IT314 Lab 10 Report
Keyur Govrani
202101498

Contents

1 Equivalence class test cases Question 1

1. Valid input for a previous date:

   - Equivalence class 1: Day, month, and year that corresponds to a valid date that is not the lowest boundary (day = 2, month = 3, year = 2010).
   - Equivalence class 2: Day = 1, month > 1 (day = 1, month = 4, year = 2005).
   - Equivalence class 3: Day > 1, month = 1 (day = 15, month = 1, year = 1999).

2. Valid input for the lowest boundary:

   - Equivalence class 4: Day = 1, month = 1 (day = 1, month = 1, year = 1900).

3. Valid input for the highest boundary:

   - Equivalence class 5: Day = 31, month = 12, year = 2015 (day = 31, month = 12, year = 2015).

4. Invalid inputs:

   - Equivalence class 6: Day < 1 (day = 0, month = 6, year = 2000).
   - Equivalence class 7: Day > 31 (day = 32, month = 7, year = 1995).
   - Equivalence class 8: Month < 1 (day = 20, month = 0, year = 2012).
   - Equivalence class 9: Month > 12 (day = 10, month = 13, year = 2008).
   - Equivalence class 10: Year < 1900 (day = 5, month = 9, year = 1899).
   - Equivalence class 11: Year > 2015 (day = 3, month = 11, year = 2016).

5. Special cases:

   - Equivalence class 12: Leap year (day = 29, month = 2, year = 2000).
   - Equivalence class 13: Non-leap year (day = 29, month = 2, year = 1900).

2 Equivalence class test cases Program 1

1. Equivalence Class 1 - Invalid Triangles:

   - Test Case 1: $a = 0$, $b = 1$, $c = 2 \rightarrow$ Expected Outcome: INVALID
   - Test Case 2: $a = 1$, $b = 0$, $c = 2 \rightarrow$ Expected Outcome: INVALID
   - Test Case 3: $a = 1$, $b = 2$, $c = 0 \rightarrow$ Expected Outcome: INVALID
   - Test Case 4: $a = 1$, $b = 2$, $c = 4 \rightarrow$ Expected Outcome: INVALID (Triangle Inequality Violated)
   - Test Case 5: $a = 1$, $b = 4$, $c = 2 \rightarrow$ Expected Outcome: INVALID (Triangle Inequality Violated)
   - Test Case 6: $a = 4$, $b = 1$, $c = 2 \rightarrow$ Expected Outcome: INVALID (Triangle Inequality Violated)

2. Equivalence Class 2 - Equilateral Triangles:

- Test Case 7: $a = 3$, $b = 3$, $c = 3 \rightarrow$ Expected Outcome: EQUILATERAL
- Test Case 8: $a = 100$, $b = 100$, $c = 100 \rightarrow$ Expected Outcome: EQUILATERAL (Large values)

3. Equivalence Class 3 - Isosceles Triangles:

   - Test Case 9: $a = 3$, $b = 3$, $c = 4 \rightarrow$ Expected Outcome: ISOSCELES
   - Test Case 10: $a = 4$, $b = 3$, $c = 3 \rightarrow$ Expected Outcome: ISOSCELES
   - Test Case 11: $a = 3$, $b = 4$, $c = 3 \rightarrow$ Expected Outcome: ISOSCELES
   - Test Case 12: $a = 100$, $b = 100$, $c = 150 \rightarrow$ Expected Outcome: ISOSCELES (Large values)

4. Equivalence Class 4 - Scalene Triangles:

   - Test Case 13: $a = 3$, $b = 4$, $c = 5 \rightarrow$ Expected Outcome: SCALENE
   - Test Case 14: $a = 5$, $b = 4$, $c = 3 \rightarrow$ Expected Outcome: SCALENE
   - Test Case 15: $a = 6$, $b = 8$, $c = 10 \rightarrow$ Expected Outcome: SCALENE (Pythagorean triple)

5. Boundary Value Analysis:

   - Boundary Values for Equilateral Triangles:
   - Test Case 16: $a = 1$, $b = 1$, $c = 1 \rightarrow$ Expected Outcome: EQUILATERAL
   - Test Case 17: $a = 200$, $b = 200$, $c = 200 \rightarrow$ Expected Outcome: EQUILATERAL (Maximum values)
   - Boundary Values for Isosceles Triangles:
   - Test Case 18: $a = 1$, $b = 1$, $c = 2 \rightarrow$ Expected Outcome: ISOSCELES
   - Test Case 19: $a = 1$, $b = 2$, $c = 1 \rightarrow$ Expected Outcome: ISOSCELES
   - Test Case 20: $a = 2$, $b = 1$, $c = 1 \rightarrow$ Expected Outcome: ISOSCELES
   - Test Case 21: $a = 200$, $b = 200$, $c = 300 \rightarrow$ Expected Outcome: ISOSCELES (Maximum values)
   - Boundary Values for Scalene Triangles:
   - Test Case 22: $a = 1$, $b = 2$, $c = 3 \rightarrow$ Expected Outcome: SCALENE
   - Test Case 23: $a = 3$, $b = 4$, $c = 5 \rightarrow$ Expected Outcome: SCALENE
   - Test Case 24: $a = 5$, $b = 12$, $c = 13 \rightarrow$ Expected Outcome: SCALENE (Pythagorean triple)

3 Equivalence class test cases Question 2

a) Equivalence Classes:

   (a) Equilateral Triangle: All sides are equal ($A = B = C$).
   (b) Isosceles Triangle: Two sides are equal, and the third is different ($A = B \neq C$, $A \neq B = C$, $A = C \neq B$).

(c) Scalene Triangle: All sides are different ($A \neq B \neq C$).

(d) Right-Angled Triangle: Satisfies the Pythagorean theorem ($A^2 + B^2 = C^2$).

(e) Non-Triangle: It cannot form a triangle ($A + B \leq C$, $B + C \leq A$, $C + A \leq B$).

b) Extensive Test Cases:

(a) Equivalence Class: Equilateral Triangle

- Test Case 1: $A = 1, B = 1, C = 1$ (Minimum positive values)
- Test Case 2: $A = 10, B = 10, C = 10$ (Larger positive values)

(b) Equivalence Class: Isosceles Triangle

- Test Case 3: $A = 3, B = 3, C = 4$ ($A = B \neq C$)
- Test Case 4: $A = 4, B = 3, C = 3$ ($A \neq B = C$)
- Test Case 5: $A = 3, B = 4, C = 3$ ($A = C \neq B$)

(c) Equivalence Class: Scalene Triangle

- Test Case 6: $A = 3, B = 4, C = 5$ (Regular scalene triangle)
- Test Case 7: $A = 1, B = 2, C = 3$ (Smallest positive values)

(d) Equivalence Class: Right-Angled Triangle

- Test Case 8: $A = 3, B = 4, C = 5$ ($A^2 + B^2 = 9 + 16 = 25 = C^2$)
- Test Case 9: $A = 5, B = 12, C = 13$ (Another right-angled triangle)

(e) Equivalence Class: Non-Triangle

- Test Case 10: $A = 1, B = 2, C = 6$ ($A + B = 3 < C$)
- Test Case 11: $A = 0, B = 0, C = 0$ (All sides are zero)
- Test Case 12: $A = 1, B = 1, C = 2$ ($A + B = 2 = C$)

c) Boundary Condition $A + B > C$ (Scalene Triangle):

(a) Test Case 13: $A = 3, B = 4, C = 6$ ($A + B = 7 > C$)

(b) Test Case 14: $A = 1, B = 1, C = 2$ ($A + B = 2 < C$)

d) Boundary Condition $A = C$ (Isosceles Triangle):

(a) Test Case 15: $A = 5, B = 4, C = 5$ ($A = C$)

(b) Test Case 16: $A = 1, B = 1, C = 2$ ($A \neq C$)

e) Boundary Condition $A = B = C$ (Equilateral Triangle):

(a) Test Case 17: $A = 4, B = 4, C = 4$ ($A = B = C$)

(b) Test Case 18: $A = 1, B = 2, C = 3$ ($A \neq B \neq C$)

f) Boundary Condition $A^2 + B^2 = C^2$ (Right-Angled Triangle):

(a) Test Case 19: $A = 3, B = 4, C = 5$ ($A^2 + B^2 = 9 + 16 = 25 = C^2$)

(b) Test Case 20: $A = 7, B = 24, C = 25$ (Another right-angled triangle)

g) For Non-Triangle Case (Boundary Exploration):

    (a) Test Case 21: $A = 1, B = 2, C = 3$ $(A + B = 3 < C)$

    (b) Test Case 22: $A = 0, B = 0, C = 1$ (A and B are zero, $A + B = 0 < C$)

    (c) Test Case 23: $A = 1, B = 1, C = 3$ $(A + B = 2 < C)$

h) For Non-Positive Input (Boundary Exploration):

    (a) Test Case 24: $A = -1, B = 2, C = 3$ (A is non-positive)

    (b) Test Case 25: $A = 1, B = -2, C = 3$ (B is non-positive)

    (c) Test Case 26: $A = 1, B = 2, C = -3$ (C is non-positive)

    (d) Test Case 27: $A = 0, B = 2, C = 3$ (A is zero)

    (e) Test Case 28: $A = 1, B = 0, C = 3$ (B is zero)

    (f) Test Case 29: $A = 1, B = 2, C = 0$ (C is zero)