LAB NO: 3 **Date:**

CONTROL STRUCTURES-DECISION MAKING AND BRANCHING

Objectives:

In this lab, student will be able to do C++ programs using

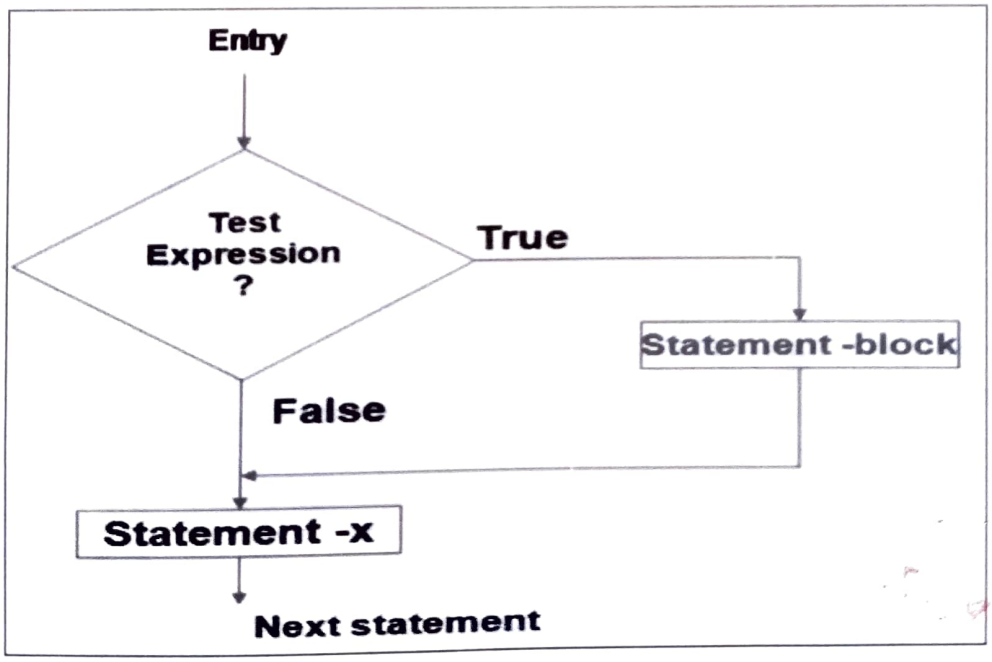
1. **simple *if*** statement
2. ***if-else*** statement
3. ***switch-case*** statement

Introduction:

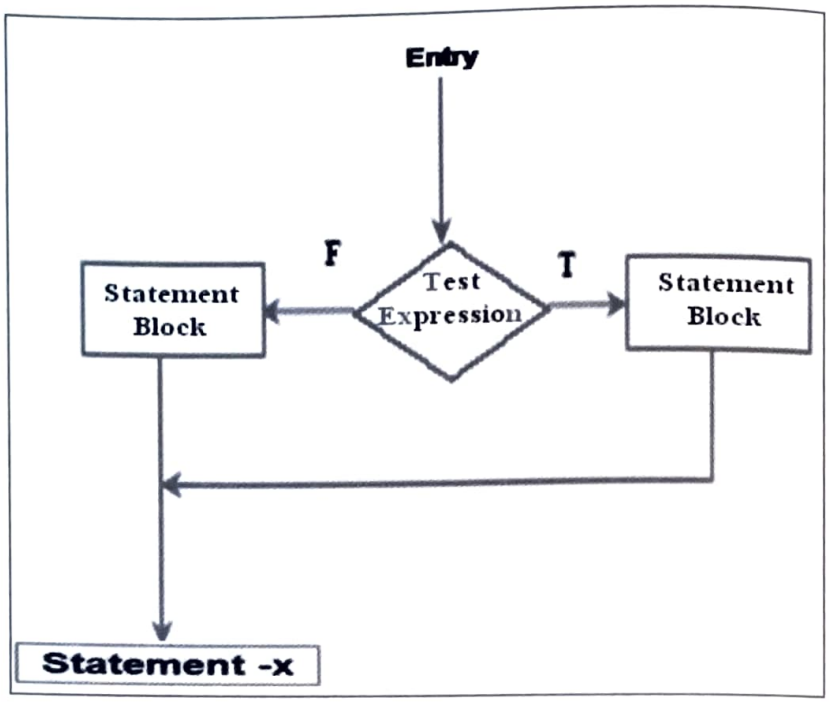
- A control structure refers to the way in which the programmer specifies the order of execution of the instructions

C++ decision making and branching statements flow control actions:

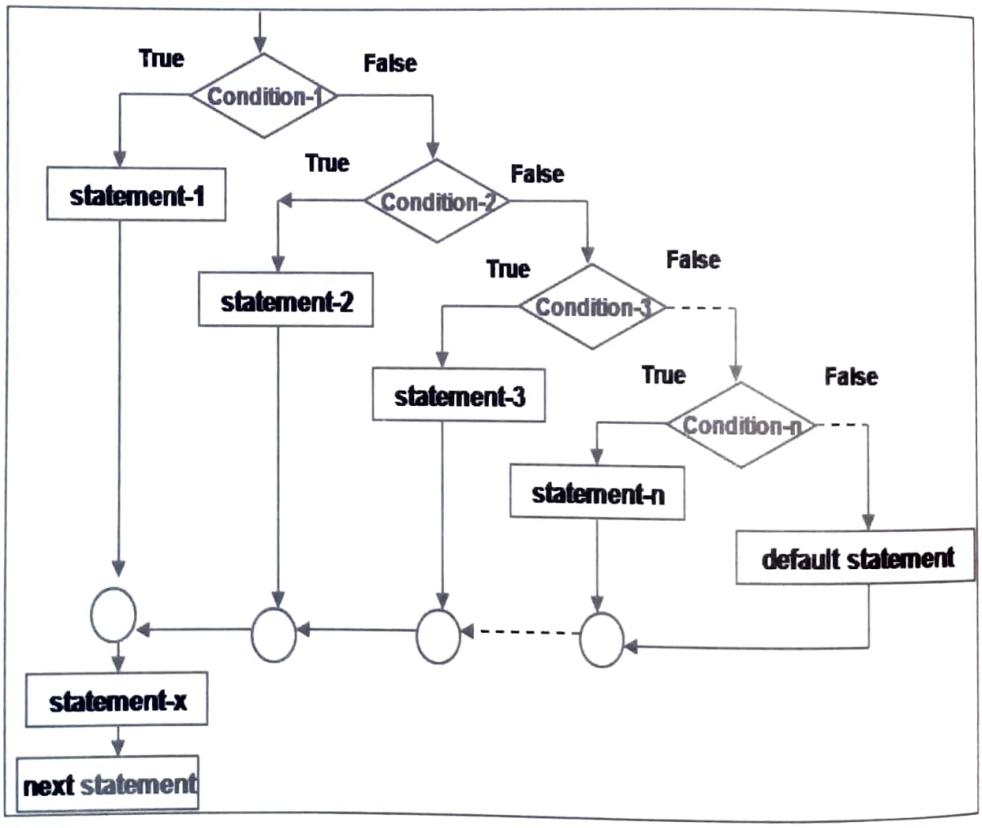
Simple if statement:



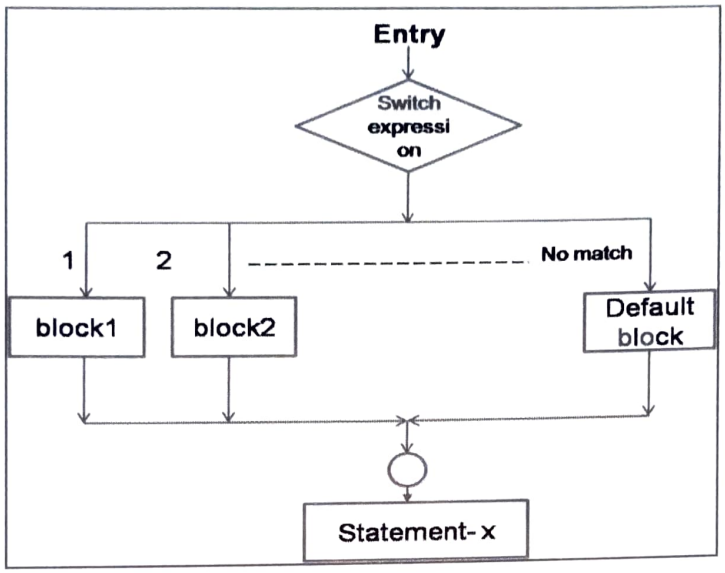
If - else statement:



Else - if ladder:



Switch statement:



Solved exercise

C++ program to compute all the roots of a quadratic equation

```
# include <iostream.h>
#include<math.h>
void main() {
int a, b, c; float root1, root2, re, im, disc;
cin>>a>>b>>c;
disc=b*b-4*a*c;
if (disc<0) // first if condition
{
cout<<"imaginary roots\n";
re= - b / (2*a);
im = pow(fabs(disc),0.5)/(2*a);
cout<<re<<"+ i"<<im;
cout<<re<<"-i"<<im;
```

```
}
else if (disc==0){ //2nd else-if condition
cout<<"real & equal roots";
re=-b / (2*a);
cout<<"Roots are"<<re;
}
else{ /*disc > 0- otherwise part with else*/
cout<<"real & distinct roots";
cout<<"Roots are";
root1=(-b + sqrt(disc))/(2*a);
root2=(-b – sqrt (disc))/(2*a);
cout<<root1<<"and"<<root2;
} }
```

Lab exercises

With the help of various branching control constructs like ***if***, ***if-else*** and ***switch*** case statements,

Write C++ programs to do the following:

1. Check whether the given number is odd or even

2. Find the largest among given 3 numbers

3. Illustrate the LEFT SHIFT and RIGHT SHIFT operations using operators.

4. Compute all the roots of a quadratic equation using ***switch case*** statement.
   [Hint: x = (-b +/- sqrt(b2-4ac))/2a]

Additional exercises

1. Check whether the given number is zero, positive or negative, using ***else-if*** ladder.

2. Find the smallest among three numbers using ***conditional*** operator.

3. Accept the number of days a member is late to return the book. Calculate and display the fine with the appropriate message using if-else ladder. The fine is charged as per the table below:

Late period	Fine
5 days	Rs. 0.50
6 – 10 days	Rs. 1.00
Above 10 days	Rs. 5.00
After 30 days	Rs. 10.00