**EXCEL**

* Microsoft Excel is a spreadsheet program developed by Microsoft. It was first released in 1985 as a part of the Microsoft Office suite. It quickly gained popularity due to its ability to organize and analyze data in rows and columns.
* Excel went through several versions, with significant updates and improvements over the years. In the late 1980s and early 1990s, Excel introduced features like charting, formula auditing, and add-ins.
* In the late 1990s, Excel 2000 brought enhanced data analysis tools and more advanced features. The 2000s saw further developments with Excel 2003, 2007, and 2010, introducing features like PivotTables, conditional formatting, and improved data visualization options.
* Excel 2013 focused on better integration with cloud services, making it easier to collaborate and share spreadsheets online. Excel 2016 introduced more advanced data modeling and Power Query capabilities.
* Excel’s most recent versions, like Excel 2019 and Microsoft 365 (formerly Office 365), have continued to enhance data analysis, visualization, and collaboration features. These versions have integrated AI-driven tools for data analysis and advanced charting options.
* Throughout its history, Microsoft Excel has become a standard tool for businesses, students, and professionals for managing and analyzing data in various fields, from finance to science.

**Founders**

Charles Simonyi is the man behind company’s most successful software, including Word and Excel.

**Advantages**

1. Easy data entry and operations

It facilitates smooth and easy data entry. Compared to any other data entry and analyzing tools, MS Excel offers features like Ribbon interface, a set of commands used to perform certain operations

1. Accurate comparisons and analysis options

MS Excel provides many analytical tools for the accurate analysis and comparison of large amounts of data.

1. Allows graphical representation of data

MS Excel allows you to create the visual representation of data and information. The data can be visually displayed in the form of bar charts, column charts and graphs. It automatically revises the charts and graphs, once the data gets modified

1. Ready to use formulas

MS Excel performs all mathematical and logical functions like addition, subtraction, multiplication, division, average, sum, mod, product etc. Excel provides many formulas that helps you to solve both simple and complex calculations.

**Disadvantages**

* Difficult To Learn

Another Limitation of MS Excel is that it can be difficult to learn. This is because there are many different elements, such as formulas, functions, and keyboard shortcuts.

* Difficult formulas

One downside of using MS Excel is that there are multiple levels of complexity. For instance, some people could feel more at ease with the thought of doing short work, such as making an inventory list for clients so they can restock their stores, while others might not be familiar with formulae and charts, which could take up significant time

* Errors in Calculation

Inaccuracies in computations in that When working with fractions or percentages, for example, the decimal point may be lost, resulting in an error on the screen.

This might make it tough for someone who doesn’t know what they’re doing to solve the problem without the aid of a professional.

**Power BI**

Power BI is a business analytics service developed by Microsoft. It was first introduced in 2011 as “Project Crescent,” a part of the SQL Server platform. However, it wasn’t until 2013 that Microsoft officially unveiled Power BI as a separate product.

The initial release of Power BI included Power Query, Power Pivot, and Power View components, which aimed to enable users to import, transform, and visualize data from various sources. These tools were mainly integrated with Microsoft Excel.

In 2015, Microsoft launched Power BI as a cloud-based service, allowing users to create interactive reports and dashboards that could be shared and accessed online. This marked a significant shift towards cloud-based analytics and data visualization.

As Power BI gained popularity, Microsoft continued to invest in its development. New features were added, such as natural language queries, custom visuals, and integration with other Microsoft services like SharePoint and OneDrive.

Power BI Pro, introduced in 2017, provided additional collaboration and sharing capabilities for teams. Power BI Premium, also launched in 2017, offered dedicated cloud resources for larger organizations and more advanced analytics needs.

Subsequent updates brought features like Power BI Report Server (for on-premises deployment), Paginated Reports, and support for mobile devices. The Power BI Desktop application allowed users to create complex data models and reports locally.

Microsoft’s emphasis on AI and machine learning also led to the incorporation of AI-driven capabilities in Power BI, enabling features like automated insights and AI-powered data transformation.

In recent years, Power BI’s capabilities have continued to expand, with a strong focus on self-service analytics, data storytelling, and integration with Azure services. As of my last update in September 2021, Power BI has become a prominent tool for organizations to make data-driven decisions and gain insights from their data.

**Founders**

Started in 2006 as the brainchild of Thierry D’hers and Amir Netz from Microsoft’s SQL Server Reporting Services Team.

**Advantages**

* Easy to use

Power BI offers you a pretty user-friendly interface that makes the entire dashboard creation process easy.

For instance, after choosing the data source if you opt for sales and location, Power BI will automatically identify the map chart.

* Low learning curve

The Power BI dashboard requires no coding; it’s easy to use and master.

* Customizable dashboard

Power BI offers amazing customization when it comes to creating and sharing dashboards.i.e

One can create Power BI HR Analytics Dashboard to simplify the HR process, a Power BI for Banking Dashboard for analyzing finances, or Power BI Marketing Dashboard to determine the success of your campaigns.

* Q and A function

The Q&A feature Power BI comes with allows you to ask questions using a natural language and get the information you want. I.e.

If you want to check the number of shoes sold. You can simply visit the Q&A section and enter “shoes sold by the state as a bar chart” This will display the information you need in the form of a bar chart.

**Disadvantages**

* Limited Sharing of Data

Reports and dashboards can be shared only with users with the same email domains or those with their email domains listed in your Office 365 tenant.

* Bulky User Interface

The formula help window and side par often block the view of vital, making the Power BI user interface very bulky. The making of a scrolling dashboard will require a lot of effort since it is not a native feature.

* Performance Issues

Sometimes Power BI might face performance issues as it has been observed that it cannot process more than 20000-30000 rows without running into issues for some queries.

* Does not handle large data sources properly

For instance If you have a large data set that needs to be analyzed, Microsoft Power BI will not be the best option for you. You might face trouble in connecting and importing large datasets, as well as problems such as slow performance and time-outs.

**TABLEAU**

Tableau was founded by Pat Hanrahan, Christian Chabot, and Chris Stolte from Stanford University in 2003. The main idea behind its creation is to make the database industry interactive and comprehensive.

Tableau appears in the era when there were already established companies like Cognos, Microsoft Excel, Business Objects, etc. It managed to climb the success chart with $3.8 billion of current market value.Since then, the company is growing day by day.

In August 2016, Tableau announced and appointed Adam Selipsky as president and CEO of the company.

**FOUNDERS**

Tableau was formally founded in January 2003 by Pat Hanrahan, Christian Chabot, and Chris Stolte, and moved its headquarters to the Fremont neighborhood of Seattle, Washington, the following year.

**Advantages**

* Data visualization

Tableau enables users to create interactive and visually compelling charts, graphs, maps, and other visualizations to explore and present data effectively.

* Quickly Create Interactive Visualization

Users can create a very interactive visual by using drag n drop functionalities of Tableau.

* Tableau can Handle Large Amounts of Data

A large amount of data can create different types of visualization without disturbing the performance of the dashboards

* Comfortable in Implementation

Many types of visualization options are available in Tableau, which enhances the user experience.

**Disadvantages**

* Scheduling of Reports

Tableau does not provide the automatic schedule of reports.

* Static and Single Value Parameter

Tableau parameters are static, and it always select a single value as a parameter. Whenever the data gets changed, these parameters also have to be updated manually every time. There is no other option for users that can automate the updating of parameters.

* **Screen Resolution on Tableau Dashboards**

The layout of the dashboards is distributed if the Tableau developer screen resolution is different from users screen resolution.

**SQL**

SQL, which stands for Structured Query Language, has a cool history. It started in the 1970s at IBM by Donald D. Chamberlin and Raymond F. Boyce.

They wanted a language to manage data in their System R project. This led to the creation of SEQUEL (Structured English Query Language), which later became SQL.

Later on,SQL gained popularity and became a standard for working with relational databases. Different companies developed their versions of SQL, which sometimes caused compatibility issues. In the 1980s and 1990s, ANSI and ISO standardized SQL to make it consistent across platforms. Today, SQL is widely used for managing, querying, and manipulating data in databases.

**FOUNDERS**

The SQL programming language was developed in the 1970s by IBM researchers Raymond Boyce and Donald Chamberlin

**Advantages**

* High speed

Using the SQL queries, the user can quickly and efficiently retrieve a large amount of records from a database.

* No coding needed

In the standard SQL, it is very easy to manage the database system. It doesn’t require a substantial amount of code to manage the database system.

* Portability

SQL can be used in laptop, PCs, server and even some mobile phones.

* Multiple data view

Using the SQL language, the users can make different views of the database structure.

**Disadvantages**

**1**. SQL has a complex interface that creates difficulty for some users to access it.

2. SQL has a high operating cost.

3. Interfacing SQL databases is more complex than adding a few lines of code.

**PYTHON**

It was created in the late 1980s by Guido van Rossum, a Dutch programmer. Guido wanted a language that was easy to read and write, so he started working on Python as a side project.

He released the first version, Python 0.9.0, in February 1991. Python’s design philosophy emphasizes code readability and its syntax allows programmers to express concepts in fewer lines of code than languages like C++ or Java.

Over the years, Python gained popularity for its simplicity and versatility. The Python community grew, and in 2000, Python 2 was released with various improvements. However, Python 3, released in 2008, introduced significant changes that weren’t backward-compatible with Python 2.

Despite some initial resistance, Python 3 became the focus, and Python 2’s support ended in 2020. Today, Python is widely used in web development, data science, machine learning, etc.

**Founders**

Python was created by Guido van Rossum, and first released on February 20, 1991.

**Advantages**

* Simple to Use and Understand

Python is simple to understand and use. It’s a highly developed programming language with an English-like syntax. The language is simple to adapt as a result of these factors. Because of its simplicity, Python’s fundamentals can be implemented faster than those in other programming languages.

* Interpreted Language

This is one of the features that makes it simple to use. In the event of an error, it halts the process and reports the problem. Python only shows one error, even if the program has multiple errors. This makes debugging easier.

* Portability

Python, on the contrary, is not equivalent to other programming languages. It only needs to be written once, and then it can be run anywhere. However, the user should avoid involving any system-dependent features.

**Disadvantages**

* Python is Slow at Runtime
* Python is Not Great for Mobile Application Development
* Python Programmers face Difficulty in Using Other Languages
* Python has High Memory Consumption

The memory consumption of Python is high due to the flexibility of the data types. However, for large and long-running systems developed using Python, dealing with memory management is difficult.

**R**

R is a popular programming language and free software environment primarily used for statistical computing and graphics. It was developed by Ross Ihaka and Robert Gentleman at the University of Auckland, New Zealand, in the early 1990s.

Initially, R was inspired by the S programming language and environment, created by John Chambers and his colleagues at Bell Laboratories. R was designed to provide a free, open-source alternative to S, with an emphasis on statistical analysis and data visualization.

R gained traction within the academic and research communities for its flexibility, extensive package ecosystem, and robust statistical capabilities. Its user community and package repository, known as CRAN (Comprehensive R Archive Network), grew rapidly, contributing to its widespread adoption.

Over time, R evolved to include a wide range of statistical and graphical techniques, making it a go-to tool for data analysis, visualization, and modeling. Its popularity expanded beyond academia, finding applications in industries like finance, healthcare, and more.

The development of RStudio, an integrated development environment (IDE) specifically designed for R, further boosted its accessibility and ease of use. RStudio provided a user-friendly interface, enhancing the overall R programming experience.

Today, R continues to be a powerful tool for statisticians, data scientists, and researchers, contributing significantly to the field of data analysis, visualization, and statistical modeling.

**Founders**

Created by statisticians Ross Ihaka and Robert Gentleman.

**Advantages**

**Open-Source Language**

R is an open-source language accessible to anyone. Users do not need any paid licensing or permissions to access it. One can easily contribute and modify the source code.

**Compatibility And Versatility**

One can integrate R language with other languages such as C/C++, Java, and Python. It also allows you to pair it up with other DBMSs and technologies. Also, R is a platform-independent language. It enables you to run it on Linux, Windows, and Mac without any bugs.

**Extensions**

R has many extensions that provide the user with a premium experience. One may not need to explore different tools for different tasks while developing a business model or a machine learning project. Extensions that help in statistical modeling, data manipulation, and graphics are present. The user is free to use them for better modifications.

**Data Visualization**

As discussed above, with various extensions, one can create attractive reports with R wherever there is data. Plotting visually appealing and aesthetic graphs is supported by R.

**Machine Learning**

One can perform machine learning operations using R. Be it advanced artificial neural networks or regression and classification.

**Statistics**

R is widely used because it can develop statistical models as no other language can. R supports discrete and continuous probability distributions, making its horizon more favorable.

**Disadvantages**

**Steep learning curve:**

R has a steep learning curve, especially for users with no prior programming experience.  **Performance:**

R can be slower than other programming languages, particularly when handling large datasets.

**Less user-friendly:**

R’s syntax and structure can be less user-friendly compared to other languages like Python.