

Q) Write a Java program that prints the machine's temperature, which is closer to 100, and the difference from 100.

Code:-

```
import java.util.Scanner;  
class Main{  
    public static void main(String[] args){  
        Scanner sc=new Scanner(System.in);  
        int n1=sc.nextInt();  
        int n2=sc.nextInt();  
        int [n3,n4];  
        if (n1>=100){  
            n3=100-n1;  
        } else {  
            n3=n1-100;  
        }  
        if (n2>=100){  
            n4=100-n2;  
        } else {  
            n4=n2-100;  
        }  
        System.out.println("The Integer closer to 100  
        is "+m+" with a difference of "+n);  
    }  
}
```

Input:-

90

80

Output:-

The Integer closer to 100 is 90 with
a difference of 10

2) Write a Java program that handles an integer and wants to find if one integer positive while the other is not divisible by 3.

Code :-

```
import java.util.Scanner;  
class Main {  
    public static void main(String[] args) {  
        Scanner sc = new Scanner(System.in);  
        int a = sc.nextInt();  
        int b = sc.nextInt();  
        if ((a > 0 && b > 0) && ((a > 0 || b > 0) && (a % 3 != 0  
            || b % 3 != 0))) {  
            System.out.print("One of the integers is  
positive while the other is not divisible  
by 3.");  
        } else if ((a < 0 && b < 0) && ((a > 0 || b > 0) && (a % 3 != 0  
            || b % 3 != 0))) {  
            System.out.print("One of the integers is positive  
while the other is not divisible by 3.");  
        } else {  
            System.out.print("Neither of the integers  
meets the condition.");  
        }  
    }  
}
```

Input:-

12

27

Output:-

Neither of the integers meets the
condition.

- 3) Write a java program that takes an Integer input, converts it into a double, and display both the original integer and the converted double value.

Code:-

```
import java.util.Scanner;  
class Main{  
    public static void main (String [] args){  
        Scanner sc = new Scanner (System.in);  
        int a = sc.nextInt();  
        double b=a;  
        System.out.println("Original Integer: "+a);  
        System.out.println("Converted Double: "+b);  
    }  
}
```

Input:-

53

Output:-

Original Integer: 53

Converted Double: 53.0

4) Write a Java program to check if the sum of these two numbers is a multiple of their product

Code:-

```
import java.util.Scanner;  
class Main {  
    public static void main (String [] args) {  
        Scanner sc = new Scanner (System.in);  
        String s = sc.nextLine();  
        String [] a = s.split (" ");  
        int n1 = Integer.parseInt (a[0]);  
        int n2 = Integer.parseInt (a[1]);  
        int sum = n1 + n2;  
        int mul = n1 * n2;  
        if (sum * 1.0 / mul == 0) {  
            System.out.println ("Sum is multiple of  
product");  
        } else {  
            System.out.println ("Sum is not multiple of  
product");  
        }  
    }  
}
```

Input:-

2 2

Output:-

Sum is multiple of product

5) Write a java program to calculate the area and circumference of a garden.

Code:-

```
import java.util.Scanner;  
class Main{  
    public static void main (String [] args){  
        Scanner sc = new Scanner (System.in);  
        double a = sc.nextDouble();  
        double c = 2 * a * 3.14159;  
        double v = a * 3.14159 * a;  
        System.out.printf ("Circumference: %.2f  
                           meters\n", c);  
        System.out.printf ("Area: %.2f square  
                           meter ", v);  
    }  
}
```

Input:-

3.0

Output:-

Circumference: 18.85 meters

Area: 28.27 meters .

b) Write a program that takes an integer and the number of bits n as input and outputs the value of the lowest n bits of the integer.

Code:-

```
import java.util.Scanner;
class Main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        int a = sc.nextInt();
        int b = sc.nextInt();
        int mask = (1 << b) - 1;
        if (a >= mask)
            System.out.println("Result :" + a);
        else
            System.out.println("Result :" + (a & mask));
    }
}
```

Input:-

85

2

Output:-

Result :1

10000000000000000000000000000000

10000000000000000000000000000000

- 7) Write a program to check if either one of the integers is both
 (i) less than or equal to zero, and
 (ii) odd.

Code:-

```
import java.util.Scanner;
class Main {
    public static void main (String [] args) {
        Scanner sc = new Scanner (System.in);
        int a = sc.nextInt();
        int b = sc.nextInt();
        boolean q;
        if ((a <= 0 && a != 0) || (b <= 0 && b != 0))
            q = true;
        else
            q = false;
        System.out.println(q);
    }
}
```

Input:- Output:-

15

"false" is printed out

345

8

-negative -true

is true to start with nothing is printed

8
d
oi

8) Write a program to calculate the average of the three expenses and check if it is greater than any two categories.

Code:-

```
import java.util.Scanner;  
class Main  
{  
    public static void main (String [] args)  
    {  
        Scanner sc = new Scanner (System.in);  
        double a = sc.nextDouble();  
        double b = sc.nextDouble();  
        double c = sc.nextDouble();  
        double d = (a+b+c)/3;  
        System.out.printf ("%.2f\n", d);  
        if (a>d && b>d && c>d)  
            System.out.println ("Average is greater  
            than both 'a' and 'c'");  
        else if (a>d && b>d && c<d)  
            System.out.println ("Average is greater  
            than both 'a' and 'c'");  
        else if (a>d && b<d && c>d)  
            System.out.println ("Average is greater  
            than both 'a' and 'b'");  
        else  
            System.out.println ("Average is not greater than  
            two smallest expenses");  
    }  
}
```

Input:- Output:-

4

6.67

6

Average is greater than both 4 and 6

10

9) Write a program that checks if the second sensor reading is the average of the first and third sensor readings.

Code :-

```
import java.util.Scanner;
class Main {
    public static void main (String [] args) {
        Scanner sc = new Scanner (System.in);
        int a = sc.nextInt();
        int b = sc.nextInt();
        int c = sc.nextInt();
        int d = ((c-a)/2)+a;
        boolean n;
        if (b==d) {
            n=true;
            System.out.println(n);
            System.out.print("The second integer is
halfway between the first and third integer");
        } else {
            n=false;
            System.out.println(n);
            System.out.print("The second integer is not
halfway between the first and third integers.");
        }
    }
}
```

Input :- Output :-

10 false

7 The second integer is not halfway
10 between the first and third integers.

10) Write a program to calculate the time if A, B, C were worked separately.

Code:-

```
import java.util.Scanner;  
class Main{  
    public static void main(String[] args){  
        Scanner sc = new Scanner(System.in);  
        String str = sc.nextLine();  
        String[] s = str.split(" ");  
        int a = Integer.parseInt(s[0]);  
        int b = Integer.parseInt(s[1]);  
        int c = Integer.parseInt(s[2]);  
        int d = Integer.parseInt(s[3]);  
        int e = Integer.parseInt(s[4]);  
        double f = 1.0/a;  
        double g = 1.0/b;  
        double h = 1.0/c;  
        double i = (f+g+h)*d;  
        double j = (f+g)*d;  
        double k = 1 - (j + i);  
        System.out.printf("Work done in first d1 days  
(A+B+C): %.2f\n", i);  
        System.out.printf("Work done in next d2 days  
(A+B): %.2f\n", j);  
        System.out.printf("Remaining work : %.2f", k)  
    }  
}
```

Input:

10 20 30 2 2

Output:-

Work done in first d1 days (A+B+C): 0.37

Work done in next d2 days (A+B): 0.30

Remaining work: 0.33

Control structures

- 1) Write a program to that takes positive five integers and to print whether he had passed and average marks
Code:-

```
import java.util.Scanner;
class Main{
    public static void main (String [] args){
        Scanner sc = new Scanner (System.in);
        String q = sc.nextLine();
        String [] w = q.split(" ");
        int a = Integer.parseInt (w[0]);
        int b = Integer.parseInt (w[1]);
        int c = Integer.parseInt (w[2]);
        int d = Integer.parseInt (w[3]);
        int e = Integer.parseInt (w[4]);
        int avg = (a+b+c+d+e)/5;
        System.out.println ("Average Score: " + avg);
        if (avg >= 50){
            System.out.print ("The student has passed");
        } else {
            System.out.print ("The student has failed");
        }
    }
}
```

Input:-

50 60 70 80 90

Output:-

Average Score: 70
The student has passed.

2) Write a program that takes a number as input and checks whether it is a multiple of 5 or 7.

Code:-

```
import java.util.Scanner;
class Main {
    public static void main (String [] args) {
        Scanner sc = new Scanner (System.in);
        int a = sc.nextInt();
        if (a % 5 == 0 && a % 7 != 0) {
            System.out.println (a + " is a multiple of 5");
        } else if (a % 7 == 0) {
            System.out.println (a + " is a multiple of 7");
        } else {
            System.out.println (a + " is neither multiple of 5 nor 7");
        }
    }
}
```

Input:-

10

Output:-

10 is a multiple of 5
because 10 is divisible by 5

or 02 or 00 or 07

3) Write a program to calculate the bmi.

Code:

```
import java.util.Scanner;
class Main{
    public static void main(String[] args){
        Scanner sc = new Scanner(System.in);
        double a = sc.nextDouble();
        double b = sc.nextDouble();
        double bmi = b / (a * a);
        System.out.println("BMI: " + bmi);
        System.out.print("Classification: ");
        String s1 = "";
        if(bmi < 18.5){
            s1 = "Underweight";
        } else if(bmi > 18.6 && bmi < 24.9){
            s1 = "Normal Weight";
        } else if(bmi > 25 && bmi < 29.9){
            s1 = "Overweight";
        } else {
            s1 = "Obese";
        }
        System.out.print(s1);
    }
}
```

Input:-

1.2

45.2

Output:-

BMI: 31.39

Classification: Obese

4). Write a program that calculates the current value of the car applying this depreciation over the given number of years.

Code:-

```
import java.util.Scanner;
class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        double rate = sc.nextDouble();
        int year = sc.nextInt();
        for (int i=1; i<=year; i++) {
            rate = rate - rate * 0.15;
        }
        System.out.printf("Current Value : %.2f\n", rate);
        if (rate > 10000) {
            System.out.print("Category : High");
        } else if (rate < 10000 && rate > 5000) {
            System.out.print("Category : Medium");
        } else {
            System.out.print("Category : Low");
        }
    }
}
```

Input:-

20000

5

Output:-

Current Value : 8874.11

Category : Medium

5) Write a program that checks if the number of digits in an integer matches the sum of the digits

Code:-

```
import java.util.Scanner;
```

```
class Main{
```

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

```
        Scanner sc = new Scanner(System.in);
```

```
        int a = sc.nextInt();
```

```
        int count = 1, u = a % 10;
```

```
        for(i = 1; a != 0; i++) {
```

```
            count += a / 10;
```

```
            a /= 10;
```

```
        } if(count == i) {
```

```
            System.out.println("The number of digits in
```

```
'a' matches the sum of its digits .", 0);
```

```
    } else {
```

```
        System.out.println("The number of digits in 'a'
```

```
does not match the sum of its digits .", 0);
```

```
}
```

```
}
```

Input:-

20

Output:-

The number of digits in 20 matches the sum of its digits.

b) Write a program that takes an integer as input and constructs the following pattern using for loops.

Code:-

```
import java.util.Scanner;
class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        for (int i = 1; i <= a; i++) {
            for (int j = i; j <= i; j++) {
                System.out.print("*");
            }
            System.out.printf("\n");
        }
        for (int i = a - 1; i > 0; i--) {
            for (int j = 1; j <= i; j++) {
                System.out.print("*");
            }
            System.out.printf("\n");
        }
    }
}
```

Input:-

5

Output:-

```
*
* *
* * *
* * * *
* * * * *
* * * * * *
* * * *
* * *
*
```

exit to main menu or if exit for minimum edit

edit

exit

f) Write a program that generates a mesmerizing numerical pyramid pattern.

Code:-

```
import java.util.Scanner;
class Main{
    public static void main(String[] args){
        Scanner sc=new Scanner(System.in);
        int a=sc.nextInt();
        int h=a,m=1;
        for(int i=1;i<=a;i++){
            int p=1;
            for(int k=h-i;k>=0;k--){
                System.out.print(" ");
            }
            h--;
            for(int j=1;j<=m;j++){
                System.out.print(p);
            }
            p++;
            System.out.println("");
            m+=2;
        }
    }
}
```

Input:-

4

Output:-

```

1
1 2 3
1 2 3 4 5
1 2 3 4 5 6 7
```

8) Write a program that takes the integer and prints the next integers that are divisible by 3.

Code:-

```
import java.util.Scanner;
class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int a = sc.nextInt();
        int count = 0;
        for (int i = 100; i <= a; i++) {
            if (i % 3 == 0) {
                int e1 = i / 10;
                int f1 = i / 10;
                int e2 = f1 / 10;
                int f2 = f1 / 10;
                int e3 = f2 / 10;
                if (e1 != e2 && e1 != e3 && e2 != e3) {
                    System.out.println(i);
                    count++;
                }
            }
        }
    }
}
```

Input:-

3

Output:-

102

105

108

Averages

- 1) Write a program to compute the sum of the third-, largest and second-smallest elements from an array.
- Code:-

```
import java.util.Scanner;  
class Main{  
    public static void main(String[] args){  
        Scanner sc = new Scanner(System.in);  
        int n = sc.nextInt();  
        int arr[] = new int[n];  
        for(int i=0; i<n; i++){  
            arr[i] = sc.nextInt();  
        }  
        for(int i=0; i<n; i++){  
            for(int j=i+1; j<n; j++){  
                if(arr[i] > arr[j]){  
                    int t = arr[i];  
                    arr[i] = arr[j];  
                    arr[j] = t;  
                }  
            }  
        }  
        int s = arr[n-3] + arr[1];  
        System.out.println(s);  
    }  
}
```

Input:-

3

10 28 47

Output:-

38

2) Write a program that prints the sum of main diagonal and sum of secondary diagonal of a 2D matrix.

Code:-

```
import java.util.Scanner;  
class Main{  
    public static void main(String[] args){  
        Scanner sc = new Scanner(System.in);  
        int n = sc.nextInt();  
        int[][] arr = new int[n][n];  
        int m=0, s=0;  
        for(int i=0; i<n; i++){  
            for(int j=0; j<n; j++){  
                arr[i][j] = sc.nextInt();  
            }  
            if(i < j){  
                m+=arr[i][j];  
            }  
            else{  
                s+=arr[i][n-i-j];  
            }  
        }  
        System.out.println("Sum of the main diagonal: "+m);  
        System.out.println("Sum of the secondary diagonal: "+s);  
    }  
}
```

Input:-

```
3  
1 2 3  
4 5 6  
7 8 9
```

Output:-

Sum of the main diagonal: 15

Sum of the secondary diagonal: 15

3) Write a program that prints the sum of first and last elements of the given array.

Code:-

```
import java.util.Scanner;  
class Main{  
    public static void main (String [] args){  
        Scanner sc = new Scanner (System.in);  
        int n = sc.nextInt();  
        int arr [] = new int [n];  
        int c=0;  
        for (int i=0; i<n; i++) {  
            arr[i] = sc.nextInt();  
            if (i==0 || i==n-1) {  
                c+=arr[i];  
            }  
        }  
    }  
}
```

System.out.println("Sum of the first and
last elements: "+c);

Input:-

5

10 20 30 40 50

Output:-

Sum of the first and last elements : 60

4) Write a program to add the two ^{2D} matrix and ~~and~~ ^{points}.

Code:-

```
import java.util.Scanner;  
class Main{  
    public static void main(String[] args){  
        Scanner sc = new Scanner(System.in);  
        int n = sc.nextInt();  
        int m = sc.nextInt();  
        int[][] arr1 = new int[n][m];  
        int[][] arr2 = new int[n][m];  
        int[][] arr3 = new int[n][m];  
        for(int i=0; i<n; i++){  
            for(int j=0; j<m; j++){  
                arr1[i][j] = sc.nextInt();  
            }  
        }  
        for(int i=0; i<n; i++){  
            for(int j=0; j<m; j++){  
                arr2[i][j] = sc.nextInt();  
                arr3[i][j] = arr1[i][j] + arr2[i][j];  
            }  
        }  
        System.out.printf("%d", arr3[i][j]);  
        System.out.println();  
    }  
}
```

Input:-

1 3

25 5 5

5 14 5

Output:-

30 49 10

5) Write a program that prints the first repeated element in the array.

Code:-

```
import java.util.Scanner;
class Main {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        int[] arr = new int[n];
        boolean t = false;
        for (int i = 0; i < n; i++) {
            int m = sc.nextInt();
            arr[i] = m;
        }
        for (int j = 0; j < i; j++) {
            if (m == arr[j] && t == false) {
                System.out.println(m);
                t = true;
            }
        }
        if (!t)
            System.out.println("No repeated element found in the array");
    }
}
```

Input:-

5
15 23 15 34 23

Output:-

15.

Strings

- 1) Write a program that counts the number of specific punctuation marks in each passage.

Code:-

```
for (int i=0; i<n; i++) {  
    String s = sc.nextLine();  
    int c=0, f=0, q=0;  
    for (int j=0; j<s.length(); j++) {  
        if (s.charAt(j) == ',') {  
            c++;  
        } else if (s.charAt(j) == '.') {  
            f++;  
        } else if (s.charAt(j) == '?') {  
            q++;  
        }  
    }  
    System.out.println(c + " , " + f + " , " + q);  
}
```

Input:-

Hello, world. How are you? two.mistake

Output:-

1 1 1

! Right

! Wrong

2) Write a program that accepts at least five keywords as input arguments and outputs them in sorted alphabetical order.

Code:-

```
String s = sc.nextLine();
String[] a = s.split(" ");
Arrays.sort(a);
for (int i = 0; i < n; i++) {
    System.out.println(a[i] + " ");
}
```

Input:-

5
Blockchain Cloud AI Data Cybersecurity

Output:-

AI Blockchain Cloud Cybersecurity Data

3) Write a program to determine whether each mobile number in the list is valid or not.

Code:-

```
for (int j=0; j<n; j++) {  
    boolean t=true; //if all digits are present  
    String s=sc.nextLine();  
    for (int i=0; i<s.length(); i++) {  
        if (!Character.isDigit(s.charAt(i))) {  
            t=false; //if any character other than digit  
        }  
    }  
    if (t && s.length()==10 && s.charAt(0)!='0') {  
        System.out.print("Yes");  
    }  
    else {  
        System.out.print("No");  
    }  
}
```

Input:-

1
9876543210

Output

Yes.

f) Write a program to read a sentence and print all the valid words in it.

Code:-

```
String s = sc.nextLine();
String[] a = s.split(" ");
int h = 0;
for (int i = 0; i < a.length; i++) {
    char[] berv = a[i].toCharArray();
    int f = 0;
    for (int j = 0; j < berv.length; j++) {
        if (berv[j] + 1 > 61) {
            f++;
        }
    }
    if (f == berv.length && berv.length > 1) {
        System.out.print(a[i] + " ");
        h = 1;
    }
}
if (h == 0) {
    System.out.print("No valid words.");
}
```

Input:-

a b c e

Output:-

No valid words.

5). Write a program to determine whether each PIN code
in the list is valid or not.

Code:-

```
for (int i = 0; i < n; i++) {
    String s = sc.nextLine();
    String[] a = s.split(" ");
    int f = 0;
    for (int j = 1; j < a.length; j++) {
        if (a[i] == a[j]) {
            f++;
        }
    }
    if (f == 0 && a.length == 4) {
        System.out.println("Yes");
    } else {
        System.out.println("No");
    }
}
```

Input:-

1 2 3 4 ("Please Enter 4 digit PIN")

Output:-

Yes

Class & Objects

1) Write a program that prints the balance amount in a bank after withdrawal or deposit.

Code:-

class account{

 double setter (double a, double b, double c){

 double tot;

 if ((a+b) >= c){
 tot = a+b - c;
 return tot = a+b - c;

}

 else{

 tot = a+b;

}

}

 void getter (int ac, String s, double tot){

 System.out.println("Account Number: "+ac);

 System.out.println("Customer Name: "+s);

 System.out.printf("Final Balance: %.1f", tot);

}

}

Input:-

1

1234

Rahul Sharma

5000

2000

3000

Output:-

Account Number: 1234

Customer Name: Rahul Sharma

Final Balance: 4000.0

2) Write a program that prints final bill of an electricity bill. (Marks 8)

Code:-

Class P{

 double set (double l){

 double tot=0;

 if (l>200){

 tot += (l-200)*10;

 tot+=1200;

 else if (l>100){

 tot += (l-100)*7;

 tot+=500;

 } else {

 tot += l*5;

 } if (tot >= 2000){

 tot = tot - tot * 0.05;

 } return tot;

}

Input:-

100

Ravi Kumar

80

Output:-

Customer ID : 100

Customer Name: Ravi Kumar

Final Bill : 400.0

0.0004 (approx)

3) Write a program to find the final bill of a cab.

Code:-

Class P{

 double cal(Pint fare){

 double tot = 50;

 tot += fare * 10;

 if (fare > 20){

 tot -= tot * 0.1;

 return tot;

}

void show(Pint id, String s, double tot){

 System.out.println("Booking ID: " + id);

 System.out.println("Customer Name: " + s);

 System.out.println("Final fare: " + tot);

Input:-

1
1234

Rahul Shaema

15

Output:-

Booking ID: 1234

Customer Name: Rahul Shaema

Final fare: 200.0

4) Write a program to print the student final fee.

Code:-

Class P{

 double set(int sub){

 double tot=61000; tot = tot - 5000

 tot+=sub*800; tot = tot + sub * 800

 if(sub>5){

 tot = tot - tot*0.2; tot = tot - tot * 0.2

 }

 return tot; tot = tot - tot * 0.2

 }

 void get(int id, String s,double tot){

 System.out.println("Enrollment ID: "+id);

 System.out.println("Student Name: "+s);

 System.out.printf("Final Fee: %.1f ",tot);

}

}

Input:-

1

1234

Ravi Kumar

3

Output:-

Enrollment ID: 1234

+800.00 prishant

Student Name: Ravi Kumar

(3 month remoted)

Finals fee: 3400.0

0.000 prishant

Inheritance

- 1) Write a program that takes input for these values and calculates the total monthly cost.

Code:-

```
class PremiumSubscription {
```

```
    double a, b, c;
```

```
    PremiumSubscription (double d, double e, double f) {
```

```
        a=d;
```

```
        b=e;
```

```
        c=f;
```

```
    }  
    double calculateMonthlyCost() {
```

```
        return a+b+c;
```

```
}
```

Input:-

10.0

2.5

5.0

Output:-

Rs. 17.50

- 2) Write a program using Inheritance to calculate the selling price of products after applying discounts.

Code:-

Class DiscountProduct {

double c, d;

DiscountProduct(double a, double b) {

c = a;

d = b;

double calculateSellingPrice() {

return c * (1 - d);

}

Input:-

50.00

0.20

Output:-

Rs. 40.00

Input

0.01

0.8

0.2

Output

02.F1 .21

3) Write a program that prints the final price of the item. Assume that tax rates are as follows
Code:-

```
class SalesTaxCalculator {  
    public static int calculateFinalPrice(int a, int b){  
        return a + ((a * b) / 100);  
    }  
    public static double calculateFinalPrice(double a,  
                                             double b){  
        return a + ((a * b) / 100);  
    }  
}
```

Input:-

100
10
100.0
5.0

Output:-

110
105.00

4) Write a program to calculate the volume of a Cuboid and a cube using method overriding.

Code:-

```
class Cuboid{  
    double l,w,h;  
    Cuboid (double l, double w, double h){  
        this.l=l;  
        this.w=w;  
        this.h=h;  
    }  
    double calculateVolume(){  
        return l*w*h;  
    }  
}
```

```
class Cube extends Cuboid{  
    Cube (double s){  
        super (s,s,s);  
    }  
    double calculateVolume(){  
        return l*w*h;  
    }  
}
```

Input:-

60.0 60.0 60.0

50.0

Output:-

Volume of Cuboid : 216000.00

Volume of Cube : 125000.00

5) Write a program to calculate the cost of a shipping list.

Code:-

Class Item{

String s;

double a;

Item (String s, double a){

s = s;

a = a; }

double calculateCost(){

return a;

}

Class Produce extends Item{

Produce (String s, double a){

super (s, a);

double calculateCost(){

return a;

}

Input:-

Regular Banana

1.99

Output

1.99

Interface

- 1) Write a program to calculate the total cost based on the daily energy usage.

Code:-

Interface CostCalculator {

 void getEnergyDetails(Scanner sc);

 void calculateAndDisplay(cost());

}

Class EnergyConsumptionTracker implements

CostCalculator {

 double a;

 int b;

 double r=0;

EnergyConsumptionTracker(double a, int b) {

 this.a=a;

 this.b=b;

}

public void getEnergyDetails(Scanner sc) {

 double[] arr = new double[b];

 System.out.println("Day-wise Energy cost: ");

 for (int i=0; i<b; i++) {

 arr[i] = sc.nextDouble();

 System.out.printf("Day-%d: Rs. %.2f\n", i+1,

 a * arr[i]);

 r += a * arr[i];

}

public void calculateAndDisplay(cost) {

 System.out.printf("Total Energy cost: Rs. %.2f", r);

}

3

Water consumption and cost estimation of water
consumption (Hence water cost)

Water consumption cost

($\text{m}^3 \text{/day}$, $\text{Rs.}/\text{m}^3$) Water cost

Periodicity of consumption period (in days)

(m^3/day , $\text{Rs.}/\text{m}^3$) Water cost

Water consumption (m^3/day)

Water cost

Water consumption (m^3/day)

Water cost ($\text{Rs.}/\text{day}$)

Rs. 1

Input:-

0.01

3

10.0 20.0 30.0

Rs. 1 : Input

Output:-

Day-wise Energy Cost:

Day 1: Rs. 0.010

Day 2: Rs. 0.020

Day 3: Rs. 0.30

Total Energy cost : Rs. 0.60

2) Write a program that takes a weight and height and calculate the BMI

Code:-

```
interface HealthCalculator {  
    double calculateBMI (double a, double b);  
}  
  
class BMICalculator implements HealthCalculator {  
    public double calculateBMI (double a, double b) {  
        return a / (b * b);  
    }  
}
```

Input:-

70.0

1.75

Output:-

BMI : 22.86

Input
70.0
1.75
22.86
Output
70.0 1.75 22.86

3). Write a program that takes in the principal amount, interest rate and time in years and computes the interest.

Code: -

Interface InterestCalculator

```
double SimpleInterest(double principal,  
double rate, int time);
```

3

```
class SimpleInterestCalculator implements  
InterestCalculator {
```

```
public double SimpleInterest(double
```

principal, double rate, int time) {

return (principal * rate * time) / 100;

3

Input:

1000.00

5.00

2

Output:

Simple Interest : 100.0

4) Write a program that should allow users to dynamically add products to the inventory and calculate the total value of all products stored.

Code:

interface Inventory {

 void addProduct(String productName, double price, int quantity);
 double calculateTotalValue();

}

class SimpleInventory implements Inventory {

 int c;

 public SimpleInventory (int c) {

 this.c = c;

}

 double p = 0;

 public void addProduct(String productName,
 double price, int quantity) {

 p += price * quantity;

 System.out.println("Product added to
 inventory.");

 }

 public double calculateTotalValue() {

 return p;

}

Input:

1
Laptop

800.0

3

2

5

3

Output:

Product added to inventory.

Total inventory value: \$2400.0

Invalid choice. please select a valid
option (1/2/3).

5) Write a program that calculates a person's age based on their birth year.
Code:-

Interface AgeCalculator {

 int calculateAge(int a);

}

class HumanAgeCalculator implements AgeCalculator {

 public int calculateAge (int a) {

 return 2024 - a;

}

}

Input:-

1934

Output:-

You are 90 years old.

QUESTION (2 marks) solve below state which
→ new question is A

3(4+1:(1))+(1)+(1)=10=10

3((10)-1:(1)+1)=9

100

3(1+1)=6

100

Exception Handling

- 1) Write a program to validate the email address and display suitable exceptions do build up code.

```
import java.util.Scanner;  
class main{  
    public static int a=0, b=0, c=0;  
    public static void dot(String s) throws  
        DotException{  
        String[] p=s.split("@");  
        String s1=p[1];  
        int v=0;  
        for(int i=0; i<s1.length(); i++){  
            if(s1.charAt(i)=='.') {  
                v++;  
            }  
            if(v!=1 || s.endsWith(".")){  
                throw new DotException("Dot usage in  
                    Invalid email address");  
            }  
        }  
        public static void rate(String s) throws  
            AtTheRateException{  
        int c=0;  
        for(int i=0; i<s.length(); i++){  
            if(s.charAt(i)=='@'){  
                c++;  
            }  
            if(c!=1){  
                throw new AtTheRateException("@ usage in  
                    Invalid email address");  
            }  
        }  
    }
```

```
public static void domain(String s) throws  
DomainException{  
    if (!s.endsWith("in") && !s.endsWith(  
        "com") && !s.endsWith("net") &&  
        !s.endsWith("biz"))  
        throw new DomainException("Domain in  
        Invalid email address");  
}
```

3

3 methods for validating email
one for checking email id
one for checking domain name
one for checking extension

Input :-

sample@gmail.com

Output :-

Valid email address: sample@gmail.com

- 2) Write a program ensuring that the duration is a positive integer and does not exceed 240 minutes

Code:

```
import java.util.Scanner;
class InvalidDurationException extends Exception {
    public InvalidDurationException(String s) {
        super(s);
    }
}
class main {
    public static void check(int a) throws
        InvalidDurationException {
        if (a < 0 || a > 240) {
            throw new InvalidDurationException("Please
                enter a positive integer not exceeding 240
                minutes (4 hours).");
        }
    }
}
```

Input:

120

Output:

Meeting scheduled successfully! lorum bilor

3). Write a program to validate the username.

Code:

```
import java.util.Scanner;  
class main{  
    public static void main(String s) throws  
        InvalidUsernameException{  
        int l=s.length();  
        if(l<5){  
            throw new InvalidUsernameException("Username must be at least 5 characters");  
        }  
        else{  
            for(int i=0; i<l; i++){  
                if(s.charAt(i)==' ') {  
                    throw new InvalidUsernameException("Username cannot contain spaces.");  
                }  
            }  
        }  
    }  
}
```

Input:-

Alice

Output:-

Username is valid: Alice

4) Write a program that validates the age of individuals to vote online.

Code:-

```
import java.util.*;  
class main{  
    public static void check(int a){throws  
        InvalidAgeException  
        if(a<18){  
            throw new InvalidAgeException("Invalid Age  
Exception: Age is not valid to vote");  
        }  
        System.out.println("Eligible to vote");  
    }  
}
```

3

Input:

20

Output:

Eligible to vote

5) Write a program to validate the filename.

Code:

```
import java.util.*;  
class main{  
    public static void check(String s) throws  
        InvalidfilenameException {  
        if (s.length() < 3) {  
            throw new InvalidfilenameException("It must  
            be alphanumeric and have a minimum  
            length of 3 characters.");  
        }  
        else {  
            for (int i=0; i < s.length(); i++) {  
                if (!Character.isLetterOrDigit(s.charAt(i))) {  
                    throw new InvalidfilenameException("It must be alphanumeric and have a minimum  
                    length of 3 characters.");  
                }  
            }  
            System.out.println("Valid file name");  
        }  
}
```

Input:-

1234

Output:-

Valid file name.

Collections

- 1) Write a program that prints the list of integers in increasing sequence, ignoring out-of-order elements

Code:-

```
import java.util.*;  
class main{  
    public static void main(String[] args){  
        Scanner sc = new Scanner(System.in);  
        int n = sc.nextInt();  
        ArrayList<Integer> num = new ArrayList<>();  
        for(int i=0; i<n; i++){  
            int a = sc.nextInt();  
            if(num.isEmpty()) {  
                num.add(a);  
            } else if(a > num.get(num.size() - 1)) {  
                num.add(a);  
            }  
        }  
        System.out.println(num);  
    }  
}
```

Input:-

4

1 2 3 5

Output:-

[1]

2) Write a program to create a simple playlist manager using Java Collections.

Code:

```
import java.util.*;  
class main{  
    public static LinkedList<String> song = new  
        (initial) LinkedList<>();  
    public static int c=0;  
    public static void add (String s){  
        song.add(s);  
    }  
    public static void show(){  
        if (song.isEmpty())  
            System.out.println("Empty");  
        else {  
            for (String s : song) {  
                System.out.print(st + " ");  
            }  
            System.out.println();  
        }  
    }  
    public static void next(){  
        if (song.isEmpty())  
            System.out.println("EMPTY");  
        else if (c < song.size()) {  
            c = (c+1) % song.size();  
            System.out.println(song.get(c));  
        }  
    }  
}
```

```

public static void elem (String s) {
    if (song.remove(s)) {
        if (c >= song.size()) {
            c = 0;
        }
    }
}

public static void main (String [] args) {
    Scanner sc = new Scanner (System.in);
    int n = sc.nextInt();
    for (int i = 0; i < n; i++) {
        String s = sc.nextLine();
        if (s.startsWith("ADD")) {
            String [] p = s.split (" ");
            add (p[1]);
        } else if (s.equals("SHOW")) {
            show();
        } else if (s.startsWith("REMOVE")) {
            String [] d = s.split (" ");
            elem (d[1]);
        } else if (s.equals("NEXT")) {
            next();
        }
    }
}

```

Input:-

4

SHOW

ADD track1

ADD track2

NEXT

Output:-

((Listia.EMPTY) in add)

((Listia.track2) in show due to add)

((Listia.track1) in add due to add)

3) Write a program that calculates the frequency of that string in the list of names.

Code:-

```
import java.util.*;  
class main{  
    public static void main (String[] args){  
        Scanner sc = new Scanner (System.in);  
        int n=sc.nextInt();  
        sc.nextLine();  
        ArrayList <String> arr = new ArrayList <>();  
        for(int i=0;i<n;i++){  
            String s=sc.nextLine();  
            arr.add (s);  
        }  
        String k=sc.nextLine();  
        int c=0;  
        for(int i=0;i<n;i++){  
            if (k.equals(arr.get(i))) {  
                c++;  
            }  
        }  
        System.out.println (c);  
    }  
}
```

Input:-

```
3  
Mitchell  
Sofia  
Lily  
Cameron
```

Output:-

```
0
```