Program 7: 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,c1,c2,c3;
char istriangle;
do
{
printf("\nenter 3 integers which are sides of triangle\n");
scanf("%d%d%d",&a,&b,&c);
printf("\na=%d\tb=%d\tc=%d",a,b,c);
        c1 = a>=1 &&  a<=10;
        c2 = b>=1 &&  b<=10;
        c3 = c>=1 &&  c<=10;
 if (!c1)
 printf("\n The value of a=%d is not the range of permitted value", a);
 if (!c2)
printf("\n The value of b=%d is not the range of permitted value", b);
if (!c3)
printf("\n The value of c=%d is not the range of permitted value", c);
} while(!(c1 && c2 && c3));
```

// to check is it a triangle or not

```
if( a < b+c && b < a+c && c < a+b )
istriangle = 'y';
else
istriangle = 'n';
if (istriangle=='y')
```

```
if ((a==b) && (b==c))
      printf("equilateral triangle\n");
else if ((a!=b) && (a!=c) && (b!=c))
      printf("scalene triangle\n");
 else
      printf("isosceles triangle\n");
else
     printf("Not a triangle\n");
return 0;
}
```

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Test Case Name :Decision table for triangle problem

Experiment Number : 7

Test Data : Enter the 3 Integer Value(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
Conditions	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
	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
Actions	a1 : Not a triangle	X	X	X								
	a2 : Scalene triangle											X
	a3 : Isosceles triangle							X		X	X	
	a4 : Equilateral triangle				X							
	a5 : Impossible					X	X		X			

Triangle Problem -Decision Table Test cases for input data

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			
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			
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			
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			
5	Enter the value a ,b and c satisfying precondition and a=b and b ≠ c	10	10	9	Should display the message Isosceles triangle			
6	Enter the value a, b and c satisfying precondition and a ≠b , b ≠ c and c ≠ a	5	6	7	Should display the message Scalene triangle			