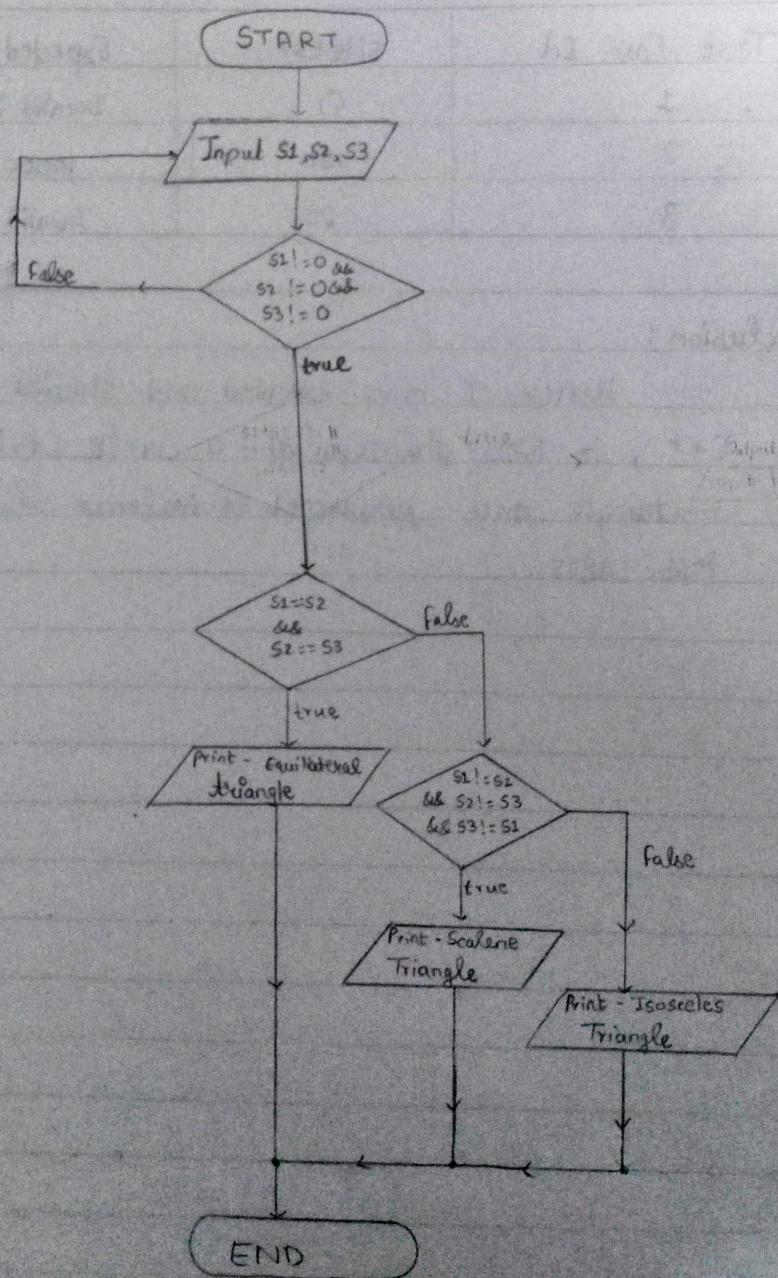


Practical No. 04

Aim: Write a program in C/C++ to read 3 sides of a triangle & to determine whether they form scalene, isosceles or equilateral triangle and test the same thing using basic path testing and find its $V(G)$ by all the three methods

Flowchart:



Aim: Write a program in C/C++ to read 3 sides of a triangle and to determine whether they form scalene, isosceles or equilateral triangle and test the same using basis path testing and find its $v(G)$ by all the three methods.

Theory:

Basis path testing helps a tester to compute logical complexity measures, $v(G)$, of the code. This value of $v(G)$, defines the maximum number of test cases to be designed by identifying basis set of execution paths to ensure that all statements are executed at least once.

Steps to compute the complexity measure, $v(G)$ are as under

- Step-1: Construct the flow graph from the source code or flowcharts.
- Step-2: Identify independent graph.
- Step-3: Calculate Cyclomatic Complexity.
- Step-4: Design the test cases.

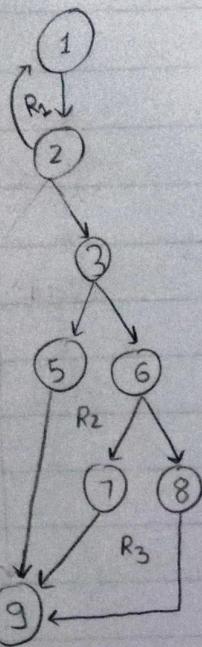
Calculation of cyclomatic complexity $v(G)$ by three methods:

$$\text{Method-1: } v(G) = E - N + 2 \quad (E = \text{No. of EDGES})$$
$$(N = \text{NO. OF NODES})$$

$$v(G) = 11 - 9 + 2$$

$$v(G) = 4$$

Graph:



1 (Outer Region)

Directed Graph

N: Number of Nodes = 9

E: Number of Edges = 11

D: Decision point = 3

	Index
R ₁	Region 1
R ₂	Region 2
R ₃	Region 3

Method - 2 :

$$v(G) = P+1 \quad (P - \text{No. of predicate nodes with out degree} = 2)$$

$$v(G) = 3+1 \quad (\text{Nodes } 2, 3, 6 \text{ are predicate nodes with two outgoing edges.})$$

$$v(G) = 4$$

Method - 3:

$$v(G) = \text{Number of enclosed regions} + 1$$

$$= 3 + 1$$

$$v(G) = 4 \quad (\text{Here, } R_1, R_2, R_3 \text{ are the enclosed regions and 1 corresponds to the outer region.})$$

$\therefore v(G) = 4$ is same by all the three methods.

The test cases for each path are:

	Test case	Valid Input	Expected Results
1	Enlist 1 st path	a,b,c : valid input	if $a=b$ or $b=c$ or $a=c$, then message "isosceles triangle" is displayed.
2	Enlist 2 nd path	a,b,c : valid input	if $a \neq b \neq c$ then message "Scalene triangle" is displayed.
3	Enlist 3 rd path	a,b,c : valid input	if $a=b=c$, message, "Equilateral triangle" is displayed.
4	Enlist 4 th path	a,b,c : invalid path	Go to, & enter values of a,b,c.

Conclusion:

Thus we have studied and executed program to read 3 sides of a triangle and to determine whether they form scalene, isosceles or equilateral triangle and tested the same using basis path testing (calculated $V(O)$) by all the three methods.

Conclusion:

Thus we have studied and executed program to read 3 sides of a triangle & to determine whether they form scalene, isosceles, or equilateral triangle and tested the same using basis path testing calculated $v(a)$ by all the three methods.