Aim of the program - Write a Java program to generate an ArrayIndexOutofBoundsException and handle it using catch statement.

```java
import java.util.Scanner;

public class ArrayIndexOutOfBoundsExceptionn {
    public static void main(String[] args) {
        try {
            int[] arr = new int[4];
            Scanner scanner = new Scanner(System.in);
            System.out.println("Enter numbers:");
            for (int i = 0; i <= arr.length; i++) {
                arr[i] = scanner.nextInt();
            }
            scanner.close();
        } catch (ArrayIndexOutOfBoundsException e) {
            System.out.println("Exception caught: " + e);
        }
    }
}
```

Output:-

Enter numbers:

1 2 3 4 5

Exception caught: java.lang.ArrayIndexOutOfBoundsException: Index 4 out of bounds for length 4

Aim of the program- Write a Java program to handle an ArithmeticException using try, catch, and finally block.

```java
class ArithmeticExceptionDemo {
    public static void main(String[] args) {
        try {
            int result = 10 / 0; // Division by zero
            System.out.println("Result: " + result);
        } catch (ArithmeticException e) {
            System.out.println("ArithmeticException caught: " + e);
        } finally {
            System.out.println("Finally block is always executed.");
        }
    }
}
```

Output:-

ArithmeticException caught: java.lang.ArithmeticException: / by zero

Finally block is always executed.

Aim of the program- Write a Java class which has a method called ProcessInput(). This method checks the number entered by the user. If the entered number is negative then throw an user defined exception called NegativeNumberException, otherwise it displays the double value of the entered number.

```
class NegativeNumberException extends Exception {
    public NegativeNumberException(String message) {
        super(message);
    }
}

class ProcessInput {
    public static void main(String[] args) {
        try {
            ProcessInput processInput = new ProcessInput();
            processInput.process();
        } catch (NegativeNumberException e) {
            System.out.println("Caught the exception");
            System.out.println("Exception occurred: " + e);
        }
    }

    public void process() throws NegativeNumberException {
        java.util.Scanner scanner = new java.util.Scanner(System.in);
        System.out.print("Enter a number: ");
        int num = scanner.nextInt();
        scanner.close();
        if (num < 0) {
            throw new NegativeNumberException("number should be positive");
        } else {
            System.out.println("Double value: " + (num * 2));
        }
    }
}
```

Output:-

Enter a number: 3

Double value: 6

Aim of the Program: Write a program to create user defined exceptions called HrsException, MinException and SecException. Create a class Time which contains data members hours,

minutes, seconds and a method to take a time from user which throws the user defined exceptions if hours (>24 &<0),minutes(>60 &<0),seconds(>60 &<0).

```
class HrsException extends Exception {
    public HrsException(String message) {
        super(message);
    }
}

class MinException extends Exception {
    public MinException(String message) {
        super(message);
    }
}

class SecException extends Exception {
    public SecException(String message) {
        super(message);
    }
}

class Time {
    private int hours;
    private int minutes;
    private int seconds;

    public void setTime(int h, int m, int s) throws HrsException,
MinException, SecException {
        if (h < 0 || h > 24) {
            throw new HrsException("InvalidHourException: hour is not between
0 and 24");
        }
        if (m < 0 || m > 60) {
            throw new MinException("InvalidMinuteException: minute is not
between 0 and 60");
        }
        if (s < 0 || s > 60) {
            throw new SecException("InvalidSecondException: second is not
between 0 and 60");
        }
        hours = h;
        minutes = m;
        seconds = s;
    }

    public void displayTime() {
        System.out.println("Correct Time: " + hours + ":" + minutes + ":" +
seconds);
    }
```

```
}

class UserDefinedExceptionDemo {
    public static void main(String[] args) {
        Time time = new Time();
        try {
            time.setTime(4, 54, 34);
            time.displayTime();
            time.setTime(30, 65, 65);
        } catch (HrsException | MinException | SecException e) {
            System.out.println("Caught the exception");
            System.out.println("Exception occurred: " + e.getMessage());
        }
    }
}
```

Output:-

Correct Time: 4:54:34

Caught the exception

Exception occurred: InvalidHourException: hour is not between 0 and 24

Aim of the Program: Create an user defined exception named CheckArgument to check the number of arguments passed through command line. If the number of arguments is less than four then throw the Check Argument exception, else print the addition of squares of all the four elements.

```
class CheckArgumentException extends Exception {
    public CheckArgumentException(String message) {
        super(message);
    }
}

class CheckArgumentDemo {
    public static void main(String[] args) {
        try {
            if (args.length < 4) {
                throw new CheckArgumentException("Exception occurred -
CheckArgument");
            } else {
                int sumOfSquares = 0;
                for (String arg : args) {
                    int num = Integer.parseInt(arg);
                    sumOfSquares += num * num;
                }
```

```
                System.out.println("Sum of squares: " + sumOfSquares);
            }
        } catch (CheckArgumentException e) {
            System.out.println("Caught the exception");
            System.out.println("Exception occurred: " + e.getMessage());
        }
    }
}
```

Output:-

Caught the exception

Exception occurred: Exception occurred - CheckArgument