


Program 1: Decision Table Approach for Solving Triangle Problem

/* 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 */

```
#include<stdio.h>
int main()
{
    int a,b,c;
    char istriangle;
    printf("Sooraj M Singh 1CR18IS151  \n");
    printf("Enter 3 integers which are sides of triangle\n");
    scanf("%d%d%d",&a,&b,&c);
    printf("a=%d\t,b=%d\t,c=%d\n",a,b,c);
    if( a<b+c && b<a+c && c<a+b )
        istriangle='y';
    else
        istriangle ='n';
    ;
    if (istriangle=='y')
        if ((a==b) && (b==c))
            printf("The triangle is an Equilateral triangle\n");
        else if ((a!=b) && (a!=c) && (b!=c))
            printf("Scalene triangle because all sides are unequal\n");
        else
            printf("Isosceles triangle \n");
        else
            printf("Not a triangle\n");
    return 0;
}
```

Screenshot of the program:



The screenshot shows a code editor with a dark theme. The menu bar at the top includes File, Edit, Selection, View, Go, Run, Terminal, and Help. Below the menu bar, there are two tabs: 'p4-STlab.cpp' and 'p7-STlab.cpp'. The 'p7-STlab.cpp' tab is active, and the cursor is at the start of the 'main()' function. The code is as follows:

```
1  #include<stdio.h>
2  int main()
3  {
4  int a,b,c;
5  char istriangle;
6  printf("Sooraj M Singh 1CR18IS151\n");
7  printf("Enter 3 integers which are sides of triangle\n");
8  scanf("%d%d%d",&a,&b,&c);
9  printf("a=%d\t,b=%d\t,c=%d\n",a,b,c);
10 if( a<b+c && b<a+c && c<a+b )
11 istriangle='y';
12 else
13 istriangle = 'n';
14 ;
15 if (istriangle=='y')
16 if ((a==b) && (b==c))
17 printf("The triangle is an Equilateral triangle\n");
18 else if ((a!=b) && (a!=c) && (b!=c))
19 printf("Scalene triangle because all sides are unequal\n");
20 else
21 printf("Isosceles triangle \n");
22 else
23 printf("Not a triangle\n");
24 return 0;
25 }
```

The status bar at the bottom indicates 'WSL: Ubuntu-20.04' and '0 0'.

Screenshots:

```
sooraj@Asus-F-15:~/st-lab$ cd "/home/sooraj/st-lab/" && g++ p7-STlab.cpp -o p7-STlab && "/home/sooraj/st-lab/"p7-STlab
Sooraj M Singh 1CR18IS151
Enter 3 integers which are sides of triangle
5 5 7
a=5      ,b=5      ,c=7
Isosceles triangle
sooraj@Asus-F-15:~/st-lab$
```

```
sooraj@Asus-F-15:~/st-lab$ cd "/home/sooraj/st-lab/" && g++ p7-STlab.cpp -o p7-STlab && "/home/sooraj/st-lab/"p7-STlab
Sooraj M Singh 1CR18IS151
Enter 3 integers which are sides of triangle
6 9 8
a=6      ,b=9      ,c=8
Scalene triangle because all sides are unequal
sooraj@Asus-F-15:~/st-lab$
```

```
sooraj@Asus-F-15:~/st-lab$ cd "/home/sooraj/st-lab/" && g++ p7-STlab.cpp -o p7-STlab && "/home/sooraj/st-lab/"p7-STlab
Sooraj M Singh 1CR18IS151
Enter 3 integers which are sides of triangle
1 2 3
a=1      ,b=2      ,c=3
Not a triangle
sooraj@Asus-F-15:~/st-lab$
```

INPUT CASES :

Case Id	Description	Input Data			Expected Output	Actual Output	Status	Comments
		a	b	c				
1	Enter the value of a, b and c Such that a is not less than sum of two sides	20	5	5	Message should be displayed can't form a triangle	Not a triangle	working	Doesn't comply with rule $a < b + c$
2	Enter the value of a, b and c Such that b is not less than sum of two sides and a is less than sum of other two sides	3	15	11	Message should be displayed can't form a triangle	Not a triangle	Working	Doesn't comply with rule $b < a + c$
3	Enter the value of a, b and c Such that c is not less than sum of two sides and a and b is less than sum of other two sides	4	5	20	Message should be displayed can't form a triangle	Not a triangle	Working	Doesn't comply with rule $c < a + b$
4	Enter the value a, b and c satisfying precondition and $a=b$, $b=c$ and $c=a$	5	5	5	Should display the message Equilateral triangle	The triangle is an Equilateral triangle	Working	Nothing unusual
5	Enter the value a, b and c satisfying precondition and $a=b$ and $b \neq c$	10	10	9	Should display the message Isosceles triangle	Isosceles triangle	working	Nothing unusual
6	Enter the value a, b and c satisfying precondition and $a \neq b$, $b \neq c$ and $c \neq a$	5	6	7	Should display the message Scalene triangle	Scalene triangle because all sides are unequal	Working	Nothing unusual

7	Enter a value for a, b, c where one of the values is negative.	-1	2	5	Message should be displayed can't form a triangle	Not a triangle	Working	Negative numbers can't be used to form a triangle The alphabet is taken as 0 The numbers are too big to be integers
8	Enter a value for a, b, c where one of the values is an alphabet	7	8	a	Message should be displayed can't form a triangle	Not a triangle	Working	
9	Enter the value a, b and c satisfying precondition and $a \neq b$, $b \neq c$ and $c \neq a$	10^{10}	$1+10^{10}$	$2+10^{10}$	Should display the message Scalene triangle	Not a triangle	Working	