DATA STRUCTURE
USING “Java”
Lecture 1

Today's Agenda

- Prerequisites Of The Course
- What Is Data Structure And Why It Is So Important ?
- Data Structures V/s Algorithm
- Examples Of Data Structure And Algorithm In Real Life
- Types Of Data Structure
- What Are Companies Looking For?
- Course Outline

Prerequisites

- To **learn** and **implement** algorithms in **Data Structures** we need:
  - Knowledge Of **Any One** Programming Language
  - We will use **JAVA** in this course
  - **No knowledge** of Any Other Language needed
  - **No Need** of **JDBC**, No **GUI**, No **Advance Java**, No **Multithreading**
  - Topics Of Java Required:
    - **Array and String**
    - **OOPS**
    - **Basics of Exception Handling**

What Is Data Structure ?

- Data Structure is a way of **storing** and **organising** the **data** in **computer's memory** in such a way that we can perform operations on these data in an **effective way**.

- To **understand** this more clearly, lets' take a simple **non-technical example** , shown in the **next slide**

What Is Data Structure ?

- So, let's **assume** we have a **pile of garments** over here that are clearly **unorganized**.

- How she can **select** the **specific outfit** for her ?

What Is Data Structure ?

- Now have a **look** at the **arrangement** of **clothes** shown below and **think again** about the task?

- As you can **observe** , since the **clothes** are now **organized** , it seems to be **very easy** for a **person** to find the **outfit**.

What Is Data Structure ?

This is a **crowd of people** who want to **get a ticket** for the **concert**.

But without **organized** way, it becomes **almost impossible** to get a ticket.

What Is Data Structure ?

The **RIGHT WAY** of people to **get ticket** is to stand in a **queue** and this is also called **queue** data structure in computer science, which is **FIRST IN FIRST OUT** method.

What Is Data Structure ?

- The **same concept** applies to **data structures** in **programming**.

- Here also we are given **some data** and we have to do **some processing** on it.

- So **before processing** the **data** we **MUST ORGANIZE** this **data** in such a way that we can **easily access/ process/operate** on this **data**.

What Is An Algorithm?

- An **Algorithm** is a **set of rules** to follow to **solve** a particular problem.

- **Example:** Suppose we want to go to the **office/college**

What Is An Algorithm?

Data Structure

How to go to the office ?

Step 1.
Go to bus stop

Step 2.
Take a bus

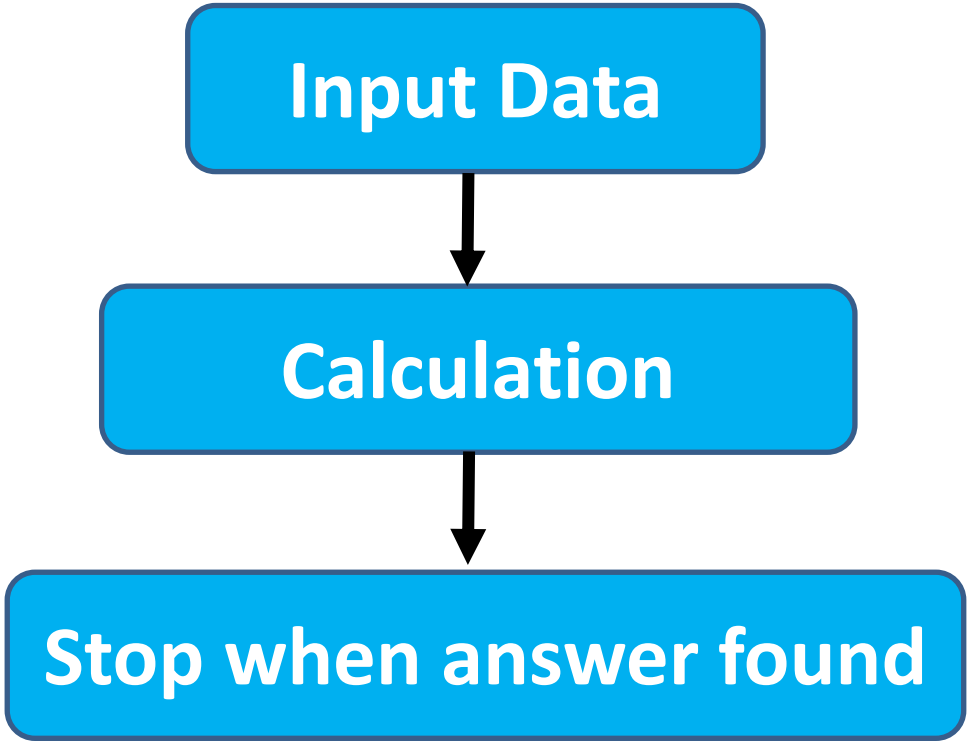
Step 3.
Go to office

What Is An Algorithm?

Data Structure

- **Algorithms** in **computer science** :

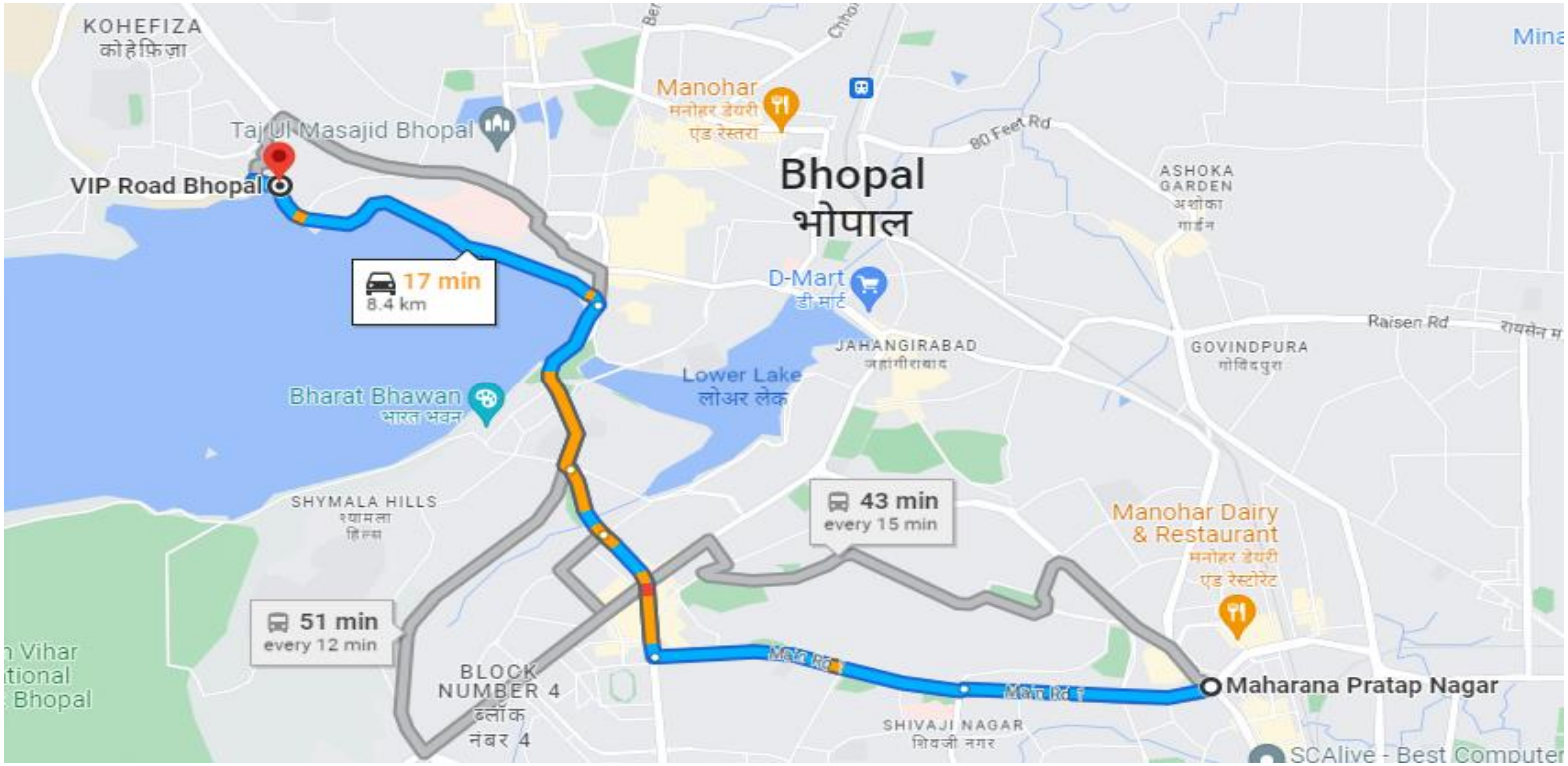
  Set of rules for a computer program to accomplish a task



Data Structure

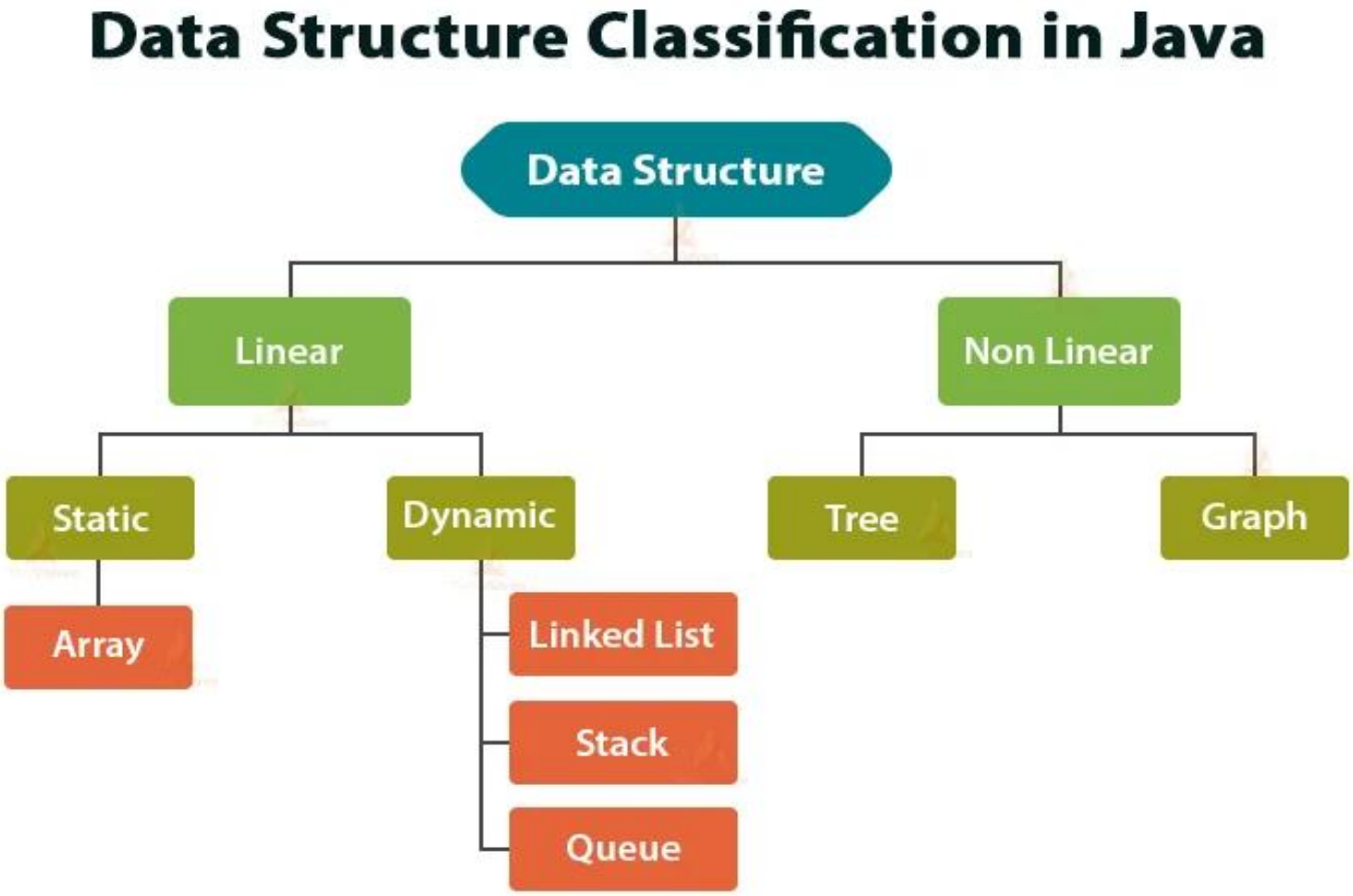
So let's look at a few famous algorithms that are used by big companies.

How to find a **ROUTE** on a **map**?



Graph algorithms

Types Of Data Structures



Linear V/s Non Linear

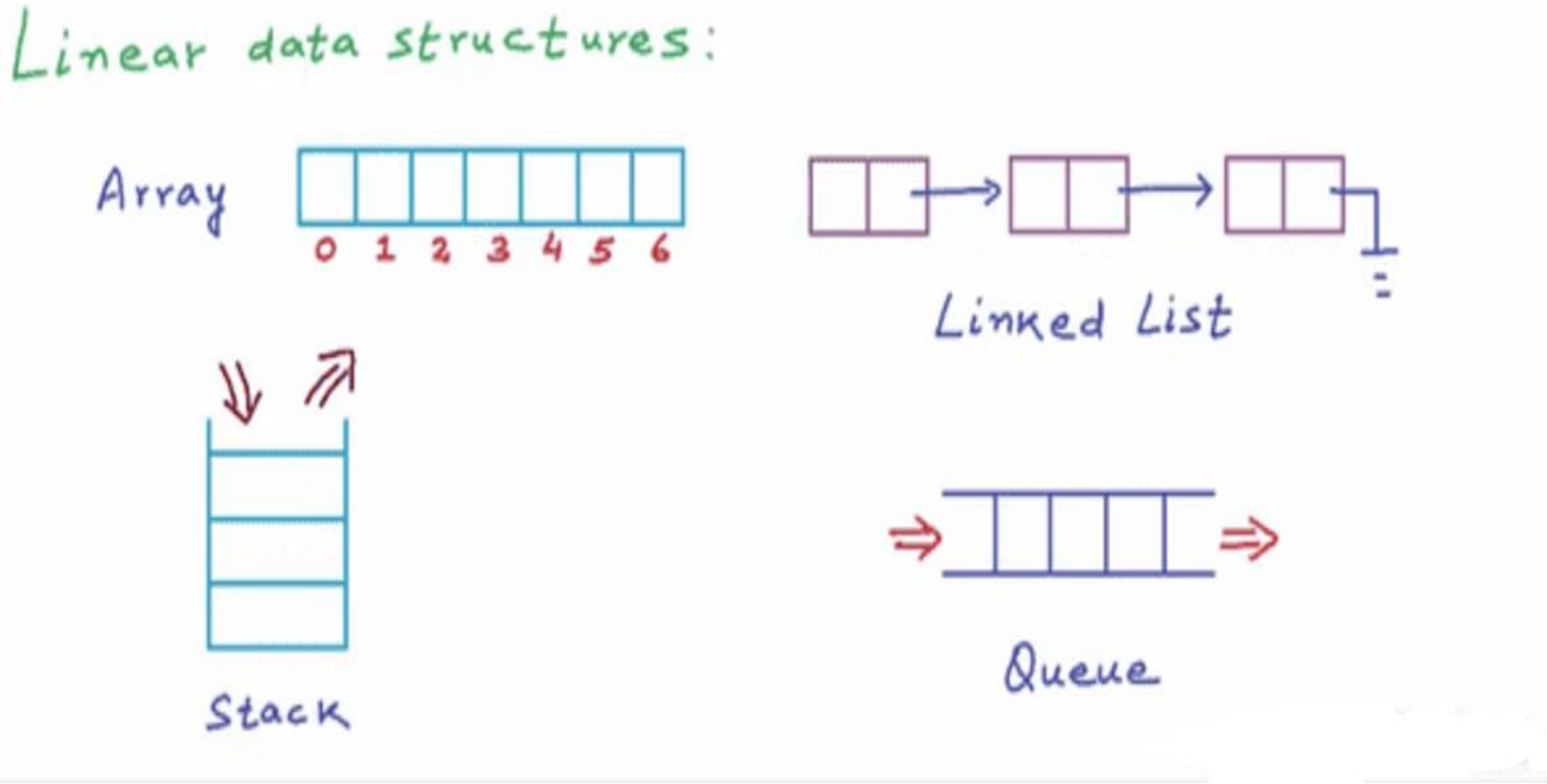
- A **data structure** is said to be **Linear** if its **elements** are connected in such a **SEQUENTIAL WAY .**

- That is , after **one element** we have just **one more element** in memory .

- Just like a **HUMAN CHAIN**

Linear V/s Non Linear

Data Structure



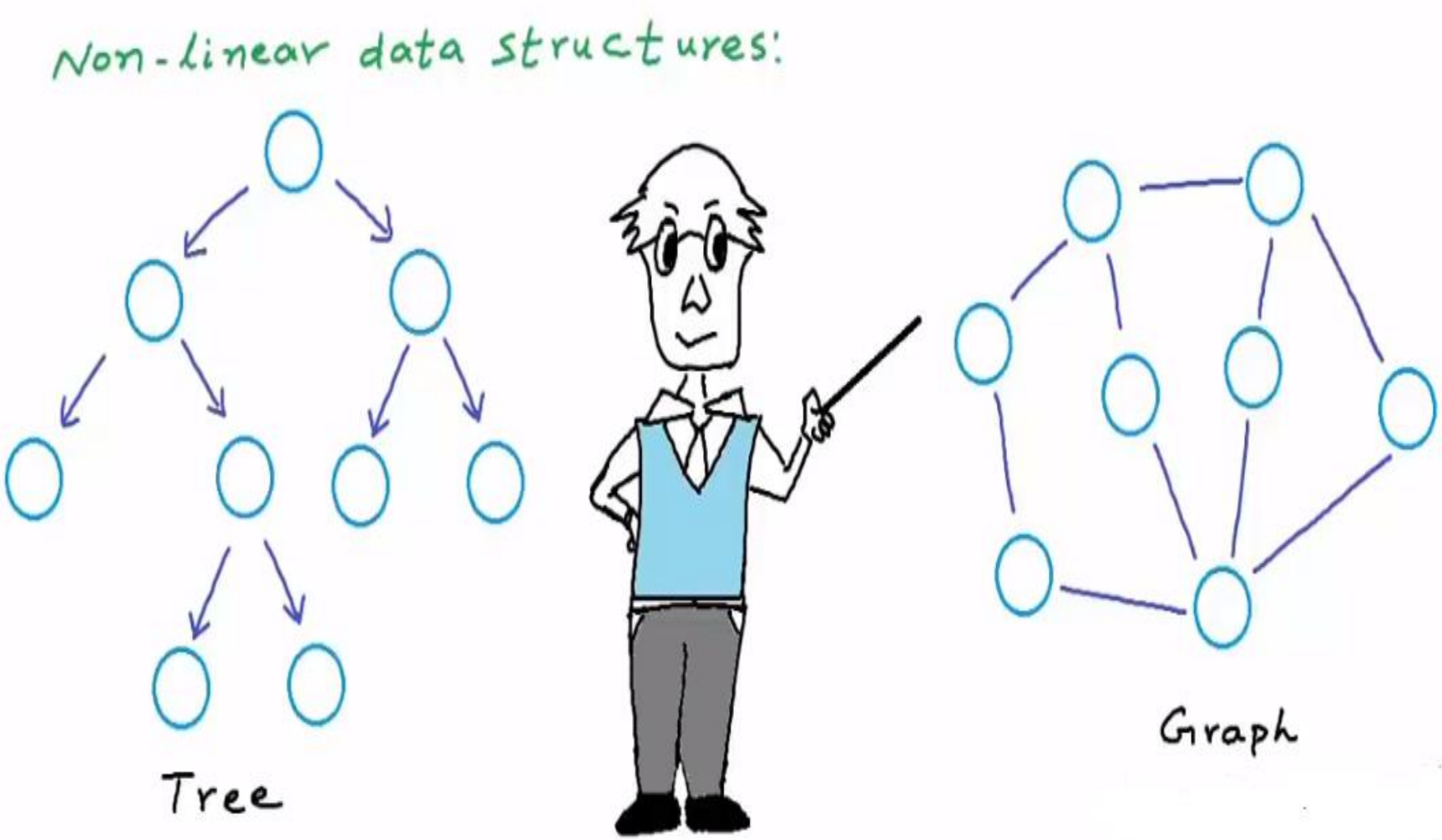
Linear V/s Non Linear

- **Nonlinear data structures** are those **data structure** in which data items are **not arranged** in **sequential manner**.

- The **data elements** are present at **different levels** and there are **different paths** for an element to **reach** the other element.

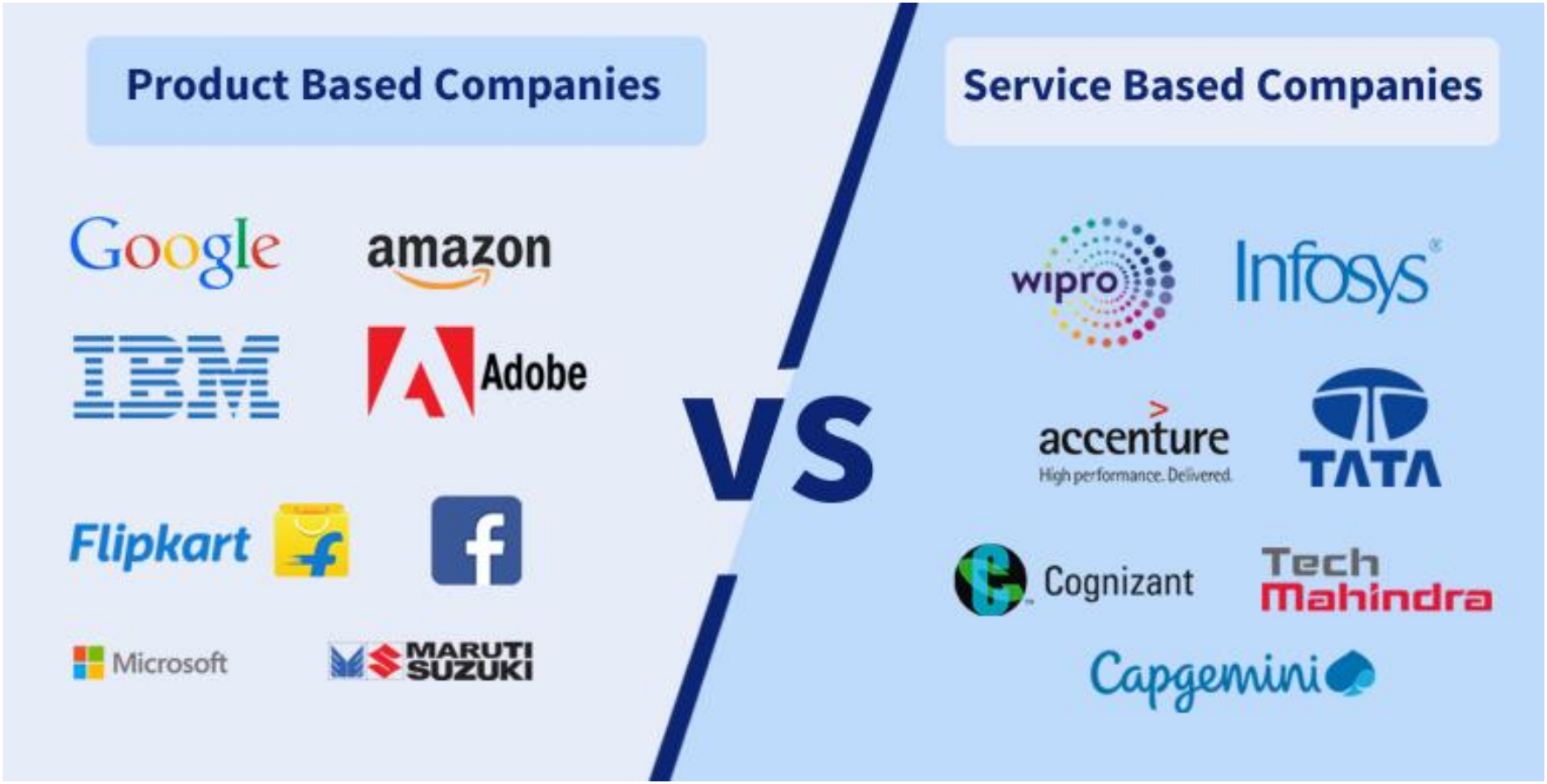
- Just like **DAHI HANDI** GOVINDAS

Linear V/s Non Linear



Types Of IT Companies

Data Structure



What Are Companies Looking For ?

- Analytical Skills
- Coding Skills
- Communication Skills

Google Interview Question

- Write a **function** that takes **2 arrays** as **argument** and returns **TRUE** if they have any element in **common** otherwise it should return **FALSE**

- For example:
  - **int [ ] arr={6,2,11,8,5};**
  - **int [ ] brr={7,1,15};**
  - For the above 2 arrays **FALSE** should be returned

  - **int [ ] arr={9,4,12,6,5,14};**
  - **int [ ] brr={3,14,8,12};**
  - For the above 2 arrays **TRUE** should be returned

Creadit :