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**Subject: SBL-OOPM**                                                  **Class: SE-DS**
**Semester: III**                                                       **A.Y. 2022-2023**

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**Experiment No. 6**
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❖  **Aim :** To write a Java program on 2D array, and also demonstrate the use of String Buffer and Vector.

❖  **Objectives :** To study the differance between array & vector in java alongwith its use in java program.

❖  **Prerequisites :** Students should know about array concept in C along witharray declaration, initialization & its advantages.

❖  **Software used :** jdk 1.6.0

❖  **Theory :**

## 1] Array in Java :

- array is a collection of similar type of elements that have contiguous memory location.
- **Java array** is an object that contains elements of similar data type.
- It is a data structure where we store similar elements.
- We can store only fixed set of elements in a java array.
- Array in java is index based, first element of the array is stored at 0 index.
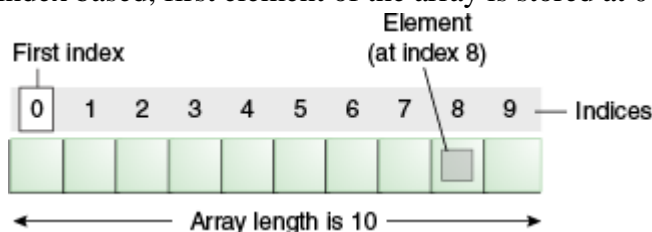


➢  **Advantage of Java Array**
  - Code Optimization: It makes the code optimized, we can retrieve or sort the data easily.
  - Random access: We can get any data located at any index position.

➢ Types of Array in java
         There are two types of array.
  - Single Dimensional Array
  - Multidimensional Array

➢ **Single Dimensional Array in java**
  ➔ Syntax :
         dataType[] arr;
         (or)    dataType[] arr;

         (or)    dataType arr[];

  ➢ Instantiation of an Array in java
                 ArrayRefVar=new datatype[size];


➢ **Example of single dimensional java array**
  ➔ example of java array, where we are going to declare, instantiate, initialize and traverse

an array.

```
class Testarray{
public static void main(String args[]){

int a[]=new int[5];//declaration and instantiation
a[0]=10;//initialization
a[1]=20;
a[2]=70;
a[3]=40;
a[4]=50;

//printing array
for(int i=0;i<a.length;i++)//length is the property of array
System.out.println(a[i]);

}}
```

➔ OUTPUT :

        10
        20
        70
        40
        50

➔ **Declaration, Instantiation and Initialization of Java Array**
We can declare, instantiate and initialize the java array together by:

```
int a[]={33,3,4,5};//declaration, instantiation and initialization
```

➔ **Passing Array to method in java**
We can pass the java array to method so that we can reuse the same logic on any array.
➔ **Example :**
Example to find minimum number of an array by passing array to method.

```java
class Testarray2{
static void min(int arr[]){
int min=arr[0];
for(int i=1;i<arr.length;i++)
 if(min>arr[i])
  min=arr[i];


System.out.println(min);
}


public static void main(String args[]){


int a[]={33,3,4,5};
min(a);//passing array to method


}}
```

OUTPUT :    **3**

➤ **Multidimensional array in java :**
   ➔ In such case, data is stored in row and column based index (also known as matrix form).
   ➔ **Syntax to Declare Multidimensional Array in java**

```
dataType[][] arrayRefVar; (or)
dataType [][]arrayRefVar; (or)
dataType arrayRefVar[][]; (or)
dataType []arrayRefVar[];
```

   ➔ **instantiate Multidimensional Array in java**
          Int[][] arr=new int[3][3];     //3 row and 3 column
   ➔ **initializing Multidimensional Array in java**
          arr[0][0]=1;
          arr[0][1]=2;
          arr[0][2]=3;

➢ **Disadvantage of Java Array**
- Size Limit: We can store only fixed size of elements in the array. It doesn't grow its size at runtime. To solve this problem, collection framework is used in java.

## 2] Vector In Java :
- We know that Arrays are very useful when there is a need to use fix number ofvariables
- There is a problem with Array i.e. they use only single data type or The Elements of array are always Same type For Avoiding this Problem Vectors are used.
- Vectors are Collection of elements those are object data type.
- For Using Vectors we have to import java . util package . These are also Calledas dynamic Array of object data type .
- For Creating a Vector, Vector Class will be used which is reside in java'sutility package
- vectors doesn't support primitives data types like int, float, char etc.
  - **Three ways to create vector class object:**

### 1. Method 1:

```java
Vector vec = new Vector();
```

It creates an empty Vector with the default initial capacity of 10. It means the Vector will be re-sized when the 11th elements needs to be inserted into the Vector.

Note: By default vector doubles its size. i.e. In this case the Vector size would remain 10 till 10 insertions and once we try to insert the 11th element It would become 20 (double of default capacity 10).

### 2. Method 2:

```java
Vector object= new Vector(int initialCapacity)
```
It will create a Vector of initial capacity of mentioned value.

### 3. Method 3:

```java
Vector object= new vector(int initialcapacity, capacityIncrement)
```

e.g.

```java
Vector vec= new Vector(4, 6)
```

Here we have provided two arguments. The initial capacity is 4 and capacityIncrement is 6.

**CONCLUSION :** Summarise what you understood from this lab.