1️⃣ What is Computer Science?

Computer Science (CS) is the study of computers, how they work, and how we use them to solve problems. It includes programming, data structures, algorithms, networks, databases, cybersecurity, and artificial intelligence.

2️⃣ Key Areas of Computer Science

📝 a) Programming & Coding

- Writing instructions for computers using programming languages.
- Popular languages: **Python, JavaScript, C++, Java, Rust, Go**.

Example (Python):
python
CopyEdit

```python
print("Hello, Suu! 🚀")
```

-

⚡ b) Data Structures

- Ways of organizing data efficiently.
- Common types:
    - **Arrays** – Fixed-size collection of elements.
    - **Linked Lists** – Nodes pointing to the next.
    - **Stacks** – Last-In-First-Out (LIFO).
    - **Queues** – First-In-First-Out (FIFO).
    - **Hash Tables** – Key-value pairs for fast lookups.

⚙ c) Algorithms

- Step-by-step instructions to solve problems.
- Common algorithms:
    - **Sorting** (Bubble Sort, Merge Sort, Quick Sort)
    - **Searching** (Binary Search, Linear Search)
    - **Graph Algorithms** (Dijkstra's, BFS, DFS)

Example of Binary Search (Python):
python

```python
def binary_search(arr, target):
    left, right = 0, len(arr) - 1
    while left <= right:
        mid = (left + right) // 2
        if arr[mid] == target:
            return mid
        elif arr[mid] < target:
            left = mid + 1
        else:
            right = mid - 1
    return -1
```

-

🌐 d) Computer Networks

- How computers communicate over the internet.
- Concepts:
    - **IP Addresses** (Uniquely identifies a device online)
    - **DNS (Domain Name System)** – Converts names to IPs.
    - **TCP/IP Model** – Rules for internet communication.
    - **HTTP/HTTPS** – Protocols for websites.

🛢️ e) Databases

- Systems that store and manage data.
- Types of databases:
    - **SQL (Relational Databases)** – MySQL, PostgreSQL.
    - **NoSQL (Non-Relational Databases)** – MongoDB, Firebase.

Example SQL Query:

sql
```sql
SELECT * FROM users WHERE age > 18;
```

🔒 f) Cybersecurity

- Protecting systems from hackers & threats.
- Common threats:
    - **Phishing** – Fake emails to steal data.

      ○ **Malware** – Viruses, worms, trojans.
      ○ **DDoS Attacks** – Overloading a website.

3️⃣ Why is Computer Science Important?

✔ Builds problem-solving skills.
✔ High-paying career opportunities.
✔ Powers everything from websites to AI.