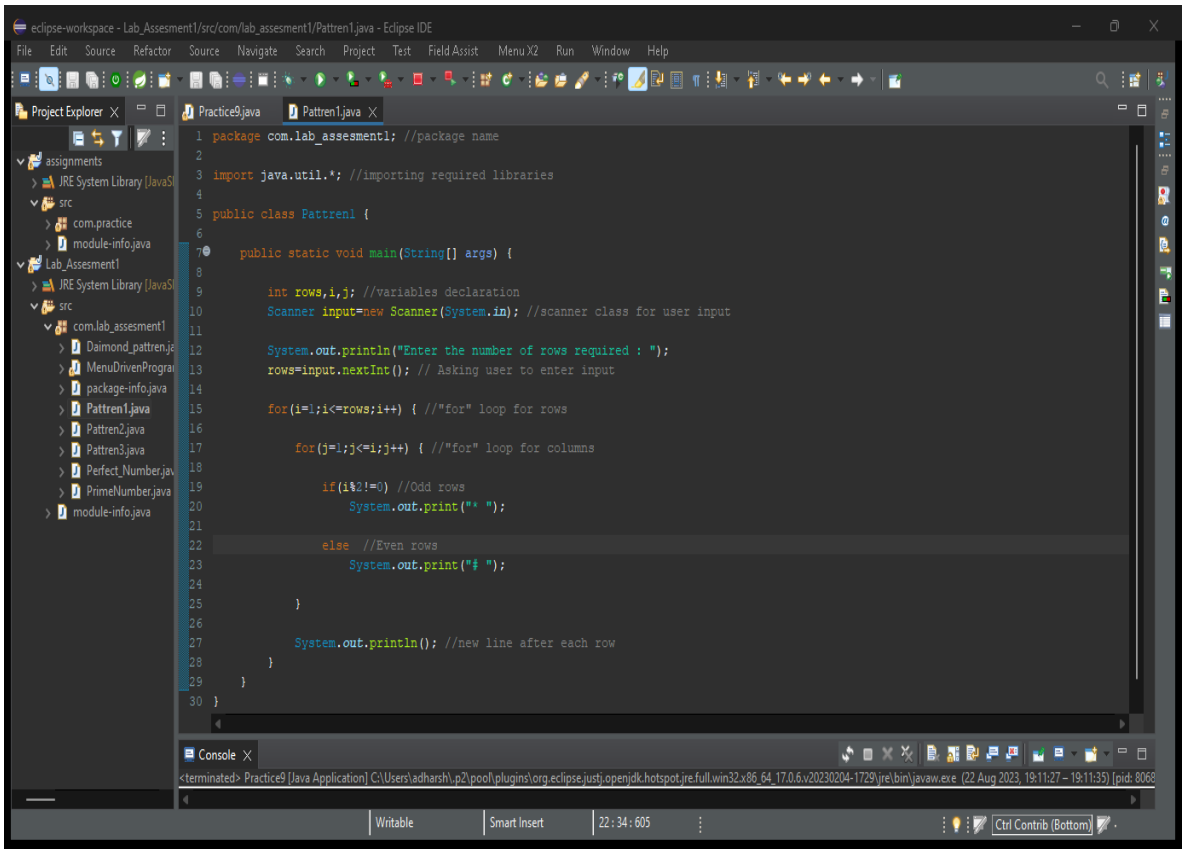
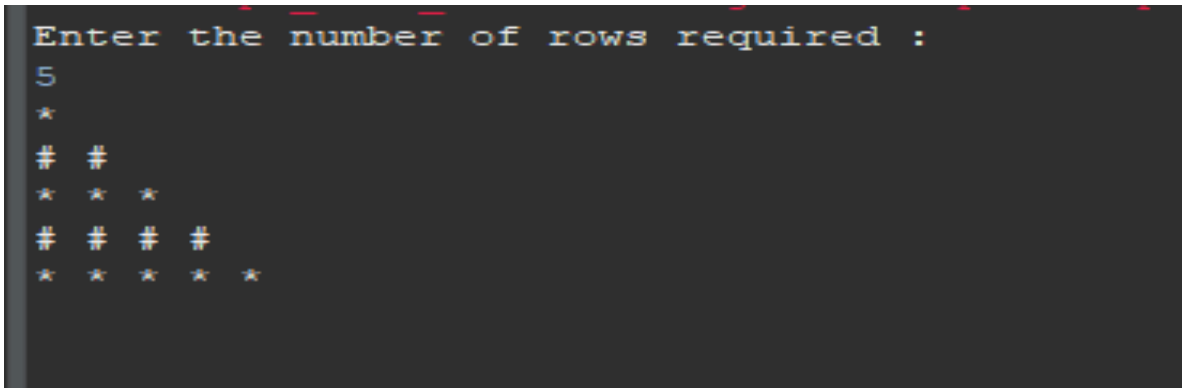
Q1) Print the following pattern using nested for loop:

a) *
# #
* * *
# # # #

Program:

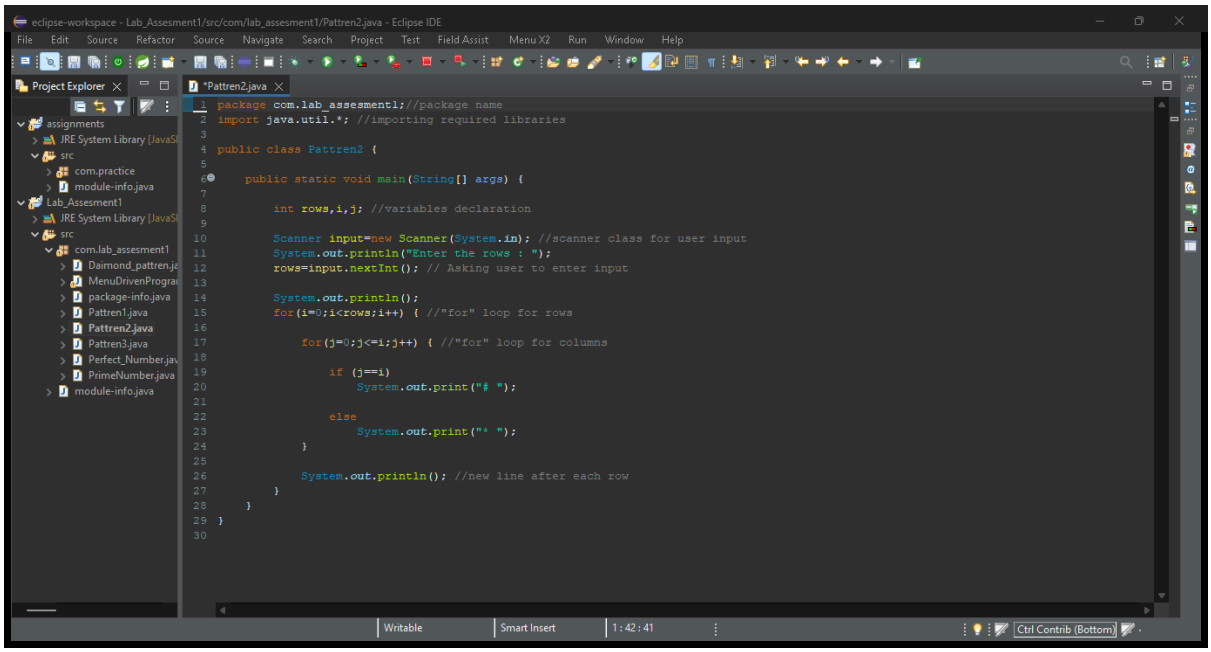


Output of this program is:

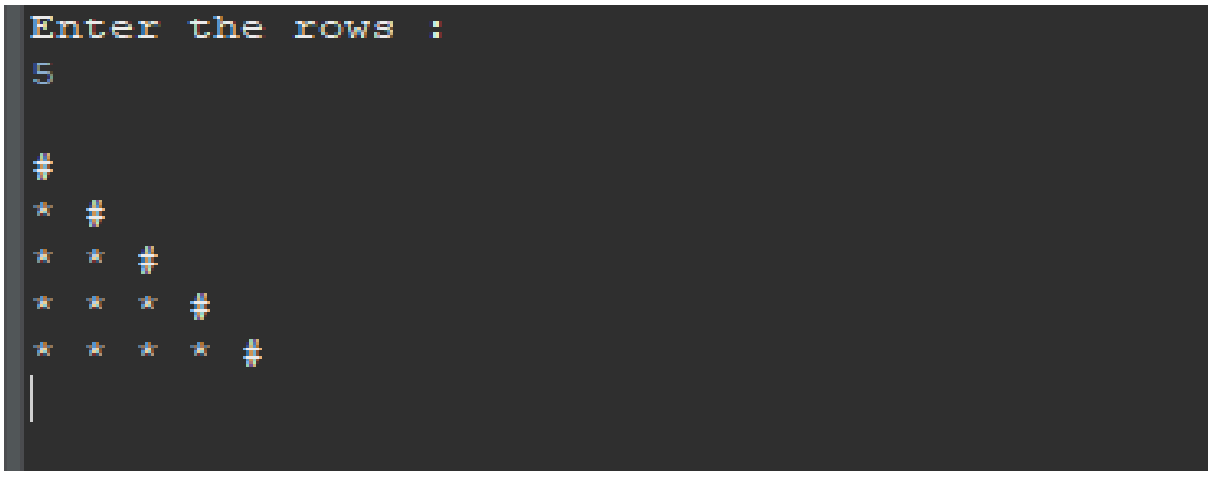


b) #
* #
* * #
* * * #
* * * * #

Program:

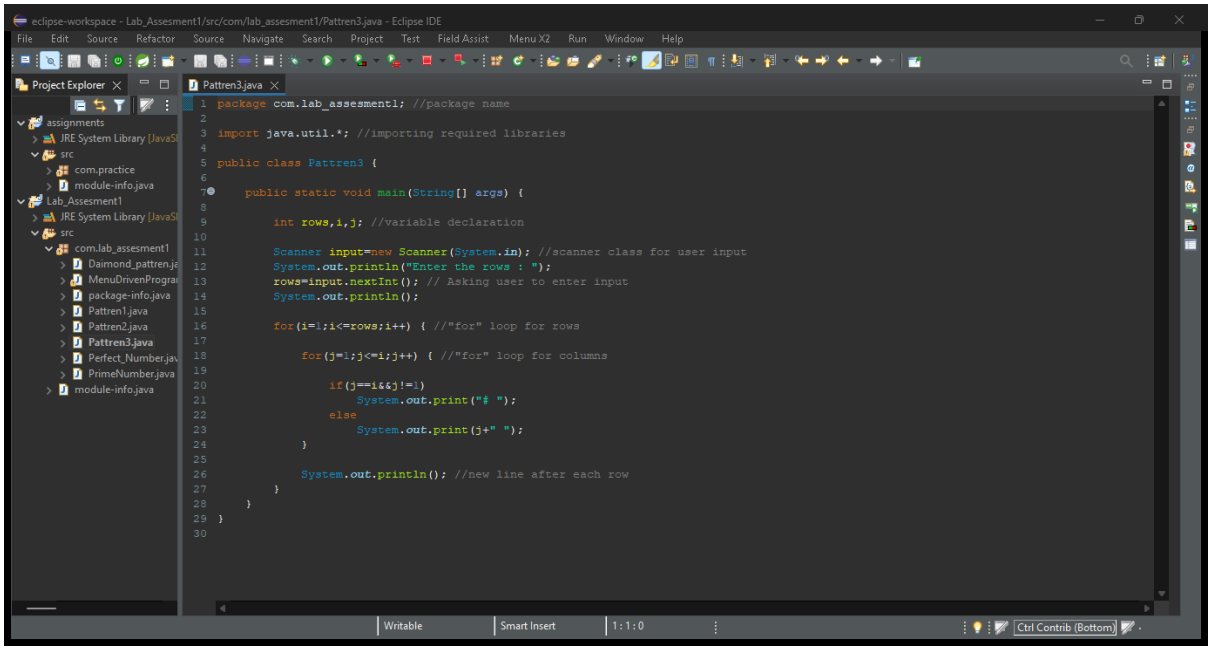


Output of this program is:

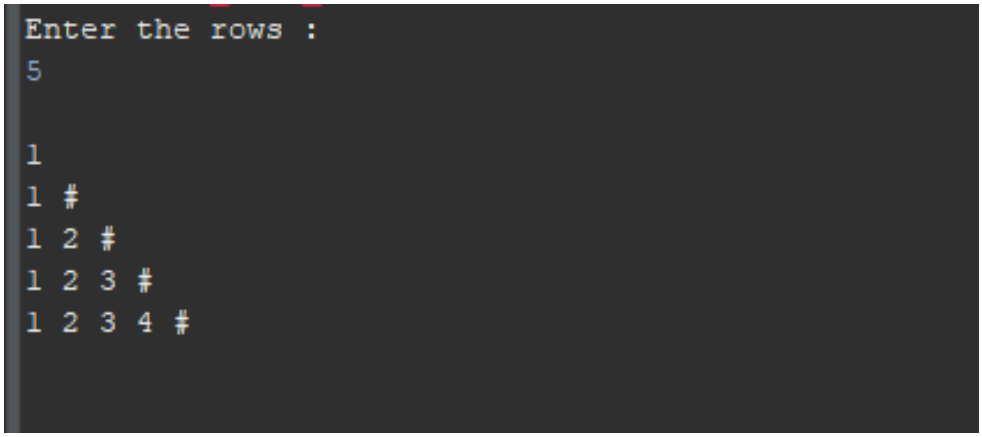


c) 1
1 #
1 2 #
1 2 3 #

Program:



Output of this program is:



d)

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

Program:

```
package com.lab_assesment1; //package name

import java.util.*; //importing required libraries

public class Daimond_pattren {

	public static void main(String[] args) {

	 int rows,i,j,k; //variable declaration

	  Scanner input=new Scanner(System.in); //scanner class for user input
		System.out.println("Enter the rows : ");
		rows=input.nextInt(); // Asking user to enter input
		System.out.println();

		// Upper Triangle
		for(i=1;i<=rows;i++) {

			for(k=1;k<=rows-i;k++)  //for space
				System.out.print(" ");

			for(j=1;j<=i;j++)
				System.out.print(" *");
			System.out.println();
		}
		// Lower Triangle
		for(i=rows-1;i>0;i--) {

			for(k=1;k<=rows-i;k++) //for space
				System.out.print(" ");

			for(j=1;j<=i;j++)
				System.out.print(" *");
			System.out.println();
		}
	}
}
```

Output of this program is:

```
Enter the rows :
5
        *
       * *
      * * *
     * * * *
    * * * * *
     * * * *
      * * *
       * *
        *
```

Q2) Read a number and check whether its prime number or not

```
package com.lab_assesment1; //package name
import java.util.Scanner; //importing scanner class from "util package"

public class PrimeNumber {

	public static void main(String[] args) {
		int num,i; //variables declaration
		boolean condition=true; // assuming all numbers as prime

		Scanner input=new Scanner(System.in); //creating object for scanner
class

		// asking user to input
		System.out.print("Enter the number : ");
		num=input.nextInt();
		input.close();
		System.out.println();

		//if number is 0 or 1 say not prime or number is 2 say prime number
		if(num==0 || num==1) {
			System.out.println(num+" is not prime number");
		}
		else if(num==2)
			System.out.println(num+" is prime number");

		//implementation for number other that 0 or 1 or 2;
		else {
			//the number is always divisible within half of it's
			for(i=2;i<=num/2;i++) {
				if(num%i==0)
					condition=false;
			}
			// printing outputs according to condition
			if(condition)
				System.out.println(num+" is prime number");
			else
				System.out.println(num+" is not prime number");

		}

	}

}
```

Output of this program is:

```
Enter the number : 5

5 is prime number
```

```
Enter the number : 9

9 is not prime number
```

Q3) Program to read a number and check given number is perfect number or not

```java
package com.lab_assesment1; // package name

import java.util.Scanner; //importing Scanner class form util package
public class Perfect_Number {

	public static void main(String[] args) {
		//variables declaration
		int num,sum=0,i;

		//creating object for scanner class
		Scanner input=new Scanner(System.in);

		//reading input form user
		System.out.print("Enter the number : ");
		num=input.nextInt();
		input.close();
		System.out.println();

		//adding all the divisors for the number
		for(i=1;i<=num/2;i++) {
			if(num%i==0) {
				sum+=i;
			}
		}

		//printing output with respect to sum of all divisors
		if(sum==num)
			System.out.println(num+" is a perfect number");
		else
			System.out.println(num+" is not a perfect number");
	}
}
```

Output of this program is:

```
Enter the number : 4

4 is not a perfect number
```

```
Enter the number : 6

6 is a perfect number
```