window.	
		Number of visuals selected : 1 Cancel
		Remove visuals from this report? X
		not pinned, to use it in the future in this report, you'll need to import it again.
		Remove Cancel





Collaboration Options

Power BI Service allows the members of an enterprise to collaborate in the creation of content. Workspace Memberships set what different users can do to the content inside the workspace, while Dashboards allow visualizations from different Insights and Reports in the same workspace to be joined in the same page for easier monitoring.

Workspace Membership

#	Activity	Expected Outcome					
124	Go back to the Workspace you created way back in Step 6, then on the menus near the upper right-hand corner of the screen, click on Access	S220577 Hury Imp Fine R Rolgans Imp Fine R Rolgans					
125	Enter the email addresses of the people who you want to have access to the workspace. Power BI also has an auto- complete function so you can select the e-mail address of people within your organization.	Add admins, members, or contributors. Learn more Add Add admins, members, or contributors. Learn more Interim Jopet Boja X Kathreen Marie Dela Cruz X Mark Alexander Catapang X carlo Carlo Critita exito contagefacion Carlo Reiver carloravity/ar@fasttrackph.com					
126	After adding the e-mail addresses, assign the type of membership they will have. Note that the exact people you can add might not match with what can be seen on the screenshot.	Add admins, members, or contributors. <u>Learn more</u> I Martin Jopet Borja X Kathreen Marie Dela Cruz X Mark Alexander Catapang X Carlo Ortilla X Member V Admin Venter					

There are four membership types, which dictate what the member can and can't do (referred to as **Permissions**) to the workspace itself and its contents. There is a lot of information to consider about the technicalities present with membership and permissions, but generally, these are what each type means:

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph


- Admin has the highest level of permissions regarding that workspace. Admins can create new, modify, and delete content within the workspace. They can also do tasks pertaining to the management of the Workspace itself, including adding new people and setting their membership type (including other admins), and update and delete the workspace itself. The creator of a workspace is automatically counted as its administrator. Essentially, they are the Top Manager of the workspace.
- 2. **Member** has the second-highest level of permissions. They can do almost everything the Admins can do, with few exceptions. They cannot:
 - a. Update or Delete the workspace itself
 - b. Add or Remove other people with the Member type (they can only add people with lower membership)
- Contributor has the third-highest level of permissions. They can only do actions that pertain to the creation and removal of content within the workspace. They cannot add other users in the workspace and cannot perform any managerial duties pertaining to the workspace and its contents (such as adding other people).
- 4. Viewer the lowest level of permissions. Can only view and interact with the content in the workspace. That is to say, they can consume reports, but not make new ones.

Clicking on the Learn More link above will direct you to the technical documentation for Workspace Memberships if more details are needed. Typically, the management of the Power BI environment in the enterprise is relegated to a specific department, usually as an additional function of the IT Department, or a specific subgroup within the IT Department. Business Users and Analysts will at least be Contributors, while C-level executives and Management are Viewers.

	V V	
#	Activity	Expected Outcome
128	After setting the desired membership type (in this case, Contributor), click on Add.	Add admins, members, or contributors. Learn more IMartin Jopet Borja × Kathreen Marie Dela Cruz × Mark Alexander Catapang × Carlo Ortilla × Enter email addresses Contributor Add
129	Near the bottom of the Access Pane, you will see all members of the workspace.	X ACCESS 20210617-Huey Add admins, members, or contributors. <u>Learn more</u> Enter email addresses Contributor * Add
	permission level of the member after he or she is added. They can also remove their membership entirely.	NAME PERMISSION Revel Santlago Admin I Martin lopet Borja Contributor I Mark Alexander Catapang Contributor Mark Alexander Catapang Contributor Carlo Ontilia Contributor





Dashboards

A **dashboard** is a single interactive page containing all the important information (KPI's) that a company must monitor. Generally speaking, something is called a "dashboard" for as long as a page is used to display different KPI's and it is interactive. In Power BI, **Dashboards** allow users to create a centralized method of monitoring the business. Power BI **Dashboards** consist of **visualizations** (if a **visualization** is inside a **dashboard**, it is referred to as a **tile**) from **reports** within the **workspace**. Its main advantage over **reports** is that because any **visualization** in any **report** within the workspace can be used, multiple KPI's from different **datasets** can be combined in one page. **Reports** on the other hand, can only display data from the **dataset** it is based on.

The inverse is also true. It is not possible to **filter** data and slice and dice **visualizations** in the **Dashboard.** This is why **Dashboards** are used for *monitoring* the business. If deeper *analysis* is required, that is when the detailed **report** is consulted. However, if the functionality is required, whole **report** pages can be pinned to **dashboards** as a **live tile**.











137	Back in the Workspace, view the Insights created from the Dataset .	Name Type Our First Dashboard Dashboard Sales Data MicroOctagon Hub Sam Create report Sales Data MicroOctagon Hub Samplaxtar Autigra in Excel Sales Data MicroOctagon Hub Samplaxtar Create report Create paginated report Create paginated report Deiffe Verev Insights Security Rename Settings Marage permissions Verev Ineage Security
138	Question/Activity: Can you add Insights to Dashboards? Why or why not?	<u>Answer:</u>
139	Pay attention to the lower right corner of a tile when hovering the mouse over it. Dragging and dropping from this icon will allow for resizing tiles . Dragging and Dropping tiles around allows for rearranging the layout of the dashboard as well.	
140	Question/Activity: How do you pin an entire report page into the dashboard? Hint: the option can be found only while editing the report. This activity aims to make you explore the interface on your own.	Answer:
141	Question/Activity: Is interactivity preserved when the page is pinned to the dashboard?	Answer:

Publishing Results

Business Analytics is not just concerned with the analysis of data. As discussed in previous chapters, it is also concerned with the delivery of the results of the analysis, so that only the right people with the right privileges would be able to see them. This is called **Publishing**. Generally, **publishing** a report means "making it available" for its intended audience.

FASTTRACK IT ACADEMY | GF King's Court Bldg II., Chino Roces cor. Delarosa Sts., Makati City 1200, Philippines | Telephone Number: 63.2.759.4348 | www.fitacademy.ph

Power BI



There are multiple ways to publish reports and dashboards in Power BI. Some of the methods will be discussed in the upcoming activities, but in order for the recipients to be able to consume these content, they typically have to be a Member of the **Workspace** the content is found in with at least **Viewer Permissions**. Individual **Reports** can also be exported as files to work around this restriction.

The Power BI Mobile App

In today's fast-paced world, business users might not have their computers with them 100% of the time. If they need to see an update about the business and the metrics they are monitoring, they need a way to access these content without having to depend on their computer. Luckily, mobile phones in recent years have become an integral part of the personal computing space. With these s, business users can get access to apps that provide additional capabilities to their phones. It is no surprise that enterprises also developed apps for their own use to help run the business.

The Microsoft Power BI Mobile App allows the user to sign in using their account and retain access to **reports**, **dashboards**, and other **apps** that allow them to monitor the business for as long as they have an internet connection. The Microsoft Power BI Mobile App is available to download for free in the Google Play Store (for Android devices) and Apple App Store (for iOS devices). Please note that the mobile app is mainly used for *consumption* of content. Creating **reports**, **dashboards**, and **apps** are still done through the web browser.

Home	Favorites	Apps	Workspaces	More
	\leq	0		

In order to use the mobile app, users will have to download it first and sign in. The sign in process is similar to the process for web browsers, so that process will no longer be shown here. Near the bottom of the interface of the app is a condensed version of the

browser's Navigation Pane.

The Home Tob Quick acces Activity Frequents Test Report Retends of an II 5, 2021 Test Report Recents

The **Home** Tab is where the user can quickly access the Power BI Content that is available to him or her. It contains two subtabs: **Quick access** and **Activity**. **Quick access** contains all **reports** and **dashboards** that the user frequently and/or has recently accessed. The **Activity** tab shows a history of all the things that were done on content the user has access to (like if certain **apps** were updated, etc.) The bell icon contains notifications and the magnifying glass icon allows the user to search for content. Both are on the upper right hand corner of the **Home** Tab. It is essentially a stripped-down version of the **Home** Page of the browser interface.

The Favorites Tab

The **Favorites** Tab contains all of the content that you have set as a Favorite. This allows the user to directly access those pieces of content in a centralized location instead of having to manually browse through and remember which **workspaces** they are located in.

To add content into the **Favorites** tab, simply click on the star icon. For the Browser interface, the star icon only appears if the cursor is hovering above content that can be favorited (mainly **Reports** and **dashboards**).



Mobile App

\leftarrow	2 20210617-Huey ~		Q
All	Reports Dashboards		
0	Our First Dashboard	☆	(i)
0	Sales Data MicroOctag.	☆	í
J	Test Report	☆	i

	Browser
٩٩	20210617-Huey Huey Sample Workspace
+ New	~
All	Content Datasets + dataflows
	Name Our First Dashboard
Ø	<u>Our First Dashboard</u> 🖻 ☆ :
8	Sales Data MicroOctagon Hub Sample
Ø	Sales Data MicroOctagon Hub Sample.xlsx
ab	Test Report



8	Workspaces	Q	Q
MW	My Workspace		
2A	20210504 AU Demo		

The More Pages Tab

More pages						
Ŀ	Recents					
RR	Shared with me					
Ê	Samples					
	Scanner					

The **Workspaces** Tab contains all the **workspaces** that the user has created or has access to. Clicking on a workspace will show its contents. The main difference with this view from the browser view is that only **reports** and **dashboards** are visible from the mobile app. This means that other content, such as **datasets** aren't accessible through the mobile app.

The **More Pages** tab contains less-frequently used options: **Recents** show a more detailed list (compared to the **recents** section of the **Home Tab**) of the most recently accessed content; **Shared with me** contains all content that has been shared to the user; **Samples** contain sample reports from Microsoft; and finally, **Scanner** brings up the built-in QR Code Scanner to allow for quick access to **reports** that are being shared via a QR Code (more on this on a later topic)

Exporting Reports

This option will create either a PDF or Power Point file that serves as a snapshot of the report. This means What You See Is What You Get (WYSIWYG) and as such, any interactivity is lost in the resulting file. Use this option if the intended audience does not have access to Power BI (download the file and email as an attachment). Make sure that any filters and slicers are set to their proper values for your intended audience before exporting.

Activity Expected Outcome



142	Open the Test report that was created in the previous steps. This will open it in Reading View . <i>The Export option is only available in Reading View.</i>	20210617-Huey Huey Sample Workspace Huey Sample Workspace New All Content Datasets + dataflows Name Type Our First Dashboard Our First Dashboard Sales Data MicroOctagon Hub Sample Dataset Sales Data I Test Report n Hub Sample.xlsx Dashboard
143	On the Menu Bar , click on	Power BI 20210617-Huey Test Report Data updated
	Export, then select PDF.	Pages
		Page 2 Page 3 Page 3
		Page 4
144	A new window should open, containing the different options before exporting. Click on Export . A message will appear on the upper right hand corner of the Menu bar .	x Export Export with Current Values Exclude hidden report tabs Only export current page Export Cancel
145	Wait for the Export process to finish, and a new window will	 Save As ✓ Save As ✓ Save As ✓ Save As ✓ Save As
	open. This will prompt you to	Organize ▼ New folder This PC ^ Name Date modified Type Size
	save the resulting file. Give it a	3 30 Objects 2020 PubCorpo CompTIA Training Atten 26/11/2020 8-42 AM File folder Coudswyft 15/12/2020 3-41 PM File folder
	name, and save it to the	Documents Documents Outlook Calendars 20/04/2021 10:44 PM File folder
	Desktop. Clicking on Save will	A 2021 NEW CONTRACT_REUEL SANTIAGO 28/01/2021 2:17 PM Adobe Acrobat D 1 Adobe Acrobat D 1 Adobe Acrobat D 2 Deture Adobe Acrobat D 2
	file	LUMINKA VIRIUAL MACHINE (Problems e 03/11/2020 //35 AM Adobe Acrobat D Wideos Mapping Course Content to CompTIA A 05/03/2021 437 PM Adobe Acrobat D to Cr Cr D. A percond district Appage of 01/07/2021 115 PM Adobe Acrobat D
	inc.	→ DATA (D:) v c A Close A B i on Closed - Als 2021 mdf 05/01/2021 5/2 PM Adobe Acrobet D. 5 v
	The default file name is whatever the name of the report that is being exported.	File <u>name</u> Test Report.pdf ✓ Save as type Adobe Acrobat Document (*.pdf) ✓
	The exported file can be saved to your preferred location. Desktop is just used here to make it easier to locate for this activity.	A Hide Folders Save Cancel A 6 A 6 B Test Report.pdf A







Generate a QR Code for the Report

This option will allow the user to create a QR Code that can be given to others. The QR Code will allow those other users to be able to directly access the **report** by scanning it. The person who will scan this code will need to be signed in to Power BI and require at least **Viewer Permission** to the **Workspace** containing the **report**.

#	Activity	Expected Outcome
147	Still on the report, enter Edit Mode.	Power BI 20210617-Huay Test Report Data updated 6/18/21 ∨ Pages C File ∨ → Export ∨ Lt ⁰ Share Comment Subscribe € Edit Page 1 Profit by Brand Profit by Brand Profit Comment
148	Near the upper right hand corner of the report, click on the More Options button, and select Generate QR Code	Q Image: Save generate a QR code Q Save generate a QR code Q Image: Ima
149	A new window will appear. The QR code itself can be scanned here. Click on Download and save the file to your desktop. We can now send this file to people in the organization.	Your QR code is ready Tet Report Now that you've created a QR code you can scan it from a mobile device to access this report directly. To save the QR code image on the left. click the "Download" button. O' Voir colleagues can use this QR code only if they have permissions to see this report. Download Download Download Download
150	Question/Activity:	Answer:





	Scan the QR Code you	
	generated using the mobile	
	app. What happens?	
151	Question/Activity:	Answer:
	Add a new, blank page to the	
	report and save it. After about a	
	minute, scan your QR Code	
	again. What happens?	
	Do NOT generate a new QR Code. Scan the old one. This is why we saved the resulting code in Step 149.	

The Shared With Me Tab

As long as a user is given membership to a **Workspace**, all content within that **workspace** (**Reports** and **Dashboards**) can be seen from this tab.

	Power BI	Shared with me				
≡	,₽ se	earch				
ଜ						
☆	D	Name	Туре	Owner	Shared	
© _	ab	FIT-Kath	Report	FIT-Kath	6/16/21, 2:31:07 PM	
0	Ø	Our First Dashboard	Dashboard	20210617-Huey	6/22/21, 1:04:31 PM	
Q	Ø	Sales Data MicroOctagon Hub.csv dsx	Dashboard	20210617-Huey	6/22/21, 11:42:49 AM	
₽	Ø	Sales Data MicroOctagon Hub.csv	Dashboard	FIT-Kath	6/16/21, 2:27:28 PM	
e ^q	_	Test Report	Report	20210617-Huey	6/22/21, 11:42:49 AM	
S.						

Publishing with Apps

The Admin Members of the workspace can create and update an App based on the contents of the workspace. Apps are an easy way to roll up the **contents** of the **workspace** into a single, centralized location for ease of access. The Admin Members can select which **Dashboards** and **Reports** are included in the **app**. Viewing **Apps** requires **Workspace** membership.

#	Activity			E	xpect	ed Ou	utcon	ne	
152	Go to the workspace that was created in Step 6 of this	Power B1 20210517-3hay Image: State of the sta						IP Ver v	Marging P Dentity 0 0 0 0 0 Contraction Contraction Contraction ν T Range Settings A Asses P. Seach
	workshop. Near the upper right hand corner of the screen, click on the Create app button.	D Narse	Тури	Gumar	Refreshed	Next refresh	Endorsement	Semitivity	lackdadi in app



153	Give the app a name. By default, it will have the same name as the Workspace . For this activity, name it Our First App. Give the app a description. An image can also be uploaded to make the app easier to recognize. Click on Publish App after	Notes 1. Auge
154	A new window should show up. Click on Publish .	Our First App × When you publish an app that has large distribution, it might take a little while to process. Typically. the content will be available within 5-10 minutes, but it can take up to one day. Publish Cancel
155	Click on Go to app	Successfully published Tur First App Give people the link below, or direct them to Apps > Get apps in the Power BI service. https://app.powerbi.com/Redirect?action=OpenApp&appId=Sff12a3: Copy Copied to dipboard. Go to app Close
156	The dashboards and report in the workspace can be seen on the left side of the app. The report can be expanded to show the exact page.	C De d'Archever () bander () band
157	Question/Activity: The Sales Data MicroOctagon Hub dashboard is blank. How do we remove it from the app? Hint: Look closely at the workspace list. This serves as the activity on how to update an app.	Question/Activity:





		Cur First App Our First Dashboard Test Report	
158	Like individual dashboards and reports , apps can be accessed via the mobile app.	Apps C Q Image: Demo App - CDG Last published on Jun 22, 2021 Image: Demo App - CDG Last published on Jun 22, 2021 Image: Demo App - CDG Last published on Jun 22, 2021 Image: Demo App - CDG Last published on Jun 23, 2021 Image: Demo App - CDG Last published o	
159	Members of the workspace can individually add the app to their account by going to Apps from the Navigation Pane , then clicking Get more Apps from Microsoft AppSource then finally going to the Organizational apps tab.	© Search content.	Power BI apps Install apps that provide actionable insights and drive business results All apps Organizational apps Template apps Cur First App Katheen Mare Data Cus Test app for Workshop Get it now

Mobile Layout

As noted near the beginning of this chapter, Power BI was designed with computer screens in mind. This means that the interfaces tend to be used much more easily if the screen is wider than it is tall (landscape mode). This stands in stark contrast to mobile devices, especially with mobile phones, which have screens that are taller than they are wide to facilitate usage with one hand. For **Reports** and **Dashboards**, Power BI allows for the creation of a **Mobile Layout** to make the display much more user-friendly for mobile device users.

Please note that **Reports, Dashboards,** and **Apps** can still be viewed as normal in the Power BI Mobile app, even without the **Mobile Layout**. This simply serves as a "Quality of Life" feature that improves the usability of the content across different types of devices.

Mobile Layout for Reports

#	Activity	Expected Outcome				
160	Open the Test Report , and go	Power Bl 20210517-Huey	Test Report Data updated 6/18/21 🗸			
	to Edit Mode.	File V View V Reading view Mobile layout Profit by Brand	다 Ask a question 🖏 Explore > 스케 Text box 😥 Shapes > 📟 Butt Net Sales by Region			
	On the Menu Bar , there should be a button for Mobile Layout .	ASUS	244.4M (19.01%)			



Business Analytics and Data Visualization with Power BI



161	The Mobile Layout Formatter will appear. To create a mobile layout, simply drag and drop the visualizations from the Page Visuals Pane to the Mobile Canvas.	Re la degre la degr
162	Add the Slicer at the topmost portion of the screen, followed by the Bar Chart, then the Pie Chart.	Month 3 0 Profit by Brand 4 4 5 1 6 1
163	Near the bottom of the screen is the list of pages. Go to Page 4 and create a mobile layout for	Page 1 Page 2 Page 3 Page 4 Page 5 Page 6 Page 7 Page 8
	that page as well.	



165	Save the report . To start editing the report again (adding new pages and visuals), just click on Web Larout	Profit by Brand and Month Month 1 2 3 3 4 5 5 6 6 7 8 8 9 1 ASUS ASUS Barder Barder Barder Save Save this report
166	Question/Activity: Using the Power BI Mobile App, go to the workspace where the report belongs and refresh the list. Open the report. Is interactivity preserved?	Answer:
167	Question/Activity: Still on Page 1, want to see the original layout of the report as it was created in the browser. How do we change the display? Return the mobile device to	Question/Activity:
169	portrait mode. Question/Activity: Go to Page 2. Were you immediately able to see the	Question/Activity:
	report?	

Mobile Layout for Dashboards

	#	Activity	Expected Outcome
--	---	----------	------------------

Power BI



170	From the Workspace using the	Power BI 20210617-Huey	
	Web Browser Interface, open Our First Dashboard	🎦 File 🗸 🖻 Share 🛛 Chat in Teams 🖓 Comment 🗹 Subscribe	${ \slashed {P}}$ Edit ${ \slashed { \slashed {V}}}$
	our mist businedru.	☐ Ask a question about your data	+ Add a tile
	In the Menu Bar. click Edit then		Ø Dashboard theme
	Mobile Layout.	Profit by sales person, month sold	. Mobile layout
171	The Mobile Layout Formatter should appear.	Life medite layout O	inggenered filter
172	Question/Activity:	Answer:	
	Did you have to create a Mobile		
	Layout from scratch?		
173	Question/Activity:	Answer:	
	The pie chart is no longer		
	needed for the mobile layout.		
174	How can it be removed?	-	
174	Question/Activity:	Answer:	
	Access the dashboard using the		
	mobile app. How can the		
	Proweer be shown?		
L			//
	AUA		7

CHECK FOR UNDERSTANDING: TECHNOLOGI

MicroOctagon Hub approached you to develop a report using their data. They want to be able to more accurately analyze the profit levels of their company for any given month, so that they can easily see what are the top Brands, Items, and Sales People in their organization. They also want to see the actual numbers of their Net Sales, Total Cost of Sales, and Profits. With these in mind, they gave you a template of what they want the end result of the report to look like:





They also have the following interactivity requirements:

- 1. The Top 3 Brands By Profit Chart should filter out all the other visualizations in the page.
- 2. The Top 3 Items By Profit and Top 5 Sales People charts should highlight the values on the other charts.
- MicroOctagon Hub has noticed that their Laptops make up a huge portion of their profits already. They want those data points excluded from the report to see which other aspect of the business they should focus on.

Power BI



Chapter 5: Capstone Project

Using everything we have learned so far, prepare a presentation that analyzes the data of an enterprise.

- 1. Use Rapid Prototyping to create a worksheet that will be used as the dataset (or sets).
- 2. Use **Microsoft Power BI** to enrich the dataset (if needed), create visualizations for Analysis, and compose a data story.
- 3. Do a 3-5 minute presentation of your Business Analysis. You will then be asked questions based on your presentation.

Additional Tips for Creating the Capstone

Visualize your (imaginary) client

Ask yourself the following questions: What it their company name? What is the nature of their products and services? How large is the enterprise? Do they span multiple geographic locations? Are they a local or international company? And the like. This will give you a rough idea of what their data might look like.

Put yourself in the shoes of your (imaginary) client

As an enterprise, ask the following questions: What kind of information do they need to keep track? What metrics do they need to see so that they can get an idea of how the business is performing? Do we need to see the revenue per product on a geographical Map? Do I need to see the same information for the last 3 years? Etc. This drills down on what kind of data is needed in greater detail.

Begin with the End in mind

In conjunction with the previous two tips, visualizing the final look and feel of the Story will help you make informed decisions on what kind of data needs to be included in the workbook, because certain chart types are more conducive to different kinds of information, which will help immensely in the **Rapid Prototyping** process of the Workbooks.

Three Years of Historical Data

To ensure that a deep analysis can be made, prototype for at least three years' worth of Historical Data. Although highly unlikely, do note that Excel Files (.xlsx) has a limit of around 1M rows.

Power BI Samples

Check out some of the Sample Reports from the Power BI Mobile App. This can help you formulate the formatting and KPI's that you may want to include in your presentation.