

Data Structures

→ What is data structure?

→ Why you need to study this?

→ Types of Data Structures?

Some Data Statistics

→ Facebook: 4 PB

= 4000 TB/day

→ YouTube: 5 billion videos/day

→ Phone memory requirements

→ Jobs for Data Scientist/Data Analytics

→ Scope for Data Science

→ Think of data in daily life

Need of Data Structures

What is Data Structures??

Class: Think of attributes

- way to organize data
- easy management
- storage
- efficient operations

Types of Data Structures

→ Primitive

- integers
- character
- float
- pointers

→ Non-Primitive

→ Arrays

→ Lists

Linear

Non-Linear

→ Stacks (LIFO)

→ Queues (FIFO)

→ Linked Lists

→ Trees

→ Graphs

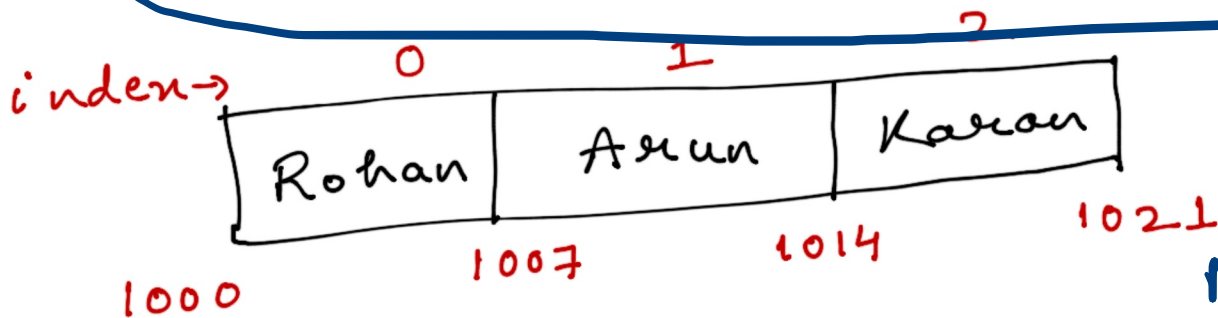
Data type

Data types: String int float

Name	Age	Marks
Rohan	22	34.5
Arun	21	36.8
Karan	23	39.0

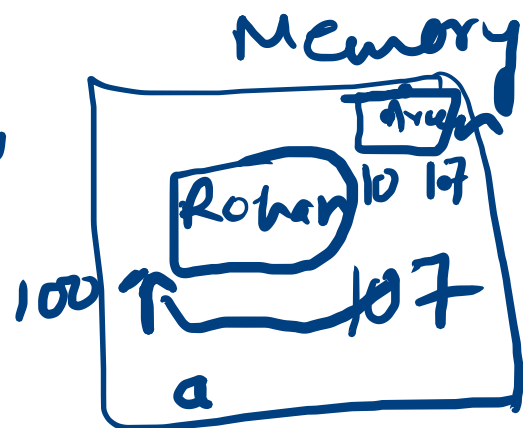


String arr[3] = { 'Rohan', 'Arun', 'Kari' }



String a = "Rohan"

variable name



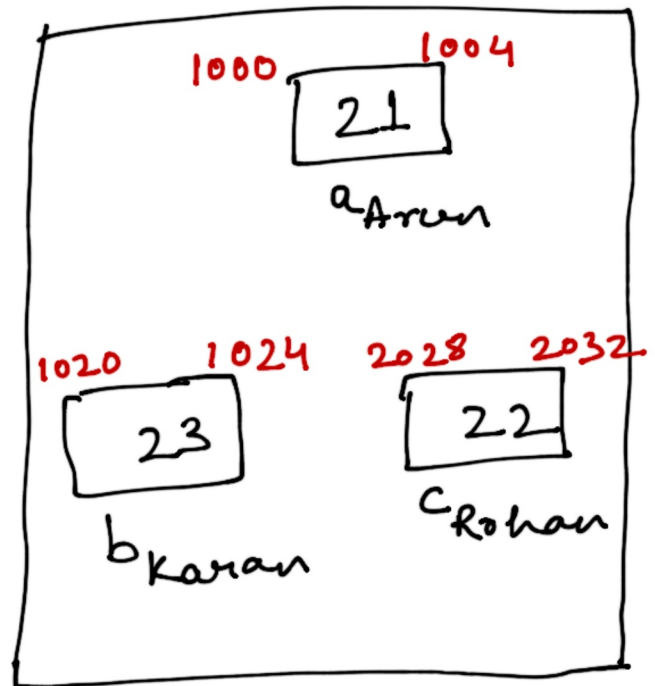
Age: {22, 21, 23}

↑ integers

$a_{\text{Arun}} = 21;$

$b_{\text{Karan}} = 23;$

$c_{\text{Rohan}} = 22;$

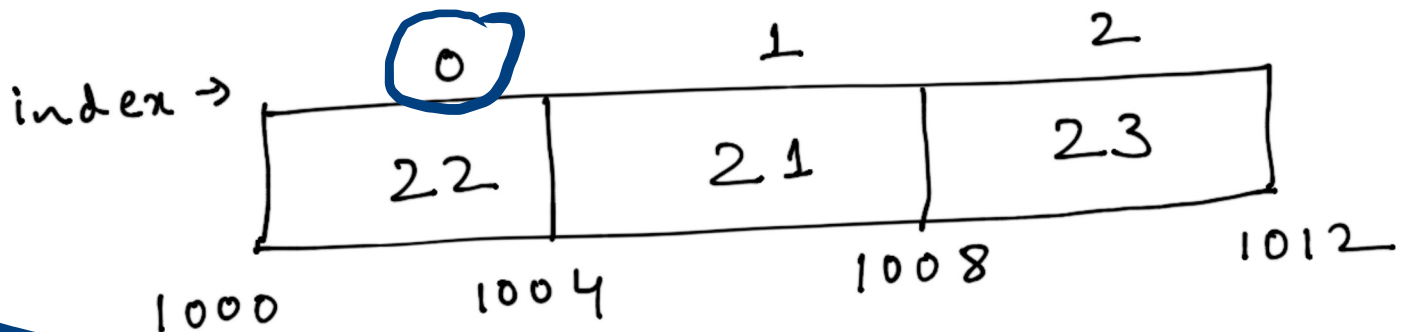


~~$\text{int arr}[3] = \{22, 21, 23\}$~~

~~Rohan~~

~~Arun~~

~~Karan~~



$\text{arr}[0]$

Problems, Algorithms, Program

Problem: Specific tasks

inputs $\xrightarrow{\text{mapping}}$ outputs
How???

Algorithms: A step by step process

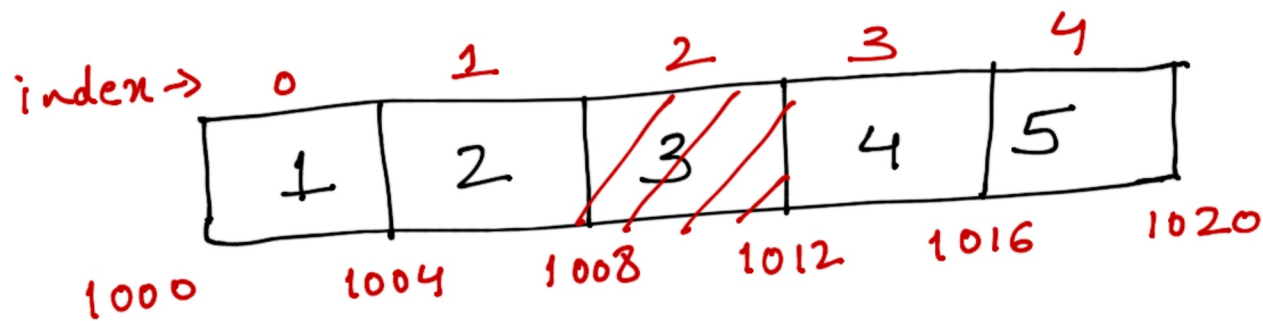
- * Concrete steps
- * No ambiguity
- * Correct
- * terminate

Program: An instance of an algorithm

→ May use different programming language

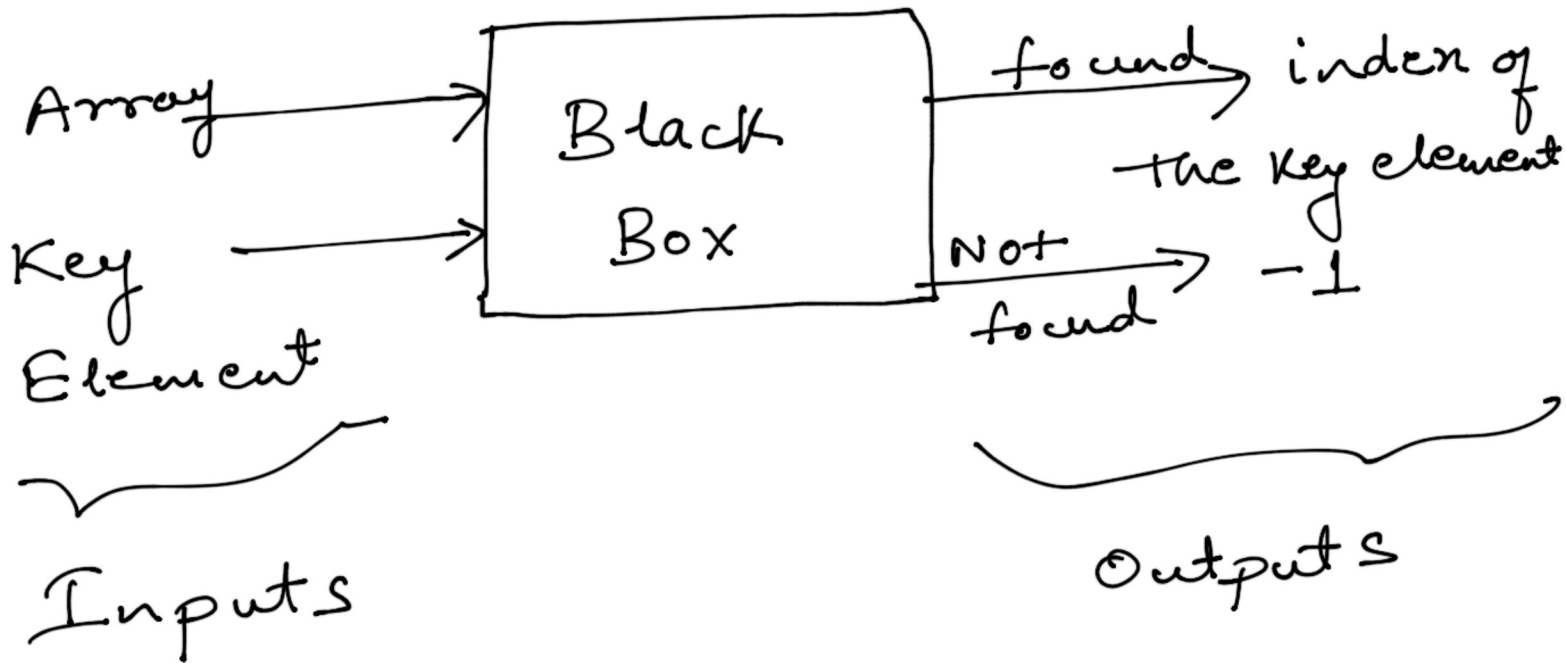
Eg: Search an element in an array

`int arr[5] = {1, 2, 3, 4, 5}`



Problem: Inputs: Array, Key element
Output: index $\begin{cases} \text{if found} \\ -1 \text{ if NOT} \end{cases}$

Problem:



Algorithm

