**Pseudo-code**

This program will prompt the user to enter five test scores and will display a letter grade for each score and the average test score

DemoTestAvgGrade

Begin

1. Print “Enter five test scores.”
2. testScores = scoresInput()
3. averageScore = calcAverage(testScores)
4. averageGrade = determineGrade(averageScore)
5. Print “Average test score: “ + averageScore
6. Print “Average test grade: “ + averageGrade

End

These are the methods that the program depends on to prompt the user to enter the test scores and validate the inputs, calculate the average grade of the user’s input, and determine the letter grade of each score entered

MethodsAvgGrade

Begin scoreInput()

1. Initialize scores arraylist with arraySize of 5
2. For i = 0, i < length of scores array
3. Initialize testScore variable and set to 0
4. Initialize continueInput variable and set to true
5. Begin do-while loop to validate user input
6. Begin try-catch exception handling to validate input is a number
7. Print “Test score #” + (i + 1) + “: “
8. Input score
9. Catch InputMismatchException
10. Print “Try again. (Incorrect input: a double is required.)”
11. Discard current input line so user can enter a new line of input
12. Check if input is in range, score <= 100 and score >= 0
13. Set continueInput to false to trigger sentinel value and end loop
14. Else
15. Print “Please enter a number between 0 and 100”
16. Continue loop
17. While continueInput = true, continue loop, if continueInput = false, end loop
18. grade = determineGrade(score)
19. Print “Grade for test #” + (i + 1) + “: “ + grade
20. Add score to scores
21. Return scores

End

Begin calcAverage(arraylist scores)

1. sum = scores[0] + scores[1] + scores[2] + scores[3] + scores[4]
2. avg = sum / 5.0
3. return avg

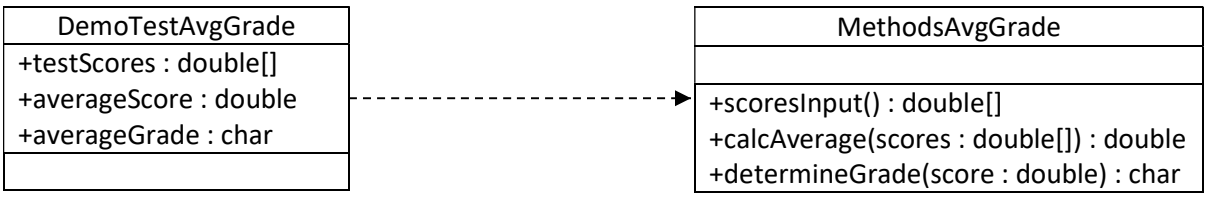
End

Begin determineGrade(score)

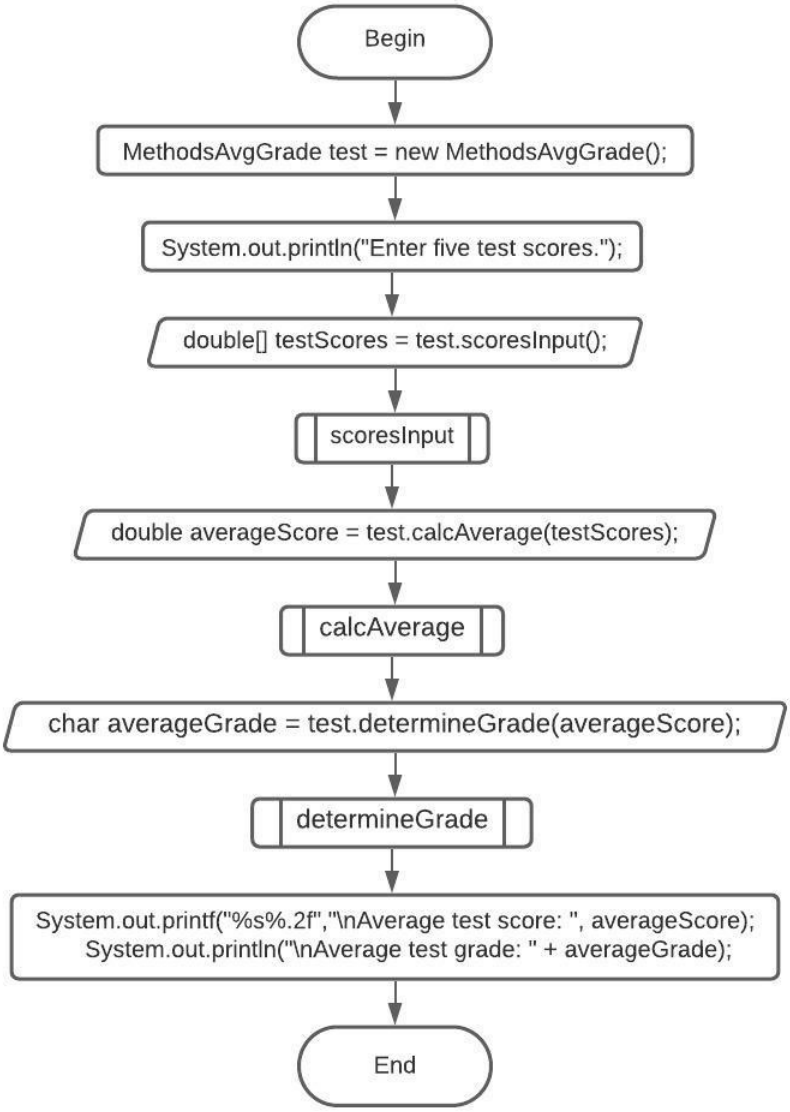
1. Initialize grade
2. If score >= 90
3. grade = ‘A’
4. Else if score >= 80
5. grade = ‘B’
6. Else if score >= 70
7. grade = ‘C’
8. Else if score >= 60
9. grade = ‘D’
10. Else
11. grade = ‘F’
12. return grade

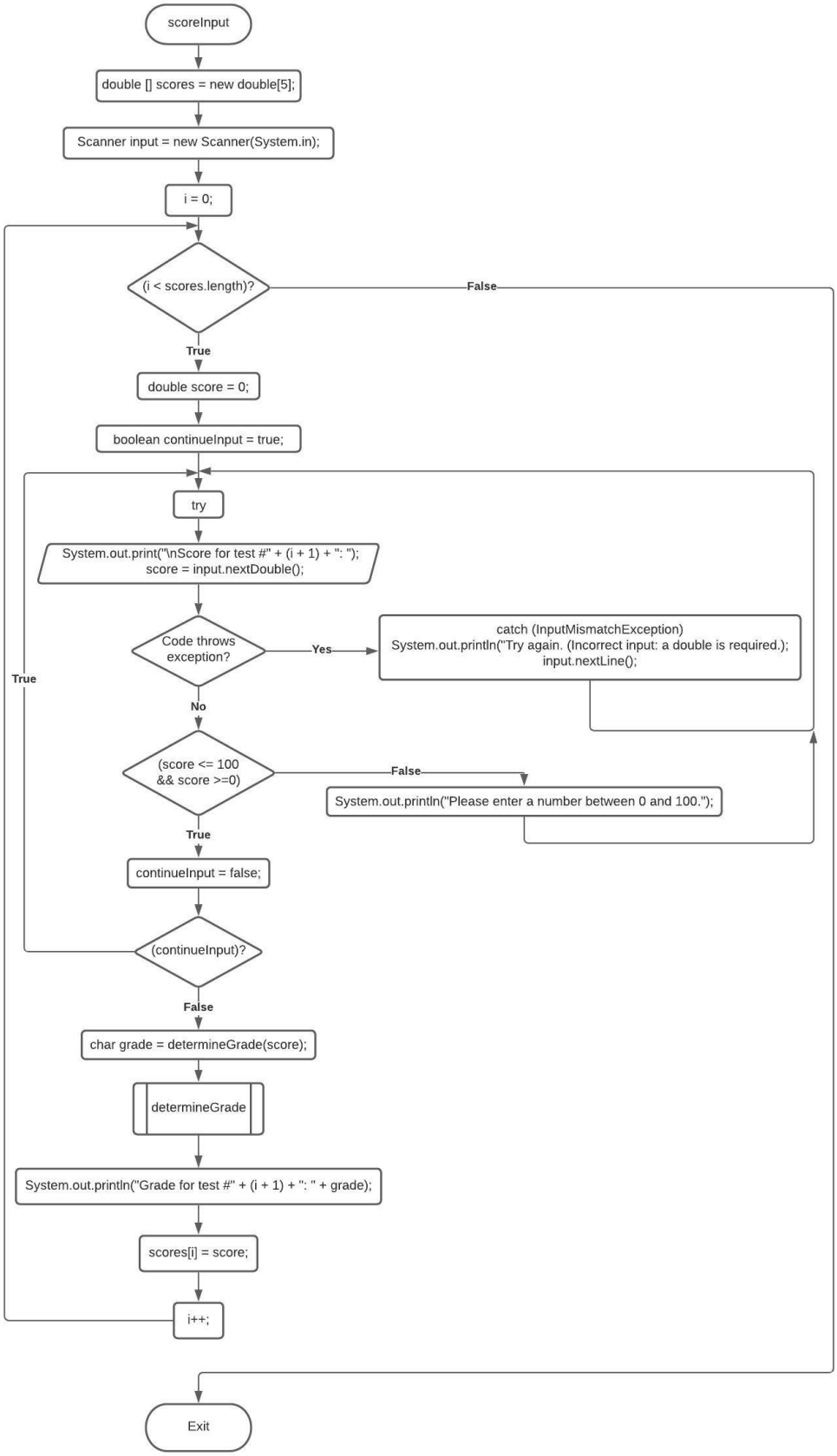
End

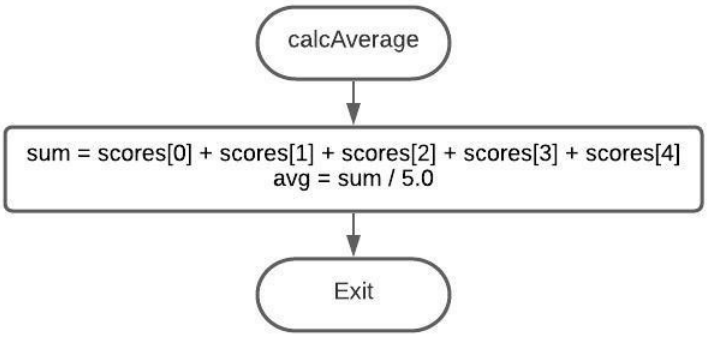
**UML**

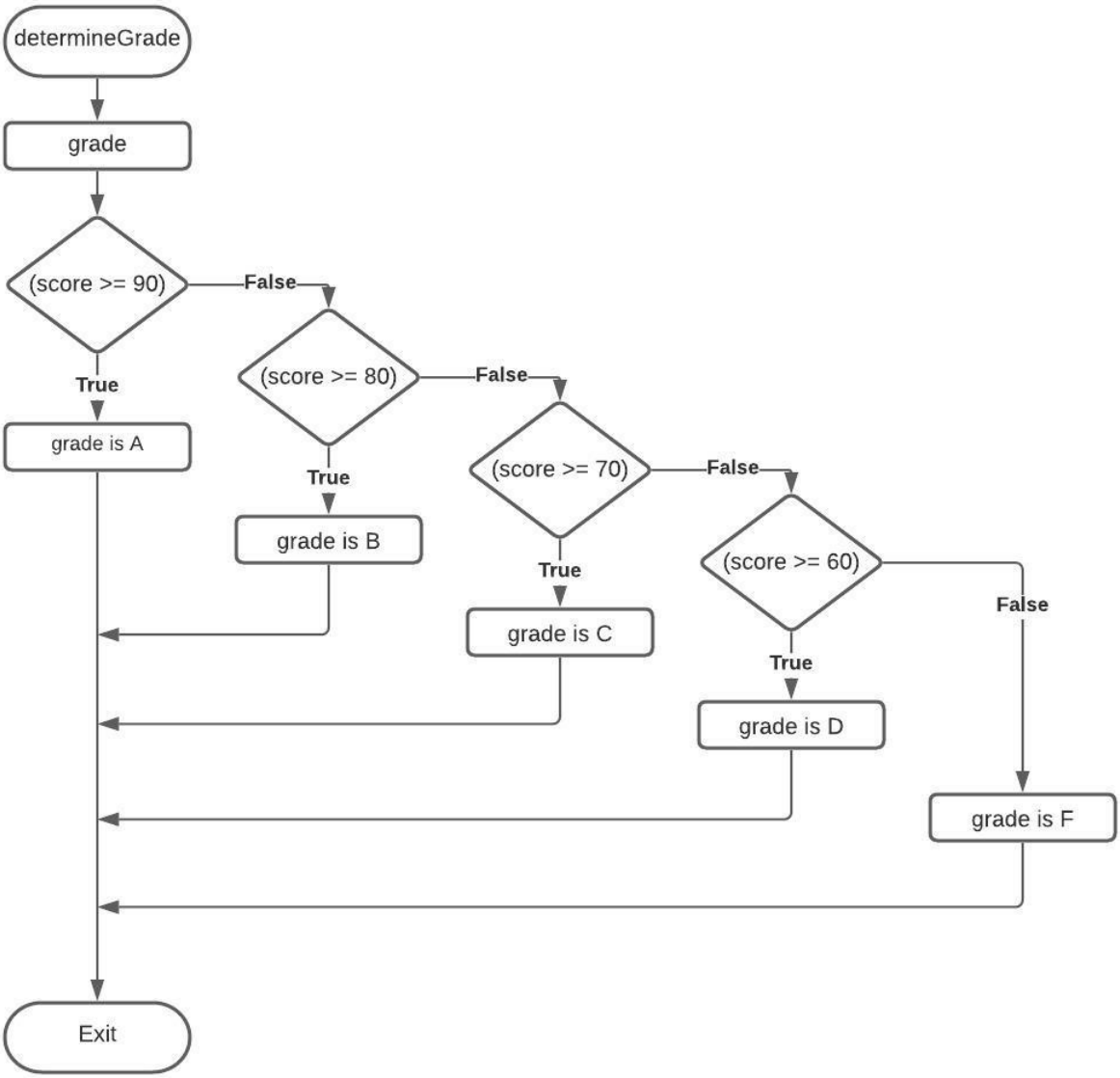


**Flow-charts**


Begin
MethodsAvgGrade test = new MethodsAvgGrade();
System.out.println("Enter five test scores.");
double[] testScores = test.scoresInput();
scoresInput
double averageScore = test.calcAverage(testScores);
calcAverage
char averageGrade = test.determineGrade(averageScore);
determineGrade
System.out.printf("%s%.2f","\nAverage test score: ", averageScore);
System.out.println("\nAverage test grade: " + averageGrade);
End


scoreInput
double [] scores = new double[5];
Scanner input = new Scanner(System.in);
i = 0;
(i < scores.length)?
False
True
double score = 0;
boolean continueInput = true;
try
System.out.print("\nScore for test #" + (i + 1) + ": ");
score = input.nextDouble();
Code throws exception?
Yes
catch (InputMismatchException)
System.out.println("Try again. (Incorrect input: a double is required.);
input.nextLine();
True
No
(score <= 100 && score >=0)
False
System.out.println("Please enter a number between 0 and 100.");
True
continueInput = false;
(continueInput)?
False
char grade = determineGrade(score);
determineGrade
System.out.println("Grade for test #" + (i + 1) + ": " + grade);
scores[i] = score;
i++;
Exit


calcAverage
sum = scores[0] + scores[1] + scores[2] + scores[3] + scores[4]
avg = sum / 5.0
Exit


determineGrade
grade
(score >= 90)
False
True
grade is A
(score >= 80)
False
True
grade is B
(score >= 70)
False
True
grade is C
(score >= 60)
False
True
grade is D
grade is F
Exit