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**CS 474 – Software Testing Techniques**

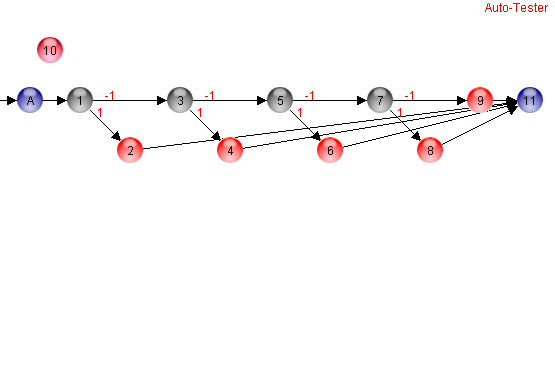
**Assignment No. 02**

|  |  |
| --- | --- |
| Submitted to | Dr. Mudassar Azam Sindhu |

**Group Members**

|  |  |
| --- | --- |
| **Name** | **Reg. No** |
| Hammad Raza | 04071913017 |
| Muhammad Taha | 04071913018 |

**Auto Tester**



**Node Coverage Criteria:**

**Supports:** Yes (Statement Coverage Criteria)

**Test Paths:**

|  |  |  |
| --- | --- | --- |
| **S. No.** | **Paths** | **Executable** |
| 1 | A → 1 → 3 → 5 → 7 → 9 → 11 | Yes |
| 2 | A → 1 → 3 → 5 → 7 → 8 → 11 | Yes |
| 3 | A → 1 → 3 → 5 → 6 → 11 | Yes |
| 4 | A → 1 → 3 → 4 → 11 | Yes |
| 5 | A → 1 → 2 → 11 | Yes |

**Test Cases:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Test Path** | **S1** | **S2** | **S3** | **Expected**  **Output** | **Observed**  **Output** | **Verdict** |
| 1 | 4 | 5 | 6 | Scalene | Scalene | Pass |
| 2 | 4 | 4 | 7 | Isosceles | Isosceles | Pass |
| 4 | 7 | 4 | Isosceles | Isosceles | Pass |
| 7 | 4 | 4 | Isosceles | Isosceles | Pass |
| 3 | 4 | 4 | 4 | Equilateral | Equilateral | Pass |
| 4 | 4 | 4 | 8 | No triangle | No triangle | Pass |
| 4 | 8 | 4 | No triangle | No triangle | Pass |
| 8 | 4 | 4 | No triangle | No triangle | Pass |
| 1 | 1 | 3 | No triangle | No triangle | Pass |
| 1 | 3 | 1 | No triangle | No triangle | Pass |
| 3 | 1 | 1 | No triangle | No triangle | Pass |
| 5 | 4 | -1 | 0 | Bad side | Bad side | Pass |
| 0 | 0 | 0 | Bad side | Bad side | Pass |

**Minimized:** Yes

**Edge Coverage Criteria:**

**Supports:** Yes (Decision Coverage Criteria)

**Test Paths:**

|  |  |  |
| --- | --- | --- |
| **S. No.** | **Paths** | **Executable** |
| 1 | A → 1 → 3 → 5 → 7 → 9 → 11 | Yes |
| 2 | A → 1 → 3 → 5 → 7 → 8 → 11 | Yes |
| 3 | A → 1 → 3 → 5 → 6 → 11 | Yes |
| 4 | A → 1 → 3 → 4 → 11 | Yes |
| 5 | A → 1 → 2 → 11 | Yes |

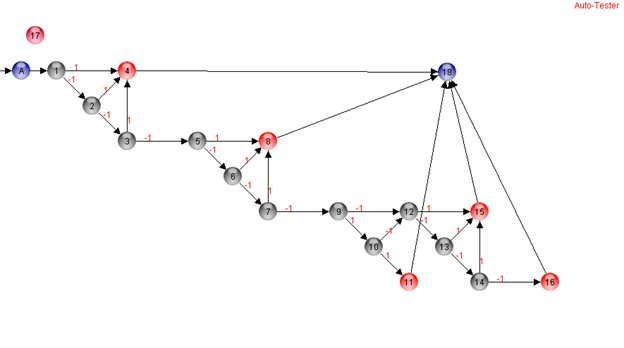
**Test Cases:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Test Path** | **S1** | **S2** | **S3** | **Expected**  **Output** | **Observed**  **Output** | **Verdict** |
| 1 | 4 | 5 | 6 | Scalene | Scalene | Pass |
| 2 | 4 | 4 | 7 | Isosceles | Isosceles | Pass |
| 4 | 7 | 4 | Isosceles | Isosceles | Pass |
| 7 | 4 | 4 | Isosceles | Isosceles | Pass |
| 3 | 4 | 4 | 4 | Equilateral | Equilateral | Pass |
| 4 | 4 | 4 | 8 | No triangle | No triangle | Pass |
| 4 | 8 | 4 | No triangle | No triangle | Pass |
| 8 | 4 | 4 | No triangle | No triangle | Pass |
| 1 | 1 | 3 | No triangle | No triangle | Pass |
| 1 | 3 | 1 | No triangle | No triangle | Pass |
| 3 | 1 | 1 | No triangle | No triangle | Pass |
| 5 | 4 | -1 | 0 | Bad side | Bad side | Pass |
| 0 | 0 | 0 | Bad side | Bad side | Pass |

**Minimized:** Yes

**Predicate Coverage Criteria:**

As we know from lecture, when predicates come from conditions on edges, predicate coverage is equivalent to edge coverage.



**Clause Coverage Criteria:**

**Supports:** Yes (Condition Coverage Criteria)

**Test Paths:**

|  |  |  |
| --- | --- | --- |
| **S. No.** | **Paths** | **Executable** |
| 1 | A → 1 → 4 → 18 | Yes |
| 2 | A → 1 → 2 → 4 → 18 | Yes |
| 3 | A → 1 → 2 → 3 → 5 → 8 → 18 | Yes |
| 4 | A → 1 → 2 → 3 → 5 → 6 → 8 → 18 | Yes |
| 5 | A → 1 → 2 → 3 → 5 → 6 → 7 → 9 → 12 → 15 → 18 | No |
| 6 | A → 1 → 2 → 3 → 5 → 6 → 7 → 9 → 12 → 13 → 15 → 18 | Yes |
| 7 | A → 1 → 2 → 3 → 5 → 6 → 7 → 9 → 12 → 13 → 14 → 16 → 18 | Yes |
| 8 | A → 1 → 2 → 3 → 5 → 6 → 7 → 9 → 12 → 13 → 14 → 15 → 18 | Yes |
| 9 | A → 1 → 2 → 3 → 5 → 6 → 7 → 9 → 10 → 12 → 15 → 18 | Yes |
| 10 | A → 1 → 2 → 3 → 5 → 6 → 7 → 9 → 10 → 11 → 18 | Yes |
| 11 | A → 1 → 2 → 3 → 5 → 6 → 7 → 8 → 18 | Yes |
| 12 | A → 1 → 2 → 3 → 4 → 18 | Yes |

**Explanation:**

Test Path # 05 is infeasible because node 15 is semantically unreachable in this particular test path because this path considers condition *s1==s2* false at node 9 and then it considers the same condition to become true at node 12. To make it executable, we can add node 13 before node 15 but a separate test path for it exists.

**Test Cases:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Test Path** | **S1** | **S2** | **S3** | **Expected**  **Output** | **Observed**  **Output** | **Verdict** |
| 1 | 0 | 0 | 0 | Bad side | Bad side | Pass |
| 2 | 4 | 0 | 5 | Bad side | Bad side | Pass |
| 3 | 4 | 5 | 9 | No Triangle | No Triangle | Pass |
| 4 | 5 | 10 | No Triangle | No Triangle | Pass |
| 4 | 9 | 4 | 5 | No Triangle | No Triangle | Pass |
| 10 | 4 | 5 | No Triangle | No Triangle | Pass |
| 5 | - | - | - | - | - | - |
| 6 | 5 | 4 | 4 | Isosceles | Isosceles | Pass |
| 7 | 5 | 4 | 6 | Scalene | Scalene | Pass |
| 8 | 4 | 5 | 4 | Isosceles | Isosceles | Pass |
| 9 | 5 | 5 | 4 | Isosceles | Isosceles | Pass |
| 10 | 5 | 5 | 5 | Equilateral | Equilateral | Pass |
| 11 | 3 | 5 | 2 | No Triangle | No Triangle | Pass |
| 3 | 6 | 2 | No Triangle | No Triangle | Pass |
| 12 | 4 | 5 | -1 | Bad side | Bad side | Pass |

**Minimized:** Yes

**Restricted Active Clause Coverage:**

**Supports:** Yes

**Test Paths:**

|  |  |  |
| --- | --- | --- |
| **S. No.** | **Paths** | **Executable** |
| 1 | A → 1 → 4 → 18 | Yes |
| 2 | A → 1 → 2 → 4 → 18 | Yes |
| 3 | A → 1 → 2 → 3 → 5 → 8 → 18 | Yes |
| 4 | A → 1 → 2 → 3 → 5 → 6 → 8 → 18 | Yes |
| 5 | A → 1 → 2 → 3 → 5 → 6 → 7 → 9 → 12 → 15 → 18 | No |
| 6 | A → 1 → 2 → 3 → 5 → 6 → 7 → 9 → 12 → 13 → 15 → 18 | Yes |
| 7 | A → 1 → 2 → 3 → 5 → 6 → 7 → 9 → 12 → 13 → 14 → 16 → 18 | Yes |
| 8 | A → 1 → 2 → 3 → 5 → 6 → 7 → 9 → 12 → 13 → 14 → 15 → 18 | Yes |
| 9 | A → 1 → 2 → 3 → 5 → 6 → 7 → 9 → 10 → 12 → 15 → 18 | Yes |
| 10 | A → 1 → 2 → 3 → 5 → 6 → 7 → 9 → 10 → 11 → 18 | Yes |
| 11 | A → 1 → 2 → 3 → 5 → 6 → 7 → 8 → 18 | Yes |
| 12 | A → 1 → 2 → 3 → 4 → 18 | Yes |

**Explanation:**

TP: 05 is infeasible because node 15 is semantically unreachable in this test path, as it considers s1==s2 false in node 9, but at node 12 it s1 == s2 as true. Which is not possible.

**Test Cases:**

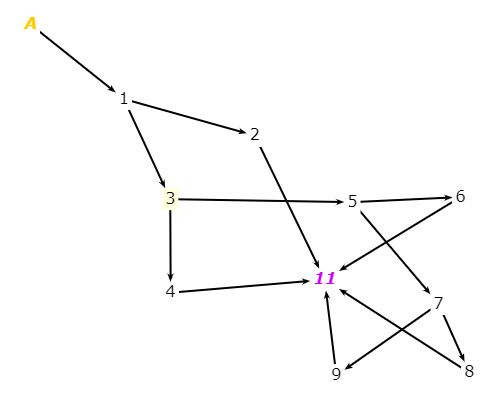
|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Test Path** | **S1** | **S2** | **S3** | **Expected**  **Output** | **Observed**  **Output** | **Verdict** |
| 1 | 0 | 0 | 0 | Bad side | Bad side | Pass |
| 2 | 4 | 0 | 5 | Bad side | Bad side | Pass |
| 3 | 4 | 5 | 9 | No Triangle | No Triangle | Pass |
| 4 | 5 | 10 | No Triangle | No Triangle | Pass |
| 4 | 9 | 4 | 5 | No Triangle | No Triangle | Pass |
| 10 | 4 | 5 | No Triangle | No Triangle | Pass |
| 5 | - | - | - | - | - | - |
| 6 | 5 | 4 | 4 | Isosceles | Isosceles | Pass |
| 7 | 5 | 4 | 6 | Scalene | Scalene | Pass |
| 8 | 4 | 5 | 4 | Isosceles | Isosceles | Pass |
| 9 | 5 | 5 | 4 | Isosceles | Isosceles | Pass |
| 10 | 5 | 5 | 5 | Equilateral | Equilateral | Pass |
| 11 | 3 | 5 | 2 | No Triangle | No Triangle | Pass |
| 3 | 6 | 2 | No Triangle | No Triangle | Pass |
| 12 | 4 | 5 | -1 | Bad side | Bad side | Pass |

**Minimized:** Yes

**Tool Assessment**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S.**  **No.** | **Question** | **NC** | **EC** | **PC** | **CC** | **RACC** |
| 1 | Do you have a test case that represents a valid scalene triangle? | 1 | 1 | 1 | 1 | 1 |
| 2 | Do you have a test case that represents a valid isosceles triangle? | 1 | 1 | 1 | 1 | 1 |
| 3 | Do you have a test case that represents a valid equilateral triangle? | 1 | 1 | 1 | 1 | 1 |
| 4 | Do you have three test case that represent valid isosceles triangle that is you have tried all three permutations of two equal sides? | 1 | 1 | 1 | 1 | 1 |
| 5 | Do you have a test case in which one side has a zero value? | 1 | 1 | 1 | 1 | 1 |
| 6 | Do you have a test case in which one side has a negative value? | 1 | 1 | 1 | 1 | 1 |
| 7 | Do you have a test case with three integers such that the sum of two is equal to the third? | 1 | 1 | 1 | 1 | 1 |
| 8 | Do you have at least three test cases for question 7 above such that you have tried all permutations of sum of lengths of two sides equal to the length of third side? | 1 | 1 | 1 | 1 | 1 |
| 9 | Do you have a test case with three integers greater than zero such that the sum of two is less than the third? | 1 | 1 | 1 | 1 | 1 |
| 10 | Do you have at least three test cases for question 9 such that you have tried all three permutations? | 1 | 1 | 1 | 1 | 1 |
| 11 | Do you have a test case in which all sides are zero? | 1 | 1 | 1 | 1 | 1 |
| 12 | Do you have a test case with non-integer values? | 0 | 0 | 0 | 0 | 0 |
| 13 | Do you have a test case with wrong number of values (two or less or four or more) | 0 | 0 | 0 | 0 | 0 |
| 14 | For each test case did you specify the expected output along with the input value? | 1 | 1 | 1 | 1 | 1 |

**Graph Coverage Tool**



**Node Coverage Criteria:**

**Supports:** Yes

**Test Paths:**

|  |  |  |
| --- | --- | --- |
| **S. No.** | **Paths** | **Executable** |
| 1 | A → 1 → 3 → 5 → 7 → 9 → 11 | Yes |
| 2 | A → 1 → 3 → 5 → 7 → 8 → 11 | Yes |
| 3 | A → 1 → 3 → 5 → 6 → 11 | Yes |
| 4 | A → 1 → 3 → 4 → 11 | Yes |
| 5 | A → 1 → 2 → 11 | Yes |

**Test Cases:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Test Path** | **S1** | **S2** | **S3** | **Expected**  **Output** | **Observed**  **Output** | **Verdict** |
| 1 | 4 | 5 | 6 | Scalene | Scalene | Pass |
| 2 | 4 | 4 | 7 | Isosceles | Isosceles | Pass |
| 4 | 7 | 4 | Isosceles | Isosceles | Pass |
| 7 | 4 | 4 | Isosceles | Isosceles | Pass |
| 3 | 4 | 4 | 4 | Equilateral | Equilateral | Pass |
| 4 | 4 | 4 | 8 | No triangle | No triangle | Pass |
| 4 | 8 | 4 | No triangle | No triangle | Pass |
| 8 | 4 | 4 | No triangle | No triangle | Pass |
| 1 | 1 | 3 | No triangle | No triangle | Pass |
| 1 | 3 | 1 | No triangle | No triangle | Pass |
| 3 | 1 | 1 | No triangle | No triangle | Pass |
| 5 | 4 | -1 | 0 | Bad side | Bad side | Pass |
| 0 | 0 | 0 | Bad side | Bad side | Pass |

**Minimized:** Yes

**Edge Coverage Criteria:**

**Supports:** Yes

**Test Paths:**

|  |  |  |
| --- | --- | --- |
| **S. No.** | **Paths** | **Executable** |
| 1 | A → 1 → 3 → 5 → 7 → 9 → 11 | Yes |
| 2 | A → 1 → 3 → 5 → 7 → 8 → 11 | Yes |
| 3 | A → 1 → 3 → 5 → 6 → 11 | Yes |
| 4 | A → 1 → 3 → 4 → 11 | Yes |
| 5 | A → 1 → 2 → 11 | Yes |

**Test Cases:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Test Path** | **S1** | **S2** | **S3** | **Expected**  **Output** | **Observed**  **Output** | **Verdict** |
| 1 | 4 | 5 | 6 | Scalene | Scalene | Pass |
| 2 | 4 | 4 | 7 | Isosceles | Isosceles | Pass |
| 4 | 7 | 4 | Isosceles | Isosceles | Pass |
| 7 | 4 | 4 | Isosceles | Isosceles | Pass |
| 3 | 4 | 4 | 4 | Equilateral | Equilateral | Pass |
| 4 | 4 | 4 | 8 | No triangle | No triangle | Pass |
| 4 | 8 | 4 | No triangle | No triangle | Pass |
| 8 | 4 | 4 | No triangle | No triangle | Pass |
| 1 | 1 | 3 | No triangle | No triangle | Pass |
| 1 | 3 | 1 | No triangle | No triangle | Pass |
| 3 | 1 | 1 | No triangle | No triangle | Pass |
| 5 | 4 | -1 | 0 | Bad side | Bad side | Pass |
| 0 | 0 | 0 | Bad side | Bad side | Pass |

**Minimized:** Yes

**Predicate Coverage Criteria:**

As we know from lecture, when predicates come from conditions on edges, predicate coverage is equivalent to edge coverage.

**Clause Coverage Criteria:**

**Supports:** No

**Restricted Active Clause Coverage:**

**Supports:** No

**Tool Assessment**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S.**  **No.** | **Question** | **NC** | **EC** | **PC** | **CC** | **RACC** |
| 1 | Do you have a test case that represents a valid scalene triangle? | 1 | 1 | 1 | 0 | 0 |
| 2 | Do you have a test case that represents a valid isosceles triangle? | 1 | 1 | 1 | 0 | 0 |
| 3 | Do you have a test case that represents a valid equilateral triangle? | 1 | 1 | 1 | 0 | 0 |
| 4 | Do you have three test case that represent valid isosceles triangle that is you have tried all three permutations of two equal sides? | 1 | 1 | 1 | 0 | 0 |
| 5 | Do you have a test case in which one side has a zero value? | 1 | 1 | 1 | 0 | 0 |
| 6 | Do you have a test case in which one side has a negative value? | 1 | 1 | 1 | 0 | 0 |
| 7 | Do you have a test case with three integers such that the sum of two is equal to the third? | 1 | 1 | 1 | 0 | 0 |
| 8 | Do you have at least three test cases for question 7 above such that you have tried all permutations of sum of lengths of two sides equal to the length of third side? | 1 | 1 | 1 | 0 | 0 |
| 9 | Do you have a test case with three integers greater than zero such that the sum of two is less than the third? | 1 | 1 | 1 | 0 | 0 |
| 10 | Do you have at least three test cases for question 9 such that you have tried all three permutations? | 1 | 1 | 1 | 0 | 0 |
| 11 | Do you have a test case in which all sides are zero? | 1 | 1 | 1 | 0 | 0 |
| 12 | Do you have a test case with non-integer values? | 0 | 0 | 0 | 0 | 0 |
| 13 | Do you have a test case with wrong number of values (two or less or four or more) | 0 | 0 | 0 | 0 | 0 |
| 14 | For each test case did you specify the expected output along with the input value? | 1 | 1 | 1 | 0 | 0 |

**Dataflow Graph Coverage Tool**

**Node Coverage Criteria:**

**Supports:** No

**Edge Coverage Criteria:**

**Supports:** No

**Predicate Coverage Criteria:**

**Supports:** No

**Clause Coverage Criteria:**

**Supports:** No

**Restricted Active Clause Coverage:**

**Supports:** No

**Tool Assessment**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S.**  **No.** | **Question** | **NC** | **EC** | **PC** | **CC** | **RACC** |
| 1 | Do you have a test case that represents a valid scalene triangle? | 0 | 0 | 0 | 0 | 0 |
| 2 | Do you have a test case that represents a valid isosceles triangle? | 0 | 0 | 0 | 0 | 0 |
| 3 | Do you have a test case that represents a valid equilateral triangle? | 0 | 0 | 0 | 0 | 0 |
| 4 | Do you have three test case that represent valid isosceles triangle that is you have tried all three permutations of two equal sides? | 0 | 0 | 0 | 0 | 0 |
| 5 | Do you have a test case in which one side has a zero value? | 0 | 0 | 0 | 0 | 0 |
| 6 | Do you have a test case in which one side has a negative value? | 0 | 0 | 0 | 0 | 0 |
| 7 | Do you have a test case with three integers such that the sum of two is equal to the third? | 0 | 0 | 0 | 0 | 0 |
| 8 | Do you have at least three test cases for question 7 above such that you have tried all permutations of sum of lengths of two sides equal to the length of third side? | 0 | 0 | 0 | 0 | 0 |
| 9 | Do you have a test case with three integers greater than zero such that the sum of two is less than the third? | 0 | 0 | 0 | 0 | 0 |
| 10 | Do you have at least three test cases for question 9 such that you have tried all three permutations? | 0 | 0 | 0 | 0 | 0 |
| 11 | Do you have a test case in which all sides are zero? | 0 | 0 | 0 | 0 | 0 |
| 12 | Do you have a test case with non-integer values? | 0 | 0 | 0 | 0 | 0 |
| 13 | Do you have a test case with wrong number of values (two or less or four or more) | 0 | 0 | 0 | 0 | 0 |
| 14 | For each test case did you specify the expected output along with the input value? | 0 | 0 | 0 | 0 | 0 |

**Logic Coverage Tool**

**Node Coverage Criteria:**

**Supports:** No

**Edge Coverage Criteria:**

**Supports:** No

**Predicate Coverage Criteria:**

**Supports:** No

**Clause Coverage Criteria:**

**Supports:** No

**Restricted Active Clause Coverage:**

**Supports:** Yes

**Equilateral Triangle:** a & b; *where a: s1 == s2 and b: s2 == s3*

**Truth Table:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Row** | **a** | **B** | **P** |
| 1 | T | T | T |
| 2 | T | F | F |
| 3 | F | T | F |
| 4 | F | F | F |

**RACC:**

|  |  |
| --- | --- |
| **Major Clause** | **Set of possible tests** |
| a | (1,3) |
| b | (1,2) |

**Test Cases:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S. No.** | **S1** | **S2** | **S3** | **Expected**  **Output** | **Observed**  **Output** | **Verdict** |
| 1 | 3 | 3 | 3 | True | True | Pass |
| 2 | 5 | 5 | 8 | False | False | Pass |
| 3 | 0 | 5 | 5 | False | False | Pass |

**Isosceles Triangle:** !(a & b & c) & (a | b | c); *where a: s1 == s2, b: s2 == s3, c: s1 == s3*

**Truth Table:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Row** | **a** | **b** | **c** | **P** |
| 1 | T | T | T | F |
| 2 | T | T | F | T |
| 3 | T | F | T | T |
| 4 | T | F | F | T |
| 5 | F | T | T | T |
| 6 | F | T | F | T |
| 7 | F | F | T | T |
| 8 | F | F | F | F |

**RACC:**

|  |  |
| --- | --- |
| **Major Clause** | **Set of possible tests** |
| a | (1,5), (4,8) |
| b | (1,3), (6,8) |
| c | (1,2), (7,8) |

**Test Cases:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S. No.** | **S1** | **S2** | **S3** | **Expected**  **Output** | **Observed**  **Output** | **Verdict** |
| 1 | 0 | 0 | 0 | False | False | Pass |
| 2 | - | - | - | - | - | - |
| 3 | - | - | - | - | - | - |
| 4 | 3 | 3 | 5 | True | True | Pass |
| 5 | - | - | - | - | - | - |
| 6 | 5 | 3 | 3 | True | True | Pass |
| 7 | 5 | 3 | 5 | True | True | Pass |
| 8 | 3 | -1 | 4 | False | False | Pass |
| -1 | 3 | 4 | False | False | Pass |
| 4 | -1 | 3 | False | False | Pass |

**Scalene Triangle:** !(a | b | c); *where a: s1 == s2, b: s2 == s3, c: s1 == s3*

**Truth Table:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Row** | **a** | **b** | **c** | **P** |
| 1 | T | T | T | F |
| 2 | T | T | F | F |
| 3 | T | F | T | F |
| 4 | T | F | F | F |
| 5 | F | T | T | F |
| 6 | F | T | F | F |
| 7 | F | F | T | F |
| 8 | F | F | F | T |

**RACC:**

|  |  |
| --- | --- |
| **Major Clause** | **Set of possible tests** |
| a | (4,8) |
| b | (6,8) |
| c | (7,8) |

**Test Cases:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S. No.** | **S1** | **S2** | **S3** | **Expected**  **Output** | **Observed**  **Output** | **Verdict** |
| 4 | 3 | 3 | 5 | False | False | Pass |
| 6 | 5 | 3 | 3 | False | False | Pass |
| 7 | 5 | 3 | 5 | False | False | Pass |
| 8 | 3 | 4 | 5 | True | True | Pass |

**Tool Assessment**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S.**  **No.** | **Question** | **NC** | **EC** | **PC** | **CC** | **RACC** |
| 1 | Do you have a test case that represents a valid scalene triangle? | 0 | 0 | 0 | 0 | 1 |
| 2 | Do you have a test case that represents a valid isosceles triangle? | 0 | 0 | 0 | 0 | 1 |
| 3 | Do you have a test case that represents a valid equilateral triangle? | 0 | 0 | 0 | 0 | 1 |
| 4 | Do you have three test case that represent valid isosceles triangle that is you have tried all three permutations of two equal sides? | 0 | 0 | 0 | 0 | 1 |
| 5 | Do you have a test case in which one side has a zero value? | 0 | 0 | 0 | 0 | 1 |
| 6 | Do you have a test case in which one side has a negative value? | 0 | 0 | 0 | 0 | 1 |
| 7 | Do you have a test case with three integers such that the sum of two is equal to the third? | 0 | 0 | 0 | 0 | 1 |
| 8 | Do you have at least three test cases for question 7 above such that you have tried all permutations of sum of lengths of two sides equal to the length of third side? | 0 | 0 | 0 | 0 | 1 |
| 9 | Do you have a test case with three integers greater than zero such that the sum of two is less than the third? | 0 | 0 | 0 | 0 | 1 |
| 10 | Do you have at least three test cases for question 9 such that you have tried all three permutations? | 0 | 0 | 0 | 0 | 1 |
| 11 | Do you have a test case in which all sides are zero? | 0 | 0 | 0 | 0 | 1 |
| 12 | Do you have a test case with non-integer values? | 0 | 0 | 0 | 0 | 0 |
| 13 | Do you have a test case with wrong number of values (two or less or four or more) | 0 | 0 | 0 | 0 | 0 |
| 14 | For each test case did you specify the expected output along with the input value? | 0 | 0 | 0 | 0 | 1 |

**Conclusion**

|  |  |  |
| --- | --- | --- |
| **S. No.** | **Tool** | **Points** |
| 1 | Auto Tester | 60/70 |
| 2 | Graph Coverage Tool | 36/70 |
| 3 | Dataflow Graph Coverage Tool | 0/70 |
| 4 | Logic Coverage Tool | 12/70 |

Auto Tester is the tool with highest points (60/70 overall). It gets 12 out of 14 points for every coverage criterion and 60/70 overall points.