Program 4:

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 a triangle and determine if the three values represent an equilateral triangle, isosceles triangle, scalene triangle, or they do not form a triangle at all. Assume that the upper limit for the size of any side is 10. Derive test cases for your program based on boundary-value analysis, equivalence class partitioning and decision-table approach and execute the test cases and discuss the results.

Code for Decision-Table Approach:

```
#include<stdio.h>
int main()
{
int a ,b ,c;
char istriangle;
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("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;
}
```

Test Case Name :Decision table for triangle problem

Experiment Number : 1

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			

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			

Code for Boundary Value and Equivalence Class Analysis :-

```
#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("\nthe value of a=%d is not the range of permitted value",a);
if (!c2)
printf("\nthe value of b=%d is not the range of permitted value",b);
if (!c3)
printf("\nthe 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;
}
```

Test Case Name :Boundary Value Analysis for triangle problem

Experiment Number : 2

Test Data : Enter the 3 Integer Value(a , b And c)

Pre-condition : $1 \le a \le 10$, $1 \le b \le 10$ and $1 \le c \le 10$ and $a < b + c$, $b < a + c$ and $c < a + b$

Brief Description : Check whether given value for a Equilateral, Isosceles , Scalene triangle or can't form a triangle

Triangle Problem -Boundary value Test cases for input data

Case Id	Description	Input Data			Expected Output	Actual Output	Status	Comments
		A	b	c				
1	Enter the min value for a , b and c	1	1	1	Should display the message Equilateral triangle			
2	Enter the min value for 2 items and min +1 for any one item1	1	1	2	Message should be displayed can't form a Triangle			
3	Enter the min value for 2 items and min +1 for any one item1	1	2	1	Message should be displayed can't form a triangle			
4	Enter the min value for 2 items and min +1 for any one item1	2	1	1	Message should be displayed can't form a triangle			
5	Enter the normal value for 2 items and 1 item is min value	5	5	1	Should display the message Isosceles triangle			
6	Enter the normal value for 2 items and 1 item is min value	5	1	5	Should display the message Isosceles triangle			
7	Enter the normal value for 2 items and 1 item is min value	1	5	5	Should display the message Isosceles triangle			
8	Enter the normal Value for a, b and c	5	5	5	Should display the message Equilateral triangle			

9	Enter the normal value for 2 items and 1 item is max value	5	5	10	Should display the message Not a triangle			
10	Enter the normal value for 2 items and 1 item is max value	5	10	5	Should display the message Not a triangle			
11	Enter the normal value for 2 items and 1 item is max value	10	5	5	Should display the message Not a triangle			
12	Enter the max value for 2 items and max - 1 for any one item	10	10	9	Should display the message Isosceles triangle			
13	Enter the max value for 2 items and max - 1 for any one item	10	9	10	Should display the message Isosceles triangle			
14	Enter the max value for 2 items and max - 1 for any one item	9	10	10	Should display the message Isosceles triangle			
15	Enter the max value for a, b and c	10	10	10	Should display the message Equilateral Triangle			

Test Case Name :Equivalence class Analysis for triangle problem

Experiment Number : 3

Test Data : Enter the 3 Integer Value(a , b And c)

Pre-condition : $1 \le a \le 10$, $1 \le b \le 10$ and $1 \le c \le 10$ and $a < b + c$, $b < a + c$ and $c < a + b$

Brief Description : Check whether given value for a Equilateral, Isosceles , Scalene triangle or can't form a triangle

Triangle Problem - Equivalence Class Test cases for input data

Weak Equivalence class Testing								
Case Id	Description	Input Data			Expected Output	Actual Output	Status	Comments
		A	b	C				
1	Enter the min value for a , b and c	5	5	5	Should display the message Equilateral triangle			
2	Enter the min value for a , b and c	2	2	3	Should display the message Isosceles triangle			
3	Enter the min value for a , b and c	3	4	5	Should display the message Scalene triangle			
4	Enter the min value for a , b and c	4	1	2	Message should be displayed can't form a triangle			

Weak Robust Equivalence Class Testing								
5	Enter one invalid input and two valid value for a , b and c	-1	5	5	Should display value of a is not in the range of permitted values			
6	Enter one invalid input and two valid value for a , b and c	5	-1	5	Should display value of a is not in the range of permitted values			
7	Enter one invalid input and two valid value for a , b and c	5	5	-1	Should display value of a is not in the range of permitted values			
8	Enter one invalid input and two valid value for a , b and c	11	5	5	Should display value of a is not in the range of permitted values			
9	Enter one invalid input and two valid value for a , b and c	5	11	5	Should display value of a is not in the range of permitted values			

10	Enter one invalid input and two valid value for a , b and c	5	5	11	Should display value of a is not in the range of permitted values			
Strong Robust Equivalence class Testing								
11	Enter one invalid input and two valid value for a , b and c	-1	5	5	Should display value of a is not in the range of permitted values			
12	Enter one invalid input and two valid value for a , b and c	5	-1	5	Should display value of a is not in the range of permitted values			
13	Enter one invalid input and two valid value for a , b and c	5	5	-1	Should display value of a is not in the range of permitted values			
14	Enter two invalid input and two valid value for a , b and c	-1	-1	5	Should display value of a is not in the range of permitted values			
					Should display value of b is not in the range of permitted values			
14	Enter two invalid input and two valid value for a , b and c	5	-1	-1	Should display value of b is not in the range of permitted values			
					Should display value of c is not in the range of permitted values			
14	Enter two invalid input and two valid value for a , b and c	-1	5	-1	Should display value of a is not in the range of permitted values			
					Should display value of c is not in the range of permitted values			
15	Enter all invalid inputs	-1	-1	-1	Should display value of a is not in the range of permitted values			
					Should display value of b is not in the range of permitted values			
					Should display value of c is not in the range of permitted values			

Program 5:

Design, develop, code and run the program in any suitable language to solve the commission problem. Analyze it from the perspective of dataflow testing, derive different test cases, execute these test cases and discuss the test results.

```
2#include<stdio.h>
3 int main()
4 {
5 int locks, stocks, barrels, tlocks, tstocks, tbarrels;
6 float lprice,sprice,bprice,lsales,ssales,bsales,sales,comm;
7 lprice=45.0;
```