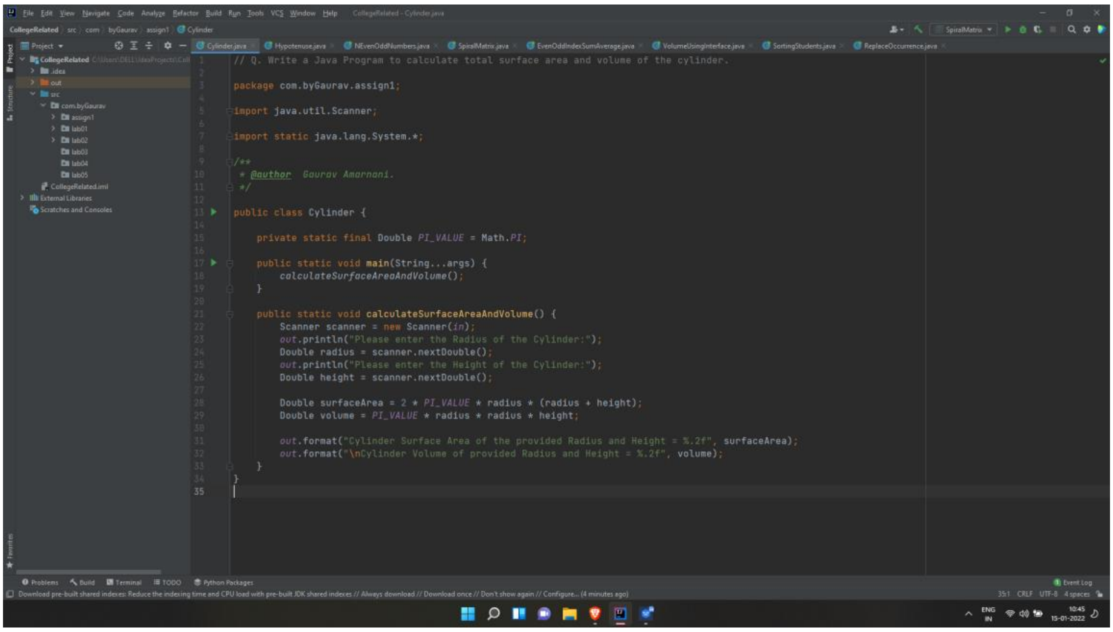
OOPM ASSIGNMENT 1.

Name: Gaurav Amarnani.
Roll No. 67.

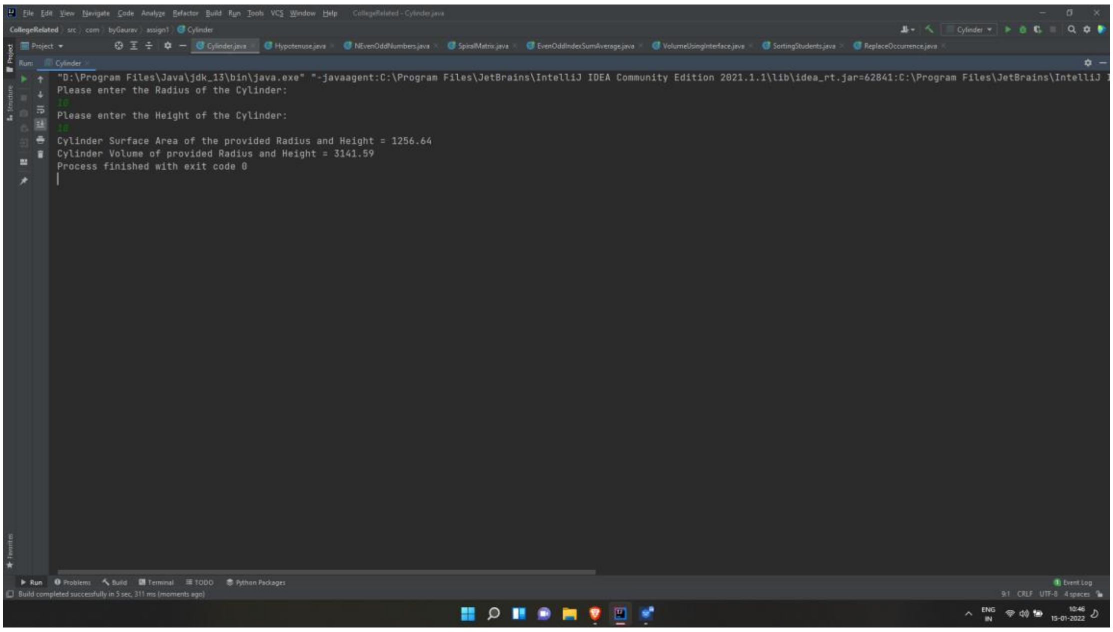
1. WAP to calculate the total surface area and volume of the cylinder . Make use of keyword final.

Program:



```java
// Q. Write a Java Program to calculate total surface area and volume of the cylinder.

package com.byGaurav.assign1;

import java.util.Scanner;

import static java.lang.System.*;

/**
 * @author  Gaurav Amarnani.
 */

public class Cylinder {

    private static final Double PI_VALUE = Math.PI;

    public static void main(String...args) {
        calculateSurfaceAreaAndVolume();
    }

    public static void calculateSurfaceAreaAndVolume() {
        Scanner scanner = new Scanner(in);
        out.println("Please enter the Radius of the Cylinder:");
        Double radius = scanner.nextDouble();
        out.println("Please enter the Height of the Cylinder:");
        Double height = scanner.nextDouble();

        Double surfaceArea = 2 * PI_VALUE * radius * (radius + height);
        Double volume = PI_VALUE * radius * radius * height;

        out.format("Cylinder Surface Area of the provided Radius and Height = %.2f", surfaceArea);
        out.format("\nCylinder Volume of provided Radius and Height = %.2f", volume);
    }
}
```

Output:

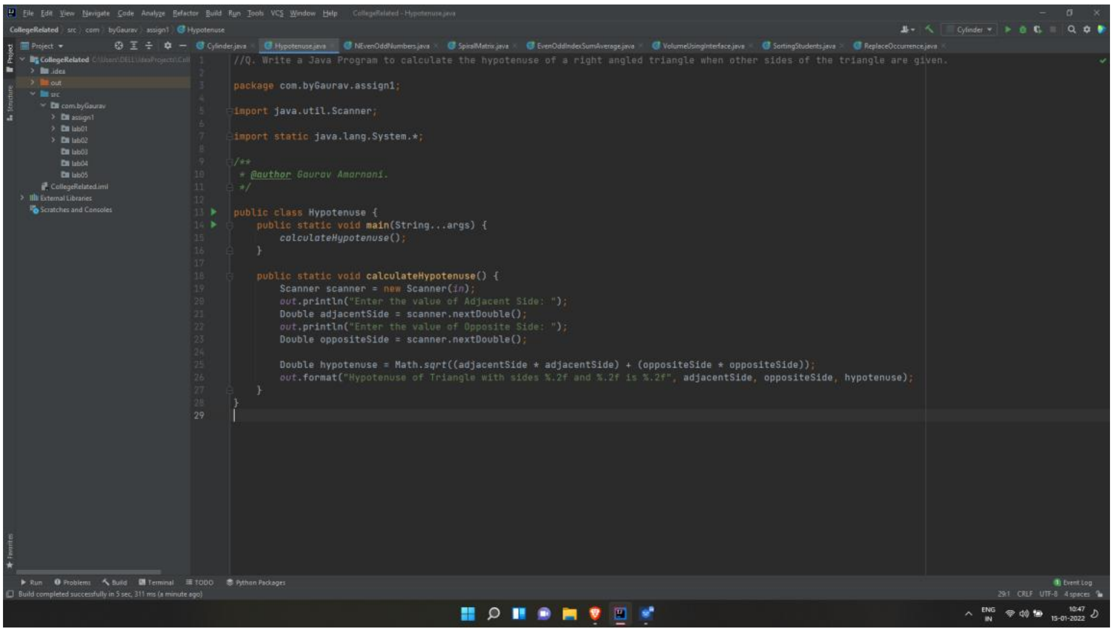


```
"D:\Program Files\Java\jdk_13\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2021.1.1\lib\idea_rt.jar=62841:C:\Program Files\JetBrains\IntelliJ I
Please enter the Radius of the Cylinder:
10
Please enter the Height of the Cylinder:
10
Cylinder Surface Area of the provided Radius and Height = 1256.64
Cylinder Volume of provided Radius and Height = 3141.59
Process finished with exit code 0
```

Name: Gaurav Amarnani.
Roll No. 67.

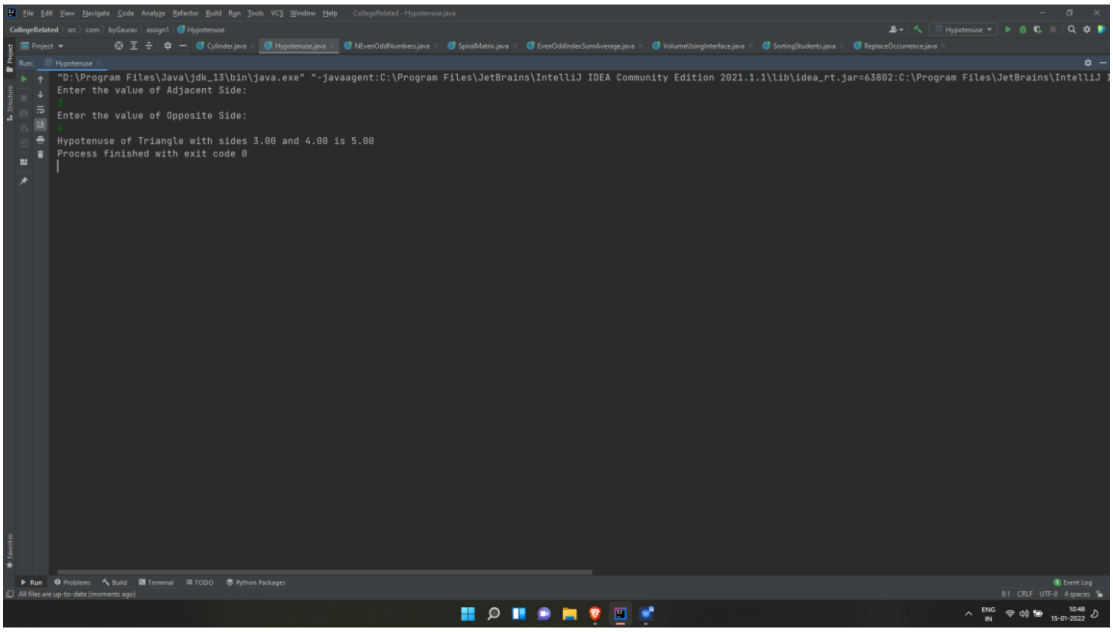
2. WAP to calculate the hypotenuse of a right angled triangle when other sides of the triangle are given.

Program:



```java
//Q. Write a Java Program to calculate the hypotenuse of a right angled triangle when other sides of the triangle are given.

package com.byGaurav.assign1;

import java.util.Scanner;

import static java.lang.System.*;

/**
 * @author Gaurav Amarnani.
 */

public class Hypotenuse {
    public static void main(String...args) {
        calculateHypotenuse();
    }

    public static void calculateHypotenuse() {
        Scanner scanner = new Scanner(in);
        out.println("Enter the value of Adjacent Side: ");
        Double adjacentSide = scanner.nextDouble();
        out.println("Enter the value of Opposite Side: ");
        Double oppositeSide = scanner.nextDouble();

        Double hypotenuse = Math.sqrt((adjacentSide * adjacentSide) + (oppositeSide * oppositeSide));
        out.format("Hypotenuse of Triangle with sides %.2f and %.2f is %.2f", adjacentSide, oppositeSide, hypotenuse);
    }
}
```

Output:

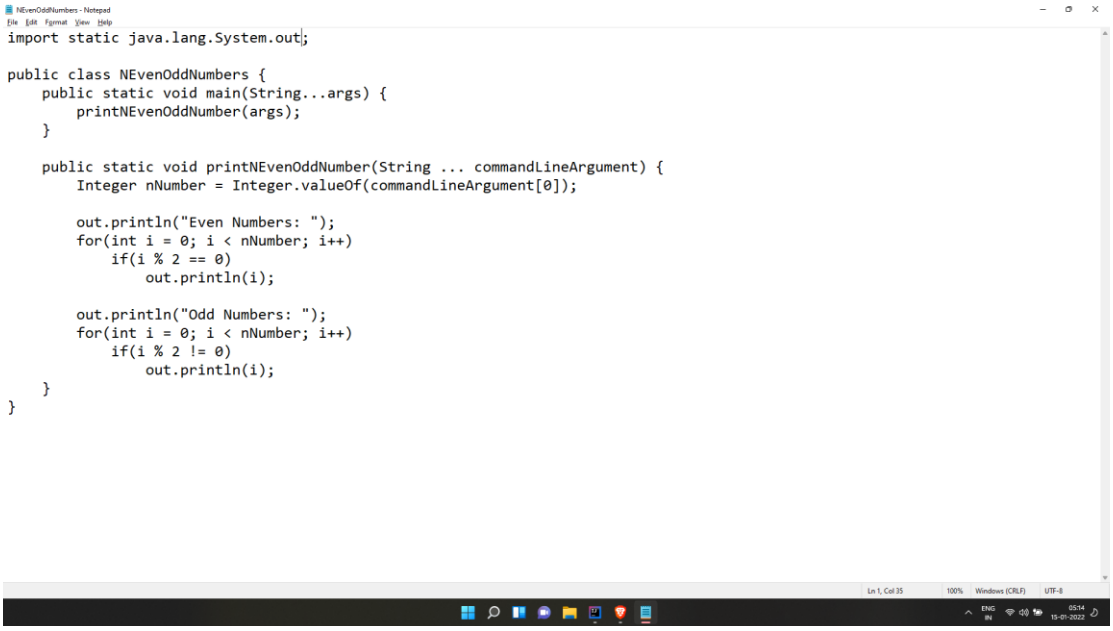


```
"D:\Program Files\Java\jdk_13\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2021.1.1\lib\idea_rt.jar=63802:C:\Program Files\JetBrains\IntelliJ I
Enter the value of Adjacent Side:
3
Enter the value of Opposite Side:
4
Hypotenuse of Triangle with sides 3.00 and 4.00 is 5.00
Process finished with exit code 0
```

Name: Gaurav Amarnani.
Roll No. 67.

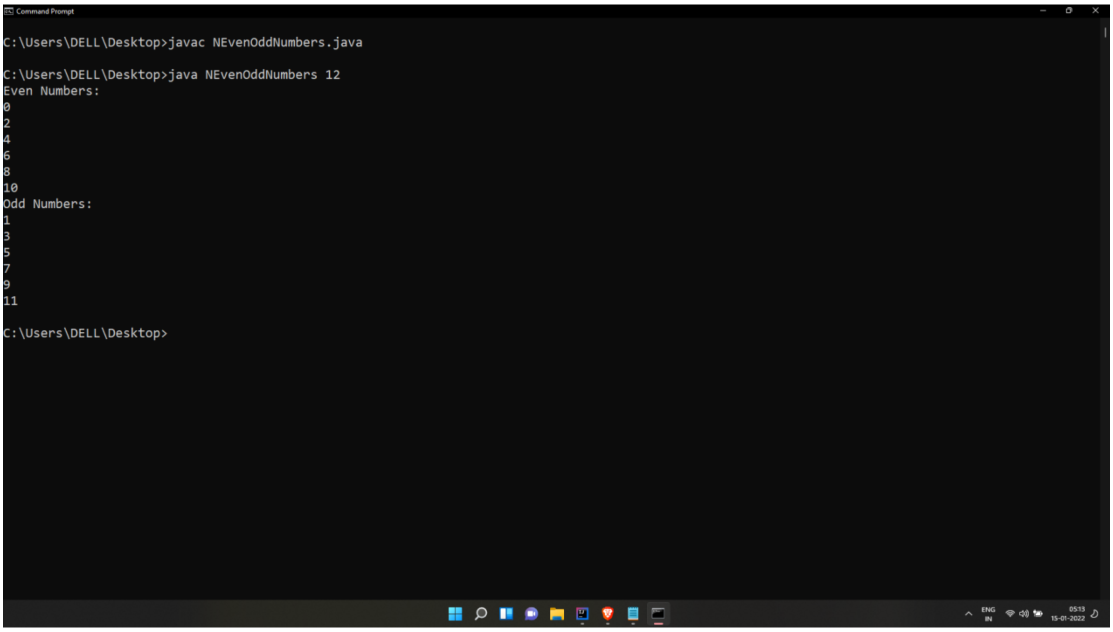
3. Write a program to print first n even and odd nos. take the value of n from the keyboard via command line argument.

Program:



```java
import static java.lang.System.out;

public class NEvenOddNumbers {
    public static void main(String...args) {
        printNEvenOddNumber(args);
    }

    public static void printNEvenOddNumber(String ... commandLineArgument) {
        Integer nNumber = Integer.valueOf(commandLineArgument[0]);

        out.println("Even Numbers: ");
        for(int i = 0; i < nNumber; i++)
            if(i % 2 == 0)
                out.println(i);

        out.println("Odd Numbers: ");
        for(int i = 0; i < nNumber; i++)
            if(i % 2 != 0)
                out.println(i);
    }
}
```

Output:

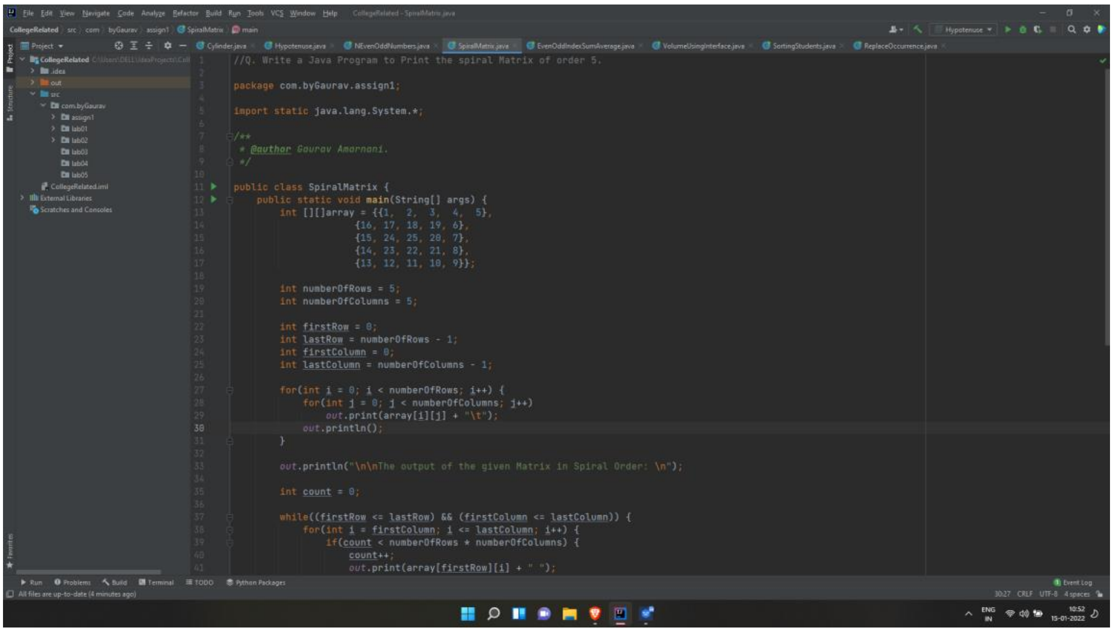


```
C:\Users\DELL\Desktop>javac NEvenOddNumbers.java

C:\Users\DELL\Desktop>java NEvenOddNumbers 12
Even Numbers:
0
2
4
6
8
10
Odd Numbers:
1
3
5
7
9
11

C:\Users\DELL\Desktop>
```

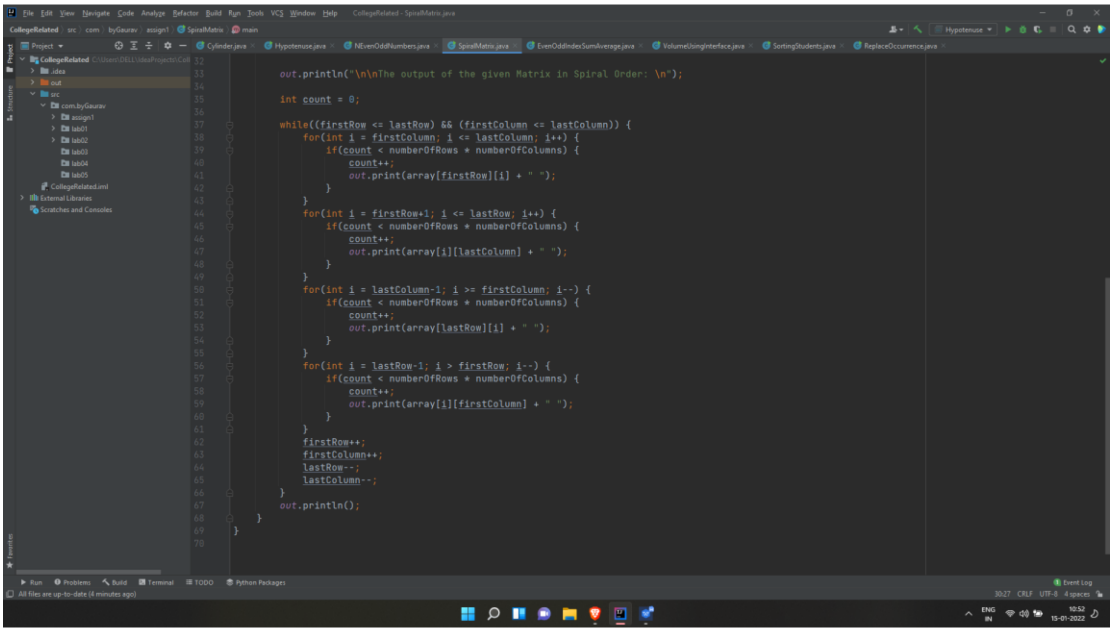
Name: Gaurav Amarnani.
Roll No. 67.

4. WAP to Print the spiral Matrix of order 5:

Program:

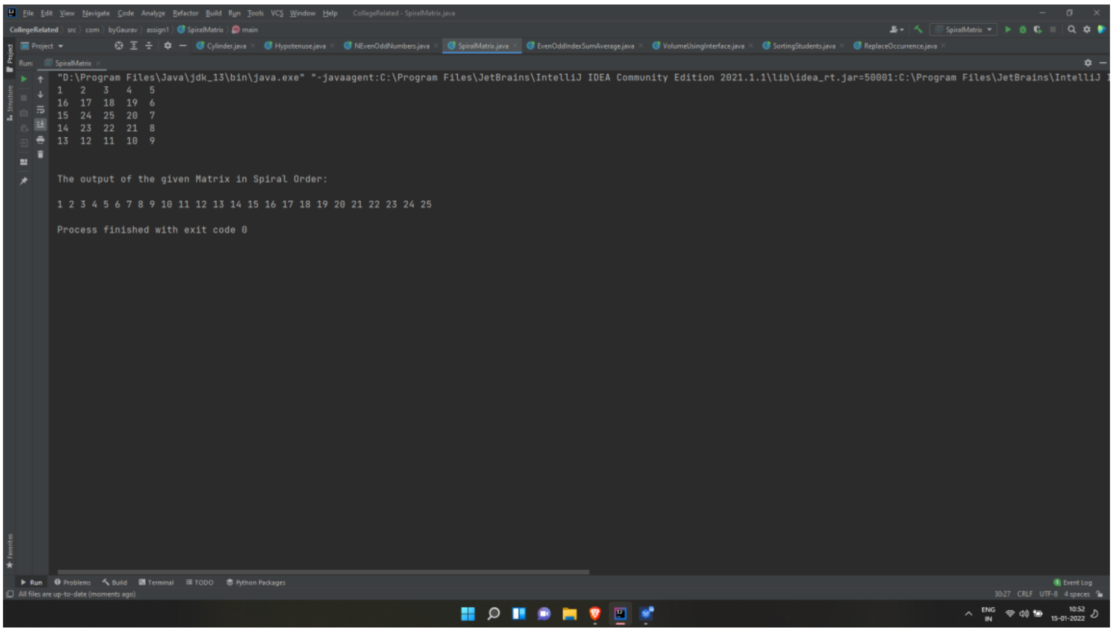


```java
//Q. Write a Java Program to Print the spiral Matrix of order 5.

package com.byGaurav.assign1;

import static java.lang.System.*;

/**
 * @auther Gaurav Amarnani.
 */

public class SpiralMatrix {
    public static void main(String[] args) {
        int [][]array = {{1,  2,  3,  4,  5},
                         {16, 17, 18, 19, 6},
                         {15, 24, 25, 20, 7},
                         {14, 23, 22, 21, 8},
                         {13, 12, 11, 10, 9}};

        int numberOfRows = 5;
        int numberOfColumns = 5;

        int firstRow = 0;
        int lastRow = numberOfRows - 1;
        int firstColumn = 0;
        int lastColumn = numberOfColumns - 1;

        for(int i = 0; i < numberOfRows; i++) {
            for(int j = 0; j < numberOfColumns; j++)
                out.print(array[i][j] + "\t");
            out.println();
        }

        out.println("\n\nThe output of the given Matrix in Spiral Order: \n");

        int count = 0;

        while((firstRow <= lastRow) && (firstColumn <= lastColumn)) {
            for(int i = firstColumn; i <= lastColumn; i++) {
                if(count < numberOfRows * numberOfColumns) {
                    count++;
                    out.print(array[firstRow][i] + " ");
```



```java

        out.println("\n\nThe output of the given Matrix in Spiral Order: \n");

        int count = 0;

        while((firstRow <= lastRow) && (firstColumn <= lastColumn)) {
            for(int i = firstColumn; i <= lastColumn; i++) {
                if(count < numberOfRows * numberOfColumns) {
                    count++;
                    out.print(array[firstRow][i] + " ");
                }
            }
            for(int i = firstRow+1; i <= lastRow; i++) {
                if(count < numberOfRows * numberOfColumns) {
                    count++;
                    out.print(array[i][lastColumn] + " ");
                }
            }
            for(int i = lastColumn-1; i >= firstColumn; i--) {
                if(count < numberOfRows * numberOfColumns) {
                    count++;
                    out.print(array[lastRow][i] + " ");
                }
            }
            for(int i = lastRow-1; i > firstRow; i--) {
                if(count < numberOfRows * numberOfColumns) {
                    count++;
                    out.print(array[i][firstColumn] + " ");
                }
            }
            firstRow++;
            firstColumn++;
            lastRow--;
            lastColumn--;
        }
        out.println();
    }
}
```

Output:



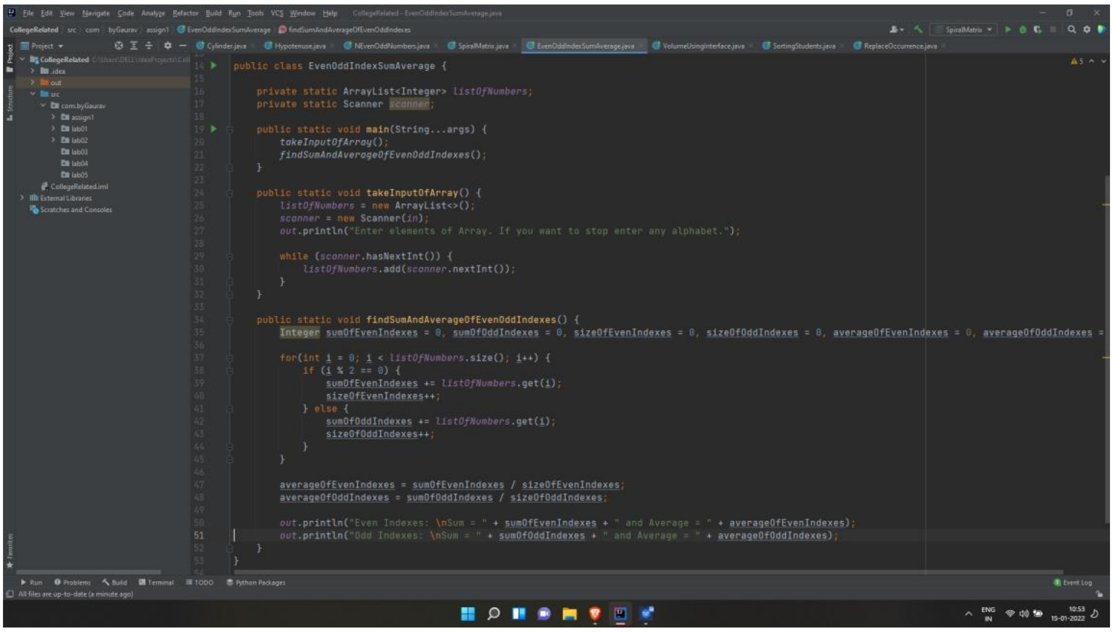
```
"D:\Program Files\Java\jdk_13\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2021.1.1\lib\idea_rt.jar=50001:C:\Program Files\JetBrains\IntelliJ I
1   2   3   4   5
16  17  18  19  6
15  24  25  20  7
14  23  22  21  8
13  12  11  10  9


The output of the given Matrix in Spiral Order:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

Process finished with exit code 0
```

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
CollegeRelated - SpiralMatrix.java
CollegeRelated src com byGaurav assign1 SpiralMatrix main
Project
Cylinder.java
Hypotenuse.java
NEvenOddNumbers.java
SpiralMatrix.java
EvenOddIndexSumAverage.java
VolumeUsingInterface.java
SortingStudents.java
ReplaceOccurrence.java
Run: SpiralMatrix
Run
Problems
Build
Terminal
TODO
Python Packages
Event Log
All files are up-to-date (moments ago)
30:27 CRLF UTF-8 4 spaces
ENG IN
10:52
15-01-2022

Name: Gaurav Amarnani.
Roll No. 67.

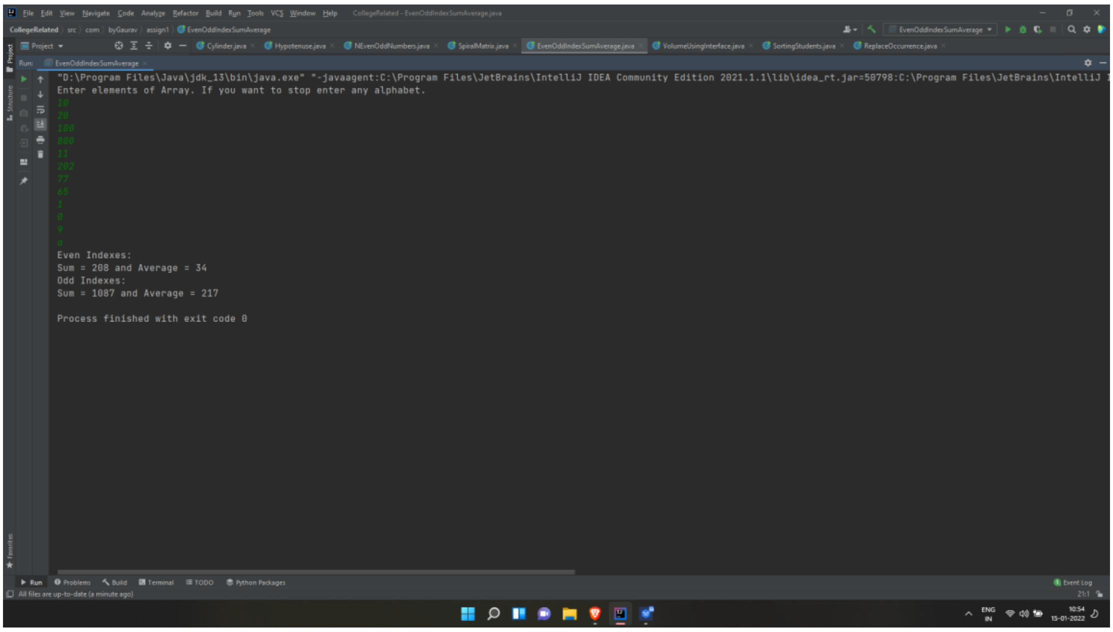
5. WAP to find sum and average of numbers on even and odd indexes in the array entered by the user.

Program:



```java
public class EvenOddIndexSumAverage {

    private static ArrayList<Integer> listOfNumbers;
    private static Scanner scanner;

    public static void main(String...args) {
        takeInputOfArray();
        findSumAndAverageOfEvenOddIndexes();
    }

    public static void takeInputOfArray() {
        listOfNumbers = new ArrayList<>();
        scanner = new Scanner(in);
        out.println("Enter elements of Array. If you want to stop enter any alphabet.");

        while (scanner.hasNextInt()) {
            listOfNumbers.add(scanner.nextInt());
        }
    }

    public static void findSumAndAverageOfEvenOddIndexes() {
        Integer sumOfEvenIndexes = 0, sumOfOddIndexes = 0, sizeOfEvenIndexes = 0, sizeOfOddIndexes = 0, averageOfEvenIndexes = 0, averageOfOddIndexes =

        for(int i = 0; i < listOfNumbers.size(); i++) {
            if (i % 2 == 0) {
                sumOfEvenIndexes += listOfNumbers.get(i);
                sizeOfEvenIndexes++;
            } else {
                sumOfOddIndexes += listOfNumbers.get(i);
                sizeOfOddIndexes++;
            }
        }

        averageOfEvenIndexes = sumOfEvenIndexes / sizeOfEvenIndexes;
        averageOfOddIndexes = sumOfOddIndexes / sizeOfOddIndexes;

        out.println("Even Indexes: \nSum = " + sumOfEvenIndexes + " and Average = " + averageOfEvenIndexes);
        out.println("Odd Indexes: \nSum = " + sumOfOddIndexes + " and Average = " + averageOfOddIndexes);
    }
}
```

Output:

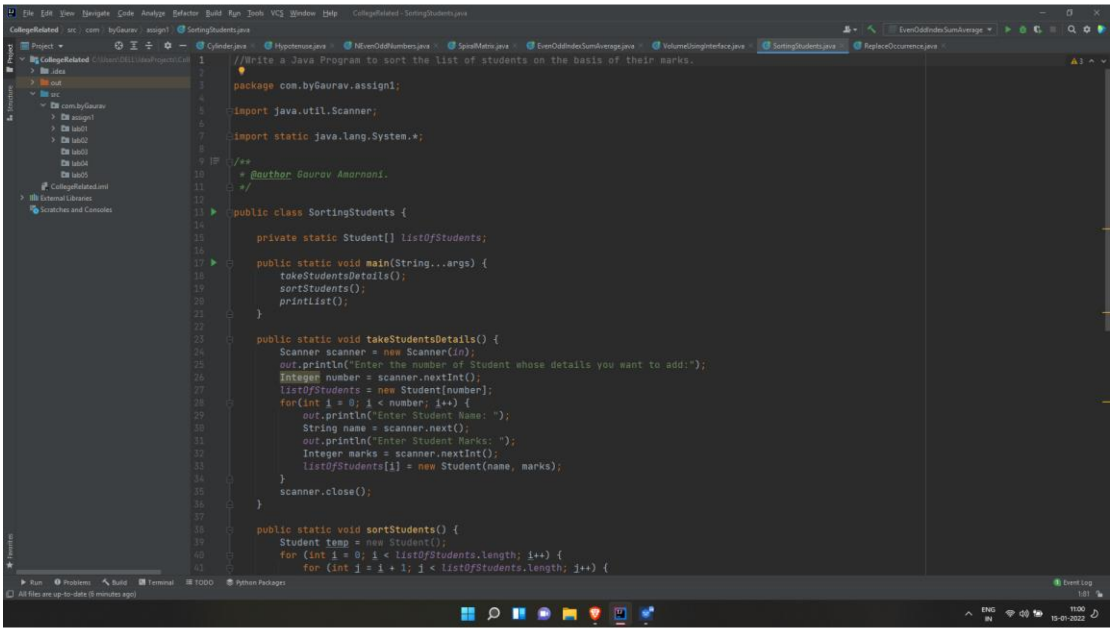


```
"D:\Program Files\Java\jdk_13\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2021.1.1\lib\idea_rt.jar=50798:C:\Program Files\JetBrains\IntelliJ I
Enter elements of Array. If you want to stop enter any alphabet.
10
20
100
800
11
202
77
65
1
0
9
a
Even Indexes:
Sum = 208 and Average = 34
Odd Indexes:
Sum = 1087 and Average = 217

Process finished with exit code 0
```

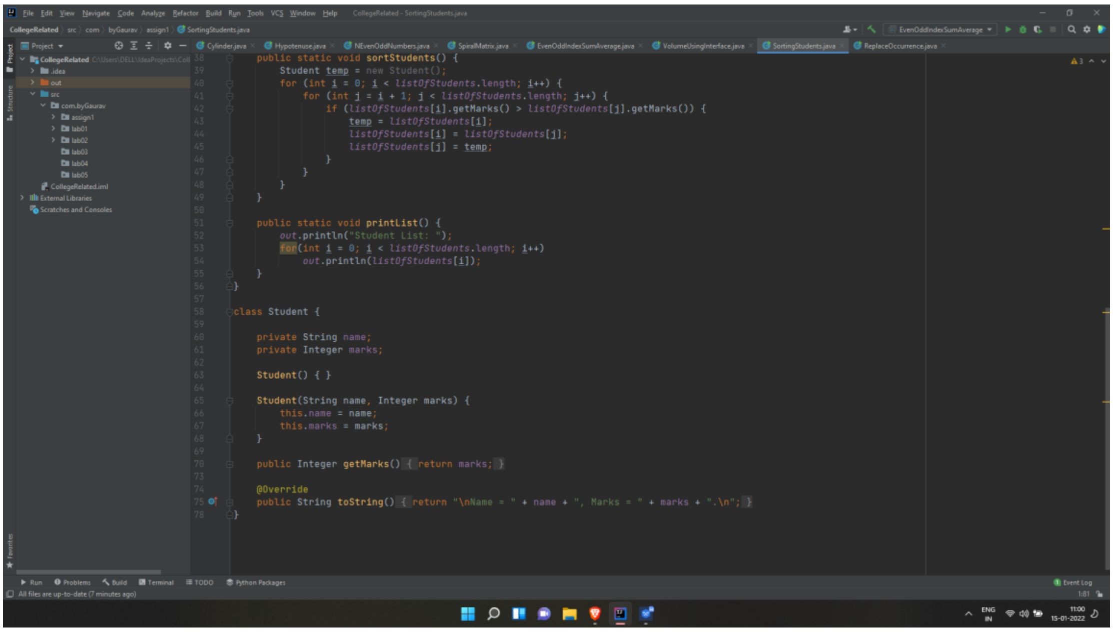
Name: Gaurav Amarnani.
Roll No. 67.

6. WAP to sort the list of students on the basis of their marks.

Program:

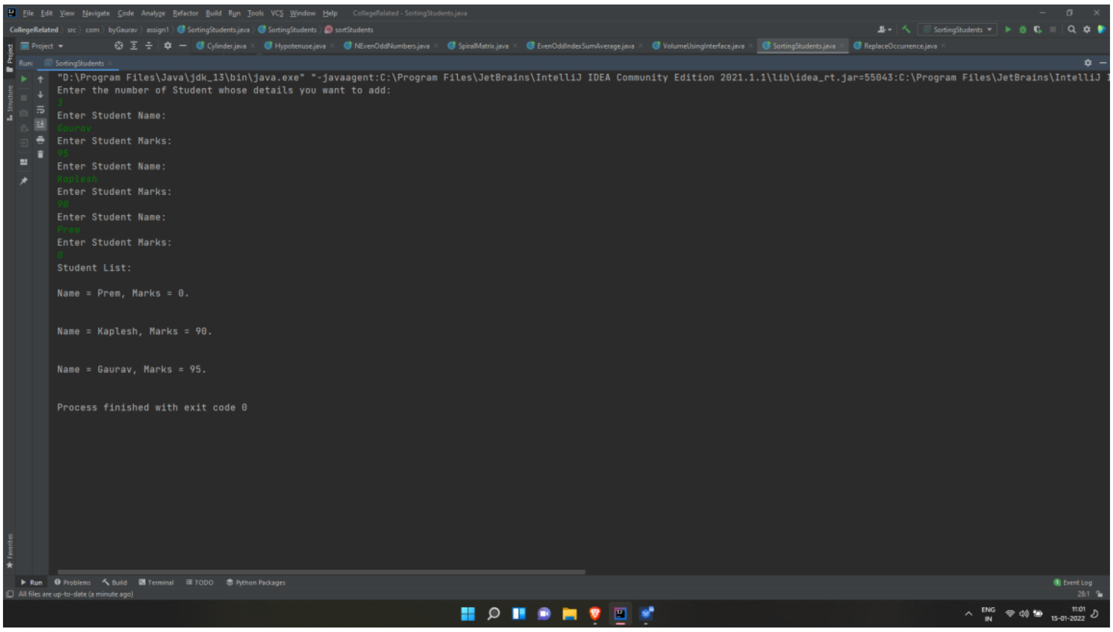


```java
//Write a Java Program to sort the list of students on the basis of their marks.

package com.byGaurav.assign1;

import java.util.Scanner;

import static java.lang.System.*;

/**
 * @author Gaurav Amarnani.
 */

public class SortingStudents {

    private static Student[] listOfStudents;

    public static void main(String...args) {
        takeStudentsDetails();
        sortStudents();
        printList();
    }

    public static void takeStudentsDetails() {
        Scanner scanner = new Scanner(in);
        out.println("Enter the number of Student whose details you want to add:");
        Integer number = scanner.nextInt();
        listOfStudents = new Student[number];
        for(int i = 0; i < number; i++) {
            out.println("Enter Student Name: ");
            String name = scanner.next();
            out.println("Enter Student Marks: ");
            Integer marks = scanner.nextInt();
            listOfStudents[i] = new Student(name, marks);
        }
        scanner.close();
    }

    public static void sortStudents() {
        Student temp = new Student();
        for (int i = 0; i < listOfStudents.length; i++) {
            for (int j = i + 1; j < listOfStudents.length; j++) {
```



```java
    public static void sortStudents() {
        Student temp = new Student();
        for (int i = 0; i < listOfStudents.length; i++) {
            for (int j = i + 1; j < listOfStudents.length; j++) {
                if (listOfStudents[i].getMarks() > listOfStudents[j].getMarks()) {
                    temp = listOfStudents[i];
                    listOfStudents[i] = listOfStudents[j];
                    listOfStudents[j] = temp;
                }
            }
        }
    }

    public static void printList() {
        out.println("Student List: ");
        for(int i = 0; i < listOfStudents.length; i++)
            out.println(listOfStudents[i]);
    }
}

class Student {

    private String name;
    private Integer marks;

    Student() { }

    Student(String name, Integer marks) {
        this.name = name;
        this.marks = marks;
    }

    public Integer getMarks() { return marks; }

    @Override
    public String toString() { return "\nName = " + name + ", Marks = " + marks + ".\n"; }
}
```

Output:



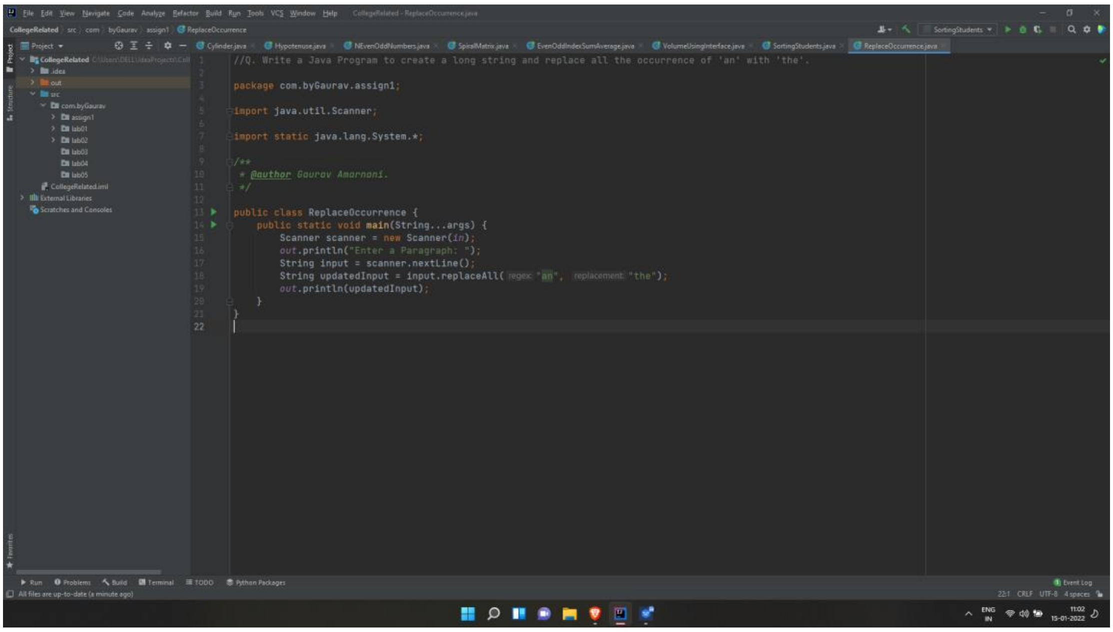
```
"D:\Program Files\Java\jdk_13\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2021.1.1\lib\idea_rt.jar=55043:C:\Program Files\JetBrains\IntelliJ I
Enter the number of Student whose details you want to add:
3
Enter Student Name:
Gaurav
Enter Student Marks:
95
Enter Student Name:
Kaplesh
Enter Student Marks:
90
Enter Student Name:
Prem
Enter Student Marks:
0
Student List:

Name = Prem, Marks = 0.


Name = Kaplesh, Marks = 90.


Name = Gaurav, Marks = 95.


Process finished with exit code 0
```

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
CollegeRelated - SortingStudents.java
CollegeRelated 〉 src 〉 com 〉 byGaurav 〉 assign1 〉 SortingStudents.java 〉 SortingStudents 〉 sortStudents
SortingStudents
Project
Cylinder.java
Hypotenuse.java
NEvenOddNumbers.java
SpiralMatrix.java
EvenOddIndexSumAverage.java
VolumeUsingInterface.java
SortingStudents.java
ReplaceOccurrence.java
Run: SortingStudents
Run
Problems
Build
Terminal
TODO
Python Packages
Event Log
All files are up-to-date (a minute ago)
28:1
ENG
IN
11:01
15-01-2022

Name: Gaurav Amarnani.
Roll No. 67.

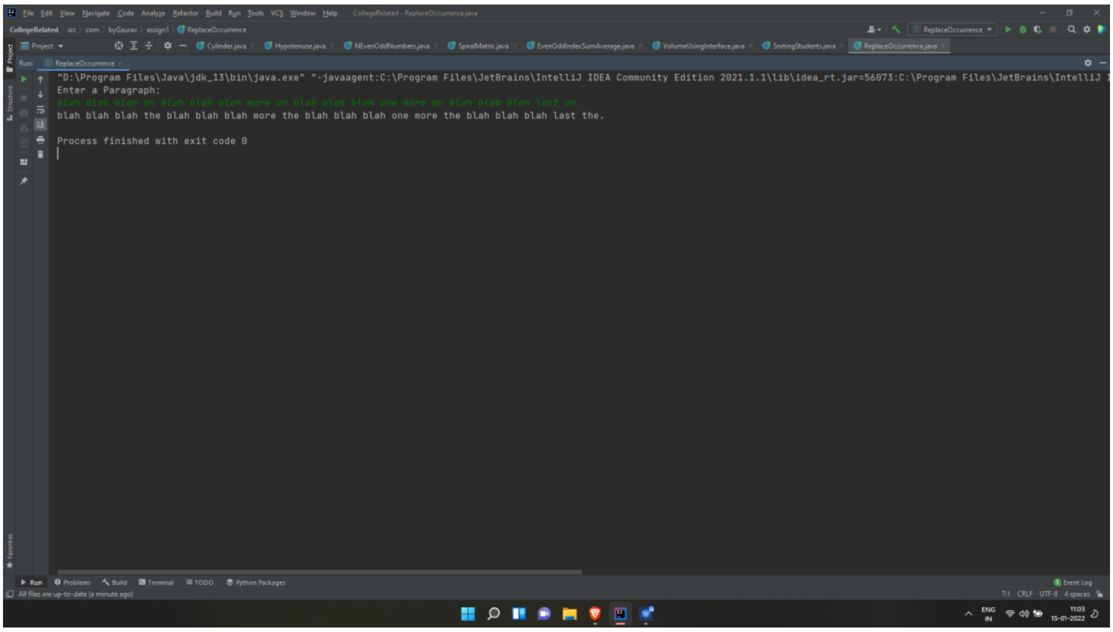
7. WAP to create a long string and replace all the occurrence of ‘an’ with ‘the’.

Program:



```java
//Q. Write a Java Program to create a long string and replace all the occurrence of 'an' with 'the'.

package com.byGaurav.assign1;

import java.util.Scanner;

import static java.lang.System.*;

/**
 * @author Gaurav Amarnani.
 */

public class ReplaceOccurrence {
    public static void main(String...args) {
        Scanner scanner = new Scanner(in);
        out.println("Enter a Paragraph: ");
        String input = scanner.nextLine();
        String updatedInput = input.replaceAll( regex: "an",  replacement: "the");
        out.println(updatedInput);
    }
}
```

Output:



```
"D:\Program Files\Java\jdk_13\bin\java.exe" "-javaagent:C:\Program Files\JetBrains\IntelliJ IDEA Community Edition 2021.1.1\lib\idea_rt.jar=56073:C:\Program Files\JetBrains\IntelliJ I
Enter a Paragraph:
blah blah blah an blah blah blah more an blah blah blah one more an blah blah blah last an.
blah blah blah the blah blah blah more the blah blah blah one more the blah blah blah last the.

Process finished with exit code 0
```

Name: Gaurav Amarnani.
Roll No. 67.

8. Predict the output:

Program:

```
class A{
	A() {
		System.out.println(“A”);
	}
}
public class B extends A{
	public static void main(String args[]) {
		B b1=new B();
		super();
	}
	B() {
		System.out.println(“B”);
	}
}
```

Output:

We cannot call the super() outside constructor. So basically Syntax / Compile Time Error.

Name: Gaurav Amarnani.
Roll No. 67.

9. Predict the output:

Program:

```
public class Mysub extends Mysuper {

	public static void MyMethod() {
		System.out.println("static method in subclass");
	}

	public void MyMethod() {
		System.out.println("Non-static method in subclass");
	}

	public static void main(String args[]) {
		MySuper s=new MySub();
		S.MyMethod();
	}
}

class MySuper {
	public static void MyMethod() {
		System.out.println("Static Method in super class");
	}
}
```

Output:

Typo of ‘MySuper’ and ‘MySub’, but other than that you cannot have a same method MyMethod() inside a class (MySub). The non-static method is the issue cause the Super class has the static method and the sub class should override the same.

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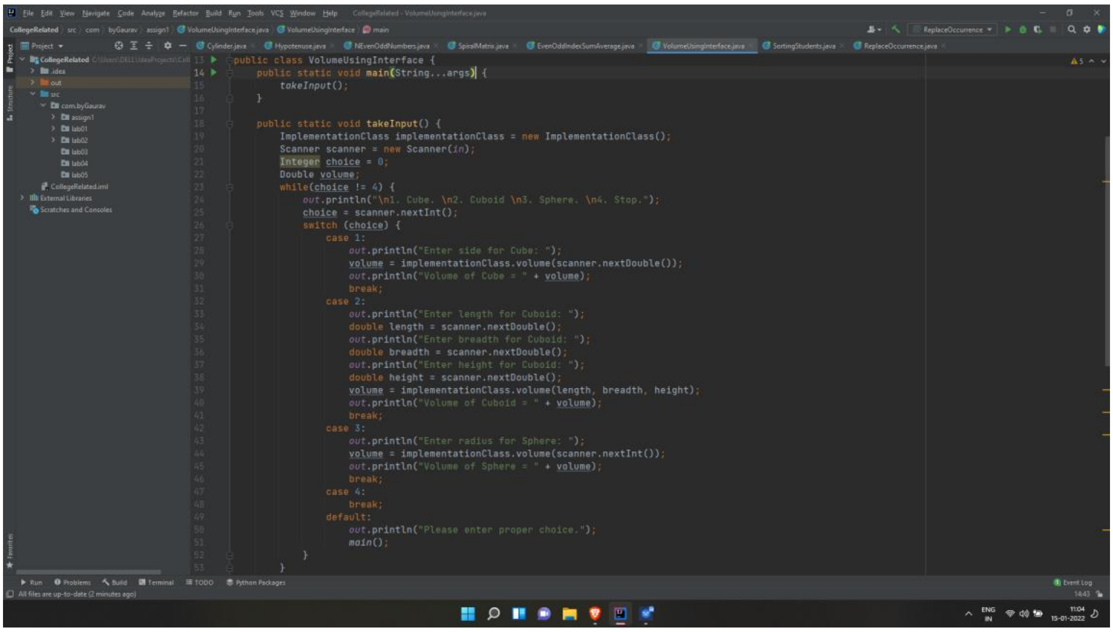
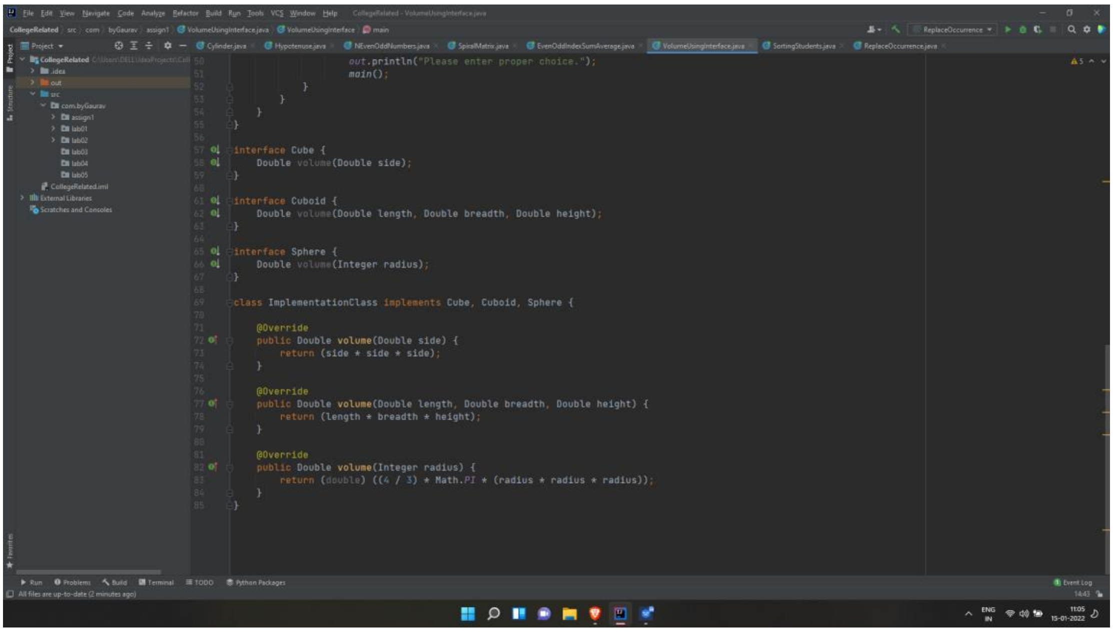
Roll No. 67.

10. WAP to calculate volume of cube, cuboid and sphere using interfaces.

Program:

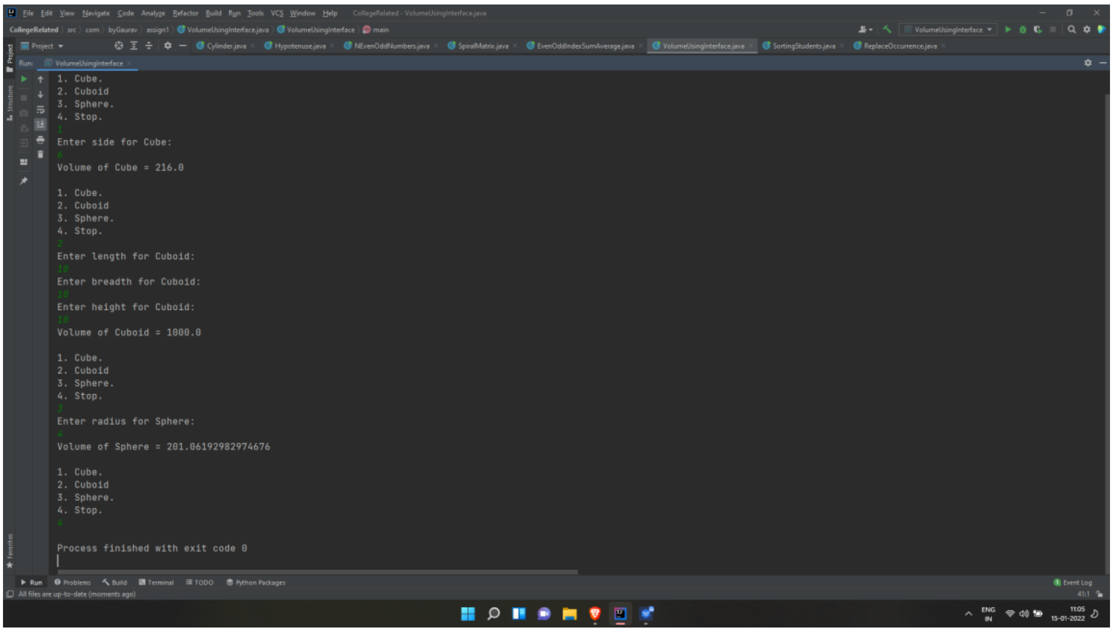


```java
public class VolumeUsingInterface {
    public static void main(String...args) {
        takeInput();
    }

    public static void takeInput() {
        ImplementationClass implementationClass = new ImplementationClass();
        Scanner scanner = new Scanner(in);
        Integer choice = 0;
        Double volume;
        while(choice != 4) {
            out.println("\n1. Cube. \n2. Cuboid \n3. Sphere. \n4. Stop.");
            choice = scanner.nextInt();
            switch (choice) {
                case 1:
                    out.println("Enter side for Cube: ");
                    volume = implementationClass.volume(scanner.nextDouble());
                    out.println("Volume of Cube = " + volume);
                    break;
                case 2:
                    out.println("Enter length for Cuboid: ");
                    double length = scanner.nextDouble();
                    out.println("Enter breadth for Cuboid: ");
                    double breadth = scanner.nextDouble();
                    out.println("Enter height for Cuboid: ");
                    double height = scanner.nextDouble();
                    volume = implementationClass.volume(length, breadth, height);
                    out.println("Volume of Cuboid = " + volume);
                    break;
                case 3:
                    out.println("Enter radius for Sphere: ");
                    volume = implementationClass.volume(scanner.nextInt());
                    out.println("Volume of Sphere = " + volume);
                    break;
                case 4:
                    break;
                default:
                    out.println("Please enter proper choice.");
                    main();
            }
        }
```



```java
                    out.println("Please enter proper choice.");
                    main();
            }
        }
    }
}

interface Cube {
    Double volume(Double side);
}

interface Cuboid {
    Double volume(Double length, Double breadth, Double height);
}

interface Sphere {
    Double volume(Integer radius);
}

class ImplementationClass implements Cube, Cuboid, Sphere {

    @Override
    public Double volume(Double side) {
        return (side * side * side);
    }

    @Override
    public Double volume(Double length, Double breadth, Double height) {
        return (length * breadth * height);
    }

    @Override
    public Double volume(Integer radius) {
        return (double) ((4 / 3) * Math.PI * (radius * radius * radius));
    }
}
```

Output:



```
1. Cube.
2. Cuboid
3. Sphere.
4. Stop.
1
Enter side for Cube:
6
Volume of Cube = 216.0

1. Cube.
2. Cuboid
3. Sphere.
4. Stop.
2
Enter length for Cuboid:
10
Enter breadth for Cuboid:
10
Enter height for Cuboid:
10
Volume of Cuboid = 1000.0

1. Cube.
2. Cuboid
3. Sphere.
4. Stop.
3
Enter radius for Sphere:
4
Volume of Sphere = 201.06192982974676

1. Cube.
2. Cuboid
3. Sphere.
4. Stop.
4

Process finished with exit code 0
```

File Edit View Navigate Code Analyze Refactor Build Run Tools VCS Window Help
CollegeRelated › src › com › byGaurav › assign1 › VolumeUsingInterface.java › VolumeUsingInterface › main
Cylinder.java
Hypotenuse.java
NEvenOddNumbers.java
SpiralMatrix.java
EvenOddIndexSumAverage.java
VolumeUsingInterface.java
SortingStudents.java
ReplaceOccurrence.java
Run: VolumeUsingInterface
Run
Problems
Build
Terminal
TODO
Python Packages
Event Log
All files are up-to-date (moments ago)

--------------- XXXXXXX ---------------