

CSA0980 -- PROGRAMMING IN JAVA FOR IDL TECHNOLOGY :-

M . NAGA KESHAHA

REG NO :-192125019

1. Write a program in Java for dynamically changing the color of Text using Multithreading.

PROGRAM :-

```
import java.awt.Color;
import javax.swing.JFrame;
import javax.swing.JLabel;
public class dynamictextcolour3 extends Thread {

    private JLabel label;
    private Color[] colors = {Color.RED, Color.GREEN, Color.BLUE};
    private int index = 0;

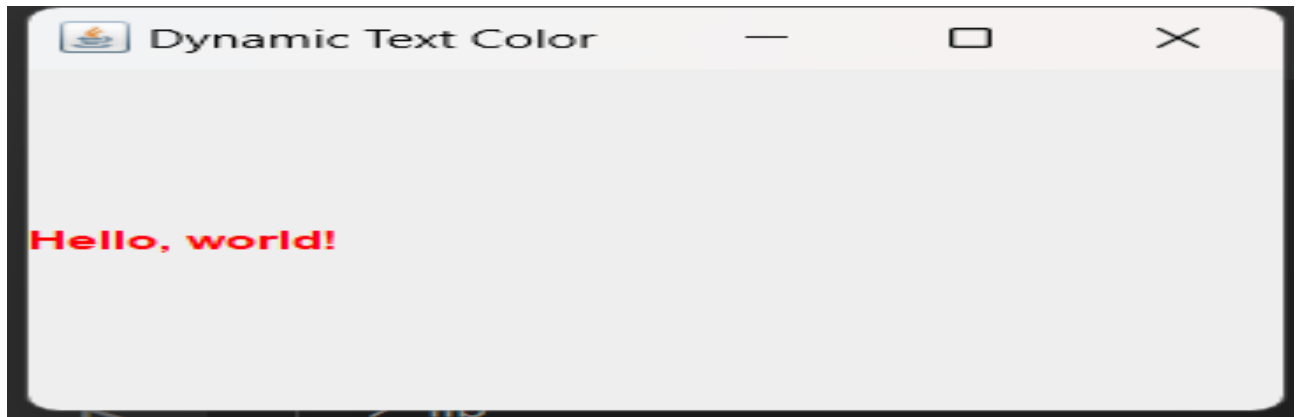
    public dynamictextcolour3(JLabel label) {
        this.label = label;
    }

    public void run() {
        while (true) {
            label.setForeground(colors[index]);
            index = (index + 1) % colors.length;
            try {
                Thread.sleep(1000);
            } catch (InterruptedException e) {
                e.printStackTrace();
            }
        }
    }

    public static void main(String[] args) {
        JFrame frame = new JFrame("Dynamic Text Color");
        JLabel label = new JLabel("Hello, world!");
        frame.add(label);
        frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
        frame.setSize(300, 200);
        frame.setVisible(true);

        dynamictextcolour3 dtc = new dynamictextcolour3(label);
        dtc.start();
    }
}
```

OUTPUT :-



2. Removing duplicate elements in java : Find/Debug the errors and get output

class duplicate

```
{
// Function to remove duplicate elements
// This function returns new size of modified
// array.
static int removeDuplicates(int arr[], int n)
{
// Return, if array is empty
// or contains a single element
if (n==0 || n==1)
return n;
int[] temp = new int[n];
// Start traversing elements
int j = 0;
for (int i=0; i<n-1; i++)
// If current element is not equal
// to next element then store that
// current element
if (arr[i] != arr[i+1])
temp[j++] = arr[i];
// Store the last element as whether
// it is unique or repeated, it hasn't
// stored previously
temp[j++] = arr[n-1];
// Modify original array
for (int i=0; i<j; i++)
```

```

arr[i] = temp[i];
return j;
}
public static void main (String[] args)
{
it arr[] = {10, 20, 20, 30, 40, 40, 40, 50, 50};
int n = arr.length;
n = removeDuplicates(arr);
// Print updated array
for (int i=0; i<n; i++)
System.out.print(arr[i]+&quot; &quot;);
}
}

```

PROGRAM :-

```

public class removeduplicate3 {
    static int removeDuplicates(int arr[], int n) {
        if (n == 0 || n == 1) {
            return n;
        }

        int[] temp = new int[n];

        int j = 0;
        for (int i = 0; i < n - 1; i++) {
            if (arr[i] != arr[i + 1]) {
                temp[j++] = arr[i];
            }
        }
        temp[j++] = arr[n - 1];
        for (int i = 0; i < j; i++) {
            arr[i] = temp[i];
        }

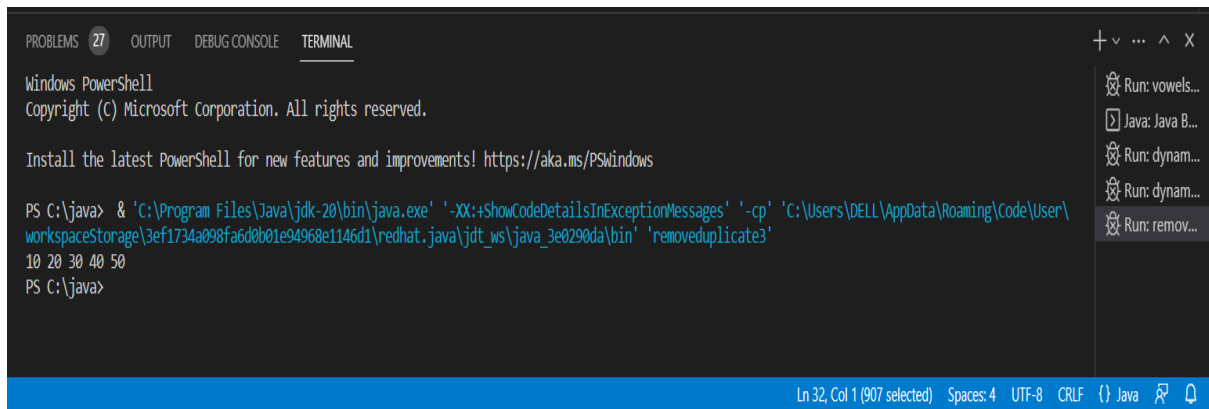
        return j;
    }

    public static void main(String[] args) {
        int arr[] = {10, 20, 20, 30, 40, 40, 40, 50, 50};
        int n = arr.length;
        n = removeDuplicates(arr, n);
        for (int i = 0; i < n; i++) {
            System.out.print(arr[i] + " ");
        }
    }
}

```

```
}
```

OUTPUT :-



```
PROBLEMS 27 OUTPUT DEBUG CONSOLE TERMINAL
Windows PowerShell
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PS C:\java> & 'C:\Program Files\Java\jdk-20\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\DELL\AppData\Roaming\Code\User\workspaceStorage\3ef1734a098fa6d0b01e94968e1146d1\redhat.java\jdt_ws\java_3e0290da\bin' 'removeduplicate3'
10 20 30 40 50
PS C:\java>
```

3. Write a program to reverse a word using loop? (Not to use inbuilt functions)

Sample Input:

String: TEMPLE

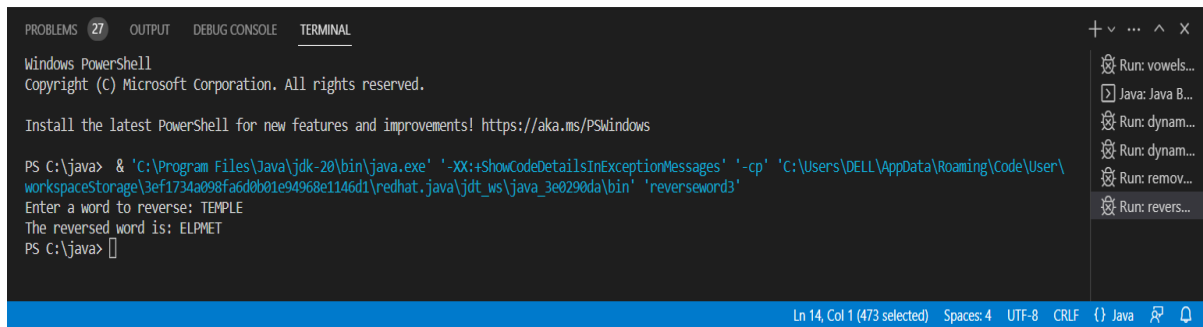
Sample Output:

Reverse String: ELPMET

PROGRAM :-

```
import java.util.*;
public class reverseword3 {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print("Enter a word to reverse: ");
        String word = scanner.nextLine();
        String reversedWord = "";
        for (int i = word.length() - 1; i >= 0; i--) {
            reversedWord += word.charAt(i);
        }
        System.out.println("The reversed word is: " + reversedWord);
    }
}
```

OUTPUT :-



```
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PS C:\java> & 'C:\Program Files\Java\jdk-20\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\DELL\AppData\Roaming\Code\User\workspaceStorage\3ef1734a098fa6d0b01e94968e1146d1\redhat.java\jdt_ws\java_3e0290da\bin' 'reverseword3'
Enter a word to reverse: TEMPLE
The reversed word is: ELPMET
PS C:\java>
```

4. Write a program to print the number of vowels in the given statement?

Sample Input:

Saveetha School of Engineering

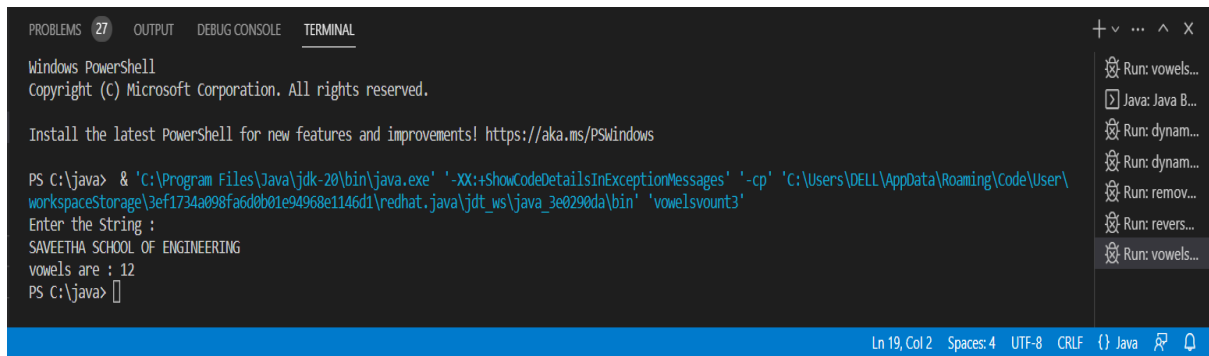
Sample Output:

Number o vowels = 12

PROGRAM :-

```
import java.util.*;
public class vowelsvount3 {
    public static void main(String[] args) {
        Scanner v = new Scanner(System.in);
        System.out.println("Enter the String : ");
        String ch = v.nextLine();
        int count = 0;
        for (int i= 0 ; i < ch.length() ; i++)
        {
            char x = ch.charAt(i);
            if (x == 'a' || x == 'e' || x == 'i' || x == 'o' || x == 'u' || x
== 'A' || x == 'E' || x == 'I' || x == 'O' || x == 'U')
            {
                count++;
            }
        }
        System.out.println("vowels are : " + count);
    }
}
```

OUTPUT :-



```
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PS C:\java> & 'C:\Program Files\Java\jdk-20\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\DELL\AppData\Roaming\Code\User\workspaceStorage\3ef1734a098fa6d8b01e94968e1146d1\redhat.java\jdt_ws\java_3e0290da\bin' 'vowelsvount3'
Enter the String :
SAVEETHA SCHOOL OF ENGINEERING
vowels are : 12
PS C:\java>
```

5. Write a program to print consonants and vowels separately in the given word

Sample Input:

Given Word: Engineering

Sample Output:

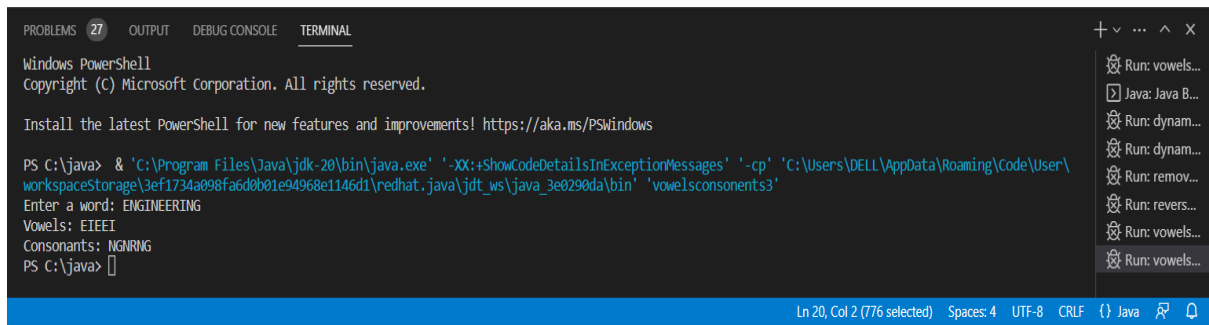
Consonants: n g n r n g

Vowels: e i e ei

PROGRAM :-

```
import java.util.*;
public class vowelsconsonants3 {
    public static void main(String[] args) {
        Scanner v = new Scanner(System.in);
        System.out.print("Enter a word: ");
        String x = v.nextLine();
        String vowels = "";
        String consonants = "";
        for (int i = 0; i < x.length(); i++) {
            char ch = x.charAt(i);
            if (ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u'
|| ch == 'A' || ch == 'E' || ch == 'I' || ch == 'O' || ch == 'U') {
                vowels += ch;
            } else if (Character.isLetter(ch)) {
                consonants += ch;
            }
        }
        System.out.println("Vowels: " + vowels);
        System.out.println("Consonants: " + consonants);
    }
}
```

OUTPUT :-



```
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PS C:\java> & 'C:\Program Files\Java\jdk-20\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\DELL\AppData\Roaming\Code\User\workspaceStorage\3ef1734a098fa6d0b01e94968e1146d1\redhat.java\jdt_ws\java_3e0290da\bin' 'vowelsconsonents3'
Enter a word: ENGINEERING
Vowels: EIEEI
Consonants: NGNRNG
PS C:\java>
```

6. Write a program that finds whether a given character is present in a string or not. In case it is present it prints the index at which it is present. Do not use built-in find functions to search the character.

Sample Input:

Enter the string: I am a programmer

Enter the character to be searched: p

Sample Output:

P is found in string at index: 8

Note: Check for non available Character in the given statement as Hidden Test case.

PROGRAM :-

```
import java.util.*;
public class searchcharacter3 {
    public static void main(String[] args) {
        Scanner v = new Scanner (System.in);
        System.out.println("Enter the String : ");
        int n,i;
        String s1 = v.nextLine();
        n = s1.length();
        System.out.println("Enter the character : ");
        char s2 = v.next().charAt(0);
        System.out.println(s2 + "is found in string : ");
        for (i=0 ; i<n ; i++)
        {
            if (s1.charAt(i) == s2)
            {
                System.out.println(i+ " ");
            }
        }
    }
}
```

OUTPUT :-

7. Write a program to arrange the letters of the word alphabetically in reverse order

Sample Input:

Enter the word: MOSQUE

Sample Output:

Alphabetical Order: U S Q O M E

Test Case:

1. HYPOTHECATION
2. MATRICULATION
3. MANIPULATION

PROGRAM :-

```
import java.util.*;
public class reversealphabeticalorder3 {
    public static void main(String[] args) {
        Scanner v = new Scanner(System.in);

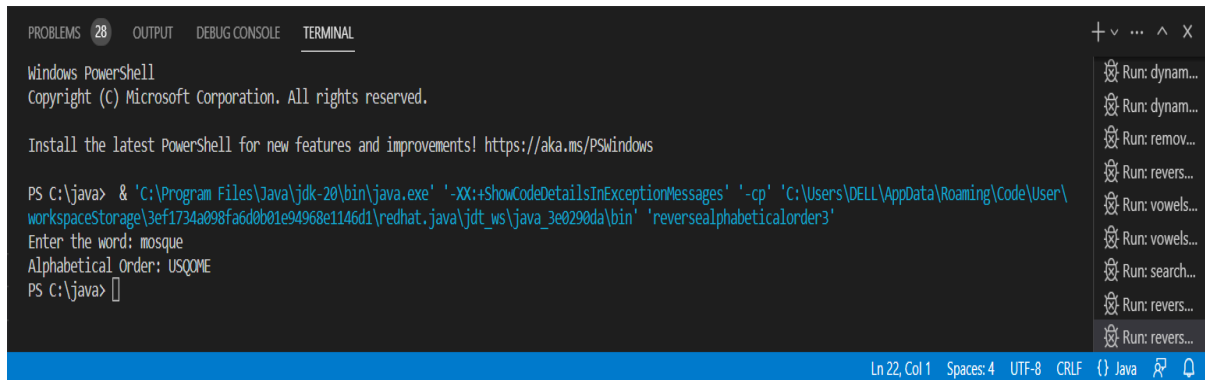
        System.out.print("Enter the word: ");
        String word = v.nextLine().toUpperCase();

        Character[] letters = new Character[word.length()];
        for (int i = 0; i < word.length(); i++) {
            letters[i] = word.charAt(i);
        }

        Arrays.sort(letters, Collections.reverseOrder());

        System.out.print("Alphabetical Order: ");
        for (char letter : letters) {
            System.out.print(letter);
        }
    }
}
```


OUTPUT :-



```
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Enter the word: mosque
Alphabetical Order: USQOME
PS C:\java>
```

8. Write a program that accepts a string from user and displays the same string after removing vowels from it.

Sample Input & Output:

Enter a string: we can play the game

The string without vowels is: w cn ply thgm

PROGRAM :-

```
import java.util.*;
public class removingvowels3 {
    public static void main(String[] args)
    {
        Scanner v = new Scanner(System.in);
        System.out.println("enter the string : ");
        String s1,s2;
        s1 = v.nextLine();
        s2 = s1.replaceAll("[aeiouAEIOU]", " ");
        System.out.println("The string without vowels is:"+s2);
    }
}
```

OUTPUT :-

```
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PS C:\java> & 'C:\Program Files\Java\jdk-20\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\DELL\AppData\Roaming\Code\User\workspaceStorage\3ef1734a098fa6d0b01e94968e1146d1\redhat.java\jdt_ws\java_3e0290da\bin' 'removingvowels3'
enter the string :
WE CAN PLAY THE GAME
The string without vowels is:W C N P L Y T H G M
PS C:\java>
```

9. Write a program to print the special characters separately and print number of Special characters in the line?

PROGRAM :-

```
import java.util.*;
public class specialcharacters3
{
    public static void main(String[] args) {
        Scanner s = new Scanner(System.in);

        System.out.print("Enter a line of text: ");
        String line = s.nextLine();

        int count = 0;
        for (int i = 0; i < line.length(); i++) {
            char ch = line.charAt(i);
            if (!Character.isLetterOrDigit(ch) && !Character.isWhitespace(ch))
            {
                System.out.println(ch);
                count++;
            }
        }

        System.out.println("Total number of special characters: " + count);
    }
}
```

OUTPUT :-

```
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PS C:\java> & 'C:\Program Files\Java\jdk-20\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\DELL\AppData\Roaming\Code\User\workspaceStorage\3ef1734a098fa6d0b01e94968e1146d1\redhat.java\jdt_ws\java_3e0290da\bin' 'specialcharacters3'
Enter a line of text: enjoy the day @##$
@
#
$
Total number of special characters: 3
PS C:\java> 
```

10. Write a program that would sort a list of names in alphabetical order Ascending or Descending, choice get from the user?

Sample Input:

Banana

Carrot

Radish

Apple

Jack

Order(A/D) : A

Sample Output:

Apple

Banana

Carrot

Jack

Radish

PROGRAM :-

```
import java.util.*;
public class ascendscordersorting {
    public static void main(String[] args) {
        Scanner v = new Scanner(System.in);

        System.out.print("Enter the number of names you want to sort: ");
        int n = v.nextInt();

        String[] names = new String[n];

        System.out.println("Enter the names: ");
        for (int i = 0; i < n; i++) {
            names[i] = v.next();
        }

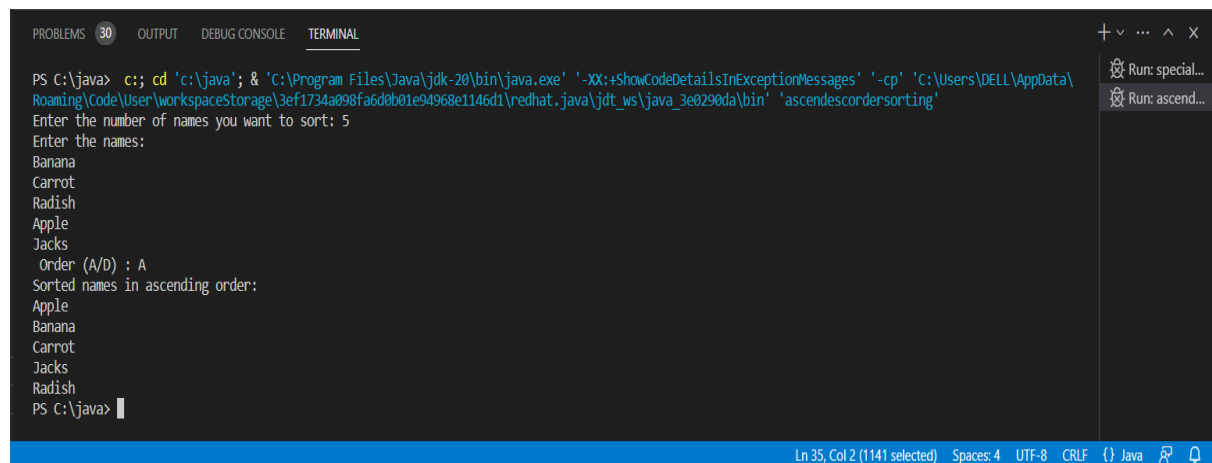
        System.out.print(" Order (A/D) : ");
        char choice = v.next().charAt(0);
```

```

        if (choice == 'A') {
            Arrays.sort(names);
            System.out.println("Sorted names in ascending order:");
            for (String name : names) {
                System.out.println(name);
            }
        } else if (choice == 'D') {
            Arrays.sort(names, Collections.reverseOrder());
            System.out.println("Sorted names in descending order:");
            for (String name : names) {
                System.out.println(name);
            }
        } else {
            System.out.println("Invalid choice. Please enter 'A' or 'D'.");
        }
    }
}

```

OUTPUT :-



```

PS C:\java> cd 'c:\java'; & 'C:\Program Files\Java\jdk-20\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\DELL\AppData\Roaming\Code\User\workspaceStorage\3ef1734a098fa6d0b01e94968e1146d1\redhat.java\jdk_ws\java_3e0290da\bin' 'ascendscordersorting'
Enter the number of names you want to sort: 5
Enter the names:
Banana
Carrot
Radish
Apple
Jacks
Order (A/D) : A
Sorted names in ascending order:
Apple
Banana
Carrot
Jacks
Radish
PS C:\java>

```

11. Write a program to convert the given string to integer?

Sample Input:

String: 1234

Sample Output:

Out put String: 1234

PROGRAM :-

```

import java.util.*;
public class sameoutput3 {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);
    }
}

```

```

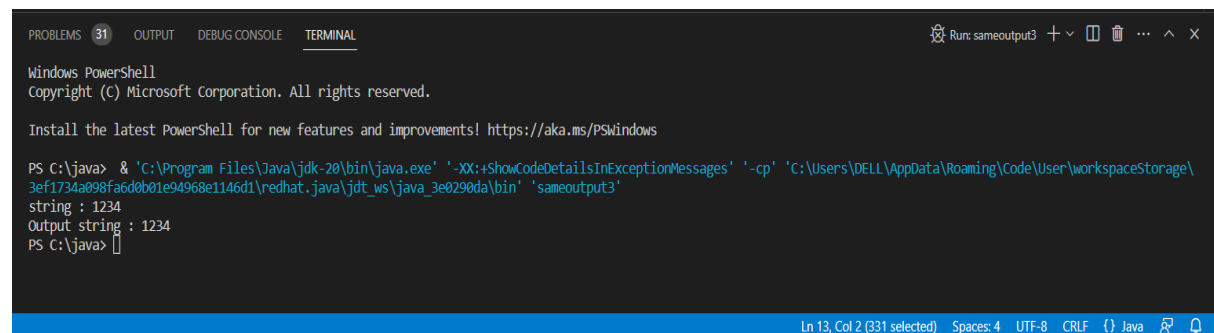
        System.out.print("string : ");
        String str = input.next();

        int num = Integer.parseInt(str);

        System.out.println("Output string : " + num);
    }
}

```

OUTPUT :-



```

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string : 1234
Output string : 1234
PS C:\java>

```

12. Write a program to check the entered user name is valid or not. Get both the inputs from the user.

PROGRAM :-

```

import java.util.*;
public class validorinvlaidd3 {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);

        System.out.print("Enter a username: ");
        String username = input.nextLine();

        boolean isValid = true;

        if (username.length() < 6 || username.length() > 20) {
            isValid = false;
        }

        for (int i = 0; i < username.length(); i++) {
            char ch = username.charAt(i);

            if (!Character.isLetterOrDigit(ch) && ch != '@') {
                isValid = false;
                break;
            }
        }
    }
}

```

```

        if (isValid) {
            System.out.println("The username is valid.");
        } else {
            System.out.println("The username is invalid.");
        }
    }
}

```

OUTPUT :-

```

PS C:\java> cd 'c:\java'; & 'C:\Program Files\Java\jdk-20\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\DELL\AppData\Roaming\Code\User\workspaceStorage\3ef1734a098fa6d0b01e94968e1146d1\redhat.java\jdt_ws\java_3e0290da\bin' 'validatorInvlaidd3'
Enter a username: KESHAVA@123
The username is valid.
PS C:\java>

```

13. The Fibonacci numbers, commonly denoted $F(n)$ form a sequence, called the Fibonacci sequence, such that each number is the sum of the two preceding ones, starting from 0 and 1. That is,

$F(0) = 0, F(1) = 1$

$F(n) = F(n - 1) + F(n - 2)$, for $n \geq 1$.

Given n , calculate $F(n)$.

Example 1:

Input: $n = 2$

Output: 1

Explanation: $F(2) = F(1) + F(0) = 1 + 0 = 1$.

Example 2:

Input: $n = 3$

Output: 2

Explanation: $F(3) = F(2) + F(1) = 1 + 1 = 2$.

Example 3:

Input: $n = 4$

Output: 3

Explanation: $F(4) = F(3) + F(2) = 2 + 1 = 3$.

Constraints:

$0 \leq n \leq 30$

class Solution {

```
public:
int fib(int n) {
}
}
```

PROGRAM :-

```
import java.util.*;
public class fibanocissi3 {
    public static void main(String[] args) {
        Scanner input = new Scanner(System.in);

        System.out.print("Enter a number: ");
        int n = input.nextInt();

        int fib1 = 0, fib2 = 1, fibN = 0;

        if (n == 0) {
            fibN = 0;
        } else if (n == 1) {
            fibN = 1;
        } else {
            for (int i = 2; i <= n; i++) {
                fibN = fib1 + fib2;
                fib1 = fib2;
                fib2 = fibN;
            }
        }

        System.out.println("Fibonacci number at position " + n + ": " + fibN);
    }
}
```

OUTPUT :-

```
PROBLEMS 33 OUTPUT DEBUG CONSOLE TERMINAL
Run: fibanocissi3

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PS C:\java> & 'C:\Program Files\Java\jdk-20\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\DELL\AppData\Roaming\Code\User\workspaceStorage\3ef1734a098fa6d0b01e94968e1146d1\redhat.java\jdt_ws\java_3e0290da\bin' 'fibanocissi3'
Enter a number: 4
Fibonacci number at position 4: 3
PS C:\java>
```

14. Differentiate Multiprocessing and Multithreading. Display Multiplication table for 5 and 10 using various stages of life cycle of the thread by generating a suitable code in

Java.

PROGRAM :-

```
public class multiplicationtable3 implements Runnable {

    private int number;

    public multiplicationtable3(int number) {
        this.number = number;
    }

    @Override
    public void run() {
        System.out.println("Thread " + Thread.currentThread().getId() + "
is running");

        for (int i = 1; i <= 10; i++) {
            System.out.println(number + " x " + i + " = " + (number * i));

            try {
                Thread.sleep(100);
            } catch (InterruptedException e) {
                e.printStackTrace();
            }
        }

        System.out.println("Thread " + Thread.currentThread().getId() + "
has finished executing");
    }

    public static void main(String[] args) {
        multiplicationtable3 table5 = new multiplicationtable3(5);
        multiplicationtable3 table10 = new multiplicationtable3(10);

        Thread thread1 = new Thread(table5);
        Thread thread2 = new Thread(table10);

        thread1.start();
        thread2.start();

        try {
            thread1.join();
            thread2.join();
        } catch (InterruptedException e) {
            e.printStackTrace();
        }

        System.out.println("Main thread has finished executing");
    }
}
```



```

    }
}

```

OUTPUT :-

```

PROBLEMS 35 OUTPUT DEBUG CONSOLE TERMINAL
10 x 6 = 60
10 x 7 = 70
5 x 7 = 35
10 x 8 = 80
5 x 8 = 40
10 x 9 = 90
5 x 9 = 45
5 x 10 = 50
10 x 10 = 100
Thread 22 has finished executing
Thread 21 has finished executing
Main thread has finished executing
PS C:\java>
Ln 48, Col 1 (1462 selected) Spaces: 4 UTF-8 CRLF {} Java

```

15. An ugly number is a positive integer whose prime factors are limited to 2, 3, and 5.

Given an integer n, return true if n is an ugly number.

Example 1:

Input: n = 6

Output: true

Explanation: $6 = 2 \times 3$

Example 2:

Input: n = 1

Output: true

Explanation: 1 has no prime factors, therefore all of its prime factors are limited to 2, 3, and 5.

Example 3:

Input: n = 14

Output: false

Explanation: 14 is not ugly since it includes the prime factor 7.

Constraints:

$-2^{31} \leq n \leq 2^{31} - 1$

```

class Solution {
public:
    bool isUgly(int n) {
    }
}

```

PROGRAM:-

```

public class ugly3 {
    public static boolean isUgly(int n) {
        if (n <= 0) {
            return false;
        }
        while (n % 2 == 0) {
            n /= 2;
        }
        while (n % 3 == 0) {
            n /= 3;
        }
        while (n % 5 == 0) {
            n /= 5;
        }
        return n == 1;
    }

    public static void main(String[] args) {
        int num1 = 6;
        int num2 = 14;

        System.out.println(num1 + " is an ugly number: " + isUgly(num1));
        System.out.println(num2 + " is an ugly number: " + isUgly(num2));
    }
}

```

OUTPUT :-

```

PROBLEMS 35 OUTPUT DEBUG CONSOLE TERMINAL
Windows PowerShell
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Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\java> & 'C:\Program Files\Java\jdk-20\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\DELL\AppData\Roaming\Code\User\workspaceStorage\3ef1734a098fa6d0b01e94968e1146d1\redhat.java\jdt_ws\java_3e0290da\bin' 'ugly3'
6 is an ugly number: true
14 is an ugly number: false
PS C:\java>

```

Ln 27, Col 1 (714 selected) Spaces: 4 UTF-8 CRLF {} Java