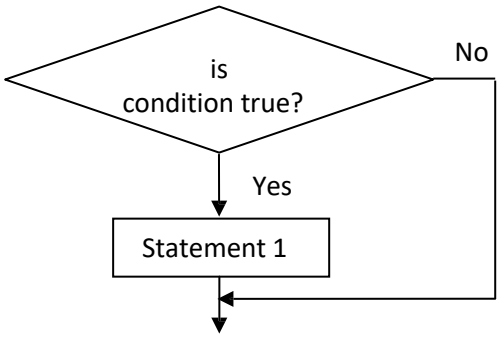
Selection (conditional) statement

1) if statement
2) if…else statements
3) Nested if statements
4) Switch statement

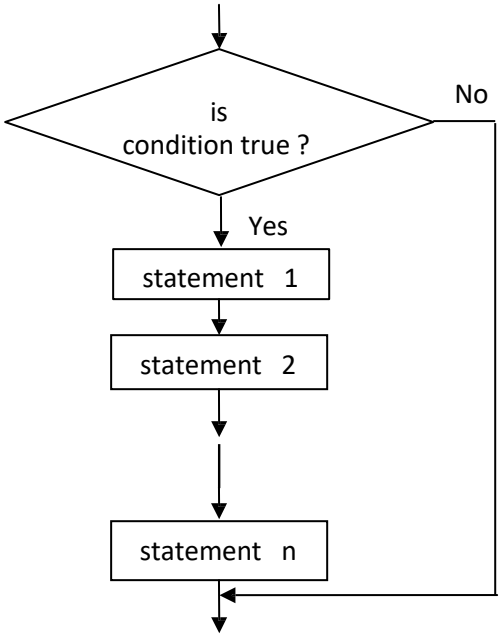
if statement

```
if (condition)
    statement 1;
```



If we wish to execute several statements if the condition is true, we use a **block** which is a set of statements enclosed in braces.

```
if (condition)
{
        Statement 1;
        Statement 2;
        .
        .
        .
        Statement n;
}
```



Example: Write a C++ program that computes the division for two integer numbers.

```
#include <iostream>
using namespace std;
int main()
{
  int  num1 , num2;
  cout<<"Enter two integer numbers: ";
  cin >> num1 >> num2;
  if (num2 != 0)
    cout<<num1<<"/"<<num2<<"= "<<num1/num2<<endl;
  return 0;
}
```

In case we want to compute the modulus in addition to division, we use the block:

```
#include <iostream>
using namespace std;
int main()
{
  int  num1 , num2;
  cout<<"Enter two integer numbers: ";
  cin >> num1 >> num2;
  if (num2 != 0)
  {
    cout<<num1<<"/"<<num2<<"= "<<num1/num2<<endl;
    cout<<num1<<"%"<<num2<<"= "<<num1%num2<<endl;
  }
  return 0;
}
```

if…else statement

```
if (condition)
   statement1;
else
   statement2;
```

Example: Write a C++ program that inputs an integer number, and determines whether the number is even or odd.

```
#include <iostream>
using namespace std;
int main()
{
  int  number;
  cout<<"Enter an integer number: ";
  cin >> number;
  if (number % 2 == 0)
     cout<<"The number is even."<<endl;
  else
     cout<<"The number is odd."<<endl;
  return 0; }
```

Sometimes if…else can be expressed in a compressed way using the **conditional operator (?:)**.

(Condition ? if true : if false)

For example, the previous program can be written as follows:

```
#include <iostream>
using namespace std;
int main()
{
  int  number;
  cout<<"Enter an integer number: ";
  cin >> number;
  cout<<(number%2 == 0 ? "The number is even." :
      "The number is odd.") << endl;
  return 0;
}
```

Example: Write a C++ program that computes the following equation:

$$y = \begin{cases} x + 5 & x > 10 \\ 2x & x \le 10 \end{cases}$$

```
#include <iostream>
using namespace std;
int main()
{
  float  x , y;
  cout<<"Enter a value of x: "<< endl;
  cin >> x;
  y = (x > 10) ? x+5 : 2*x;
  cout<<"y= " << y << endl;
  return 0;}
```

Exercises

1. If a=1, b=2, and c=3, what are the values of a, b and c at the end of the following program segment?

```
if (a <= b)
   if (c > 2)
         c =2;
if (c < 3)
   a = 0;
else
   b = 0;
```

2. Write a program that reads a number and determines whether the number is positive, negative, or zero.

3. Write and run a program that reads the user's age and then prints "You are a child." if the age < 18, "You are an adult." if 18 ≤ age < 65, and "You are a senior citizen." if age ≥ 65.

4. How is the following expression evaluated?

```
(x < y ? -1 : (x == y ? 0 : 1) );
```

5. What is wrong with the following codes:

a)
```
if (x = 0) cout << x << "x = 0\n";
  else cout << x << " x ≠ 0\n";
```

b)
```
if (x < y < z) cout << "x is the smallest";
```

c)
```
if x > y min=x
  else min=y;
```

d)
```
cout <<"Enter n: ";
  cin >> n;
  if (n < 0)
     cout << "That is negative. Try again.\n";
     cin >> n;
  else
     cout << "o.k. n = " << n << endl;
```

e)
```
if (x == 0)
   if (y == 0) cout << "x and y are both zero.\n";
 else cout << "x is not zero.\n";
```

6. Write a program that reads a human temperature then decide if he has fever or not (normal temperature).

7. Describe the output produced by this poorly indented program segment:

```
int number = 4;
double alpha = -1.0;
if (number > 0)
  if (alpha > 0)
    cout << "Here I am!" << endl;
  else
    cout << "No, I'm here!" << endl;
cout << "No, actually, I'm here!" << endl;
```