ARRAYS

One-Dimensional ARRAY:

- Array is a collection of similar data elements.
- In java the array size is given after creating the new object.

  As int A[]= new int[x];

  Where A[] is the reference and int[x] is the object.

  Where object is created in the heap.

  And the reference is either in stack or heap.
- Location of characters in array can be accessed by using their index.
- Every array in java has length as its property which can be accessed by using "array-name.length".
- For loops are most frequently used for arrays.
- Using for loop all the elements in the arrays can be accessed/ elements in array can be transveresed using arrays.
- Java has introduced for each loop for accessing arrays in version java 1.5 or java 5.
- For each loop: syntax

```
for(type var : array)
{
    Statements using var;
}
```

Example program:

```
class test

{
  public static void main(String args[])
  {
    int A[]={2,4,6,8,10}
    for(int i=0;i<A.length;i++)
    {
      System.out.println(A[i]);
    }
   for(int i=A.length-1;i>=0;i--)
   {
     System.out.println(A[i]);
   }
 }
}
```

Two-Dimensional ARRAY:

- Two-dimensional array are suitable for matrices and tabular form.
- Syntax for creating two-dimensional array in java is

  : int A[][] = new int [3][4].
- It is also known as array of arrays or collection of arrays
- Object is created In heap but the reference may or may not be created in heap.
- Array_name.length gives number of rows.
- Array_name[index].length gives the number of columns.

  Example program:

```
class test

{
  public static void main(String args[])
  {
     int A[][];
     for(int i=0;i<A.length;i++)
     {
        for(int j=0;j<A[0].length;j++)
        {
           System.out.println(A[i][j]);
        }
        System.out.println("\n");
     }
   }
}
```

- In for each loop the array have no integer elements but the reference elements.
- Syntax of for each loop for two dimensional array:

```
for(type var :array)
{
    for(type var1 :type var)
        {
            Statements using
        var(type var 1);
    }
}
```

Example:

```
class test:

{
  public static void main(String args[])
  {
     int A[];
     for(int x[]:A)
     {
       for(int y:x)
       {
         System.out.println(y);
       }
       System.out.println("\n");
     }
  }
}
```

- Jagged array is a type of array in which the members are of different sizes.
- In jagged array the members of arrays are created separately according to their sizes using their indices.

TAKING INPUT FROM THE USER FOR 1D ARRAY-----

```
import java.util.Scanner;
public class ArrayInputExample1
{
public static void main(String[] args)
{
int n;
Scanner sc=new Scanner(System.in);
System.out.print("Enter the number of elements you want to store: ");
//reading the number of elements from the that we want to enter
n=sc.nextInt();
//creates an array in the memory of length 10
int[] array = new int[10];
System.out.println("Enter the elements of the array: ");
for(int i=0; i<n; i++)
{
//reading array elements from the user
array[i]=sc.nextInt();
}
System.out.println("Array elements are: ");
// accessing array elements using the for loop
for (int i=0; i<n; i++)
{
System.out.println(array[i]);
}
}
}
```

Output:

```
Enter the number of elements you want to store: 6
Enter the elements of the array:
67
23
45
12
77
90
Array elements are:
67
23
45
12
77
90
```

TAKING INPUT FROM THE USER FOR 2D ARRAY-----

```
public class ArrayInputExample2
{
public static void main(String args[])
{
int m, n, i, j;
Scanner sc=new Scanner(System.in);
System.out.print("Enter the number of rows: ");
//taking row as input
m = sc.nextInt();
System.out.print("Enter the number of columns: ");
//taking column as input
n = sc.nextInt();
// Declaring the two-dimensional matrix
int array[][] = new int[m][n];
// Read the matrix values
System.out.println("Enter the elements of the array: ");
//loop for row
for (i = 0; i < m; i++)
//inner for loop for column
for (j = 0; j < n; j++)
array[i][j] = sc.nextInt();
//accessing array elements
System.out.println("Elements of the array are: ");
for (i = 0; i < m; i++)
{
for (j = 0; j < n; j++)
//prints the array elements
System.out.print(array[i][j] + " ");
//throws the cursor to the next line
System.out.println();
}
}
}
```

Output:

```
Enter the number of rows: 3
Enter the number of columns: 3
Enter the elements of the array:
1
2
3
4
5
6
7
8
9
Elements of the array are:
1 2 3
4 5 6
7 8 9
```

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```java
package arraypractice1;

public class ArrayPractice1 {

    public static void main(String[] args) {
        int A[]=new int[10];
        int B[]={1,2,3,4,5};

        /*int C[];
        C=new int[10];

        B[2]=15;*/

        /*for(int i=0;i<A.length;i++)
        {
            System.out.println(A[i]);
        }*/


        /*for(int i=0;i<B.length;i++)
        {
            System.out.println(B[i]);
        }*/


        /*for(int x:B)
        {
            System.out.println(x++);
        }
        for(int x:B)
        {
            System.out.println(x);
        }*/


        /*for(int i=0;i<B.length;i++)
        {
            System.out.println(B[i]++);
        }*/


        System.out.println(B.length);
    }

}
```

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```
    }*/
    /* Finding Sum of Elements
    public static void main(String[] args)
    {
        int A[]={3,9,7,8,12,6,15,5,4,10};

        int sum=0;

        for(int x:A)
        {
            sum=sum+x;
        }

        System.out.println("Sum is "+sum);



    }  */
}



  /* Searching a Key

      System.out.println("Eneter a Key " );
      key=sc.nextInt();


      for(int i=0;i<A.length;i++)
      {
          if(key==A[i])
          {
              System.out.println("Element Found at :"+i);
              System.exit(0);
          }
      }
      System.out.println("Not found");


  }*/
```

```java
package scarray1;
import java.util.*;

public class SCArray1
{

    public static void main(String[] args)
    {
        int A[]={3,9,7,8,12,6,15,5,4,10};
        int max1,max2;

        max1=max2=A[0];

        for(int i=0;i<A.length;i++)
        {
            if(A[i]>max1)
            {
                max2=max1;
                max1=A[i];

            }
            else if(A[i]>max2)
            {
                max2=A[i];
            }
        }

        System.out.println("Second Largest is "+max2);



    }
```

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```
     /* Left Rotation
      public static void main(String[] args)
      {
           int A[]={3,9,7,8,12,6,15,5,4,10};

           for(int x:A)
                System.out.print(x+",");
           System.out.println("");

           int temp=A[0];

           for(int i=1;i<A.length;i++)
           {
                A[i-1]=A[i];
           }
           A[A.length-1]=temp;

           for(int x:A)
                System.out.print(x+",");
           System.out.println("");

      }    */
 }
```

```
package scarray2;

public class SCArray2
{

     //Inserting an Element
     public static void main(String[] args)
     {
          int A[]=new int[10];
          A[0]=3;A[1]=9;A[2]=7;A[3]=8;A[4]=12;A[5]=6;

          int n=6;

          for(int i=0;i<n;i++)
               System.out.print(A[i]+",");
          System.out.println("");

          int x=20;
          int index=2;

          for(int i=n;i>index;i--)
               A[i]=A[i-1];
          A[index]=x;

          for(int i=0;i<n;i++)
               System.out.print(A[i]+",");
          System.out.println("");
```

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```
/*Reverse Copying an Array
public static void main(String[] args)
{
    int A[]={8,6,10,9,2,15,7,13,14,11};
    int B[]=new int[10];

    for(int i=A.length-1,j=0;i>=0;i++,j++)
    {
        B[j]=A[i];
    }

    for(int x:B)
    {
        System.out.println(x+",");
    }
}*/


    /* copy array Ato B
    public static void main(String[] args)
    {
        int A[]={8,6,10,9,2,15,7,13,14,11};
        int B[]=new int[10];

        for(int i=0;i<A.length;i++)
        {
            B[i]=A[i];
        }

        for(int x:B)
        {
            System.out.print(x+",");
        }

    } */
}
```

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```
3   public class ArrayPractice
4   {
5       public static void main(String[] args)
6       {
7           //Creating Array of size 5X5
8           int A[][]=new int[5][5];
9
10          //Creating 2D array for size 5X5
11          int B[][];
12          B=new int[5][5];
13
14          int [][]C=new int[5][5];
15          int []D[]=new int[5][5];
16
17          //E is a 2D array and F is a 1D array
18          int[] E[],F;
19          E=new int[5][5];
20          F=new int[5];
21
22          //G H and I are 1D arrays
23          int[] G,H,I;
24
25
26          //Creating and initialising array of size 3X4
27          int M[][]={{1,2,3,4},{5,6,7,8},{9,10,11,12}};
28
29         //Jagged Array
30          int X[][];
31          X=new int[3][];
32
33          X[0]=new int[5];
34          X[1]=new int[3];
35          X[2]=new int[8];
36
37
38          //Displaying Array M
39          for(int x[]:M)
40          {
41              for(int y:x)
42              {
43                  System.out.print(y+" ");
44              }
45              System.out.println("");
46          }
47
48      }
49
50  }
```

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```
    /* Adding 2 Matirces
    public static void main(String[] args)
    {
        int A[][]={{3,5,9},{7,6,2},{4,3,5}};
        int B[][]={{1,5,2},{6,8,4},{3,9,7}};

        int C[][]=new int[3][3];

        for(int i=0;i<A.length;i++)
        {
            for(int j=0;j<A[0].length;j++)
            {
               C[i][j]=A[i][j]+B[i][j];

            }
        }

        for(int x[]:C)
        {
            for(int y:x)
            {
                System.out.print(y+" ");
            }
            System.out.println("");
        }

    }  */
}
```