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Subject : OOP

- **Practical Name :** 5 A

- **Aim :** that allows you to create an integer array of 18 elements with the following values: int A[ ] = {3, 2, 4, 5, 6, 4, 5, 7, 3, 2, 3, 4, 7, 1, 2, 0, 0, 0}. The program computes the sum of element 0 to 14 and stores it at element 15, computes the average and stores it at element 16 and identifies the smallest value from the array and stores it at element 17.

- **Methodology Followed :**

```
import java.util.Scanner;
public class Array
{
        public static void main(String[] args) {
          Scanner it=new Scanner(System.in);
          int A[ ] = {3, 2, 4, 5, 6,  4,  5,  7,  3,  2,  3,  4,  7,  1,  2,  0,  0,  0};
          int sum=0;
          // use for loop for sum of element array index 0 to 14.
          for(int i=0;i<15;i++){
            sum+=A[i];
          }
          A[15]=sum;
          //find average for submission
          A[16]=(sum/15);
          int mx=0,mi=100000;
          // find minimum number
          for(int i=0;i<15;i++){
            if(mi>A[i])
            mi=A[i];
          }
          A[17]=mi;
          System.out.print("Array A is : ");
          for(int i=0;i<18;i++){
            System.out.print(A[i]+" ");
          }
        }
}
```

- **Theoritical Principal Used :**
  - In this program, I used for loop for find sum of elements 0 to 14 index and insert sum at 15 index. Average of element from 0 to 14 index insert at 16 index and minimum element insert at 17 index.

- **Input :**
  -
- **Output :**
  - Array A is : 3 2 4 5 6 4 5 7 3 2 3 4 7 1 2 58 3 1

- **Practical Name :** 5 B

- **Aim :** sort given n numbers and display them in ascending and descending order.

- **Methodology Followed :**

```
import java.util.Scanner;
public class Sort
{
        public static void main(String[] args) {
           Scanner it=new Scanner(System.in);
      System.out.print("Enter Size of Array : ");
           int n=it.nextInt();
           int a[]=new int[n];//array declaration
      System.out.print("Enter Element of Array : ");
           //scan array's element
           for(int i=0;i<n;i++){
              a[i]=it.nextInt();
           }
           //sort array's element using swaping.
           for(int i=0;i<n-1;i++){
              for(int j=i+1;j<n;j++){
                 if(a[j]<a[i]){
                    int temp;
                    temp=a[i];
                    a[i]=a[j];
                    a[j]=temp;
                 }
              }
           }
           // print in Ascending Order.
           System.out.print("Array In Ascending Order : ");
           for(int i=0;i<n;i++){
              System.out.print(a[i]+" ");
           }
```

```
            System.out.println();
            // print in Descending Order.
            System.out.print("Array In Descending Order : ");
            for(int i=n-1;i>=0;i--){
            System.out.print(a[i]+" ");
            }
          it.close();
          }
}
```

- **Theoritical Principal Used :**
  - In this program , I used for loop nested for loop for sort the array. Also used swap for compare 2 elements.

- **Input :**

  - Enter Size of Array : 10
  - Enter Element of Array : 1 3 5 4 2 10 8 6 9 7

- **Output :**

  - Array In Ascending Order : 1 2 3 4 5 6 7 8 9 10
  - Array In Descending Order : 10 9 8 7 6 5 4 3 2 1

- **Practical Name :** 5 C

- **Aim :** to add two given matrices and to multiply two given matrices.

- **Methodology Followed :**

```
import java.util.Scanner;
public class Matrix
{
        public static void main(String[] args) {
            Scanner it=new Scanner(System.in);
            // get row and column for matrix A from user
            System.out.print("Enter Row and Column for Matrix A : ");
            int n1=it.nextInt();
            int m1=it.nextInt();
            int a[][]=new int[n1][m1];
            //get element for matrix A
            System.out.println("Enter Element of array A : ");
            for(int i=0;i<n1;i++){
               for(int j=0;j<m1;j++){
                  a[i][j]=it.nextInt();
```

```
    }
}
// print element of array A
System.out.println("Entered elements of array A : ");
for(int i=0;i<n1;i++){
    for(int j=0;j<m1;j++){
        System.out.print(a[i][j]+" ");
    }
    System.out.println();
}
// get row and column for matrix A from user
System.out.print("Enter Row and Column for Matrix B : ");
int n2=it.nextInt();
int m2=it.nextInt();
int b[][]=new int[n2][m2];
int m[][]=new int[n1][m2];

// get element for Matrix B
System.out.println("Enter Element of array B : ");
for(int i=0;i<n2;i++){
    for(int j=0;j<m2;j++){
        b[i][j]=it.nextInt();
    }
}

//print Array B
System.out.println("Entered Element of array B : ");
for(int i=0;i<n1;i++){
    for(int j=0;j<m1;j++){
        System.out.print(b[i][j]+" ");
    }
    System.out.println();
}
//check condition for sum of 2 matrices.
if(n1==n2&&m1==m2){
    System.out.println("Sum of array A and B : ");
    //print sum of 2 matrix elements
    for(int i=0;i<n1;i++){
        for(int j=0;j<n2;j++){
            int sum=a[i][j]+b[i][j];
            System.out.print(sum+" ");
        }
        System.out.println();
    }
}
else{
    System.out.println("Sum of array A and B is not Possible");
```

```
            }

            //check condition for multiplication of 2 matrices
            if(n2==m1){
               System.out.println("Multiplication of array A and B is : ");
               // matrix m is a Multiplication of 2 matrices
               for(int i=0;i<n1;i++){
                  for(int j=0;j<m2;j++){
                     for(int k=0;k<m1;k++){
                        m[i][j]+=a[i][k]*b[k][j];
                     }
                  }
               }
               //print multiplication of 2 matrices.
               for(int i=0;i<n1;i++){
                  for(int j=0;j<m2;j++){
                    System.out.print(m[i][j]+" ");
                  }
                  System.out.println();
               }
            }
         }
   }
```

- **Theoritical Principal Used :**

  - In this program, I used nested for loops for scan 2D array. If else statement is used for check sum and multiplication is possible or not. For sum and multiplication use for loop.

- **Input :**

  - Enter Row and Column for Matrix A : 3 3
  - Enter Element of array A :

    1 2 3
    4 5 6
    7 8 9
  - Enter Row and Column for Matrix B : 3 3
  - Enter Element of array B :

    1 2 3
    4 5 6
    7 8 9

- **Output :**

  - Entered elements of array A :

    1 2 3
    4 5 6

7 8 9

- Entered Element of array B :

  1 2 3
  4 5 6
  7 8 9

- Sum of array A and B :

  2 4 6
  8 10 12
  14 16 18

- Multiplication of array A and B is :

  30 36 42
  66 81 96
  102 126 150

Conclusion :

- In this programs, I used for loop and if else statement.