



---

# Information Retrieval Project

## Mobile & Laptops Sales Data

---



### Presented By:

<b>Mohamed Mohamed Gaber</b>	<b>221005663</b>
<b>Zeyad Ahmed Hussin</b>	<b>221005658</b>
<b>Mohamed Khaled Mostafa</b>	<b>221006028</b>
<b>Mahmoud Khaled Mohamed</b>	<b>221006576</b>

### Presented to:

**Dr. Alaa**

**TA. Angie**

## **Contents**

<b>Introduction.....</b>	<b>2</b>
<b>Data Analysis.....</b>	<b>2</b>
<b>Background Information.....</b>	<b>4</b>
<b>1<sup>st</sup> Company: Samsung Electronics.....</b>	<b>4</b>
<b>2<sup>nd</sup> Company: Apple Inc.....</b>	<b>6</b>
<b>3<sup>rd</sup> Company: HP.....</b>	<b>7</b>
<b>4<sup>th</sup> Company: DELL.....</b>	<b>9</b>
<b>Combination of Data Analysis &amp; The Chosen Topic.....</b>	<b>11</b>
<b>Threats of Cyberattacks nowadays.....</b>	<b>13</b>
<b>The Chosen Dataset Description.....</b>	<b>16</b>
<b>Task 2: Dataset Description.....</b>	<b>17</b>
<b>Task 3: Charts.....</b>	<b>20</b>

## **Introduction**

### **Data Analysis**

Data analysis is the process of inspecting, cleaning, transforming, and modeling data to extract useful information, identify patterns, and support decision-making.

#### **1. Stages of Data Analysis**

1. **Data Collection:** Gather data from sources such as databases, surveys, sensors, or APIs.
2. **Data Cleaning:** Remove errors, handle missing values, and ensure consistency.
3. **Data Exploration:** Use descriptive statistics and visualization (e.g., histograms, boxplots) to understand data distribution and trends.
4. **Data Transformation:** Normalize, encode categorical variables, and prepare data for modeling.
5. **Modeling and Analysis:** Apply statistical tests or machine learning algorithms to identify relationships or make predictions.
6. **Interpretation and Communication:** Translate findings into actionable insights through reports or dashboards.

#### **2. Types of Data Analysis**

- **Descriptive Analysis:** Summarizes what happened (e.g., average sales per month).
- **Diagnostic Analysis:** Explains why it happened (e.g., correlation between sales and marketing).
- **Predictive Analysis:** Forecasts future outcomes using models like regression or Random Forest.
- **Prescriptive Analysis:** Suggests actions based on analysis (e.g., inventory optimization).

#### **3. Common Tools**

- **Excel / Google Sheets** – Basic analysis and visualization.

- **Python (Pandas, NumPy, Matplotlib, Scikit-learn)** – Advanced data manipulation and modeling.
- **R** – Statistical computing and visualization.
- **Power BI / Tableau** – Dashboarding and visual analytics.
- **SQL** – Data extraction and querying.

#### **4. Applications**

Used in finance, marketing, healthcare, education, and sports to improve decisions, efficiency, and predictions.

## **Background Information**

### **1<sup>st</sup> Company: Samsung Electronics**

#### **Origins and Early Growth**

Samsung's story begins with its parent conglomerate, the Samsung Group, founded by Lee Byung-Chul on March 1, 1938, in Taegu (now Daegu), Korea, as a modest trading business dealing in dried fish, noodles and produce, and exporting goods to China. The company name "Samsung" literally means "three stars" in Korean.

Samsung expanded into the textile industry during the Korean War (1950–53), establishing the biggest woolen factory in the nation by 1954. The group's foray into consumer electronics began in 1969 with the establishment of the electronics division (Samsung Electric Industries) in Suwon, South Korea. It formed a joint venture with NEC (Japan) and Sumitomo in 1970 to manufacture audio-visual equipment and household appliances. In 1974, Samsung Group bought Korea Semiconductor, indicating its entry into the semiconductor industry.

After Lee Byung-Chul announced in February 1983 that Samsung will become a DRAM provider (the "Tokyo Declaration"), the firm created its first 64K DRAM chip in less than a year. Samsung Electric Industries and Samsung Semiconductor & Communications combined in 1988 to become Samsung Electronics as it exists today.

#### **Expansion, Innovation & Globalization**

Samsung has increased its global presence in the 1990s and 2000s and gained a reputation for innovation in a variety of electronics areas. Samsung became the leading maker of black-and-white televisions in the 1970s, and by the 1980s, they had built R&D facilities that would support their explosive expansion, according to their own historical website. The first 64 M DRAM, digital TV, MP3 phone, and other innovations were among the milestones.

Samsung made significant investments in semiconductors, display technologies, mobile devices, and household appliances as part of its worldwide strategy.

According to Forbes, Samsung has adhered to a consistent corporate strategy from its foundation in the electronics industry in 1969: dedicating talent and technology to producing excellent goods. The business also profited from South Korea's economic growth by taking use of government policies that favored big corporations, or "chaebols," to establish itself as a significant force in the nation's economy.

## **Business & Industrial Significance**

Samsung Electronics is a leading worldwide technological company today, especially in memory chips, consumer electronics, smartphones, screens, and other digital products. It is a key component of South Korea's export economy and the flagship of the Samsung Group. The corporation's transformation from a little trade concern in 1938 to a multinational electronics behemoth demonstrates its capacity for innovation and adaptation throughout technological eras. Additionally, Samsung has demonstrated strategic integration and diversification, moving from commerce and textiles to electronics, semiconductors, display technologies, and mobile communications. Its long-term success was largely attributed to its early acquisition of Korea Semiconductor and its audacious move in the 1980s to overtake international DRAM manufacturers.

## **Culture, Vision & Challenges**

Samsung characterizes its brand identity in terms of innovative technology, worldwide leadership, and potent R&D skills. But like any large company, Samsung has had to deal with a number of difficulties, including technical rivalry, cyclical hardware markets, antitrust laws, and regulatory problems (such as price-fixing in the memory chip sector). Furthermore, it is still crucial to sustain innovation in industries that move quickly, like semiconductors and smartphones. According to Samsung, sustaining momentum in the 1990s required the creation of R&D facilities and a brand makeover.

## **2<sup>nd</sup> Company: Apple Inc.**

### **Origins and Founding**

On April 1, 1976, Steve Jobs, Steve Wozniak, and Ronald Wayne created Apple Inc. in Cupertino, California. The company's first goal was to create computers that were both compact and easy to use in homes or workplaces. Jobs promoted and sold the Apple I computer board, which Wozniak created. Apple's success in the early personal computer period was established when the company incorporated and produced the Apple II the next year, in 1977. In what was then the largest IPO since Ford Motor Company in 1956, Apple went public on December 12, 1980, selling over 4.6 million shares at \$22 apiece and making over \$100 million.

### **Growth, Innovation & Market Leadership**

Apple debuted a number of significant products: One of the earliest personal computers with color graphics was the Apple II (1977). The first widely available personal computer with a graphical user interface (GUI) and mouse was the Macintosh (1984). Apple had financial challenges and a diminishing market share in the 1990s. After being fired in 1985, Jobs reappeared in 1997 following the acquisition of NeXT by Apple. With the introduction of the iMac (1998), iPod (2001), iPhone (2007), and iPad (2010) under his direction, Apple transitioned from a maker of personal computers to a more comprehensive consumer electronics ecosystem. In order to provide smooth user experience and strong brand loyalty, Apple's business strategy places a major focus on the integration of hardware, software, and services. Apple "set new benchmarks in product innovation, user-centric functionality, aesthetics, and multiproduct integration," according to Britannica.

### **Business & Impact**

Today With its headquarters located in Cupertino, California, Apple is a prominent worldwide technology corporation that offers a wide range of services (App Store, iCloud, etc.) in addition to goods like Mac computers, iPhone handsets, and iPad tablets. Its influence goes beyond hardware: Apple introduced the app economy, shaped design, branding, and user experience throughout the industry, and contributed to the definition of ecosystems in consumer electronics and mobile computing. Apple's name is frequently linked to high price, design aesthetics, and innovation. Controlling the entire experience, increasing service revenue, and growing internationally are the company's strategic priorities.

## **3<sup>rd</sup> Company: HP**

### **Introduction**

Hewlett-Packard (HP) is one of the world's leading technology companies, known for its innovation in personal computing, printing solutions, and digital imaging. Founded in 1939 by Bill Hewlett and Dave Packard, the company started in a small garage in Palo Alto, California — now considered the birthplace of Silicon Valley. HP's mission focuses on creating technology that improves lives for everyone, everywhere.

### **Company History**

HP began as an electronics manufacturer producing oscillators. Its first customer was Walt Disney Studios, which used HP's test equipment in the production of Fantasia in 1940. Over the decades, HP grew into a global technology powerhouse, pioneering innovations in computing, printing, and enterprise solutions. In 2015, the company was split into two entities:

- HP Inc., focusing on personal systems and printing.
- Hewlett Packard Enterprise (HPE), focusing on servers, storage, and enterprise solutions.

### **Mission and Vision**

#### **Mission:**

“To create technology that makes life better for everyone, everywhere — every person, every organization, and every community around the globe.”

#### **Vision:**

“To engineer experiences that amaze.”

### **Products and Services**

HP offers a wide range of products and services across multiple segments:

- Personal Systems: Laptops, desktops, and workstations.
- Printing Solutions: Printers, 3D printing technology, ink, and toner supplies.
- Software and Cloud Services: Printing management software and sustainability tools.

HP has also invested in sustainable design, integrating recyclable materials and energy efficient production in its devices.

## **Market Position and Financial Performance**

HP remains one of the top global PC manufacturers, often competing with Dell and Lenovo for market leadership.

As of 2024, HP held a significant global market share in personal computing and maintained strong profitability from its printing division. The company continues to adapt to hybrid work trends and sustainable innovation.

## **Corporate Social Responsibility (CSR) and Sustainability**

HP is a leader in sustainability and social impact, focusing on:

- Climate Action: Reducing carbon emissions and energy use.
- Human Rights and Diversity: Promoting inclusion and equal opportunities.
- Circular Economy: Designing recyclable and repairable devices.

HP aims to achieve net-zero greenhouse gas emissions by 2040.

## **Challenges and Future Outlook**

HP faces competition from companies such as Dell, Lenovo, and Apple. Its main challenges include:

- Fluctuations in global demand for PCs and printers.
- Managing component supply chains.
- Adapting to shifts toward digital and cloud-based solutions.

However, HP's strategic investments in 3D printing, AI-driven devices, and sustainable technology position it strongly for the future.

## **4<sup>th</sup> Company: DELL**

### **Founding & Early Years**

Dell Technologies was founded in 1984 by Michael Dell, then a student at the University of Texas at Austin. Initially named PC's Limited, it specialized in assembling and selling personal computers directly to consumers. The company's first computer, the Turbo PC, was released in 1985. Dell's unique direct-to-customer model helped it grow rapidly, and by 1988 it became a publicly traded company.

### **Business Model & Growth**

Dell revolutionized the computer industry through its direct-sales and build-to-order model. Customers could order custom configurations, and Dell manufactured to order, minimizing inventory costs. The company expanded globally in the 1990s and achieved market leadership by 2001 as the world's number one PC systems provider.

### **Evolution & Strategic Shifts**

Dell diversified beyond personal computers into servers, storage, and enterprise solutions. In 2013, it went private to focus on long-term innovation. In 2016, Dell merged with EMC Corporation to form Dell Technologies, one of the largest technology mergers in history.

### **Headquarters & Corporate Structure**

Dell Technologies is headquartered in Round Rock, Texas, USA. It operates in two primary business segments: Client Solutions (PCs, laptops, peripherals) and Infrastructure Solutions (servers, storage, networking).

### **Achievements & Market Position**

Dell remains one of the world's largest PC vendors and a key player in IT infrastructure. It is known for innovation, supply chain excellence, and customer-focused strategies. Challenges & Ongoing Transformations as PC markets matured, Dell faced challenges from competitors and shifting consumer behavior. Recently, it has emphasized cloud, enterprise, and AI-driven solutions to adapt to new technological demands.

## Key Milestones

Year	Milestone
1984	Founded by Michael Dell as PC's Limited.
1985	Released first system, the Turbo PC.
1988	Went public as Dell Computer Corporation.
2001	Became world's number one PC provider.
2013	Went private to restructure.
2016	Merged with EMC to form Dell Technologies.

## Combination of Data Analysis & The Chosen Topic

### Samsung:

Samsung relies heavily on data analysis to understand global market trends, customer preferences, and product performance. With data from smartphones, laptops, sales channels, and customer feedback, Samsung can identify which models perform best in specific regions.

Through analyzing the Mobile Sales Data dataset, Samsung can determine sales volume, revenue changes, and seasonal patterns. These insights help Samsung customize marketing campaigns, adjust production plans, and balance pricing with innovation across both its mobile and laptop categories. Data analytics also helps Samsung detect declining product performance and react quickly to rising competition or shifting consumer habits.

### Apple:

Apple uses data analysis to monitor customer behavior and optimize the features of its premium devices. Because Apple products often have higher average selling prices, analysis of the Mobile Sales Data helps the company track revenue trends, identify its best-selling models, and determine how its pricing strategy compares with competitors.

By analyzing global sales performance, Apple can refine its product line, improve user experience, and detect regional variations in demand. Data insights also help Apple evaluate the success of promotions and anticipate future technology trends, ensuring its products stay aligned with customer expectations.

### HP:

HP depends on data analytics to forecast laptop demand, manage inventory efficiently, and track performance across multiple regions. Using the Mobile Sales Data dataset, HP can identify which models sell in high volumes, which markets generate the most revenue, and how pricing affects customer decisions.

Because HP often competes in the mid-range and budget segments, data analysis allows the company to study sales patterns, adjust pricing strategies, and detect potential issues such as low-performing devices or ineffective marketing campaigns. Insights also assist HP in improving operational processes and responding to changes in consumer behavior.

### Dell:

Dell uses data analysis to evaluate sales volumes, revenue performance, and customer preferences across its laptop lineup. The Mobile Sales Data dataset helps

Dell compare model performance, identify growth opportunities, and optimize inventory distribution.

Dell typically emphasizes competitive pricing and high-volume sales, so data insights help the company balance cost efficiency with product quality. By examining sales trends and customer feedback, Dell can improve product categories, identify weaknesses, and act quickly if competition increases or market conditions shift.

# **Threats of Cyberattacks nowadays.**

## **Introduction**

Cybersecurity is the process of defending computer networks, systems, and data against online threats, illegal access, and destruction. Cyberthreats are becoming more frequent and sophisticated in today's linked world, putting people, companies, and governments at serious risk. The strategies employed by cybercriminals also change as technology does. This study examines the mechanisms, practical applications, effects, and preventative measures of six of the most serious cybersecurity threats: ransomware, malware, phishing, man-in-the-middle (MITM) attacks, distributed denial-of-service (DDoS) and denial-of-service (DoS) attacks, insider threats, and phishing.

### **1. Malware**

Any program purposefully created to harm or take advantage of computer systems is referred to as malware, short for malicious software. Trojan horses, worms, viruses, spyware, and adware are common varieties. Usually, compromised websites, infected software downloads, or email attachments are how malware spreads. Once installed, it can allow hackers to remotely take over a system, interfere with operations, or steal confidential information. The 'ILOVEYOU' virus from 2000 is a prominent example; it spread via email and cost billions of dollars in damages worldwide. Using up-to-date antivirus software, staying away from dubious downloads, and keeping robust network defenses are all part of preventing malware.

### **2. Phishing Attacks**

Phishing is a type of social engineering attack in which cybercriminals pose as trustworthy organizations in an attempt to fool people into disclosing private information like credit card numbers, passwords, or personal information. Phishing, which is usually carried out via false emails or messages, can result in identity theft or monetary loss. The 2016 phishing attack on the Democratic National Committee, which exposed political data, is a notorious example. Multi-factor authentication (MFA), employee awareness training, and filtering shady emails are examples of defense strategies (FBI, 2022).

### **3. Denial-of-Service (DoS) and Distributed Denial-of-Service (DDoS) Attacks**

DoS and DDoS attacks aim to make a network or service unavailable by overwhelming it with traffic. While a DoS attack originates from one source, a DDoS attack uses multiple compromised systems (botnets) to amplify the effect. The 2016 Mirai botnet attack targeted major websites like Twitter and Netflix, disrupting internet access across the U.S. These attacks exploit bandwidth limitations and system vulnerabilities. Mitigation involves using firewalls, traffic filtering, and DDoS protection services (Cloudflare, 2023).

#### **4. Man-in-the-Middle (MITM) Attacks**

A Man-in-the-Middle (MITM) attack occurs when an attacker secretly intercepts and manipulates communication between two parties. Common scenarios include eavesdropping on unsecured Wi-Fi networks or hijacking active sessions. Attackers can steal credentials, alter transactions, or inject malicious code. For example, in 2017, attackers used MITM techniques to steal cryptocurrency from users of compromised networks. Prevention includes using encrypted connections (HTTPS), virtual private networks (VPNs), and secure Wi-Fi protocols (Kaspersky, 2023).

#### **5. Insider Threats**

Insider threats originate from within an organization, involving employees, contractors, or partners who intentionally or unintentionally compromise security. Malicious insiders may steal confidential data for personal gain, while negligent employees might accidentally expose sensitive information. For example, in 2018, a Tesla employee was accused of stealing trade secrets and leaking confidential data. Countermeasures include access controls, employee monitoring, and strict data security policies (CERT, 2022).

#### **6. Ransomware**

Ransomware is a type of malware that encrypts files and demands payment (usually in cryptocurrency) to restore access. It can paralyze entire organizations by locking critical systems. The 2017 WannaCry attack infected over 200,000 computers worldwide, exploiting vulnerability in Windows. Many hospitals, corporations, and governments were affected. Prevention involves maintaining regular data backups, applying timely software updates, and training staff to identify suspicious emails (Europol, 2023).

## **Conclusion**

The digital landscape continues to evolve and so do cyber threats. Understanding the mechanisms and impacts of threats like malware, phishing, DDoS attacks, MITM attacks, insider threats, and ransomware is vital for building stronger defenses. A combination of technological solutions, user education, and continuous monitoring can significantly reduce vulnerabilities. Ultimately, cybersecurity is a shared responsibility requiring vigilance, awareness, and proactive protection strategies.

## The Chosen Dataset Description

**Dataset Name:** Mobile & Laptops Sales Data

**Source:** Provided dataset from Kaggle

**Link:** <https://www.kaggle.com/datasets/vinothkannaece/mobiles-and-laptop-sales-data>

### **Description:**

The dataset contains detailed sales information for four major technology companies: **Samsung, Apple, HP, and Dell**. It includes data for both **mobile phones** and **laptops**, focusing on their prices, number of units sold, and total revenue. Each row represents a specific product and its sales record, allowing comparison between brands and analysis of overall sales performance.

### **Number of Columns:** 16

(Product, Brand, Product Code, Product Specification, Price, Inward Date, Dispatch Date, Quantity Sold, Customer Name, Customer Location, Region ,Core Specification, Processor Specification, RAM, ROM, SSD)

### **Number of Rows:** 50001

This dataset helps analyze sales performance, identify the best-selling brands and products, and understand how pricing affects total revenue among Samsung, Apple, HP, and Dell.

## Task 2: Dataset Description

```
Importing the library we will use:  
[1]:  
import pandas as pd  
df=pd.read_csv("/content/mobile_sales_data-DESKTOP-M7R9051.csv")  
  
To get the first # of rows:  
[2]:  
df.head(3)  
  
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+  
| 0   | Mobile Phone | Motorola | 88EB4558 | Site candidate activity company there bit ins... | 78570 | 45140 | 45141 | 6 | William Hess | South Kelsey | Central | NaN | Snapdragon 7 Gen | 12GB | 128GB | NaN |  
| 1   | Laptop | Oppo | 416DFEEB | Beat put care fight affect address his. | 44613 | 45202 | 45205 | 1 | Larry Smith | North Lisa | South | Ryzen 5 | Ryzen 5 | 8GB | 512GB | 256GB |  
| 2   | Mobile Phone | Samsung | 9F975B08 | Energy special low seven place audience. | 159826 | 45735 | 45736 | 5 | Leah Copeland | South Todd | Central | NaN | MediaTek Dimensity | 8GB | 256GB | NaN |  
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
```

```
To get the last # of rows:  
[3]:  
df.tail(3)  
  
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+  
| 49997 | Laptop | Toshiba | CAD89A93 | Test floor tax together out adult discover own... | 66502 | 45307 | 45356 | 6 | Joseph Martin | Hunturt | North | i5 | i5 | 4GB | 64GB | 2TB |  
| 49998 | Mobile Phone | Lenovo | 78566C17 | Away also magazine receive such lay. | 158883 | 45061 | 45071 | 2 | Gabrielle Barnett | Heidberg | North | NaN | Snapdragon 7s | 12GB | 1TB | NaN |  
| 49999 | Laptop | Asus | 9C3FC57C | Role ahead common listen idea few blood half. | 86483 | 45167 | 45225 | 7 | Robert Sampson | West Elizabethchester | East | i7 | i7 | 12GB | 128GB | 256GB |  
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
```

```
To get all info about the dataset:  
[4]:  
df.info()  
  
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+  
# <class 'pandas.core.frame.DataFrame'>  
RangeIndex: 50000 entries, 0 to 49999  
Data columns (total 16 columns):  
 #   Column           Non-Null Count  Dtype     
---  --  
 0   Product          50000 non-null   object    
 1   Brand            50000 non-null   object    
 2   Product Code     50000 non-null   object    
 3   Product Specification 50000 non-null   object    
 4   Price             50000 non-null   int64     
 5   Inward Date      50000 non-null   int64     
 6   Dispatch Date    50000 non-null   int64     
 7   Quantity Sold    50000 non-null   int64     
 8   Customer Name    50000 non-null   object    
 9   Customer Location 50000 non-null   object    
 10  Region            50000 non-null   object    
 11  Core Specification 25017 non-null   object    
 12  Processor Specification 50000 non-null   object    
 13  RAM               50000 non-null   object    
 14  ROM               50000 non-null   object    
 15  SSD               25017 non-null   object    
dtypes: int64(4), object(12)  
memory usage: 6.1+ MB
```

To get some summary statistics for the dataset:

```
df.describe()
```

	Price	Inward Date	Dispatch Date	Quantity Sold
count	50000.000000	50000.000000	50000.000000	50000.000000
mean	102641.407080	45370.737480	45401.329520	5.51378
std	56363.550361	210.964495	211.611159	2.88101
min	5008.000000	45006.000000	45008.000000	1.00000
25%	53487.000000	45189.000000	45219.000000	3.00000
50%	103072.000000	45370.000000	45400.000000	6.00000
75%	151396.250000	45553.000000	45584.000000	8.00000
max	199999.000000	45736.000000	45795.000000	10.00000

To get the total number of columns and rows:

+ Code + Text

```
df.shape
```

(50000, 16)

To mention all columns found in the dataset:

### df.columns

```
Index(['Product', 'Brand', 'Product Code', 'Product Specification', 'Price',
       'Inward Date', 'Dispatch Date', 'Quantity Sold', 'Customer Name',
       'Customer Location', 'Region', 'Core Specification',
       'Processor Specification', 'RAM', 'ROM', 'SSD'],
      dtype='object')
```

To get the length of the dataset (Number of Rows)

1 op(df)

To know if there is null values or not:

To know the number of null fields:

```
df.isnull().sum()
```

	9
Product	0
Brand	0
Product Code	0
Product Specification	0
Price	0
Inward Date	0
Dispatch Date	0
Quantity Sold	0
Customer Name	0
Customer Location	0
Region	0
Core Specification	24963
Processor Specification	0
RAM	0
ROM	0
SSD	24963

To group data by a specific thing:

```
df.groupby("Brand")["Quantity Sold"].sum()
```

Brand	Quantity Sold
Acer	13854
Apple	14197
Asus	12999
Dell	13419
Google	14412
HP	13600
Huawei	13805
Lenovo	13723
Microsoft	13586
Motorola	13888
Nokia	14239
OnePlus	13880
Oppo	13389
Realme	13212
Redmi	13948
Samsung	14033
Sony	14043
Toshiba	13996
Vivo	13761
iQOO	13705

dtype: int64

To sort values by a specific metric:

To sort values by a specific metric:

```
df.sort_values(["Brand"])
```

Product	Brand	Product Code	Product Specification	Price	Inward Date	Dispatch Date	Quantity Sold	Customer Name	Customer Location	Region	Core Specification	Processor Specification	RAM	ROM	SSD	
28599	Laptop	Acer	2583030F	Article yourself aid yet administration rot...	132105	45411	45435	4	Shane Vargas	Clarkmouth	South	Ryzen 3	Ryzen 3	8GB	512GB	2TB
42457	Laptop	Acer	5523B06C	Catch remember southern heart model tend prote...	128865	45547	45574	1	Anna Crawford	South Darrendale	East	Ryzen 5	Ryzen 5	8GB	1TB	256GB
46590	Laptop	Acer	7567ABC8	Response must someone outside billion develop...	14605	45671	45702	4	Trevor Robertson	Andrewstad	East	Ryzen 3	Ryzen 3	16GB	256GB	2TB
46588	Laptop	Acer	068FA806	Owner president party change old assume simila...	178248	45178	45227	10	William Hamilton	Lake Hamrah	Central	Ryzen 7	Ryzen 7	8GB	128GB	256GB
20591	Laptop	Acer	CDB1658D	Big have partner same mission manage oil evide...	92592	45952	45985	4	Melissa Burgess	Troyfort	West	Ryzen 7	Ryzen 7	4GB	512GB	1TB
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
19634	Laptop	iQOO	32B996C3	Surface central art woman money soldier play h...	18597	45722	45754	3	Gary Rodriguez	Matthewfort	East	Ryzen 7	Ryzen 7	16GB	64GB	1TB
54799	Laptop	iQOO	F04IE139	Sea same when event interesting bring Democrat...	108609	45186	45200	10	Jennifer Marks	West Matthewmouth	East	Ryzen 5	Ryzen 5	8GB	128GB	512GB
9344	Laptop	iQOO	F08AF38F	Politics month say agreement it scientist once...	191448	45352	45354	4	Dr. Jason Allen Jr.	West Eric	South	Ryzen 5	Ryzen 5	16GB	64GB	1TB
4969	Mobile Phone	iQOO	C7C562FC	Age statement together rich production provide...	12540	45632	45666	4	Ashley Alvarado	Cunninghamview	Central	NaN	Apple A-Series	32GB	512GB	NaN
19733	Laptop	iQOO	F505ECA8	Third trip dark window stock third down call w...	194749	45345	45369	1	Arthur Kelly	Martinicville	Central	i7	i7	12GB	64GB	512GB

50000 rows × 16 columns

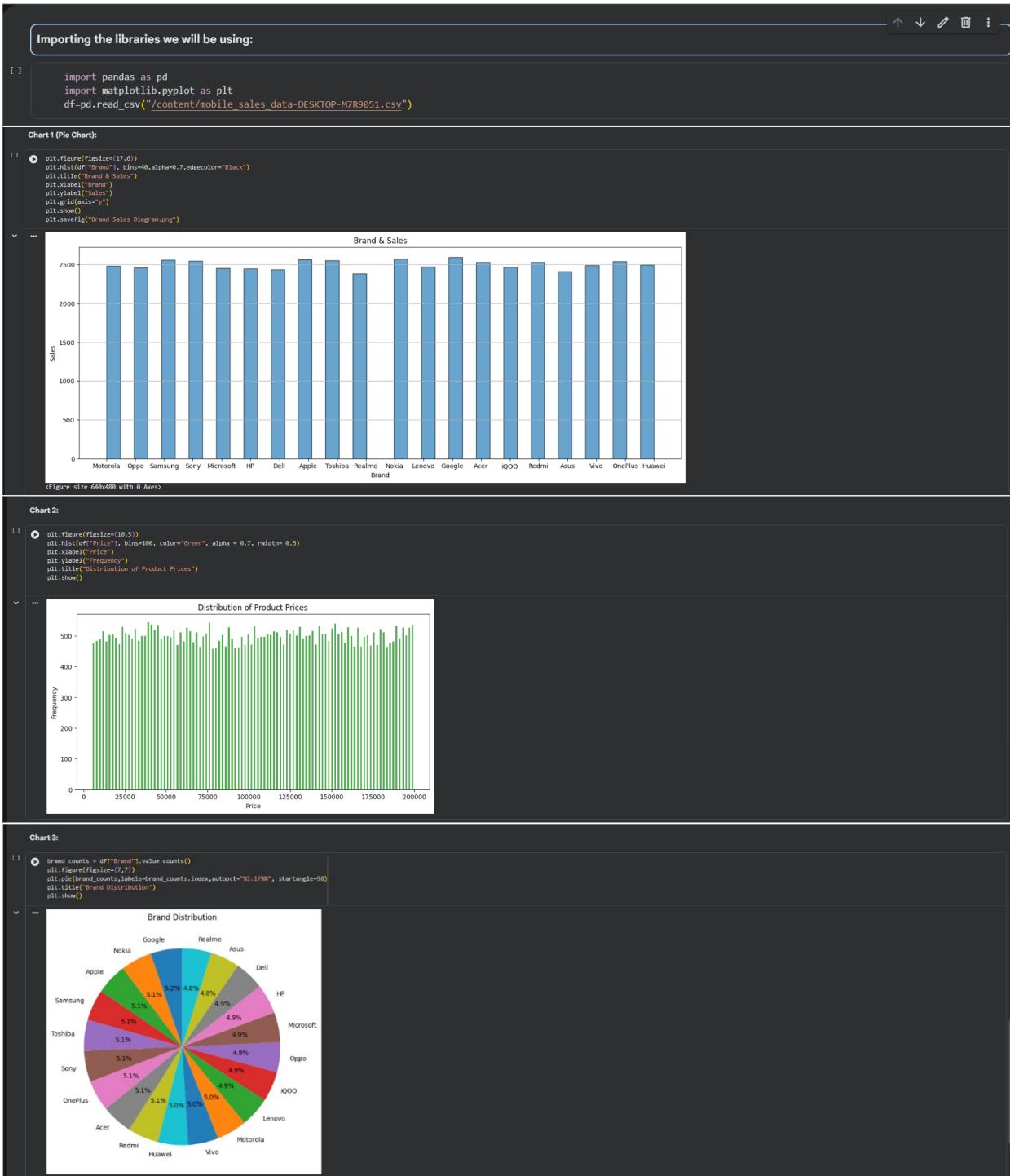
To get all rows that has a specific data:

```
df[df["Brand"]=="Apple"]
```

Product	Brand	Product Code	Product Specification	Price	Inward Date	Dispatch Date	Quantity Sold	Customer Name	Customer Location	Region	Core Specification	Processor Specification	RAM	ROM	SSD	
7	Laptop	Apple	D58FF785	Reality sea weight thing newspaper good next g...	15041	45228	45280	1	Danielle Smith	North Travis	South	i7	i7	12GB	128GB	256GB
8	Laptop	Apple	4FC302CF	Owner necessary total determine view stock chu...	186647	45196	45210	3	Kyle Brown	West Dakota	East	i5	i5	16GB	64GB	1TB
10	Mobile Phone	Apple	F546013D6	To say system loss near him.	51251	45019	45035	9	Ms. Katie Anderson	Lake Laurenfort	North	NaN	Snapdragon 8 Gen	4GB	256GB	NaN
92	Mobile Phone	Apple	0C378DC0	Worker pretty lead agent these performance hold.	66597	45617	45618	10	Blake Fitzpatrick	New Sanford	Central	NaN	Samsung Exynos	8GB	128GB	NaN
94	Laptop	Apple	2E475456	Vote chance toward meeting manager hot music s...	150198	45082	45134	10	Michelle Ruiz	Longside	West	i3	i3	8GB	256GB	2TB
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
49833	Laptop	Apple	E92A136C	Trade mother however generation prevent girl.	159834	45474	45513	4	John Williams	Allenshire	East	Ryzen 9	Ryzen 9	8GB	64GB	1TB
49928	Mobile Phone	Apple	EDF904DD	Picture century through just black big another...	76605	45520	45542	9	Jane Miranda	Damnyfurt	Central	NaN	Snapdragon 7 Gen	4GB	64GB	NaN
49956	Laptop	Apple	361ASC77	Important and resource live even security begin...	112627	45262	45307	4	April Ray DDS	Adamport	South	i3	i3	8GB	1TB	512GB
49979	Mobile Phone	Apple	EA3CFT0	Oil forget memory coach couple chair sense tea...	143868	45013	45025	6	Steven Gibson	South Jessica	South	NaN	MediaTek Dimensity	6GB	64GB	NaN
49982	Laptop	Apple	D005150C	Few either these deal future truth stand simil...	156276	45363	45407	10	Jody Cole	New Dennisview	East	Ryzen 3	Ryzen 3	12GB	128GB	256GB

2564 rows × 16 columns

## Task 3: Charts



## Task 4: NumPy

```
import numpy and pandas

[1] 1 import numpy as np
2 import pandas as pd

Load the data

[2] 1 df = pd.read_csv('mobile_sales_data.csv')

Extract columns

[3] 1 price = df['Price'].values
2 qty = df['Quantity Sold'].values
3 dis = df['Dispatch Date'].values
4 ward = df['Inward Date'].values
5 ram = df['RAM'].values
6 rom = df['ROM'].values
7 brand = df['Brand']
8 R = df['Region'].values

Average price

[4] 1 P = np.mean(price)
2 print(P)

182641.48788
```

```
Total units sold

[5] 1 Q = np.sum(qty)
2 print(Q)

275689

Most expensive item

[6] 1 p = np.max(price)
2 print(p)

199999

Average days in stock

[7] 1 dw = (dis - ward).mean()
2 print(dw)

38.59204

Price volatility

[8] 1 ps = np.std(price)
2 print(ps)

56362.986723013935
```

```
Top 10 companies

[9] 1 B5 = df['Brand'].value_counts().head(10)
2 print(B5)

Brand
Google    2598
Nokia     2571
Apple      2564
Samsung   2558
Toshiba    2555
Sony       2547
OnePlus   2541
Acer       2533
Redmi     2529
Huawei    2497
Name: count, dtype: int64
```

Sales by region

```
[66] 1 df['Region'].value_counts()
```

\*\*\* count

Region	count
West	10288
South	10055
North	9954
Central	9860
East	9843

dtype: int64

Most common ROM size

```
[67] 1 df['ROM'].mode()[0]
```

'256GB'

Total revenue

```
[70] 1 print((price * qty).sum())
```

28279081122

Smallest storage size

```
[71] 1 print(np.min(rom))
```

128GB

Average units sold per transaction

```
[72] 1 print(qty.mean())
```

\*\*\* 5.51378

## **Conclusion :**

The project shows how important data analysis is for understanding sales, customer behavior, and company performance. By studying the dataset of mobile and laptop sales, we learned how big companies like Samsung, Apple, HP, and Dell use data to improve their products, set better prices, and plan their business strategies. The project also explains the most common cyberattacks today and why cybersecurity is important for both companies and individuals. Since technology is always improving, cyber threats are also increasing, so organizations must stay alert and protect their systems. Overall, this project connects data analysis, company research, and cybersecurity in a simple and useful way, showing how these topics are important in the real world.

## **1. Data Analysis Helps Companies Make Better Decisions**

- Data needs to be collected, cleaned, and studied to be useful.
- It helps companies understand sales trends, customer needs, and future predictions.

## **2. What We Learned About the Four Companies**

### **Samsung**

- Started in 1938 and became one of the biggest electronics companies in the world.
- Uses data to study sales, plan for the future, and understand customer preferences.

### **Apple**

- Founded in 1976 and known for products like the iPhone and Mac.
- Uses data to improve user experience and understand market trends.

### **HP**

- Started in 1939 and focuses on laptops, printers, and office technology.
- Uses data to decide prices, manage inventory, and track sales.

## **Dell**

- Started in 1984 and became famous for selling computers directly to customers.
- Uses data to improve production, compare sales, and guide business decisions.

## **3. What the Dataset Tells Us**

- The dataset contains 50,001 rows of mobile and laptop sales information.
- It includes prices, quantity sold, product specifications, and customer details.
- It helps compare Samsung, Apple, HP, and Dell to see:
  - Which brand sells the most
  - Which product brings the most revenue
  - How price affects sales

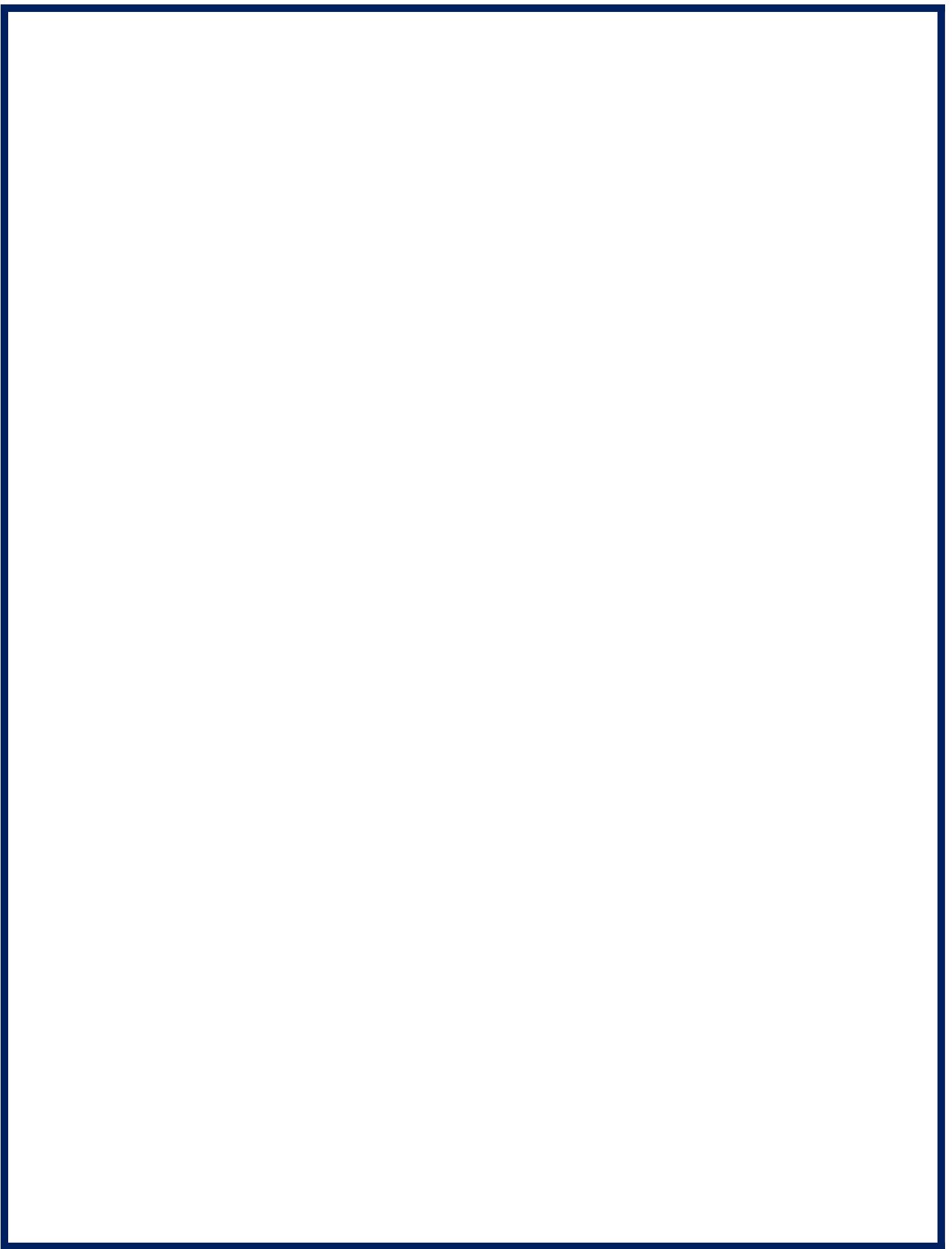
## **4. Cybersecurity Threats Are Increasing**

### **The project explains six major threats:**

1. **Malware** – harmful software that damages systems.
2. **Phishing** – fake emails/messages that steal information.
3. **DDoS/DoS attacks** – make websites or systems stop working.
4. **MITM attacks** – hackers intercept communications on unsafe networks.
5. **Insider threats** – employees causing harm by mistake or intentionally.
6. **Ransomware** – locks files and asks for money to unlock them.

## **5. Combining the Topic with Data Analysis**

- All four companies use data to stay competitive.
- Data helps them understand customers, improve products, and increase sales.
- Cybersecurity is also important because companies store and analyze huge amounts of data.



## References

1. “*The Founding of Apple Computer, Inc.*” – *Library of Congress. Research Guides*
2. “*Apple Inc. | History, Products, Headquarters, & Facts*” – *Britannica. Encyclopedia Britannica*
3. “*History of Apple: Company and Stock*” – *Yahoo Finance. finance.yahoo.com*
4. “*What is Apple? An products and history overview*” – *TechTarget. TechTarget*
5. “*Steve Jobs and the Apple Story*” – *Investopedia. Investopedia*
6. *IBM — Introduction to Data Analytics (Coursera)*. Link: <https://www.coursera.org/learn/introduction-to-data-analytics> (*Coursera*)
7. *IBM — Data Analytics Basics for Everyone (edX)*. Link: <https://www.edx.org/learn/data-analysis/ibm-data-analytics-basics-for-everyone> (*edX*)
8. *Harvard Business Review — “A Refresher on Regression Analysis.”* Link: <https://hbr.org/2015/11/a-refresher-on-regression-analysis> (*Harvard Business Review*)
9. *Harvard Business Review — “4 Analytics Concepts Every Manager Should Understand”*. Link: <https://hbr.org/2018/10/4-analytics-concepts-every-manager-should-understand> (*Harvard Business Review*)
10. *IBM — Data & Analytics Field Guide*. Link: <https://www.ibm.com/cloud/garage/content/field-guide/data-analytics-field-guide> (*ac-gm-static-files-server.lahgrqm5xee.au-syd.codeengine.appdomain.cloud*)
11. *If you tell me whether you prefer academic papers or practitioner articles, I can pull a more comprehensive list with links.*
12. “*Heritage | Brand Identity | About Us*” – *Samsung. Samsung*
13. “*Samsung | History, Consumer Products, Leadership, & Facts*” – *Britannica. Encyclopedia Britannica*
14. “*History of Samsung Electronics (1): Paving a New Path 1968-1970*” – *Samsung News. Samsung Global Newsroom*
15. “*Samsung: complete History and key Milestones*” – *inKorea. inCorea.it*
16. “*Samsung Electronics – Wikipedia*” – *(for general timeline). Wikipedia*

17. Gartner. (2024). *Data Analytics and Business Intelligence in Technology Companies*. Retrieved from <https://www.gartner.com>
18. Statista. (2024). *Global Market Share of Leading PC and Smartphone Brands*. Retrieved from <https://www.statista.com>
19. Dataset: *Mobile Sales Data* (2025).
20. HP Official Website – <https://www.hp.com/us-en/hp-information.html>
21. HP Corporate Archives –  
<https://www.hp.com/us-en/hp-information/history.html>
22. HP Annual Report 2024 – <https://investor.hp.com>
23. Gartner Research – “Worldwide PC Market Share Report 2024”
24. HP Sustainability Report 2024
25. Bloomberg (2025), “HP’s Strategic Roadmap for the Future”
26. Reuters Technology News (2024–2025)
27. Fortune Magazine, “The History of HP’s Split” (2015)
28. United Nations Global Compact – HP Participation Report
29. Britannica. (2024). Dell Inc. Retrieved from  
<https://www.britannica.com/money/Dell-Inc>
30. Wikipedia. (2024). Dell Technologies. Retrieved from  
[https://en.wikipedia.org/wiki/Dell\\_Technologies](https://en.wikipedia.org/wiki/Dell_Technologies)
31. ITPro. (2024). Everything You Need to Know About Dell. Retrieved from  
<https://www.itpro.com>
32. Companies History. (2024). Dell. Retrieved from  
<https://www.companieshistory.com/dell>
33. Zippia. (2024). Dell Company History. Retrieved from  
<https://www.zippia.com/dell-careers21185/history>
34. CERT. (2022). Insider threat mitigation guide. Carnegie Mellon University.
35. Cloudflare. (2023). Understanding DDoS attacks.  
<https://www.cloudflare.com/learning/ddos/what-is-a-ddos-attack/>
36. Europol. (2023). Ransomware: Threat assessment.  
<https://www.europol.europa.eu>
37. FBI. (2022). Internet Crime Report. Federal Bureau of Investigation.
38. Kaspersky. (2023). What is a man-in-the-middle attack?  
<https://www.kaspersky.com>
39. Symantec. (2023). Internet Security Threat Report. NortonLifeLock
40. HP Inc. Corporate Mission and Vision Statements (<https://www.hp.com/us-en/hpinformation.html>)
41. HP Sustainable Impact Report 2024

42. *United Nations Global Compact Reports – HP Section*
43. *Bloomberg, “HP’s Strategic Roadmap for 2025”*
44. *Reuters Technology News (2024–2025)*
45. *HP Product Portfolio (<https://www.hp.com>)*
46. *HP Sustainability Report 2024*
47. *Gartner Research, “Worldwide PC Market Share Report 2024”*
48. *HP Annual Report 2024 (<https://investor.hp.com>)*
49. *HP Corporate Archives  
(<https://www.hp.com/us-en/hp-information/history.html>)*
50. *Fortune Magazine, “The History of HP’s Split” (2015)*
51. *HP Official Website – About Us (<https://www.hp.com/us-en/hp-information.html>)*