Test Plan

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Chapter 3, Project 5

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**Program Goals & Objectives**

The primary objective of this program is to solicit user input for a point with coordinates (x, y) and subsequently ascertain whether that point falls within a rectangular region centered at (0, 0) with a width of 10 units and a height of 5 units. The program reliably determines whether the point is situated within or outside the rectangle based on the predetermined dimensions.

**Program Functional Requirements**

1. The program should prompt the user to enter a point with two coordinates.

2. The user should be able to enter the x and y coordinates as numerical values.

3. The program should read the x and y coordinates entered by the user.

4. The program should calculate the absolute values of x and y to determine their distances from the center (0, 0).

5. The program should determine if the point is within the rectangle:

• The point is in the rectangle if |x| ≤ (width / 2) and |y| ≤ (height / 2).

6. The rectangle dimensions are:

• Width: 10 units (extends from x = -5 to x = 5)

• Height: 5 units (extends from y = -2.5 to y = 2.5)

7. The program should display the result to the user:

• If the point is inside the rectangle, display: “Point (x, y) is in the rectangle”

• If the point is outside the rectangle, display: “Point (x, y) is not in the rectangle”

8. The program should handle invalid inputs (e.g., non-numerical inputs) appropriately by displaying an error message and terminating gracefully.

**Program Pseudocode**

START

Prompt user to "Enter a point with two coordinates: "

Read x

Read y

IF (abs(x) ≤ 10.0 / 2) AND (abs(y) ≤ 5.0 / 2) THEN

Display "Point (x, y) is in the rectangle"

ELSE

Display "Point (x, y) is not in the rectangle"

END IF

END

**Program Flowchart**

**A diagram of a rectangle

Description automatically generated**

**Table 1 – Traceability Matrix**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test Case | Input/Output | Expected Result | Actual Result | Outcome  (Pass/Fail) |
| 1a | Enter a point with two coordinates: 2.0 2.0 | Point (2.0, 2.0) is in the rectangle | Point (2.0, 2.0) is in the rectangle | Pass |
| 2a | Enter a point with two coordinates: 2.0, 2.0 | Point (2.0, 2.0) is in the rectangle | Exception in thread "main" java.util.InputMismatchException | Fail |
| 3a | Enter a point with two coordinates: (2, 2) | Point (2.0, 2.0) is in the rectangle | Exception in thread "main" java.util.InputMismatchException | Fail |