Data Structure

E-mail : **asif.io.edu@gmail.com**

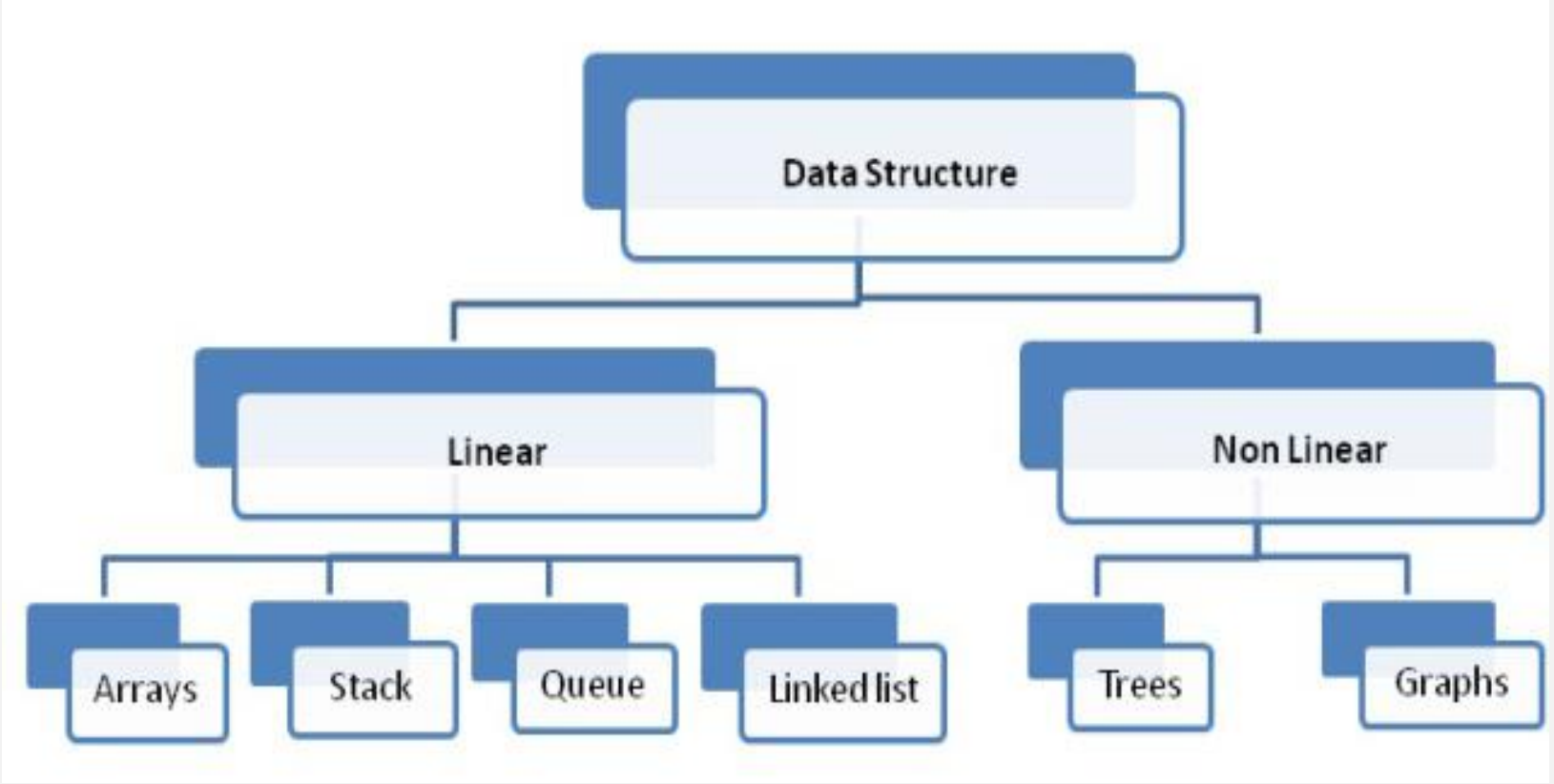
Data Structure

Data Structure

Data Structure is defined as a format for **arranging**, **processing**, **accessing**, and **storing** data.

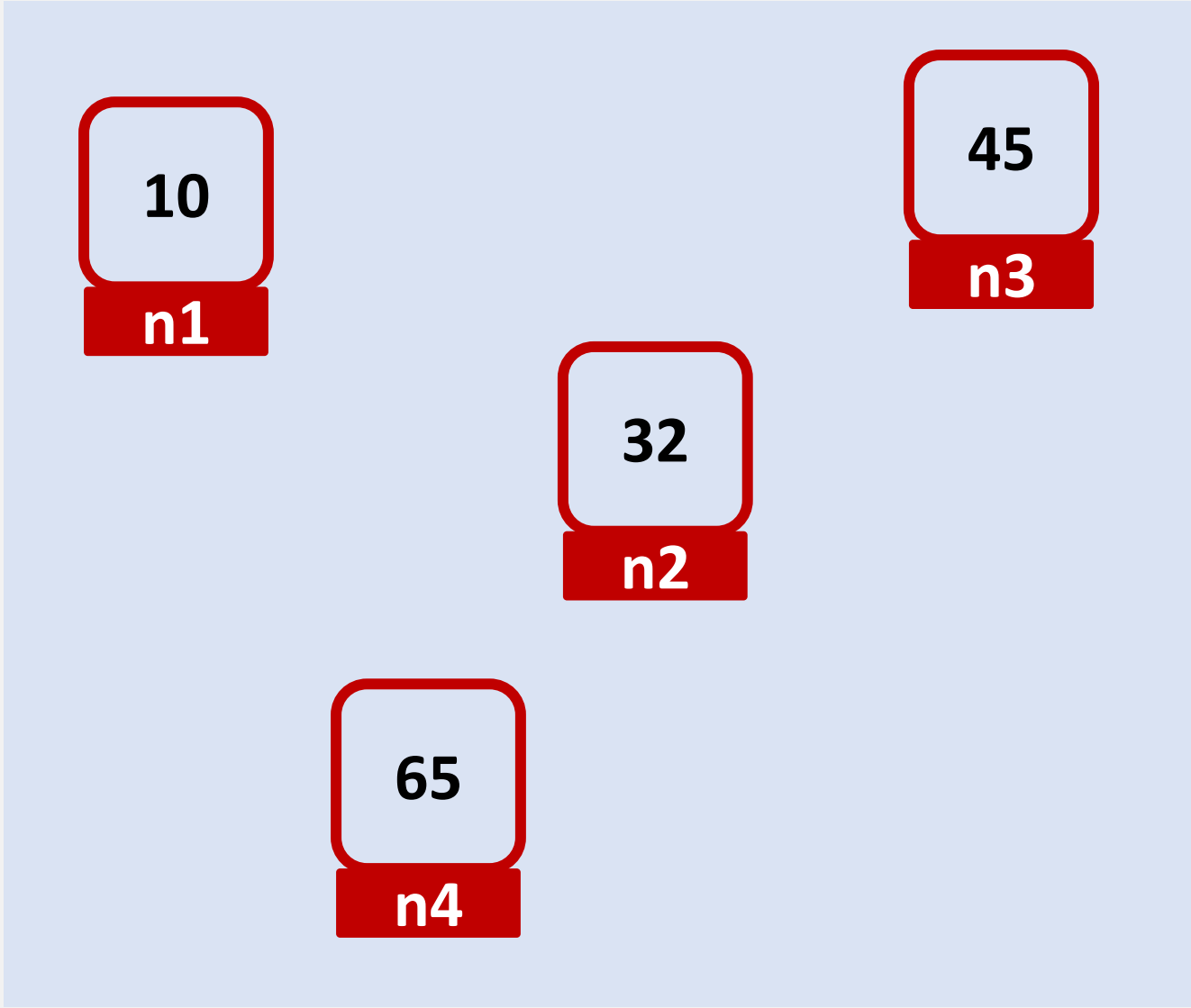
Data Structure

Data Structure is defined as a format for **arranging**, **processing**, **accessing**, and **storing** data.



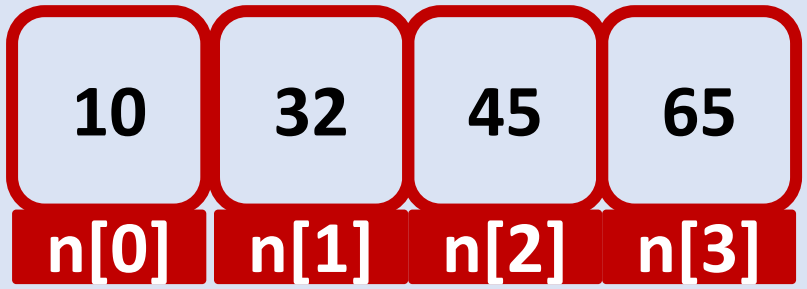
Arrays

```
int n1 = 10;

int n2 = 32;

int n3 = 45;

int n4 = 65;
```



Arrays

```
int[] n = {10,32,45,65}
```



Arrays

👉 **Array** in java is an object which contains elements of a similar data type.

👉 The elements of an array are stored in a continuous memory location.

👉 It is a data structure where we store similar elements.

How to declare an array

```
3  public class Concept_of_Array {
4      public static void main(String[] args) {
5          //Declaring and initializing arrays
6          String name[] = {"Pikachu","Balbasore","Squital"};
7          int roll[] = {230,101,502};
8          char powers[] = {'E','P','W'};
9
```

```
String[] name = new String[6];
//Taking input in array dynamically
for (int i = 0; i < name.length; i++) {
    System.out.println("Enter name at index "+i);
    name[i] = in.nextLine();
}
```

Some Basic Operation on Arrays

1. Searching

Searching an element in an array.

2. Inserting

Inserting an element at a particular index of an array.

3. Deleting

Deleting an element at a particular index of an array.

4. Sorting

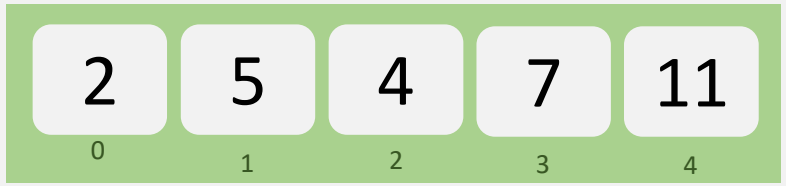
Sorting an array in ascending or descending order.

5. Merging

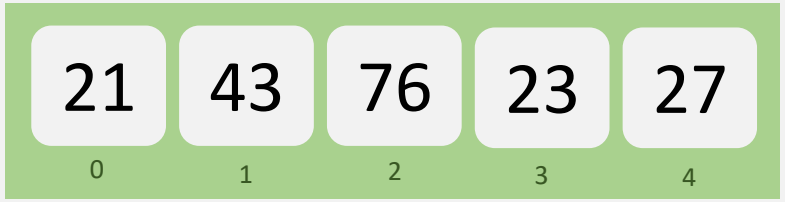
Merging two arrays in one single array.

Merging Two Arrays

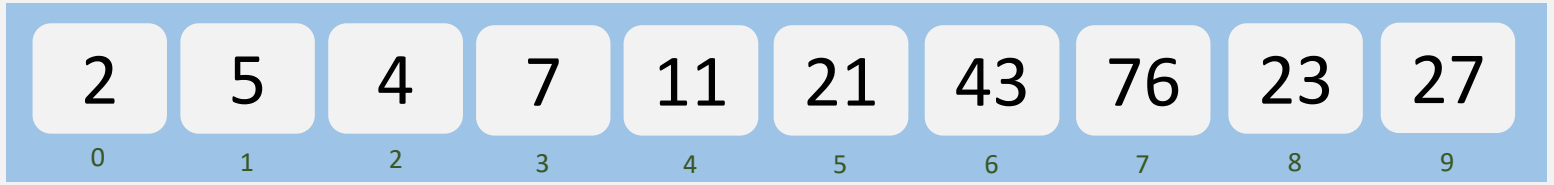
Arr1 =



Arr2 =



Arr3 =



Merging Code

```java
import java.util.Arrays;

public class Merging {
    public static void main(String[] args) {
        int[] arr1 = {1,2,3,4};
        int[] arr2 = {9,8,7,6};
        int arr3[] = new int[8];

        //Merging Logic
        for (int i = 0; i < arr1.length; i++) {
            arr3[i] = arr1[i];
        }
        for (int i = 0; i < arr2.length; i++) {
            arr3[i+arr1.length] = arr2[i];
        }
        //Printing Arrays
        System.out.println("arr1 = "+ Arrays.toString(arr1));
        System.out.println("arr2 = "+ Arrays.toString(arr2));
        System.out.println("arr3 = "+ Arrays.toString(arr3));
    }
}
```

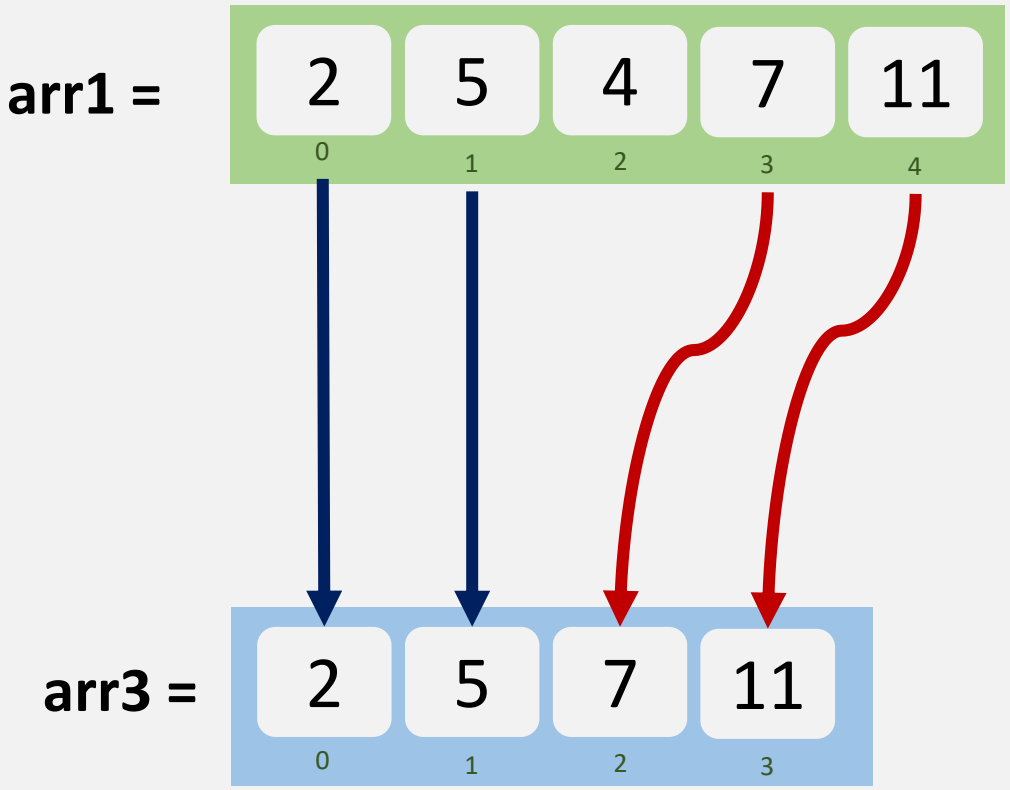
```
arr1 = [1, 2, 3, 4]
arr2 = [9, 8, 7, 6]
arr3 = [1, 2, 3, 4, 9, 8, 7, 6]

Process finished with exit code
```

E-mail : asif.io.edu@gmail.com

Deleting a element from an arrays

We want to delete the element at index 2.

Index = 2
Element value = 4
Array name = arr1



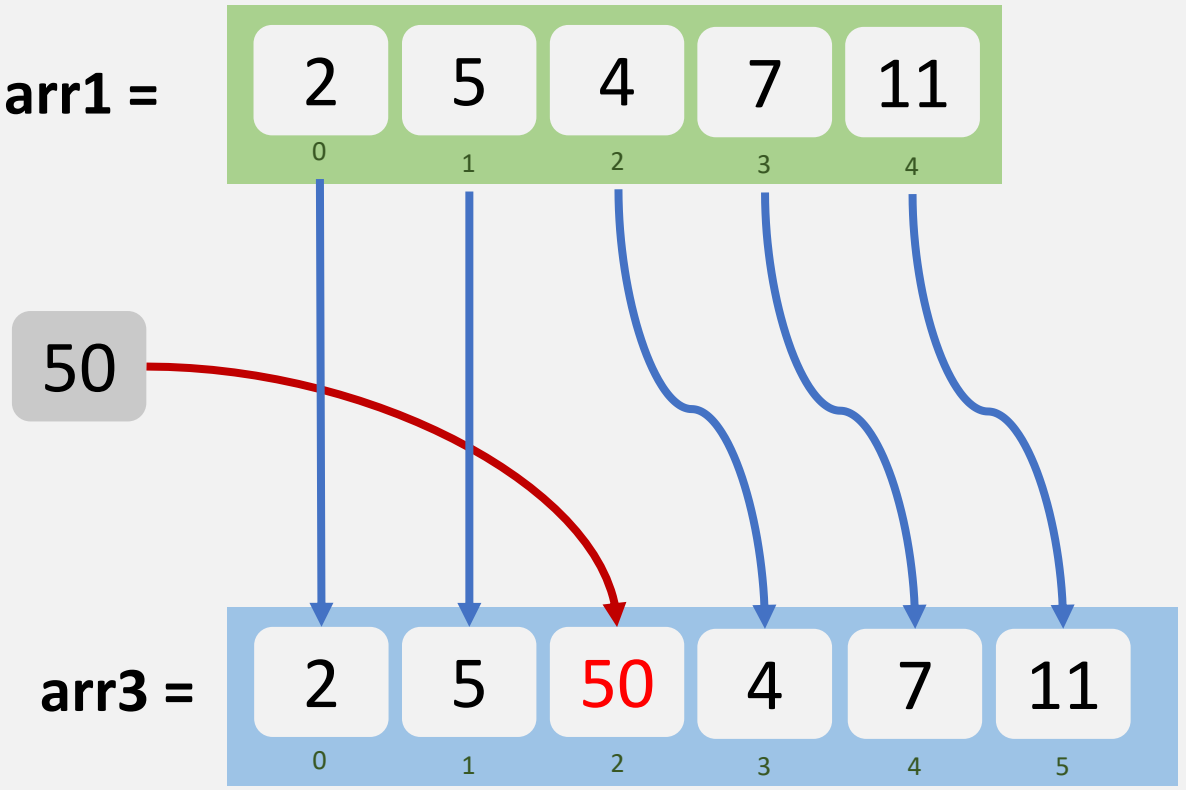
Deleting - Code

```
7   public static void main(String[] args) {
8       Scanner in = new Scanner(System.in);
9       int[] arr1 = {1,2,3,4,5,12};
10      int[] arr3 = new int[arr1.length - 1];
11
12      System.out.println("Enter index number : ");
13      int index = in.nextInt();
14      // ...
22      for (int i = 0; i < arr1.length; i++) {
23          if(i<index){
24              arr3[i] = arr1[i];
25          } else if (i>index) {
26              arr3[i-1] = arr1[i];
27          }
28      }
29
30      System.out.println("arr1 "+ Arrays.toString(arr1));
31  //      System.out.println("arr2 "+ Arrays.toString(arr2));
32      System.out.println("arr3 "+ Arrays.toString(arr3));
33  }
34 }
```

Inserting a element from an arrays

We want to insert an element at index 2.

Index (index) = 2
Element value (element) = 50
Array name = arr1



Inserting - Code

```java
public class Inserting {
    public static void main(String[] args) {
        Scanner in = new Scanner(System.in);
        int[] arr1 = {2,5,4,7,11};
        int[] arr3 = new int[arr1.length + 1];

        System.out.println("Enter index number : ");
        int index = in.nextInt();
        System.out.println("Enter the value : ");
        int x = in.nextInt();

        arr3[index] = x; //Inserting
        //merging rest of array
        for (int i = 0; i < arr1.length; i++) {
            if(i<index){
                arr3[i] = arr1[i];
            } else if (i >= index) {
                arr3[i+1] = arr1[i];
            }
        }
        System.out.println("arr1"+ Arrays.toString(arr1));
        System.out.println("arr3"+ Arrays.toString(arr3));
```

```
"C:\Program Files\Eclipse Fou
Enter index number :
2
Enter the value :
50
arr1[2, 5, 4, 7, 11]
arr3[2, 5, 50, 4, 7, 11]

Process finished with exit co
```

2D-Array

int x[][] = new int[3][4]

It simple means I want matrix of 3 rows and 4 columns

X[0][0]	X[0][1]	X[0][2]	X[0][3]
X[1][0]	X[2][1]	X[1][2]	X[1][3]
X[2][0]	X[2][1]	X[2][2]	X[2][3]

int x[][] ={{10,20,30,40},{50,60,70,80},{90,110,120,130}}

10	20	30	40
50	60	70	80
90	110	120	130

2D - Code

```java
public static void main(String[] args) {
    Scanner in = new Scanner(System.in);
    int matrix[][] = new int[3][4];
    //Accepting the value for matrix
    for (int i = 0; i <= 2; i++) {
        for ( j = 0; j <= 3; j++) {
            System.out.println("element at ["+i+"]["+j+"]");
            matrix[i][j]= in.nextInt();
        }
    }

    //Printing the matrix
    for (int i = 0; i <= 2; i++) {
        for ( j = 0; j <= 3; j++) {
            System.out.print(matrix[i][j]+" | ");
        }
        System.out.println();
    }
}
```

Java by ASIF.IO

E-mail : asif.io.edu@gmail.com