

Instruction: Attempt any Five Questions. All questions carry equal marks. Extra Attempt of any Question will not be considered.

Question No. 1

Define Network topology? Also discuss different types of topologies with the help of diagrams?

Different Network Topologies and Their Applications

Introduction

Network topology refers to the **arrangement of devices and connections** in a computer network. It defines how computers, servers, and networking devices (such as routers and switches) are **physically or logically connected**.

Network topology plays a crucial role in **businesses**, as it impacts **efficiency, performance, scalability, and security**. Different topologies are used based on the **size of the network, budget, and operational needs** of an organization.

Types of Network Topologies

Network topologies can be broadly classified into **Physical Topology** (actual layout of devices) and **Logical Topology** (how data flows within the network).

The major types of **network topologies** include:

1. Bus Topology

Structure:

- All devices (computers, printers, etc.) are connected to a **single central cable (backbone)**.
- Each device communicates by sending data along the main cable.

Advantages:

- ✓ **Low Cost:** Requires fewer cables and is easy to install.
- ✓ **Easy to Expand:** Adding new devices is simple.
- ✓ **Best for Small Networks:** Used in **small businesses and offices**.

Disadvantages:

- ✗ **Performance Issues:** As more devices are added, network speed decreases.
- ✗ **Single Point of Failure:** If the backbone cable fails, the entire network stops working.

Applications:

- ✓ Used in **small businesses, offices, and home networks**.
- ✓ Used in **temporary network setups** (exhibitions, testing labs).

2. Star Topology

Structure:

- All computers are connected to a **central device (hub or switch)**.
- Data flows through the central hub to reach the destination.

Advantages:

- ✓ **High Reliability:** If one device fails, others are unaffected.
- ✓ **Easy Troubleshooting:** Faults can be easily identified.
- ✓ **Better Performance:** Faster than bus topology as data is managed by the hub/switch.

Disadvantages:

- ✗ **High Setup Cost:** Requires more cables and hardware.
- ✗ **Central Hub Dependency:** If the hub fails, the network collapses.

Applications:

- ✓ Used in **corporate offices, schools, and data centers**.
 - ✓ Ideal for **banks and financial institutions** where security is critical.
-

3. Ring Topology

Structure:

- Devices are connected in a **circular loop**.
- Data travels in one direction (unidirectional) or both directions (bidirectional).

Advantages:

- ✓ **Equal Access:** Each device gets equal data access, preventing congestion.
- ✓ **Less Data Collision:** Data moves in an organized manner.

Disadvantages:

- ✗ **Difficult to Troubleshoot:** If one device fails, the entire network is affected.
- ✗ **Adding New Devices Disrupts Network:** The network must be reconfigured when adding devices.

Applications:

- ✓ Used in **government organizations, industrial networks, and telecom systems**.
 - ✓ Used in **high-speed networks such as fiber optic networks**.
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4. Mesh Topology

Structure:

- Every device is connected to **every other device** in the network.
- Two types: **Full Mesh (every device is interconnected)** and **Partial Mesh (some devices are interconnected)**.

Advantages:

- ✓ **Highly Reliable:** If one connection fails, others can still transmit data.
- ✓ **Efficient Data Transmission:** Multiple paths ensure no congestion.
- ✓ **High Security:** Data is transmitted through multiple secure routes.

Disadvantages:

- ✗ **Expensive:** Requires a large number of cables and configuration.
- ✗ **Complex Setup:** Difficult to install and maintain.

Applications:

- ✓ Used in **military networks, banking systems, and confidential government networks.**
- ✓ Suitable for **critical business applications where data loss is unacceptable.**

5. Tree Topology (Hybrid of Bus and Star)

Structure:

- Groups of star-configured networks are connected using a **bus topology**.
- It follows a **hierarchical structure** with different network layers.

Advantages:

- ✓ **Scalable:** Easy to expand by adding new networks.
- ✓ **Hierarchical Data Flow:** Used where data must be structured in layers.

Disadvantages:

- ✗ **High Cable Cost:** Requires a significant amount of cabling.
- ✗ **Difficult to Troubleshoot:** Identifying faults is complex.

Applications:

- ✓ Used in **large universities, multinational companies, and hospitals.**
- ✓ Ideal for **multi-branch organizations** like banks.

6. Hybrid Topology (Combination of Multiple Topologies)

Structure:

- A mix of two or more network topologies to **meet specific business needs.**
- Example: A **corporate office may use Star Topology for departments** and **Mesh Topology for security systems.**

Advantages:

- ✓ **Highly Flexible:** Can be customized based on business requirements.
- ✓ **Reliable:** Combines the benefits of different topologies.

Disadvantages:

- ✗ **Complex Setup:** Requires proper planning and advanced management.
- ✗ **High Cost:** Expensive to implement and maintain.

Applications:

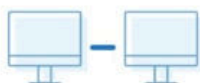
- ✓ Used in **large organizations, research centers, and cloud computing networks.**
- ✓ Suitable for **universities, airports, and smart cities.**

Comparison of Network Topologies

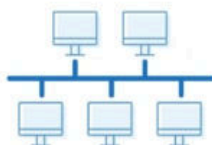
Topology	Cost	Reliability	Performance	Best For
Bus	Low	Low	Slows with more devices	Small offices, labs
Star	Medium	High	Fast	Corporate offices, schools
Ring	Medium	Medium	Consistent	Industrial setups, telecom
Mesh	High	Very High	Very Fast	Banking, military
Tree	High	Medium	Moderate	Universities, hospitals
Hybrid	High	Very High	Fast	Large corporations, smart cities

Network Topology Types

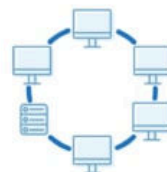
1 Point to point



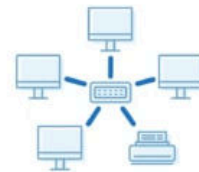
2 Bus



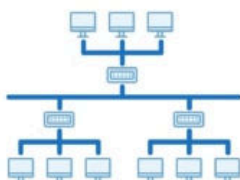
3 Ring



4 Star



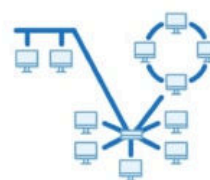
5 Tree



6 Mesh



7 Hybrid



Question No. 2

What is internet? What are the advantages and disadvantages of internet with respect to business?

Internet and Its Impact on Business**1. Introduction**

The **Internet** is a global network that connects millions of computers and devices worldwide. It enables **communication, data sharing, and access to information** through various technologies such as websites, emails, social media, and cloud computing. Businesses heavily rely on the internet for operations, marketing, and customer engagement.

2. Definition of Internet

The **Internet** is a **worldwide system of interconnected networks** that allows users to exchange information using **protocols like TCP/IP**. It facilitates communication, e-commerce, cloud computing, and various online services.

Key Features of the Internet:

- **Global Connectivity:** Allows worldwide communication and access to information.
 - **Data Sharing:** Enables instant transfer of files, documents, and media.
 - **Real-time Communication:** Supports emails, video calls, and messaging apps.
 - **Online Transactions:** Facilitates e-commerce, banking, and digital payments.
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3. Advantages of Internet in Business

The internet has revolutionized the business world by **enhancing efficiency, communication, and global reach**.

1. Improved Communication

- **Email, video conferencing, and instant messaging** allow businesses to communicate with employees, partners, and customers efficiently.
- **Examples:** Zoom meetings, Microsoft Teams, and WhatsApp Business.

2. Cost-Effective Marketing

- **Digital marketing (SEO, social media, email marketing)** helps businesses reach their target audience at a lower cost than traditional marketing.
- **Examples:** Facebook Ads, Google Ads, and influencer marketing.

3. E-Commerce and Online Sales

- The internet allows businesses to **sell products and services online**, expanding their customer base beyond physical stores.

- **Examples:** Amazon, Daraz, and Shopify.

4. Remote Work and Flexibility

- Employees can work from anywhere using **cloud computing, VPNs, and collaboration tools**.
- **Examples:** Google Drive, Dropbox, and Microsoft OneDrive.

5. Better Customer Support

- Businesses can offer **24/7 customer support** via chatbots, live chat, and email support.
- **Examples:** AI chatbots on e-commerce websites like Alibaba.

6. Business Automation and Cloud Computing

- Companies use **cloud storage and automated software** to improve operations and reduce workload.
- **Examples:** ERP systems, CRM software like Salesforce.

7. Market Research and Data Analytics

- Businesses collect customer data for **decision-making and market analysis**.
- **Examples:** Google Analytics, social media insights.

4. Disadvantages of Internet in Business

Despite its benefits, the internet also presents challenges and risks for businesses.

1. Cybersecurity Threats

- Businesses are vulnerable to **hacking, phishing, and data breaches**.
- **Examples:** Cyberattacks on financial institutions and online retailers.

2. High Dependency on Technology

- If the internet **fails or slows down**, business operations may suffer.
- **Example:** E-commerce websites losing sales due to server downtime.

3. Privacy and Data Security Issues

- Customer data collected online may be **misused or leaked**.
- **Example:** Facebook's data privacy concerns affecting user trust.

4. Digital Divide (Limited Access)

- Small businesses in **remote areas** may lack reliable internet access, limiting their digital growth.
- **Example:** Rural businesses struggling to compete with urban online markets.

5. Online Fraud and Scams

- Customers and businesses face risks of **fraudulent transactions, fake websites, and identity theft.**
- **Example:** Fake e-commerce websites tricking customers with non-delivered orders.

6. Increased Competition

- The internet exposes businesses to **global competition**, making it harder to stand out.
- **Example:** Local businesses struggling to compete with international brands.

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Question No. 3

Discuss important features of MS-PowerPoint with examples.

Question No. 4

Explain three levels of data processing with relevant examples.

Important Features of MS PowerPoint**1. Introduction**

Microsoft PowerPoint is a **presentation software** developed by Microsoft, widely used for creating **slideshows, business presentations, educational lectures, and project reports**. It offers various tools for **designing, animating, and presenting information** in an engaging and professional manner.

2. Key Features of MS PowerPoint**1. Slide-Based Presentation Structure**

- PowerPoint organizes content into **slides**, making it easy to present information in a structured way.
- **Example:** A teacher can create **lecture slides** on a specific topic, making learning more interactive.

2. Customizable Themes and Templates

- Provides **built-in themes and templates** to design professional-looking slides.
- Users can also **customize background colors, fonts, and layouts**.
- **Example:** A business executive can use a **corporate template** for an annual financial report presentation.

3. Multimedia Integration (Images, Videos, and Audio)

- Allows users to **insert images, videos, and audio** files to make presentations more engaging.
- Supports **online media embedding** from platforms like YouTube.
- **Example:** A marketing team can add a **product demo video** to their sales pitch presentation.

4. Animations and Transitions

- Offers various **animation effects** for text and objects.
- **Slide transitions** help create smooth visual effects between slides.
- **Example:** A student can use **fade-in animations** to reveal key points one by one during a class presentation.

5. SmartArt and Charts

- Users can create **SmartArt graphics, flowcharts, and organizational charts** for better visualization.
- Supports **pie charts, bar graphs, and line graphs** for data representation.
- **Example:** A company can use **bar graphs to present sales performance over the last five years.**

6. Speaker Notes and Presenter View

- Users can add **speaker notes** to help them during the presentation.
- The **Presenter View** shows notes, upcoming slides, and a timer, visible only to the presenter.
- **Example:** A professor can use **notes** to guide their lecture while presenting slides.

7. Hyperlinks and Action Buttons

- Allows **adding hyperlinks** to websites, other slides, or external files.
- Action buttons help create **interactive presentations.**
- **Example:** A software trainer can link slides to specific **tutorial videos or documents.**

8. Collaboration and Cloud Integration

- Users can **share and collaborate on presentations online** using OneDrive or SharePoint.
- Multiple users can **edit slides in real-time.**
- **Example:** A project team working remotely can **collaborate on the same PowerPoint file** using cloud storage.

9. Slide Master and Layout Customization

- The **Slide Master** feature allows users to **apply consistent formatting** across all slides.
- Custom layouts help in maintaining uniformity in design.
- **Example:** A company can create a **standardized template for all official presentations.**

10. Recording and Exporting as Video

- PowerPoint allows users to **record presentations with voice-over narration.**
- Presentations can be **exported as video files** for sharing on social media or e-learning platforms.
- **Example:** A YouTuber can **create and upload an educational PowerPoint video.**

Question No. 5

Differentiate characteristics of Local Area Network (LAN) with Wide Area Network (WAN).

Difference Between Local Area Network (LAN) and Wide Area Network (WAN)
1. Introduction

Computer networks help in **sharing data, resources, and communication**. Two major types of networks are:

- **Local Area Network (LAN)** – A network that covers a **small geographical area**, such as homes, offices, or schools.
- **Wide Area Network (WAN)** – A network that spans a **large geographical area**, such as cities, countries, or continents.

Both LAN and WAN have distinct **characteristics, advantages, and use cases**.

2. Key Differences Between LAN and WAN

Feature	Local Area Network (LAN)	Wide Area Network (WAN)
Definition	A network that connects devices within a limited area (e.g., home, office, or school).	A network that connects multiple LANs over large geographical areas (e.g., different cities or countries).
Geographical Coverage	Covers small areas (e.g., a building or campus).	Covers large areas (e.g., multiple cities, nations, or continents).
Ownership	Usually owned and maintained by a single organization.	Can be owned by multiple organizations or telecom companies .
Speed	Higher speed, typically up to 1 Gbps or more .	Slower speed due to long-distance data transfer, usually 10 Mbps to 100 Mbps .
Latency (Delay in Transmission)	Low latency as data travels over short distances .	High latency due to long-distance transmission and multiple routers.
Security	More secure as it operates within a controlled environment .	Less secure because data passes through public networks (e.g., the internet).
Installation and Maintenance Cost	Lower cost due to limited hardware and infrastructure requirements.	Higher cost due to the need for extensive infrastructure, leased lines, and maintenance.
Reliability	More reliable with less risk of failures .	Less reliable as it depends on multiple networks and ISPs.
Examples	Office networks, university campuses, hospitals.	Internet, multinational company networks, banking networks.

3. Characteristics of LAN

- **Short-range connectivity:** Limited to a **single building or campus**.
- **High data transfer speed:** Faster than WAN due to **direct wired connections**.
- **Easier management:** Maintained by a **single organization**.
- **More secure:** Less exposure to **external threats**.

Example of LAN:

A **university campus network** where students and faculty connect to a shared server and printers.

4. Characteristics of WAN

- **Long-range connectivity:** Spans **large geographical areas**.
- **Lower data transfer speed:** Slower than LAN due to **data traveling long distances**.
- **Complex infrastructure:** Requires **leased lines, satellites, and fiber optics**.
- **More vulnerable to cyber threats:** Uses **public networks** for data transmission.

Example of WAN:

A **multinational bank's network**, where branches in different countries are connected through a **secured WAN infrastructure**.

Question No. 6

What is the difference between primary and secondary storage? Explain different primary and secondary storage devices.

Difference Between Primary and Secondary Storage
1. Introduction

Storage devices are essential components of a computer system that store **data, programs, and system files**. There are two main types of storage:

- **Primary Storage** (Main Memory) – Stores data temporarily and is directly accessible by the CPU.
- **Secondary Storage** (Permanent Storage) – Stores data permanently for long-term use.

Understanding the differences between these two types of storage is crucial for effective computer usage.

2. Difference Between Primary and Secondary Storage

Feature	Primary Storage	Secondary Storage
Definition	Temporary memory used by the CPU to process data.	Permanent memory used to store data for future use.
Speed	Very fast (access time in nanoseconds).	Slower than primary storage.
Volatility	Volatile (data is lost when power is turned off).	Non-volatile (data remains even when power is off).
Capacity	Limited storage capacity (measured in GBs).	Larger storage capacity (measured in TBs).
Accessibility	Directly accessible by the CPU.	Needs to be loaded into primary memory before CPU access.
Examples	RAM, Cache Memory, Registers.	Hard Disk, SSD, USB, CD/DVD.

3. Primary Storage Devices
1. Random Access Memory (RAM)

- **Definition:** Temporary memory that stores **currently running programs and data**.
- **Types:**
 - **SRAM (Static RAM)** – Faster and used in **cache memory**.
 - **DRAM (Dynamic RAM)** – Slower but used as **main memory**.

- **Example:** Running software like **Microsoft Word** or **Google Chrome** stores data in RAM.

2. Read-Only Memory (ROM)

- **Definition:** Permanent memory that stores **firmware and system boot instructions**.
- **Types:**
 - **PROM (Programmable ROM)** – Can be programmed once.
 - **EPROM (Erasable PROM)** – Can be erased and reprogrammed.
- **Example:** The **BIOS (Basic Input/Output System)** is stored in ROM.

3. Cache Memory

- **Definition:** High-speed memory that stores frequently used data **closer to the CPU**.
- **Example:** The CPU accesses **recently used instructions** from cache instead of RAM.

4. Registers

- **Definition:** Small storage locations inside the **CPU** for immediate data processing.
- **Example:** Used for **arithmetic calculations** in the CPU.

4. Secondary Storage Devices

1. Hard Disk Drive (HDD)

- **Definition:** Magnetic storage device used for **long-term data storage**.
- **Example:** Used in **desktops and laptops** for storing OS, software, and files.

2. Solid-State Drive (SSD)

- **Definition:** A **faster and more reliable** storage device that uses flash memory.
- **Example:** Found in **modern laptops and gaming PCs** for high-speed data access.

3. USB Flash Drive

- **Definition:** A **portable storage device** that uses flash memory for quick data transfer.
- **Example:** Used to transfer **documents, music, and videos** between computers.

4. Optical Discs (CD/DVD/Blu-ray)

- **Definition:** Storage media that uses laser technology to read/write data.
- **Example:** Used for **movies, software installation, and backups**.

5. Memory Card (SD Card)

- **Definition:** Small storage device used in **mobile phones, cameras, and tablets**.
- **Example:** Stores **photos, videos, and app data** in smartphones.

6. Cloud Storage

- **Definition:** Remote storage accessed via the **internet**.
- **Example:** Google Drive, Dropbox, and OneDrive store **files online**.

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Question No. 7

How formulas and functions can be used in MS Excel? Give examples.

What is a Formula in MS Excel?

A **formula** in MS Excel is an equation used to perform **calculations** on numbers or data in a spreadsheet.

Basic Rules of Formulas in Excel:

- ✓ Every formula **must start with an equal sign (=)**.
- ✓ Formulas use **cell references (A1, B2, C3, etc.)** instead of actual numbers.
- ✓ Formulas can use **mathematical operators** like +, -, *, and /.

Basic Types of Formulas in Excel**1. Addition Formula**

Adds two or more numbers.

✓ Example:

=5 + 10 (Adds 5 and 10, result = 15)

✓ Using Cell References:

=A1 + B1 (Adds the values in A1 and B1)

2. Subtraction Formula

Subtracts one number from another.

✓ Example:

=20 - 5 (Result = 15)

✓ Using Cell References:

=A2 - B2 (Subtracts the value in B2 from A2)

3. Multiplication Formula

Multiplies numbers together.

✓ Example:

=4 * 5 (Result = 20)

✓ Using Cell References:

=A3 * B3 (Multiplies values in A3 and B3)

4. Division Formula

Divides one number by another.

✓ Example:

=50 / 10 (Result = 5)

✔ **Using Cell References:**

=A4 / B4 (Divides value in A4 by B4)

5. Percentage Formula

Finds the percentage of a number.

✔ **Example:**

=50 * 10% (Finds 10% of 50, result = 5)

✔ **Using Cell References:**

=A5 * 10% (Finds 10% of the value in A5)

6. Average Formula

Finds the average (mean) of numbers.

✔ **Example:**

=(10 + 20 + 30) / 3 (Average = 20)

✔ **Using Cell References:**

=(A1 + A2 + A3) / 3 (Finds the average of values in A1, A2, and A3)

Why Are Formulas Useful in Excel?

- ✔ Saves time by automating calculations.
- ✔ Reduces human errors in data entry.
- ✔ Helps in business, accounting, and school projects.
- ✔ Works with **large amounts of data instantly**.

Functions in MS Excel (Simple Explanation with Examples)

What is a Function in MS Excel?

A **function** in Excel is a **pre-built formula** that performs a specific task **automatically**. Instead of writing long formulas, you can use a function to get the result quickly.

- ✔ **Functions always start with an equal sign (=).**
- ✔ **They have a name (SUM, AVERAGE, etc.) and brackets ().**
- ✔ **You put numbers or cell references inside the brackets.**

Commonly Used Excel Functions (With Simple Examples)

1. SUM Function (Adds Numbers)

Adds up all the numbers in a selected range.

✓ **Example:**

=SUM(A1:A5)

☞ This adds the values from **A1 to A5** automatically.

2. AVERAGE Function (Finds the Average)

Finds the **average (mean)** of a set of numbers.

✓ **Example:**

=AVERAGE(A1:A5)

☞ If A1 = 10, A2 = 20, A3 = 30, A4 = 40, A5 = 50, the function gives **30** as the result.

3. MAX Function (Finds the Largest Number)

Finds the **biggest number** in a range.

✓ **Example:**

=MAX(A1:A5)

☞ If the values are **5, 10, 25, 40, 15**, the function gives **40** as the result.

4. MIN Function (Finds the Smallest Number)

Finds the **smallest number** in a range.

✓ **Example:**

=MIN(A1:A5)

☞ If the values are **5, 10, 25, 40, 15**, the function gives **5** as the result.

5. COUNT Function (Counts Numbers in a List)

Counts how many numbers are present in a range.

✓ **Example:**

=COUNT(A1:A10)

☞ If **A1 to A10** contains **7 numbers and 3 empty cells**, the result will be **7**.

6. IF Function (Checks a Condition)

Checks if a value is **TRUE or FALSE** and returns a result.

✓ **Example:**

=IF(A1>50, "Pass", "Fail")

👉 If A1 is greater than 50, it shows "Pass", otherwise it shows "Fail".

Why Are Functions Useful?

- ✓ They **save time** by doing calculations automatically.
- ✓ They **reduce mistakes** in calculations.
- ✓ They are **used in business, accounting, and daily tasks**.

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Question No. 8

Write a note on followings:

- a. E-Commerce
- b. Home Page of a Web Site

Note on E-Commerce and Home Page of a Website**1. Introduction**

In the digital era, businesses and individuals rely on the **internet for commerce and communication**. Two important concepts related to online business and websites are:

- **E-Commerce (Electronic Commerce)** – The buying and selling of goods and services over the internet.
- **Home Page of a Website** – The main entry page of a website that serves as a **gateway to its content**.

Understanding these concepts is essential for students, businesses, and web developers.

2. E-Commerce**a. Definition**

E-Commerce refers to the **online buying, selling, and transaction of goods and services** through electronic means. It includes **online stores, digital payments, and electronic data exchange**.

b. Types of E-Commerce

1. **B2B (Business-to-Business)** – Transactions between businesses.
 - **Example:** Alibaba, where businesses buy wholesale products.
2. **B2C (Business-to-Consumer)** – Businesses sell directly to customers.
 - **Example:** Amazon and Daraz.pk selling products to consumers.
3. **C2C (Consumer-to-Consumer)** – Individuals sell products to other individuals.
 - **Example:** OLX and eBay for second-hand goods.
4. **C2B (Consumer-to-Business)** – Individuals offer services to businesses.
 - **Example:** Freelancers on Fiverr and Upwork.

c. Advantages of E-Commerce

- **Global Reach** – Businesses can reach customers worldwide.
- **24/7 Availability** – Online stores operate **24 hours a day**.
- **Cost-Effective** – Reduces costs of **physical stores and staff**.

- **Convenience** – Customers can shop from home.
- **Easy Payment Methods** – Supports digital payments like **credit cards, mobile wallets, and online banking**.

d. Disadvantages of E-Commerce

- **Security Issues** – Risk of **hacking, fraud, and data theft**.
- **Lack of Physical Interaction** – Customers cannot inspect products before buying.
- **Internet Dependency** – Requires a **stable internet connection**.
- **Delivery Delays** – Shipping time varies, unlike physical shopping.

3. Home Page of a Website

a. Definition

The **home page** is the **main or first page** of a website, which serves as a **starting point for navigation**. It provides an **overview of the site's content, services, and features**.

b. Key Components of a Home Page

1. **Website Logo & Branding** – Displays the site's **name and identity**.
2. **Navigation Menu** – Contains **links to different sections** of the website.
3. **Search Bar** – Allows users to **search for specific content**.
4. **Main Content Area** – Displays **important information, images, and videos**.
5. **Call-to-Action (CTA) Buttons** – Encourage users to **sign up, buy, or explore further**.
6. **Footer Section** – Contains **contact information, privacy policies, and social media links**.

c. Importance of a Well-Designed Home Page

- **First Impression** – Creates a **strong impact** on visitors.
- **User Experience (UX)** – Helps users **navigate easily**.
- **SEO Optimization** – Affects **search engine rankings**.
- **Engagement & Conversion** – Encourages visitors to **take action** (buy, subscribe, or contact).

d. Examples of Good Home Page Designs

- **Google.com** – Simple and minimalistic, focused on search.
- **Amazon.com** – Well-organized product categories and recommendations.
- **University Websites** – Provide academic information, admission details, and announcements.