**41.University Type**

 Write a program to find if the student is eligible for first, second or third grade universities by finding the average of their marks given in the input integer array.

 Grade should be calculated as given below :

Average >80 First Grade University

Average >60 Second Grade University

Otherwise Third Grade University

 Include a function named **calculateGrade** that accepts 2 arguments and returns an integer. The first argument is the input array and the second argument is an int that corresponds to the size of the array. The function returns an integer that corresponds to the university type. The function returns 1 if the student is eligible for First Grade univesity, returns 2 if the student is eligible for Second Grade University, returns 3 if the student is eligible for Third Grade University and returns -1 if the average is greater than 99.

If the size of the array is negative or if any element in the array is negative or if the average marks scored by the student is greater than 99 , print “Invalid Input” and terminate the program.

**Input and Output Format:**

Input consists of n+1 integers. The first integer corresponds to n, the number of elements in the array. The next 'n' integers correspond to the elements in the array.

Output consists of a string --- “First Grade University” or “Second Grade University” or “Third Grade University” or “Invalid Input”.

Assume that the maximum size of the array is 20.

**Sample Input 1:**

5

92

87

78

74

80

**Sample Output 1:**

First Grade University

**Sample Input 2:**

-5

**Sample Output 2:**

Invalid Input

**Sample Input 3:**

5

23

2

-5

**Sample Output 3:**

Invalid Input

import java.util.Scanner;

public class Main

{

            public static void main(String[] args)

            {

                        int n, i, sum=0,avg=0;

// int flag=0;

                        Scanner in=new Scanner(System.in);

                        n = in.nextInt();

                        if(n < 0)

                        {

                                    System.out.print("Invalid array size");

                                    System.exit(0);

                        }

                        else

                        {

                                    int a[]=new int[n];

                                    for(i = 0; i< n; i++)

                                    {

                                                a[i] = in.nextInt();

                                                 if(a[i] < 0)

                                                {

                                                            //flag=1;

                                                            System.out.print("Invalid input");

                                                            System.exit(0);

                                                }

                                    }

                                    //if(flag!=1)

                                    //{

                                                for(i=0;i<n;i++)

                                                            sum=sum+a[i];

                                                avg=sum/n;

                                                if(avg>99)

                                                System.out.print ("Invalid Input");

                                                else if(avg>80)

                                                System.out.print ("First Grade University");

                                                else if(avg>60)

                                                System.out.print ("Second Grade University");

                                                else

                                                System.out.print ("Third Grade University");

                                   //}

                        }

            }

}

**42.Interchange Array**

 Write a program to interchange the first element in the array with the last element in the array. Repeat the process till the middle of the array.

 Include a function named **interchangeArray** that accepts 2 arguments and its return type is void. The first argument is the input array and the second argument is an int that corresponds to the size of the array.

If the size of the array is negative or if any element in the array is negative, print “Invalid Input” and terminate the program.

**Input and Output Format:**

Input consists of n+1 integers. The first integer corresponds to n, the number of elements in the array. The next 'n' integers correspond to the elements in the array.

Output consists of the interchanged array.

Assume that the maximum number of elements in the array is 20.

**Sample Input 1:**

4

2

1

3

4

**Sample Output 1:**

4

3

1

2

**Sample Input 2:**

-5

**Sample Output 2:**

Invalid Input

**Sample Input 3:**

5

23

2

-200

**Sample Output 3:**

Invalid Input

import java.util.Scanner;

public class Main

{

            public static void main(String[] args)

            {

                        int n, i,j,temp=0;

// int flag=0;

                        Scanner in=new Scanner(System.in);

                        n = in.nextInt();

                        if(n < 0)

                        {

                                    System.out.print("Invalid array size");

                                    System.exit(0);

                        }

                        else

                        {

                                    int a[]=new int[n];

                                    for(i = 0; i< n; i++)

                                    {

                                                a[i] = in.nextInt();

                                                 if(a[i] < 0)

                                                {

                                                           // flag=1;

                                                            System.out.print("Invalid input");

                                                            System.exit(0);

                                                }

                                    }

                                   // if(flag!=1)

                                    //{

                                                for(i=0,j=n-1;i<n/2;i++,j--)

                                                {

                                                            temp = a [i];

                                                            a [i] = a [j];

                                                            a [j] = temp;

                                                }

                                                for(i=0;i<n;i++)

                                                System.out.println(a[i]);

                                    //}

                        }

            }

}

**43.Armstrong Number**

 Write a program to find whether the given input number is an Armstrong Number.

 Include a function named **checkArmstrong** that accepts an integer and returns an integer. The function returns

1.       yes if the input is an Armstrong number

2.       no if the input is not an Arnstrong number

3.       Invalid Input if the input is a negative number or if the input is not a 3-digit number.

Print Invalid Input if the function returns -1.

**Input and Output Format:**

Input consists of a single integer.

Refer sample output for formatting specifications.

**Sample Input 1:**

153

**Sample Output 1:**

yes

**Sample Input 2:**

161

**Sample Output 2:**

no

**Sample Input 3:**

2345

**Sample Output 3:**

Invalid Input

import java.util.Scanner;

public class Main

{

            public static void main(String[] args)

            {

                        int n, sum=0,temp,rem;

// int flag=0;

                        Scanner in=new Scanner(System.in);

                        n = in.nextInt();

                        if(n<0||n>999)

                        {

                                    System.out.println ("Invalid Input");

                                    flag=1;

                        }

                       // if(flag==0)

                        {

                                     temp=n;

                                    while (n != 0)

                                    {

                                                rem = n%10;

                                                 sum = sum + (rem\*rem\*rem);

                                                n = n/10;

                                    }

                                     if (temp == sum)

                                     System.out.println("yes");

                                    else

                                    System.out.println("no");

                        //}

            }

}

**44.Factorial**

Write a program to find the factorial of a given number.

Include a function named **findFactorial** that accepts an integer argument and returns an integer that corresponds to factorial. If the input value is negative or greater than 10, the function returns -1.

If the function returns -1, print Invalid Input.

**Input and Output Format:**

Input consists of a single integer.

Output consists of an integer.

Refer sample output for formatting specifications.

**Sample Input 1:**

4

**Sample Output 1:**

24

**Sample Input 2:**

-67

**Sample Output 2:**

Invalid Input

import java.util.Scanner;

public class Main

{

            public static void main(String[] args)

            {

                        int n, fact=1,i;

// int flag=0;

                        Scanner in=new Scanner(System.in);

                        n = in.nextInt();

                        if(n<0||n>10)

                        {

                                    System.out.println ("Invalid Input");

                                    flag=1;

                        }

                        //if(flag==0)

                        //{

                                    for(i=1;i<=n;i++)

                                    {

                                                fact = fact \* i;

                                    }

                                    System.out.println (fact);

                        //}

            }

}

**45.Salary Calculation**

Jim got his salary. His salary calculations are as follows.

From his Basic amount he gets 50% of his basic for house Rent allowances and 75% of his basic as special allowances . If the number of days he worked is 31 he gets 500 extra. Write a program to calculate his gross salary after calculating all his salary split up.

Include a function named **calculateGross** that accepts 2 integer arguments and returns a float. The first integer corresponds to Jim's basic salary and the second integer corresponds to the number of days Jim has worked. The function returns a float that corresponds to the gross salary.

 Print Invalid Input and terminate the program in the following cases:

1.       Basic salary is greater than 10000

2.       Number of working days is greater than 31

3.       Basic salary is negative

4.       Number of working days is 0 or negative

**Input and Output Format:**

Input consists of 2 integers. The first integer corresponds to Jim's basic salary and the second integer corresponds to the number of days he has worked.

Output consists of a single float that corresponds to Jim's gross salary. The gross salary is displayed correct to 2 decimal places.

**Sample Input 1:**

5000

30

**Sample Output 1:**

11250 .00

**Sample Input 2:**

5000  
0  
**Sample Output 2:**

Invalid Input

import java.util.Scanner;

public class Main

{

            public static void main(String[] args)

            {

                        int basic=0,days=0;

                        double salary;

                        Scanner in=new Scanner(System.in);

                        basic=in.nextInt();

                        days= in.nextInt();

                        if(basic>10000 || days>31 || basic<0 || days==0 || days<0)

{

                                    System.out.println("Invalid Input");

                                    System.exit(0);

                        }

                        if(days==31)

                        salary=(basic\*50)/100+(basic\*75)/100+basic+500;

                        else

                        salary=(basic\*50)/100+(basic\*75)/100+basic;

                        System.out.printf("%.2f",salary);

            }

}

**46.Perfect Square**

 Write a program to find whether the given input number is a perfect square without using sqrt function.

 Include a function named **checkPerfectSquare** that accepts an integer and returns an integer. The function returns

1.       1 if the input is a perfect square

2.       0 if the input is not a perfect square

3.       -1 if the input is a negative number

Print Invalid Input if the function returns -1.

**Input and Output Format:**

Input consists of a single integer.

Refer sample output for formatting specifications.

**Sample Input 1:**

36

**Sample Output 1:**

yes

**Sample Input 2:**

40

**Sample Output 2:**

no

**Sample Input 3:**

**-**2345

**Sample Output 3:**

Invalid Input

import java.util.Scanner;

public class Main

{

            public static void main(String[] args)

            {

                        int n, i,fact=1;

// int flag=0;

                        Scanner in=new Scanner(System.in);

                        n = in.nextInt();

                        if(n<0)

                        {

                                    System.out.println ("Invalid Input");

                                    //flag=1;

System.exit(0);

                        }

                       // if(flag==0)

                       // {

                                    for(i=1;i<=n;i++)

                                    {

                                                fact=fact\*i;

                                                if(fact==n)

                                                {

                                                            System.out.println("yes");

                                                            System.exit(0);

                                                }

                                    }

                                    System.out.println("no");

                      //  }

            }

}

**47.Find Index**

 Write a program to find the index of a particular number in a given input array.

Include a function named **findIndex** that accepts 3 arguments and returns an int. The first argument is the input array, the second argument is an int that corresponds to the size of the array and the third argument is the element to be searched for. The function returns the corresponding index if the search element is present in the array and returns -1 if the search element is not present in the array.

If the size of the array is negative or if any element in the array is negative, print “Invalid Input” and terminate the program.

**Input and Output Format:**

Input consists of n+2 integers. The first integer corresponds to n, the number of elements in the array. The next 'n' integers correspond to the elements in the array.

The last integer corresponds to the element whose count needs to be found.

Output consists of an integer that corresponds to the index of the search element if it is present.

Else, print 'not found'.

Refer sample output for formatting specifications.

Assume that the maximum number of elements in the array is 20 and that all elements in the array are unique.

**Sample Input 1:**

8

2

1

3

8

6

12

10

19

8

**Sample Output 1:**

3

**Sample Input 2:**

8

2

1

3

8

6

12

10

19

80

**Sample Output 2:**

not found

**Sample Input 3:**

-5

**Sample Output 3:**

Invalid Input

**Sample Input 4:**

5

23

2

-200

**Sample Output 4:**

Invalid Input

import java.util.Scanner;

public class Main

{

            public static void main(String[] args)

            {

                        int n, i,se,index=0,f=0;

// int flag=0;

                        Scanner in=new Scanner(System.in);

                        n = in.nextInt();

                        if(n < 0)

                        {

                                    System.out.print("Invalid array size");

                                    System.exit(0);

                        }

                        else

                        {

                                    int a[]=new int[n];

                                    for(i = 0; i< n; i++)

                                    {

                                                a[i] = in.nextInt();

                                                 if(a[i] < 0)

                                                {

                                                            //flag=1;

                                                            System.out.print("Invalid input");

                                                            System.exit(0);

                                                }

                                    }

                                   // if(flag!=1)

                                   // {

                                                se=in.nextInt();

                                                for(i=0 ; i<n ;i++)

                                                {

                                                            if(a [i]==se)

{

                                                                        f=1;

                                                                        index = i;

                                                                        System.out.print(index);

                                                                        System.exit(0);

                                                }

                                                }

                                                if(f==0)

                                                System.out.print("not found");

                                    //}

                        }

            }

}

**48.Descending Order Sort**

 Write a program to sort the given array in descending order.

 Include a function named **sortArray** that accepts 2 arguments and its return type is void. The first argument is the input array and the second argument is an int that corresponds to the size of the array. If the size of the array is negative or if any of the elements in the array are negative , print “Invalid Input” and terminate the program.

**Input and Output Format:**

Input consists of n+1 integers. The first integer corresponds to n, the number of elements in the array. The next 'n' integers correspond to the elements in the array.

Output consists of an integer array.

Refer sample output for formatting specifications.

Assume that the maximum number of elements in the array is 20.

**Sample Input 1:**

8

1

6

3

5

8

10

4

9

**Sample Output 1:**

10

9

8

6

5

4

3

1

**Sample Input 2:**

-5

**Sample Output 2:**

Invalid Input

import java.util.Scanner;

public class Main

{

            public static void main(String[] args)

            {

                        int n, i,j,temp=0;

// int flag=0;

                        Scanner in=new Scanner(System.in);

                        n = in.nextInt();

                        if(n < 0)

                        {

                                    System.out.print("Invalid array size");

                                    System.exit(0);

                        }

                        else

                        {

                                    int a[]=new int[n];

                                    for(i = 0; i< n; i++)

                                    {

                                                a[i] = in.nextInt();

                                                 if(a[i] < 0)

                                                {

                                                            //flag=1;

                                                            System.out.print("Invalid input");

                                                            System.exit(0);

                                                }

                                    }

                                  //  if(flag!=1)

                                  //  {

                                                for(i=0 ; i<n ; i++)

{

                                                            for(j=i+1 ; j<n ; j++)

{

                                                                        if(a[i]<a[j])

{

                                                                                    temp = a[i];

                                                                                    a[i] = a[j];

                                                                                    a[j] = temp;

                                                                        }

                                                            }

                                                }

                                                for(i=0 ; i<n ; i++)

                                                System.out.println(a[i]);

                                    //}

                        }

            }

}

**49.endWithThree**

Read the question carefully and follow the input and output format.  
  
Given an input array, Find out the count of numbers that ends with 3.  
  
Input and Output Format :  
First line of input consists of n, the number of elements. Next n lines correspond to the array elements. Output consist of the count of numbers that ends with 3.  
  
Print "Invalid array size" when size of the array is a negative number and terminate the program  
Print "Invalid input" when there is any negative number available in the input array and terminate the program.  
  
**Sample Input 1:**  
5  
23  
353  
33  
12  
14  
**Sample Output 1:**  
3  
  
**Sample Input 2:**  
5  
1  
7  
3  
-8  
**Sample Output  2:**  
Invalid input

import java.util.Scanner;

public class Main

{

            public static void main(String[] args)

            {

                        int n, i,j, temp,count=0,rem;

// int flag=0;

                        Scanner in=new Scanner(System.in);

                        n = in.nextInt();

                        if(n < 0)

                        {

                                    System.out.print("Invalid array size");

                                    System.exit(0);

                        }

                        else

                        {

                                    int a[]=new int[n];

                                    for(i = 0; i< n; i++)

                                    {

                                                a[i] = in.nextInt();

                                                 if(a[i] < 0)

                                                {

                                                            // flag=1;

                                                            System.out.print("Invalid input");

                                                            System.exit(0);

                                                }

                                    }

                                   // if(flag!=1)

                                  //  {

                                                for(i=0 ; i<n ; i++)

{

                                                            temp = a[i];

                                                            rem = temp%10;

                                                            if(rem==3)

                                                            count++;

                                                }

                                                System.out.print(count);

                                   // }

                        }

            }

}

**50.feeCalculation**

Read the question carefully and follow the input and output format.  
  
Student Fees is calculated according to the student's 10th marks. The student will get discount in fees as follows :  
  
Marks discount(%)  
>90         -  50%  
81-90      - 25%  
70-80      - 10%  
<70         -  0%  
Calculate the fees according to above table.  
  
**Note:**  
Formula : fees - (fees\* discount(%))  
Print "Invalid mark" if the mark is greater than 100  
Print "Invalid fee" if the fee is greater than 32767  
Print "Invalid input" if any of the input is negative  
  
**Input and Output Format :**  
First line of input represents the fee, second line of input represents the marks of student.  
  
**Sample Input 1:**  
10000  
95  
**Sample Output 1:**  
5000  
  
**Sample Input 2:**  
15896  
101  
**Sample Output 2:**  
Invalid mark

import java.util.Scanner;

public class Main

{

            public static void main(String[] args)

            {

                        int fees,marks;

                        double discount,fee\_final=0;

                        Scanner in=new Scanner(System.in);

                        fees = in.nextInt();

                        marks = in.nextInt();

                        if(marks>100)

                        System.out.print("Invalid mark");

                        else if(fees>32767)

                        System.out.print("Invalid fees");

                        else if(marks<0 || fees<0)

                        System.out.print("Invalid input");

                        else

{

                                    if(marks>90)

                                    discount = .50;

                                    else if(marks>80 && marks<=90)

                                    discount = .25;

                                    else if(marks>=70 && marks<=80)

                                    discount = .10;

                                    else

                                    discount = 0;

                                    fee\_final = fees-(fees\*discount);

                                    System.out.printf("%.0f",fee\_final);

                        }

            }

}