

Assignment-3 MCA

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ROLL NO: 22MCF1R40

COURSE: OOPS(JAVA)

2ND SEMESTER, 1ST YEAR MCA

1) Write a JAVA program to compute the following Series and print the value of 'Y'. $Y = 1 - (x^2 / 2!) + (x^4 / 4!) - (x^6 / 6!) + \dots$ till n terms.
Where, 'x' and 'n' is inputted by the user.

CODE:

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

```
class seriesseq {
```

```
    public static int fact(int n) {
```

```
        int f = 1;
```

```
        while (n > 0) {
```

```
            f = f * n;
```

```
            n--;
```

```
        }
```

```
        return f;
```

```
    }
```

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

```
        double x, y = 1;
```

```
        int n;
```

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

```
        System.out.println("Enter value of x: ");
```

```
        x = obj.nextDouble();
```

```

System.out.println("Enter value of n: ");

n = obj.nextInt();

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

    int k = 2 * i;

    int m = fact(k);

    if (i % 2 == 0) {

        y = y + ((Math.pow(x, k)) / m);

    } else {

        y = y - ((Math.pow(x, k)) / m);

    }

}

System.out.println("Sum of series");

System.out.println(y);

}

}

```

The screenshot shows a Visual Studio Code window with a file named 'seriesseq.java' open. The code in the editor is as follows:

```

1 import java.util.Scanner;
2
3 class seriesseq {
4     public static int fact(int n) {
5         int f = 1;
6         while (n > 0) {
7             f = f * n;
8             n--;
9         }
10    }
11 }

```

The terminal window at the bottom shows the execution of the program. It prompts for 'Enter value of x:' and 'Enter value of n:'. The user has entered '3' for x and '3' for n. The output shows the 'Sum of series' as '-0.3333333333333333'.

```

Windows PowerShell
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PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL SEMS\SEM2\OOPS JAVA\ASSIGNMENT 3> & 'C:\Program Files\Eclipse Adoptium\jdk-17.0.5-hotspot\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\RAMAVATH SANTHOSH\AppData\Roaming\Code\User\workspaceStorage\3af51834a22945ab8319658d088ac2b0\redhat.java\jdt_ws\ASSIGNMENT_3_475feae\bin' 'seriesseq'
Enter value of x:
3
Enter value of n:
3
Sum of series
-0.3333333333333333
PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL SEMS\SEM2\OOPS JAVA\ASSIGNMENT 3>

```

Write a C function which takes string as input and reverse it, without using string predefined functions. e.g. "ABCDE" o/p: "EDCBA"

CODE:

```
import java.util.Scanner;

class strReverse {

    public static void main(String[] args) {

        Scanner sc= new Scanner(System.in);

        String s = sc.next();

        System.out.println(" My Original String is : " + s);

        System.out.println("The Reversed String is : " + reverse(s));

    }

    public static String reverse(String s) {

        int i = 0, j = s.length() - 1;

        char c[] = s.toCharArray();

        while (i < j) {

            char t = c[i];

            c[i] = c[j];

            c[j] = t;

            i++;

            j--;

        }

        String str = new String(c);

        return str;

    }

}
```

```
Go Run Terminal Help strReverse.java - ASSIGNMENT 3 - Visual Studio Code
strReverse.java 1 StringReverse.java 1 strReverse.java 1 X
1 /* Q1 b) Write a C function which takes string as input and reverse it, without using string
2 predefined functions. e.g. "ABCDE" o/p: "EDCBA"
3 */
4
5 import java.util.Scanner;
6
7 Run | Debug
8 class strReverse {
9     public static void main(String[] args) {
10         Scanner sc= new Scanner(System.in);
11         String s = sc.next();
12         System.out.println(" My Original String is : " + s);
13         System.out.println("The Reversed String is : " + reverse(s));
14     }
15 }
16
17 PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
18 Windows PowerShell
19 Copyright (C) Microsoft corporation. All rights reserved.
20 Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows
21 PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL SEMS\SEM2\COOPS JAVA\ASSIGNMENT 3> & "C:\Program Files\Eclipse Adoptium\jdk-17.0.5-hotspot\bin\
22 java.exe" -cp "C:\Users\RAMAVATH SANTHOSH\AppData\Local\Code\User\workspaceStorage\3af51834a22945ab8319658d688ac2b0\redhat - java\jd
23 \lib\ext\api-ms-win-base-util-l1-1-0.dll" strReverse
24 ABCDEF
25 My Original String is : ABCDEF
26 The Reversed String is : FEDCBA
27 PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL SEMS\SEM2\COOPS JAVA\ASSIGNMENT 3> |
```

2) Write a java method insert(), to insert an integer x into a sorted array A[] (sorted in ascending order) containing N integers so that the array remains sorted after insertion. The method takes x and array A as input and returns the index of x where it get inserted in A[]. Note: indices starts from 0.

CODE:

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

public class SortedInsert {

    public static void main(String[] args) {

        int a[] = { 1, 2, 6, 7, 8 };

        System.out.println("Original Array: ");

        for (int i : a) {

            System.out.print(i + " ");

        }

        System.out.println();

        Scanner sc = new Scanner(System.in);

        System.out.print("Enter a value to insert: ");

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

```
System.out.println("Element must be added at " + findPos(a, v));
```

```
int[] newArray = new int[a.length + 1];
```

```
int i = 0;
```

```
int j = 0;
```

```
while (a[i] < v && i < a.length) {
```

```
    newArray[j++] = a[i++];
```

```
}
```

```
newArray[j++] = v;
```

```
while (i < a.length) {
```

```
    newArray[j++] = a[i++];
```

```
}
```

```
a = Arrays.copyOf(newArray, j - 1);
```

```
System.out.println("New Array: ");
```

```
for (int x : a) {
```

```
    System.out.print(x + " ");
```

```
}
```

```
}
```

```
public static int findPos(int[] a, int value) {
```

```
    int i = 0;
```

```
    while (a[i] < value) {
```

```
        i++;
```

```
    }
```

```
    return i;
```

```
}
```

}

```
PROBLEMS 3 OUTPUT DEBUG CONSOLE TERMINAL

Windows PowerShell
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PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL SEMS\SEM2\00PS JAVA\ASSIGNMENT 3> & 'C:\Program Files\
IsInExceptionMessages' '-cp' 'C:\Users\RAMAVATH SANTHOSH\AppData\Roaming\Code\User\workspaceStorage\3af5
' 'SortedInsert'
Original Array:
1 2 6 7 8
Enter a value to insert: 5
Element must be added at 2
New Array:
1 2 5 6 7
PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL SEMS\SEM2\00PS JAVA\ASSIGNMENT 3> 
```

3) Write a java method which takes two dimensional integer array as input and prints whether the inputted matrix is symmetric.

Assume 2-D array is of size NxN, where N is known constant. A matrix is said to be symmetric if it equals to its transpose .

CODE:

```
import java.io.*;

class Symmetric {

    public static void main(String[] args)throws IOException {

        BufferedReader br= new BufferedReader(new InputStreamReader(System.in));

        System.out.println("Enter the dimension of matrix:");

        int n=Integer.parseInt(br.readLine());

        System.out.println("Enter the values of matrix rowwise: ");

        int a[][]=new int[n][n];

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

        {

            for(int j=0;j<n;j++)

            {
```

```

        a[i][j]=Integer.parseInt(br.readLine());
    }
}
if(sym(a,n))
{
    System.out.println("Matrix is Symmetric!!");
}
else
{
    System.out.println("Matrix is not Symmetric!!");
}

}

}

public static boolean sym(int a[],int n) {
    for(int i=0;i<n;i++)
    {
        for(int j=0;j<n;j++)
        {
            if(a[i][j]!=a[j][i])
            {
                return false;
            }
        }
    }
    return true;
}
}

```



```
PROBLEMS 3 OUTPUT DEBUG CONSOLE TERMINAL
PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL SEMs\SEM2\OOPS JAVA\ASSIGNMENT 3> & 'C:\Program Files\InExceptionMessages' '-cp' 'C:\Users\RAMAVATH SANTHOSH\AppData\Roaming\Code\User\workspaceStorage\3af' 'Symmetric'
Enter the dimension of matrix:
2
Enter the values of matrix rowwise:
1
2
3
4
Matrix is not Symmetric!!
PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL SEMs\SEM2\OOPS JAVA\ASSIGNMENT 3> & 'C:\Program Files\InExceptionMessages' '-cp' 'C:\Users\RAMAVATH SANTHOSH\AppData\Roaming\Code\User\workspaceStorage\3af' 'Symmetric'
Enter the dimension of matrix:
2
Enter the values of matrix rowwise:
1
1
1
1
Matrix is Symmetric!!
PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL SEMs\SEM2\OOPS JAVA\ASSIGNMENT 3> 
```

4) Write a JAVA program to extract numeric characters from a given string and display the integer sum of all the numeric character's integral value.

CODE:

```
import java.io.*;

class StringToInt {

    public static void main(String[] args) throws IOException {

        BufferedReader br= new BufferedReader(new InputStreamReader(System.in));

        System.out.println("Enter numeric character: ");

        String s=(br.readLine());

        System.out.println(stoi(s));

    }

    public static int stoi(String s) {

        int i=0;

        int num=0;

        int sum=0;

        while(i<s.length())

        {

            char c=s.charAt(i);
```



```

        int x=(int)(c-'0');

        num=num*10+x;

        sum+=x;

        i++;
    }

    return sum;
}
}

```

```

PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL S
lsInExceptionMessages' '-cp' 'C:\Users\RAMAVATH SANT
' 'StringToInt'
Enter numeric character:
1234
10
PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL S

```

5) Write a program to interchange corresponding elements of two single dimensional integer arrays of same size, say 'n'. Use function to interchange the elements and pass arrays as a parameters to the function.

E.g.: If A[]={1,2,3,4} and B[]={5,6,7,8} then A[]={5,6,7,8} and B[]={1,2,3,4}.

CODE:

```
import java.util.Arrays;
```

```
public class ArrayInterchange {
```

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

```
        int[] A = {1, 2, 3, 4};
```

```
        int[] B = {5, 6, 7, 8};
```

```
        interchange(A, B);
```

```
        System.out.println("My inputed string is A={1,2,3,4} and    B= {5,6,7,8} ");
```

```
        System.out.println("A: " + Arrays.toString(A));
```

```
        System.out.println("B: " + Arrays.toString(B));
```

```

    }

    public static void interchange(int[] A, int[] B) {
        for (int i = 0; i < A.length; i++) {
            int temp = A[i];
            A[i] = B[i];
            B[i] = temp;
        }
    }
}

```

```

PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL SEMs\SEM2\OOPS JAVA\ASSIGNMENT 3> lsInExceptionMessages' -cp' 'C:\Users\RAMAVATH SANTHOSH\AppData\Roaming\Code\User\work
' 'ArrayInterchange'
My inputted string is A={1,2,3,4} and B= {5,6,7,8}
A: [5, 6, 7, 8]
B: [1, 2, 3, 4]
PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL SEMs\SEM2\OOPS JAVA\ASSIGNMENT 3>

```

6) Write a Method rotate() which takes an input string and integer d and shifts all character in the input string towards right by d elements. For example if input string is "apple" and d=2 then the Method changes the string to "leapp".

CODE:

```

import java.io.*;

public class StringRotation {

    public static void main(String[] args) throws IOException {

        BufferedReader br= new BufferedReader(new InputStreamReader(System.in));

        System.out.println("Enter the string: ");

        String input=(br.readLine());

        //String input = "apple";

        int d= Integer.parseInt(br.readLine());

        //int d = 2;

        System.out.println(rotate(input, d));

    }
}

```

```

    public static String rotate(String input, int d) {
        String rotated = input.substring(input.length() - d) +
            input.substring(0, input.length() - d);
        return rotated;
    }
}

```

```

PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL SEMs\SEM2\OOPS JAVA\ASSIGNMENT 3> & 'C:\Program Files\Java\jdk-9.0.4\bin\java.exe' -cp 'C:\Users\RAMAVATH SANTHOSH\AppData\Roaming\Code\User\workspaceStorage\1\workspace\StringRotation' 'StringRotation'
Enter the string:
apple
3
pleap
PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL SEMs\SEM2\OOPS JAVA\ASSIGNMENT 3> & 'C:\Program Files\Java\jdk-9.0.4\bin\java.exe' -cp 'C:\Users\RAMAVATH SANTHOSH\AppData\Roaming\Code\User\workspaceStorage\1\workspace\StringRotation' 'StringRotation'
Enter the string:
apple
2
leapp
PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL SEMs\SEM2\OOPS JAVA\ASSIGNMENT 3> 

```

7) The digital root of an integer n is defined as the result of summing the digits repeatedly until only a single digit remains. For example, the digital root of 1729 can be calculated using the following steps:

Step 1: $1+7+2+9 = 19$

Step 2: $1+9 = 10$

Step 3: $1+0 = 1$

Because the total at the end of step 3 is the single digit 1, that value is the digital root.

Write a method digitalRoot(n) that returns the digital root of its argument. Write the Method recursively without using any explicit loop constructs.

Note:- whatever concepts you know about PSCP use in java.

CODE:

```

import java.io.*;

public class DigitalRoot {

    public static void main(String[] args) throws IOException {

        BufferedReader br= new BufferedReader(new InputStreamReader(System.in));

        System.out.println("Enter atleast a two digit number :");

        int n=Integer.parseInt(br.readLine());

        System.out.println(digitalRoot(n));
    }
}

```

```

    }

    public static int digitalRoot(int n) {

        if (n < 10) {

            return n;

        }

        int sum = 0;

        while (n > 0) {

            sum += n % 10;

            n /= 10;

        }

        return digitalRoot(sum);

    }

}

```

```

PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL SEMs\SEM2\OOPS JAVA\ASSIGNMENT 3> & 'C:\Pr
lsInExceptionMessages' -cp 'C:\Users\RAMAVATH SANTHOSH\AppData\Roaming\Code\User\workspaceSt
' 'DigitalRoot'
Enter atleast a two digit number :
1729
1
PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL SEMs\SEM2\OOPS JAVA\ASSIGNMENT 3> & 'C:\Pr
lsInExceptionMessages' -cp 'C:\Users\RAMAVATH SANTHOSH\AppData\Roaming\Code\User\workspaceSt
' 'DigitalRoot'
Enter atleast a two digit number :
99
9
PS C:\Users\RAMAVATH SANTHOSH\OneDrive\Desktop\ALL SEMs\SEM2\OOPS JAVA\ASSIGNMENT 3> 

```