—Question 1—

Write a program to create three single dimensional arrays **cod[ ]**, **pric[ ]**, **qty[ ]** to store product code, unit price of each product and quantity of **10** products. Calculate the total cost of each product and print the result in tabular form including product code, unit price of each product, quantity of each product and total cost of each. At the end print total of price, total of quantity and the total of costs.

```java
import java.util.Scanner;
class A
{
        void main()
        {
                int cod[] = new int[10];
                int pric[]= new int[10]; //unit price
                int qty[] = new int[10];

                Scanner sc = new Scanner(System.in);
                System.out.println("Enter product code, unit price and quantity of 10 products ");
                for(int i=0; i<10; i++)
                {
                        System.out.println("---Product " + (i+1) + " ---");
                        cod[i] = sc.nextInt();
                        pric[i] = sc.nextInt();
                        qty[i] = sc.nextInt();
                }
                System.out.println("Code\t\tUnit Price\t\tQuantity\t\tTotal Price")
                for(int i=0; i<10; i++)
                {
                        System.out.print(cod[i] + "\t\t");
                        System.out.print(pric[i] + "\t\t");
                        System.out.print(qty[i] + "\t\t");
                        System.out.print(pric[i] * qty[i] + "\n");
                }
        }
}
```

—Question 2—

Design a function **void findMarks(float M[ ])**. The function takes single subscripted variable **M[ ]** as function argument with marks of **10** students. Print average of **10** students along with highest and lowest marks scored by the student with suitable messages.

```java
class a
{
        void findMarks(float M[])
        {
                int n=M.length;
                int minNo=a[0];
```

```
            int maxNo=a[0];
            int sum=0;

            for(int i=0;i<n;i++)
            {
                    sum += a[i]
                    if(a[i] > maxNo){
                            maxNo = a[i];
                    }
                    if(a[i] < minNo)
                    {
                            minNo = a[i];
                    }
            }
            System.out.println("Highest No: " + maxNo);
            System.out.println("Lowest No: " + minNo);
            System.out.println("Average: " + (sum/10));
        }
}
```

—Question 3—

QUESTION 3 :

Write a program to initialize the following character arrays and print a suitable message after checking the arrays whether the two arrays are identical or not. Make suitable use of **boolean data type** to decide whether the two character arrays are same or not.

X[ ]={'x', 'y', 'z', 'w'} and Y[ ]={'x', 'y', 'z', 'w'}

```
class A
{
        static void main()
        {
                char x1[] = {'x','y','z','w'};
                char x2[] = {'x','y','z','w'};
                boolean isIdentical = true;

                for(int i=0; i<4; i++)
                {
                        if(x1[i] != x2[i])
                                isIdentical = false;
                }
                if(isIdentical)
                        System.out.println("Both the arrays are identical");
                else
                        System.out.println("Both the arrays are not identical");
        }
}
```

—Question 4—

QUESTION 4 :

Write a program to make suitable use of Scanner class and its functions to input N integers in two single dimensional arrays X[ ] and Y[ ]. Create another array Z[ ] that contains integers from arrays X[ ] and Y[ ] that are *common in both*. Print all three arrays.

Example: let X[ ]= {3, 5, 7, 9, 2} and Y[ ]= {6, 3, 11, 2, 7} then array Z[ ]= {3, 7, 2}

```java
import java.util.Scanner;
class A
{
        static void main()
        {
                Scanner sc = new Scanner(System.in);
                System.out.println("Enter size of N");
                int N = sc.nextInt();

                int x[] = new int[N];
                int y[] = new int[N];
                int z[] = new int[N];
                int j=0;

                //get input in both arrays
                for(int i=0; i<N; i++)
                {
                        x[i] = sc.nextInt();
                        y[i] = sc.nextInt();
                }

                for(int i=0; i<N; i++)
                {
                        if(x[i] == y[i])
                        {
                                z[j] = x[i];
                                j++;
                        }
                }
                System.out.println("Elements of array x: ");
                displayArray(x);
                System.out.println("Elements of array y: ");
                displayArray(y);
                System.out.println("Elements of array z: ");
                displayArray(z);
        }
        static void displayArray(int a[])
        {
                for(int i=0; i<a.length; i++)
                {
                        System.out.print(a[i] + "  ");
                }
        }
}
```

QUESTION 5 :   Date : ....

Write a program to initialize a single dimensional array AR[ ] of 15 integer elements. Arrange the array in **ascending order** using **Bubble sort** method. Print the array before and after sorting. Each array should be printed in a single line with a suitable space between each element.

```java
import java.util.Scanner;

public class A {
  public static void main(String []args) {
    int i,j,temp,n;
    Scanner sc = new Scanner(System.in);

    n = 15;

    int AR[] = new int[n];

    System.out.println("Enter " + n + " numbers: ");
    for (i = 0; i <n; i++)
      AR[i] = sc.nextInt();

    for (i = 0; i < ( n - 1 ); i++)
        {
      for (j = 0; j < n - i - 1; j++)
          {
        if (AR[j] > AR[j+1]) //swap the elements if first one is greater than second
        {
          temp = AR[j];
          AR[j] = AR[j+1];
          AR[j+1] = temp;
        }
       }
     }

    System.out.println("******Sorted list******");
    for (i = 0; i < n; i++)
      System.out.print(AR[i] + " ");
  }
}
```

QUESTION 6 :

Write a program to initialize a single dimensional array **num[ ]** with 15 integer elements. Arrange the array **num[ ]** in ascending order. Input another integer *val*. Search *val* from array **num[ ]** using **binary search technique**. Print the sorted array **num[ ]** in a single line with suitable space between each number and index/subscript of *val*, if found in the sorted array otherwise print a message "**Not found in the list, search unsuccessful**" along with value of *val*.

```java
import java.util.Scanner;

public class A {
 public static void main(String []numgs)
 {
   int i,j,temp,n;
   Scanner sc = new Scanner(System.in);

   n = 15;

   int num[] = new int[n];

   System.out.println("Enter " + n + " numbers: ");
   for (i = 0; i <n; i++)
    num[i] = sc.nextInt();

   for (i = 0; i < ( n - 1 ); i++)
       {
    for (j = 0; j < n - i - 1; j++)
        {
     if (num[j] > num[j+1]) //swap the elements if first one is greater than second
     {
       temp = num[j];
       num[j] = num[j+1];
       num[j+1] = temp;
     }
    }
   }

   System.out.println("******Sorted list******");
   for (i = 0; i < n; i++)
    System.out.print(num[i] + " ");

       //start the process of searching
       System.out.println("Enter number to search");
       int val = sc.nextInt();

       int start=0, end=n-1,mid=0, found=0;
       while(start <= end)
       {
               mid = (start+end)/2;
               if(num[mid] == val)
               {
                       found=1;
```

```java
                break;
            }
        else if(val > num[mid])
                start = mid+1;
        else
                end = mid-1;
    }
    if(found == 1)
            System.out.println(val + " found at index : " + mid);
    else
            System.out.println(val + " not found");
 }
}
```

—Question 7—

QUESTION 7 :   Date : ....

Write a program to create a single dimensional array A[20] of *numbers in decimals* (the numbers may be positive/negative). Arrange the numbers in **Descending order** using **Selection sort** method. Print unsorted and sorted arrays.

```java
import java.util.*;
class A
{
   public static void main()
   {
     float A[] = new float[20];
     Scanner sc = new Scanner(System.in);
     System.out.println("Enter 20 elements");
     for(int i=0; i<A.length; i++)
     {
       A[i] = sc.nextInt();
     }

            System.out.println("Before Sorting : ");
     for (int i = 0; i < A.length; i++)
            {
       System.out.print(A[i] + "   ");
            }

     for (int i = 0; i < A.length - 1; i++)
     {
       int index = i;

       for (int j = i + 1; j < A.length; j++)
       {
         if (A[j] > A[index])
         {
            index = j;//searching for lowest index
         }
       }
     }
```

```java
            float smallerNumber = A[index];
            A[index] = A[i];
            A[i] = smallerNumber;
        }

        System.out.println("Sorted array : ");
        for (int i = 0; i < A.length; i++)
            System.out.print(A[i] + "   ");
    }

}
```

—Question 8—

QUESTION 8 :

Write a function **void printNumbers(int Y[ ], int Z[ ])** that takes two arrays as arguments. Calculate the sizes of both the arrays. Print only Armstrong numbers from array X[ ]. Print only palindrome numbers from array Z[ ].

Write a main function using Suitable *Scanner class* and its associated functions to input two arrays of sizes **M, N** respectively and by calling the method print *Armstrong* and *palindrome* numbers from the arrays.

Example : (i) If the input number is present on the right of square of input number then the input number is Automorphic. For eg. Let **N=25**, its square is **625**, here input number **25** is present on the right of **625** so **25** is an Automorphic.

(ii) if the reverse and forward of a number is same then the input number is palindrome. For eg. Let **N=282**, its reverse is also **282** so **282** is a palindrome.

Answer :

```java
import java.util.Scanner;
class A
{
    static void main()
    {
        Scanner sc = new Scanner(System.in);
        int M=10, N=5;
        int a[] = new int[M];
        int b[] = new int[N];
        System.out.println("Enter " + M + " Numbers for automorphic") ;
        for(int i=0; i<a.length; i++)
            a[i] = sc.nextInt();

        System.out.println("Enter " + N + " Numbers for palindrome") ;
        for(int i=0; i<b.length; i++)
            b[i] = sc.nextInt();

        printNumbers(a,b);

    }

    static void printNumbers(int Y[], int Z[])
    {
        int sizeY = Y.length;
        int sizeZ = Z.length;
```

```java
      System.out.println("The automorphic numbers are: ");
      for(int i=0; i<sizeY; i++)
      {
         int num = Y[i];
         if(automorphic(num))
            System.out.print(num + "  ");
      }
      System.out.println();
      System.out.println("\nThe palindrome numbers are: ");
      for(int i=0; i<sizeZ; i++)
      {
         int num = Z[i];
         if(palindrome(num))
            System.out.print(num + "  ");
      }

   }

   static boolean automorphic(int num)
   {
      int count=0, sqr = num*num;
      int temp =num;

      //count digit of number
      while(temp>0){
         count++;
         temp=temp/10;
      }

      //taking last count digit of sqr of num
      int lastSquareDigits = (int) (sqr%(Math.pow(10,count)));
      if(num == lastSquareDigits)
         return true;
      else
         return false;
   }

   static boolean palindrome(int n)
   {
      int r,sum=0,temp;

      temp=n;
      while(n>0)
      {
         r=n%10;  //getting remainder
         sum=(sum*10)+r;
         n=n/10;  //eliminating rightmost digit
      }
      if(temp==sum)
         return true;
      else
         return false;
   }
```

}

QUESTION 9 :

Write a program to input weights of **30** persons in a single dimensional array AR[ ]. Arrange the array in **descending order** using **Bubble sort** method. Print the original array and sorted array.

```java
import java.util.Scanner;

class b
{
   static void main()
   {
      int temp,n;
      Scanner sc = new Scanner(System.in);
      n = 30;
      int num[] = new int[n];

      System.out.println("\nEnter weight of " + n + " people: ");
      for (int i = 0; i <n; i++)
         num[i] = sc.nextInt();

      System.out.println("Before Sorting");
      for (int i = 0; i < n; i++)
         System.out.print(num[i] + " ");

      for (int i = 0; i < ( n - 1 ); i++)
      {
         for (int j = 0; j < n - i - 1; j++)
         {
            if (num[j] < num[j+1]) //swap the elements if first one is greater than second
            {
               temp = num[j];
               num[j] = num[j+1];
               num[j+1] = temp;
            }
         }
      }

      System.out.println("\n\n******Sorted list******");
      for (int i = 0; i < n; i++)
         System.out.print(num[i] + " ");
   }
}
```

QUESTION 10 :

Write a program to nput an integer num. Using Binary Search technique search num from the list of integers given below:

3, 5, 8, 10, 13, -14, 17, -20, 22, -35, 52, 76, 80

Print the index/subscript of *num*, if found in the sorted array otherwise print a message "**Search unsuccessful**".

```java
import java.util.Scanner;
class A
{
    public static void binarySearch()
    {
        int arr[] = {3,5,8,10,13,-14,17,-20,22,-35,52,76,80};
        int first = 0, last=arr.length-1, found=0, n = arr.length;

        for (int i = 0; i < ( n - 1 ); i++)
        {
            for (int j = 0; j < n - i - 1; j++)
            {
                if (arr[j] > arr[j+1])
                {
                    int temp = arr[j];
                    arr[j] = arr[j+1];
                    arr[j+1] = temp;
                }
            }
        }
        Scanner sc = new Scanner(System.in);
        System.out.println("\nEnter value to search");
        int num = sc.nextInt();

        int mid = (first + last)/2;
        while( first <= last )
        {
            if(arr[mid] == num)
            {
                found=1;
                break;
            }
            else if ( arr[mid] < num )
            {
                first = mid + 1;
            }
            else
            {
                last = mid - 1;
            }
            mid = (first + last)/2;
        }
        if ( found == 1 )
            System.out.println("Element found at index " + mid);
```

```
        else
            System.out.println("Search Unssuccessful!");
    }
}
```

—Question 11—

QUESTION 11 :

Write a program to sort the following years in **Ascending order** using **Selection sort** method. Print the original array and the sorted array.

2000, 1998, 1996, 2010, 1984, 2012, 2011, 1992, 2013, 1999, 2018, 2016

```
class b
{
    static void main()
    {
            int A[] = {2000, 1998, 1996, 2010, 1984, 2012, 2011, 1992, 2013, 1999, 2018, 2016};

            System.out.println("Before Sorting : ");
    for (int i = 0; i < A.length; i++)
            {
    System.out.print(A[i] + "   ");
            }

    for (int i = 0; i < A.length - 1; i++)
    {
       int index = i;

       for (int j = i + 1; j < A.length; j++)
       {
          if (A[j] > A[index])
          {
             index = j;
          }
       }
       int smallerNumber = A[index];
       A[index] = A[i];
       A[i] = smallerNumber;
    }

    System.out.println("Sorted array : ");
    for (int i = 0; i < A.length; i++)
       System.out.print(A[i] + "   ");
       }
}
```

—Question 12—

QUESTION 12 :

Write a program assign the following integers in a two dimensional array **arr**[ ][ ]. Print the array in the form of matrix of 3 rows and 3 columns. Also print product of even integers and sum of odd integers from the matrix.

4, 3, 2, 1, -5, 6, 7, -8, 9

```
class a
{
        static void main()
        {
                int arr[][] = {{4,3,2}, {1,-5,6}, {7,-8,9}};
                int pro=1, sum=0;
                for(int i=0; i<3; i++)
                {
                        for(int j=0; j<3; j++)
                        {
                                System.out.print(arr[i] + "\t");
                                int num = arr[i][j];
                                if(num % 2 == 0)
                                        pro = pro * num;
                                else
                                        sum = sum + num;
                        }
                        System.out.println();
                }

                System.out.println("\nSum of odd numbers: " + sum);
                System.out.println("\Product of even numbers: " + pro);
        }
}
```

—Question 13—

QUESTION 13 :

Write a program to input a double dimensional array of 4 rows and 4 columns. Print the array in the form of matrix of 4 rows and 4 columns. Also print sum of left diagonal elements.

```
class a
{
        static void main()
        {
                int arr[][] = {{4,3,2}, {1,-5,6}, {7,-8,9}};
                int pro=1, sum=0;
                for(int i=0; i<3; i++)
                {
                        for(int j=0; j<3; j++)
                        {
                                System.out.print(arr[i] + "\t");
                                int num = arr[i][j];
                                if(i == j)
```

```
                        sum = sum + num;
                }
                System.out.println();
        }
        System.out.println("\nSum of left diagonal: " + sum);
    }
}
```

—Question 14—

QUESTION 14 :

Write a program to input a square matrix of **M** rows and **M** columns. Input **M** from the user. Print the square matrix also print the product of even elements from the right diagonal.

```java
import java.util.Scanner;
class a
{
        static void main()
        {
                Scanner sc = new Scanner(System.in);
                System.out.println("Enter value of M");
                int M = sc.nextInt();

                int arr[][] = new int[M][M]
                int pro=1, sum=0;
                System.out.println("Enter the elements ");
                for(int i=0; i<M; i++)
                {
                        for(int j=0; j<M; j++)
                        {
                                arr[i][j] = sc.nextInt();
                                int num = arr[i][j];
                                if(i+j == 2)
                                {
                                        if(num % 2 == 0)
                                                sum = sum + num;
                                }
                        }
                }


                for(int i=0; i<M; i++)
                {
                        for(int j=0; j<M; j++)
                        {
                                System.out.print(arr[i][j] + "\t");
                        }
                        System.out.println();
                }
                System.out.println("\nSum of right diagonal: " + sum);
        }
```

}

—Question 15—

Write a program to input a integers in a two dimensional array **mat[ ][ ]** of **3 rows** and **4 columns**. Print the array in matrix form. Print the sum of elements of each row of the matrix.

For example: 3 4 5 6   Sum of row 0 = 18
             1 2 7 9   Sum of row 1 = 19
             4 5 6 8   Sum of row 2 = 23

```java
class a
{
        static void main()
        {
                int arr[][] = {{3,4,5,6}, {1,2,7,9}, {4,5,6,8}};
                int pro=1, sum=0;

                for(int i=0; i<3; i++)
                {
                        for(int j=0; j<4; j++)
                        {
                                int num = arr[i][j];
                                sum = sum + num;
                        }
                        System.out.println("Sum of row " + i  + ": " + sum);
                        sum=0;
                }

        }
}
```

—Question 16—

Write a program to input **R** (*number of rows*) and **C** (*number of columns*) from the user. Input integers in a two dimensional array **arr[ ][ ]** of **R rows** and **C columns**. Print the array in matrix form. Print the sum of elements of each column of the matrix.

For example: 3 4 5 6   Sum of column 0 = 8
             1 2 7 9   Sum of column 1 = 11
             4 5 6 8   Sum of column 2 = 23

Answer :

```java
import java.util.Scanner;
class aaa
{
   static void main()
   {
      Scanner sc = new Scanner(System.in);
      System.out.println("Enter value of R and C");
```

```java
        int R = sc.nextInt();
        int C = sc.nextInt();

        int arr[][] = new int[R][C];
        int  sum=0;
        System.out.println("Enter the elements ");
        for(int i=0; i<R; i++)
        {
            for(int j=0; j<C; j++)
            {
                arr[i][j] = sc.nextInt();
            }

        }

        //print the array
        for(int i=0; i<R; i++)
        {
            for(int j=0; j<C; j++)
            {
                System.out.print(arr[i][j] + "\t");
            }
            System.out.println();
        }
        System.out.println();

        //calculate column sum
        for(int i=0; i<R; i++)
        {
            for(int j=0; j<C; j++)
            {
                if(j < R)
                {
                    int num = arr[j][i];
                    sum = sum + num;
                }
            }
            System.out.println("Sum of column " + i  + ": " + sum);
            sum=0;
        }

    }
}
```