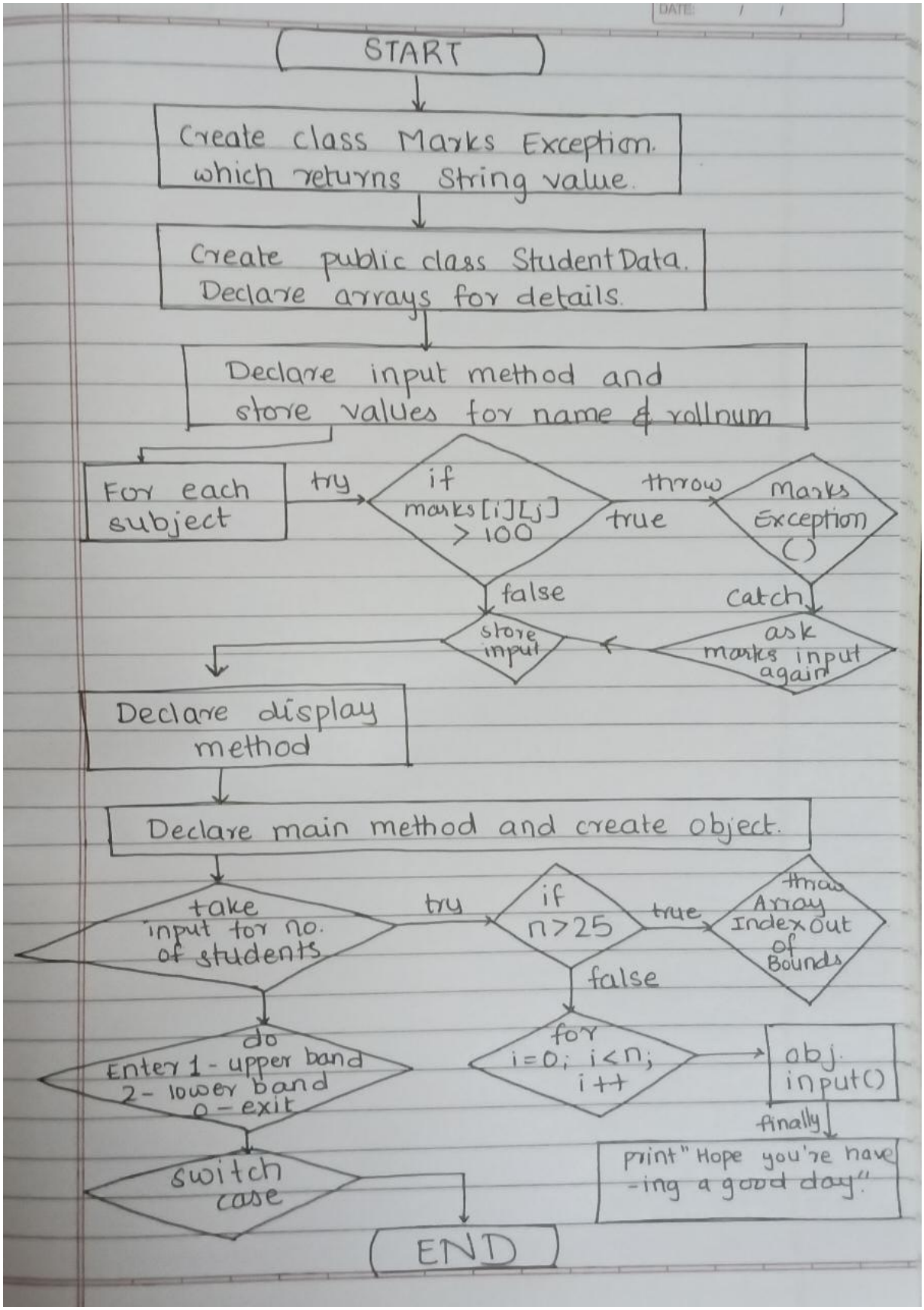
ASSIGNMENT 8

Java Program: Create a student result database. Calculate the grades of the student. Decide the criteria for best student and shortlist students who satisfy the criteria. Use Exception Handling.

Algorithm:

1. Declare a public class StudentData and a class MarksException extending to class Exception.
2. Declare 1D array for roll number, name and grade and 2D array for marks.
3. Create a method for input from the user and use try and catch to throw the exceptions where marks cannot be greater than 100 for each subject.
4. Create another method to display input taken from the user.
5. Take input of number of students and create object of the class StudentData in main method. Use try and catch to throw exceptions where no. of students in database cannot exceed 25.
6. Call the method input and display in separate for loops.
7. Using switch case, display top band and bottom band students by taking choice from the user.
8. In first case, display top band students for grade>8.0 and in second case, display bottom band students for grade<5.0 (using if statement in for loop).

Flowchart:


START
Create class Marks Exception. which returns String value.
Create public class StudentData. Declare arrays for details.
Declare input method and store values for name & rollnum
For each subject
try
if marks[i][j] > 100
true
throw
Marks Exception ()
false
Catch
store input
ask marks input again
Declare display method
Declare main method and create object.
take input for no. of students
try
if n>25
true
throw Array Index Out of Bounds
false
do
Enter 1 - upper band
2 - lower band
0 - exit
for i=0; i<n; i++
obj. input()
finally
print "Hope you're having a good day"
switch case
END

Code:

```
package exception_program;
import java.util.Scanner;

class MarksException extends Exception{
	String Marks() {
		return ("Marks obtained cannot exceed 100.");
	}
}

public class StudentData {

    Scanner sc = new Scanner(System.in);

    static int rollno[] = new int[25];
    static int marks[][] = new int[25][5];
    static String name[] = new String[25];
    static float grade[] = new float[25];

    void input(int i) {

        System.out.print("\n\t Enter name of student : ");
        sc.nextLine();
        name[i] = sc.nextLine();
        System.out.print("\t Enter the roll no. of student : ");
        rollno[i] = sc.nextInt();

        System.out.print("\t Enter marks out of 100 in MVC : ");
        marks[i][0] = sc.nextInt();
        if(marks[i][0]>100) {
            try {
                throw new MarksException();
            }
            catch (MarksException e) {
                System.out.println(e.Marks());
            }
        }
        System.out.print("\t Enter marks out of 100 in MVC again : ");
        marks[i][0] = sc.nextInt();

        System.out.print("\t Enter marks out of 100 in FPL : ");
        marks[i][1] = sc.nextInt();
        if(marks[i][1]>100) {
            try {
                throw new MarksException();
            }
            catch (MarksException e) {
                System.out.println(e.Marks());
            }
        }
        System.out.print("\t Enter marks out of 100 in FPL again : ");
        marks[i][1] = sc.nextInt();

        System.out.print("\t Enter marks out of 100 in GI : ");
        marks[i][2] = sc.nextInt();
        if(marks[i][2]>100) {
            try {
                throw new MarksException();
```

```
            }
            catch (MarksException e) {
                  System.out.println(e.Marks());
            }
        }
        System.out.print("\t Enter marks out of 100 in GI again : ");
        marks[i][2] = sc.nextInt();

        System.out.print("\t Enter marks out of 100 in Phy : ");
        marks[i][3] = sc.nextInt();
        if(marks[i][3]>100) {
            try {
                  throw new MarksException();
            }
            catch (MarksException e) {
                  System.out.println(e.Marks());
            }
        }
        System.out.print("\t Enter marks out of 100 in Phy again : ");
        marks[i][3] = sc.nextInt();

        System.out.print("\t Enter marks out of 100 in EG : ");
        marks[i][4] = sc.nextInt();
        if(marks[i][0]>100) {
            try {
                  throw new MarksException();
            }
            catch (MarksException e) {
                  System.out.println(e.Marks());
            }
        }
        System.out.print("\t Enter marks out of 100 in EG again : ");
        marks[i][4] = sc.nextInt();

        int total_marks = marks[i][0] + marks[i][1] + marks[i][2] +
marks[i][3] + marks[i][4];
        grade[i] = (float) total_marks / 500 * 10;
    }

    void display(int i) {

        System.out.print("\n\n Name of the student : " + name[i]);
        System.out.print("\n Marks in MVC : " + marks[i][0]);
        System.out.print("\n Marks in FPL : " + marks[i][1]);
        System.out.print("\n Marks in GI : " + marks[i][2]);
        System.out.print("\n Marks in Phy : " + marks[i][3]);
        System.out.print("\n Marks in EG : " + marks[i][4]);
        System.out.print("\n Grade : " + grade[i]);
    }
```

```
    public static void main(String[] args) {

        StudentData obj = new StudentData();
        System.out.print("Enter number of students : ");
        int n = obj.sc.nextInt();
        int i = 0;
        try {
            if (n > 25) {
                throw new ArrayIndexOutOfBoundsException("Only applicable
for a batch of 25 students or less.");
            } else {
                for (i = 0; i < n; i++) {
                    System.out.println("\nEnter the details of student " +
(i + 1));
                    obj.input(i);
                }
            }
        } finally {
            System.out.println("Hope you're having a great day!");
        }

        System.out.println("Details of students :");
        System.out.println();

        for (i = 0; i < n; i++) {
            obj.display(i);
        }

        do {
            System.out.println("\nEnter 1 to display upper band students, 2
to display lower band students, and 0 to exit.");
            int choice = obj.sc.nextInt();

            switch (choice) {

                case 1:
                    System.out.println("List of upper band students : ");
                    for (i = 0; i < n; i++) {
                        if (grade[i] > 8.00)
                            System.out.println(rollno[i] + "\t" + name[i]);
                    }
                    break;

                case 2:
                    System.out.println("List of lower band students:");
                    for (i = 0; i < n; i++) {
                        if (grade[i] < 5.00)
                            System.out.println(rollno[i] + "\t" + name[i]);
                    }
                    break;

                case 0:
                    System.exit(0);
                    break;

                default:
                    System.out.println("Input appropriate choice.");
            }
        } while (true);
    }
```

Output:

```
Enter number of students : 50


Hope you're having a great day!
Exception in thread "main" java.lang.ArrayIndexOutOfBoundsException: Only
applicable for a batch of 25 students or less.
      at Asngmt8/exception_program.StudentData.main(StudentData.java:115)
```

```
Enter number of students : 25

Enter the details of student 1

       Enter name of student : Shakira
       Enter the roll no. of student : 101
       Enter marks out of 100 in MVC : 500

Marks obtained cannot exceed 100.

       Enter marks out of 100 in MVC again : 50
       Enter marks out of 100 in FPL : 70
```