**7. Design and develop a program in a language of your choice to solve the triangle problem defined as follows: Accept three integers which are supposed to be the three sides of triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all. Derive test cases for your program based on decision-table approach, execute the test cases and discuss the results.**

**Refer program 1**

**Test Data : Enter the 3 Integer Values( a , b and c )**

**Pre-condition : a < b + c , b < a + c and c < a + b**

**Brief Description : Check whether given value for a Equilateral, Isosceles ,**

**Scalene triangle or can't form a triangle**

**Input data decision table**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **RULES** | | | **R1** | **R2** | **R3** | **R4** | **R5** | **R6** | **R7** | **R8** | **R9** | **R10** | **R11** |
|  | C1: a < b + c | | F | T | T | T | T | T | T | T | T | T | T |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | C2: b < a + c | | - | F | T | T | T | T | T | T | T | T | T |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Conditions** | C3 : c < a + b | | - | - | F | T | T | T | T | T | T | T | T |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
| C4 : a = b | | - | - | - | T | T | T | T | F | F | F | F |  |
|  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | C5 : a = c | | - | - | - | T | T | F | F | T | T | F | F |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | C6 : b = c | | - | - | - | T | F | T | F | T | F | T | F |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | a1 | : Not a triangle | X | X | X |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | a2 | : Scalene triangle |  |  |  |  |  |  |  |  |  |  | X |  |
|  |  | |  |  |  |  |  |  |  |  |  |  |  |  |
| **Actions** | a3 : Isosceles triangle | |  |  |  |  |  |  | X |  | X | X |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | a4 | : Equilateral triangle |  |  |  | X |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | a5 | : Impossible |  |  |  |  | X | X |  | X |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |

**Decision table based Test cases for triangle problem**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **TC ID** | **Description:** Enter the input data satisfying | **Input Data** | | | **Expected Output** | **Actual Output** | **Status** |
| **a** | **b** | **c** |
| DT1 | RULE 1 | 3 | 1 | 1 | Not a Triangle | Not a Triangle | Test pass |
| DT2 | RULE 2 | 1 | 3 | 1 | Not a Triangle | Not a Triangle | Test pass |
| DT3 | RULE 3 | 1 | 1 | 3 | Not a Triangle | Not a Triangle | Test pass |
| DT4 | RULE 4 | 5 | 5 | 5 | Equilateral Triangle | Equilateral Triangle | Test pass |
| DT5 | RULE 7 | 2 | 2 | 3 | Isosceles Triangle | Isosceles Triangle | Test pass |
| DT6 | RULE 9 | 2 | 3 | 2 | Isosceles Triangle | Isosceles Triangle | Test pass |
| DT7 | RULE 10 | 3 | 2 | 2 | Isosceles Triangle | Isosceles Triangle | Test pass |
| DT8 | RULE 11 | 3 | 4 | 6 | Scalene Triangle | Scalene Triangle | Test pass |