Lab Sheet 1

[1] WAP in Java to calculate the area of rectangle and triangle. (Make necessary assumptions if needed.)

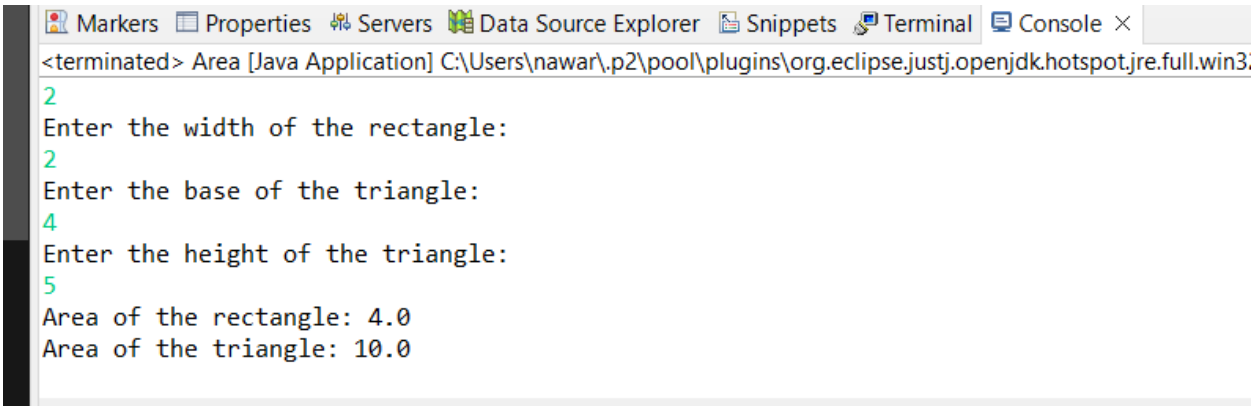
[Hint: Use two classes for rectangle and triangle and one main class]

Source code:

```
package Lab1;

import java.util.Scanner;

class Rectangle {
    double length;
    double width;

    public Rectangle(double length, double width) {
        this.length = length;
        this.width = width;
    }

    public double calculateArea() {
        return length * width;
    }
}

class Triangle {
    double base;
    double height;

    public Triangle(double base, double height) {
        this.base = base;
        this.height = height;
    }

    public double calculateArea() {
        return 0.5 * base * height;
    }
}

public class Area {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.println("Enter the length of the rectangle:");
        double rectLength = scanner.nextDouble();
```

```
        System.out.println("Enter the width of the rectangle:");
        double rectWidth = scanner.nextDouble();

        Rectangle rectangle = new Rectangle(rectLength, rectWidth);

        System.out.println("Enter the base of the triangle:");
        double triBase = scanner.nextDouble();

        System.out.println("Enter the height of the triangle:");
        double triHeight = scanner.nextDouble();

        Triangle triangle = new Triangle(triBase, triHeight);

        double rectArea = rectangle.calculateArea();
        System.out.println("Area of the rectangle: " + rectArea);

        double triArea = triangle.calculateArea();
        System.out.println("Area of the triangle: " + triArea);

        scanner.close();
    }
}
```

Output:



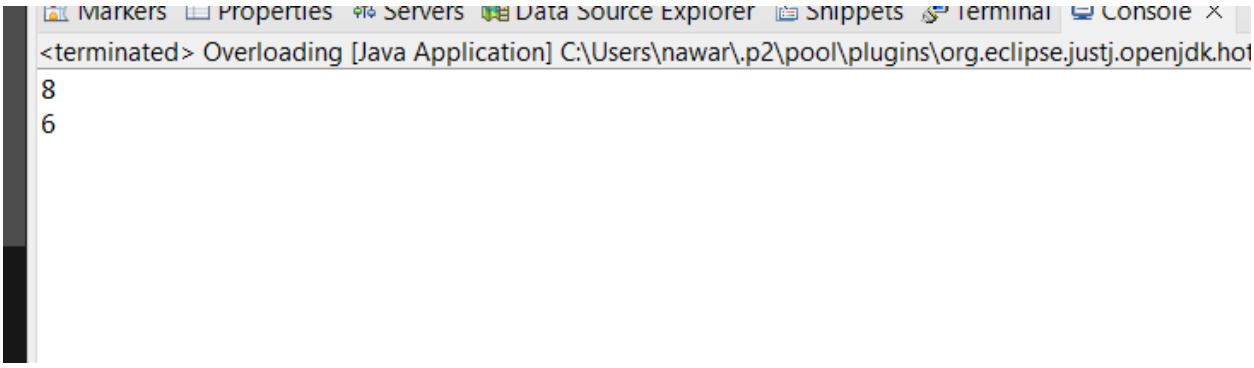
[2] Implement above problem using method overloading and use constructor to initialize variables.

Source code:

```
package Lab1;


/////question 2

public class Overloading {
    int area;
```

```
    public Overloading() {
    }

    public int show(int a, int b) {
        return area = a * b;
    }

    public int show(int a, int b, int c) {
        return area = a * b * c;
    }

    public static void main(String[] args) {
        Overloading n1 = new Overloading();
        n1.show(2, 4);
        int no1 = n1.area;
        System.out.println(no1);

        n1.show(1, 2, 3);

        int no2 = n1.area;
        System.out.println(no2);
    }
}
```

Output:



[3] WAP to find the smallest and largest element and sum of all the elements of an array.

Source code:

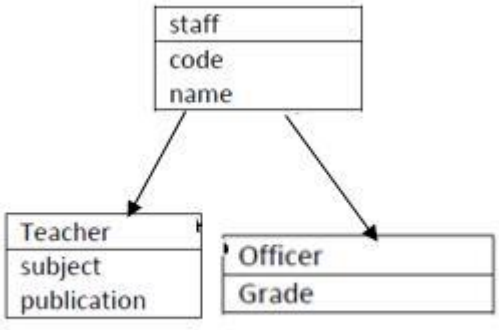
```
package Lab1;

/////question 3
import java.util.Scanner;

public class ArrayMinMaxSum {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
```

```
        System.out.println("Enter the size of the array:");
        int size = scanner.nextInt();
        int[] arr = new int[size];
        System.out.println("Enter the elements of the array:");
        for (int i = 0; i < size; i++) {
            arr[i] = scanner.nextInt();
        }
        int smallest = arr[0];
        int largest = arr[0];
        int sum = 0;
        for (int i = 0; i < size; i++) {
            if (arr[i] < smallest) {
                smallest = arr[i];
            }
            if (arr[i] > largest) {
                largest = arr[i];
            }
            sum += arr[i];
        }
        System.out.println("Smallest Element: " + smallest);
        System.out.println("Largest Element: " + largest);
        System.out.println("Sum of Elements: " + sum);

        scanner.close();
    }
}
```

Output:

```
<terminated> ArrayMinMaxSum [Java Application] C:\Users\nawar\.p2\pc
Enter the size of the array:
4
Enter the elements of the array:
4
3
8
9
Smallest Element: 3
Largest Element: 9
Sum of Elements: 24
```

[4] Implement the following class diagram. Make necessary assumptions if necessary.

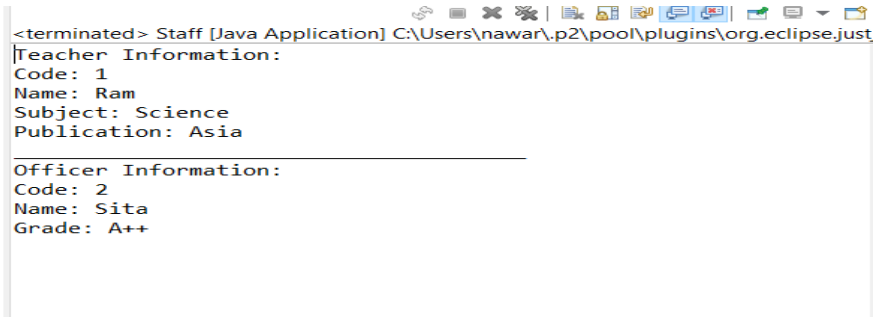


Source code:

```
package Lab1;


/////question 4
public class Staff {

    public String code;
    public String name;

    public static class Teacher extends Staff {
        public String subject;
        public String publication;
    }

    public static class Officer extends Staff {
        public String grade;
    }

    public static void main(String[] args) {
        // Teacher access
        Teacher t = new Teacher();
        t.code = "1";
        t.name = "Ram";
        t.subject = "Science";
        t.publication = "Asia";

        System.out.println("Teacher Information:");
        System.out.println("Code: " + t.code);
        System.out.println("Name: " + t.name);
        System.out.println("Subject: " + t.subject);
        System.out.println("Publication: " + t.publication);
        System.out.println("_____");

        // Officer access
        Officer o = new Officer();
```

```
        o.code = "2";
        o.name = "Sita";
        o.grade = "A++";

        System.out.println("Officer Information:");
        System.out.println("Code: " + o.code);
        System.out.println("Name: " + o.name);
        System.out.println("Grade: " + o.grade);
    }
}
```

Output:



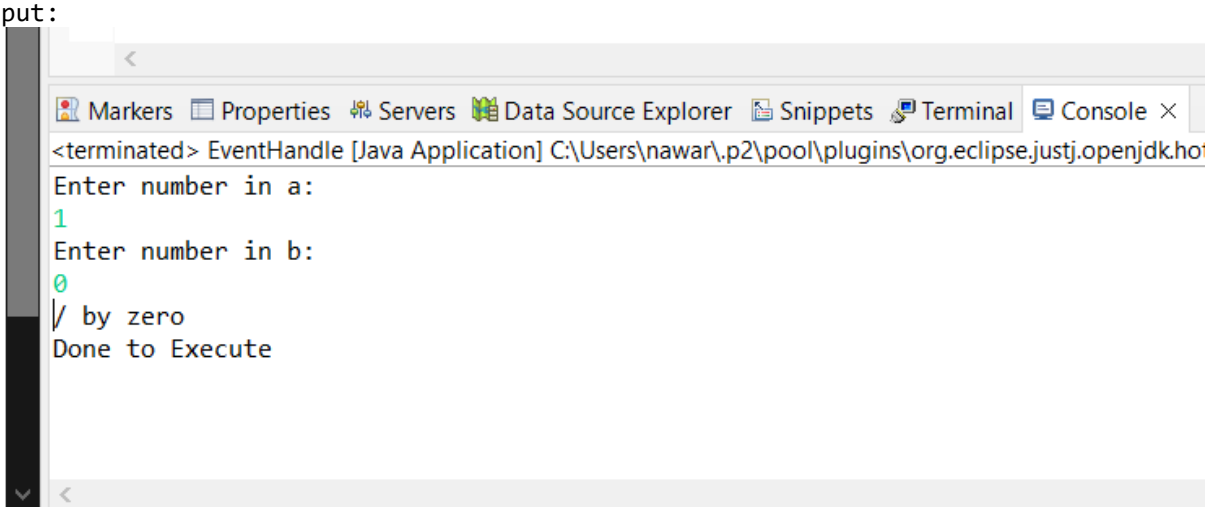
[5] WAP in java to implement try-catch, finally and throw statement.

Source code:

```
package Lab1;
////question 5
import java.util.Scanner;

public class EventHandle {

	public static void main(String[] args) {

		System.out.println("Enter number in a: ");
		int a= new Scanner(System.in).nextInt();
		System.out.println("Enter number in b: ");
		int b= new Scanner(System.in).nextInt();
		int c;

		try {
			c= a/b;
			System.out.println(a);
			throw new Exception("Done");

		}catch(Exception e) {
			System.out.println(e.getMessage());
		}finally {
```

```
                System.out.println("Done to Execute");
            }
        }}
```

Output:



[6] WAP in java to demonstrate ArithmeticException, ArrayIndexOutOfBoundException, NullPointerException, NumberFormatException separately. [Make necessary assumptions]

Source code:

```
package Lab1;


//question 6
import java.util.Scanner;

public class AllEventHandle {

    public static void main(String[] args) {

        try {
            System.out.println("Enter a number: ");
            String userInput = new Scanner(System.in).nextLine();
            int number = Integer.parseInt(userInput);
            System.out.println("Done");
        } catch (NumberFormatException e) {
            System.out.println("NumberFormatException caught: " + e.getMessage());
        }

        try {
            String str = null;
            int length = str.length();
        } catch (NullPointerException e) {
            System.out.println("NullPointerException caught: " + e.getMessage());
```

```
        }

        try {
            int[] array = new int[3];
            int value = array[5];
        } catch (ArrayIndexOutOfBoundsException e) {
            System.out.println("ArrayIndexOutOfBoundsException caught: " +
e.getMessage());
        }

        try {
            int n1 = 4 / 0;
        } catch (ArithmeticException e) {
            System.out.println("ArithmeticException: " + e.getMessage());
        }
    }
}
```

Output: