

Selection Structures

The structures that make decisions and change the flow of a program in C++ are known as **selection structures**.

There are several different types we will discuss and add to our programs.

Using if

One of the most useful and common selection structures in a program is the if...then statement.

Different languages make this happen in different ways but the principal is the same.

The expression that makes the decision is known as the **control expression**.

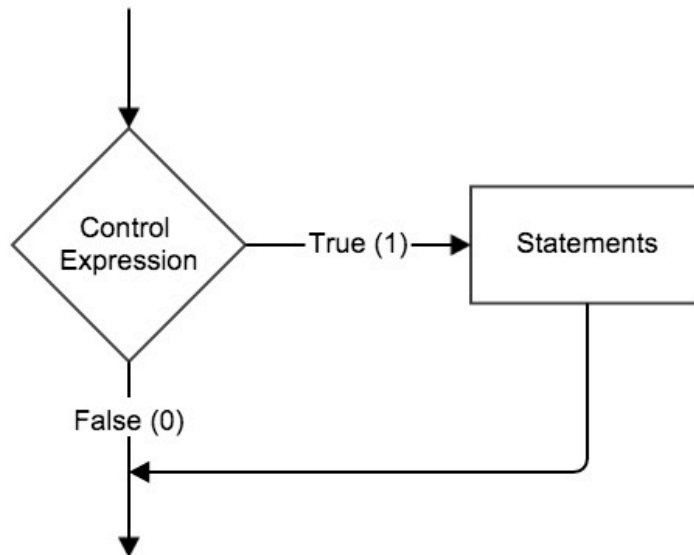
If that expression is true, code is executed, if it's not that code is skipped.

Example

```
if (i == 3)
{
    cout << "The value of i is 3" << endl;
}

if (YesNo == 'Y')
{
    cout << "Enter the title: ";
    getline(cin, title);
}
```

The following flow chart demonstrates how the if..then structure works:



Be careful when it comes to entering the control expression, it is one of the few lines in C++ that does NOT end in a semi-colon. Putting that at the end will make the code that follows execute regardless of the outcome of the control expression.

```
cout << "Please pick an integer number from 1 to 100: ";
cin >> number;
cout << endl;

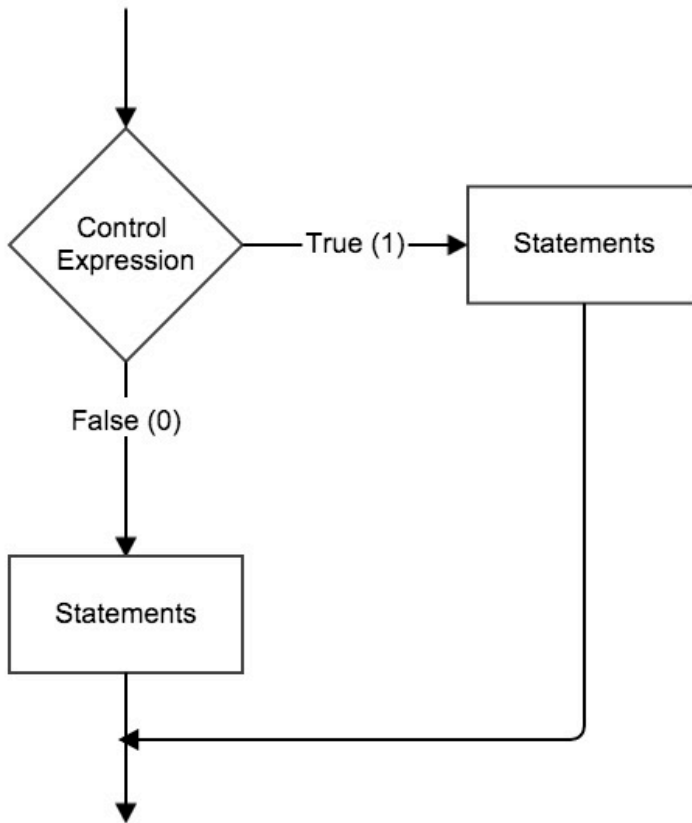
if (number > 100)          //don't put a semi-colon here!!
{
    cout << "That number is too LARGE!!!";
}

cout << endl;
cout << "DONE!";
```

The code above will print that the number is too large no matter what if the semi-colon is placed after the if statement!!

Using if/else

Sometimes it's not enough just to do something if the statement is true, we want an alternative if the statement is false.



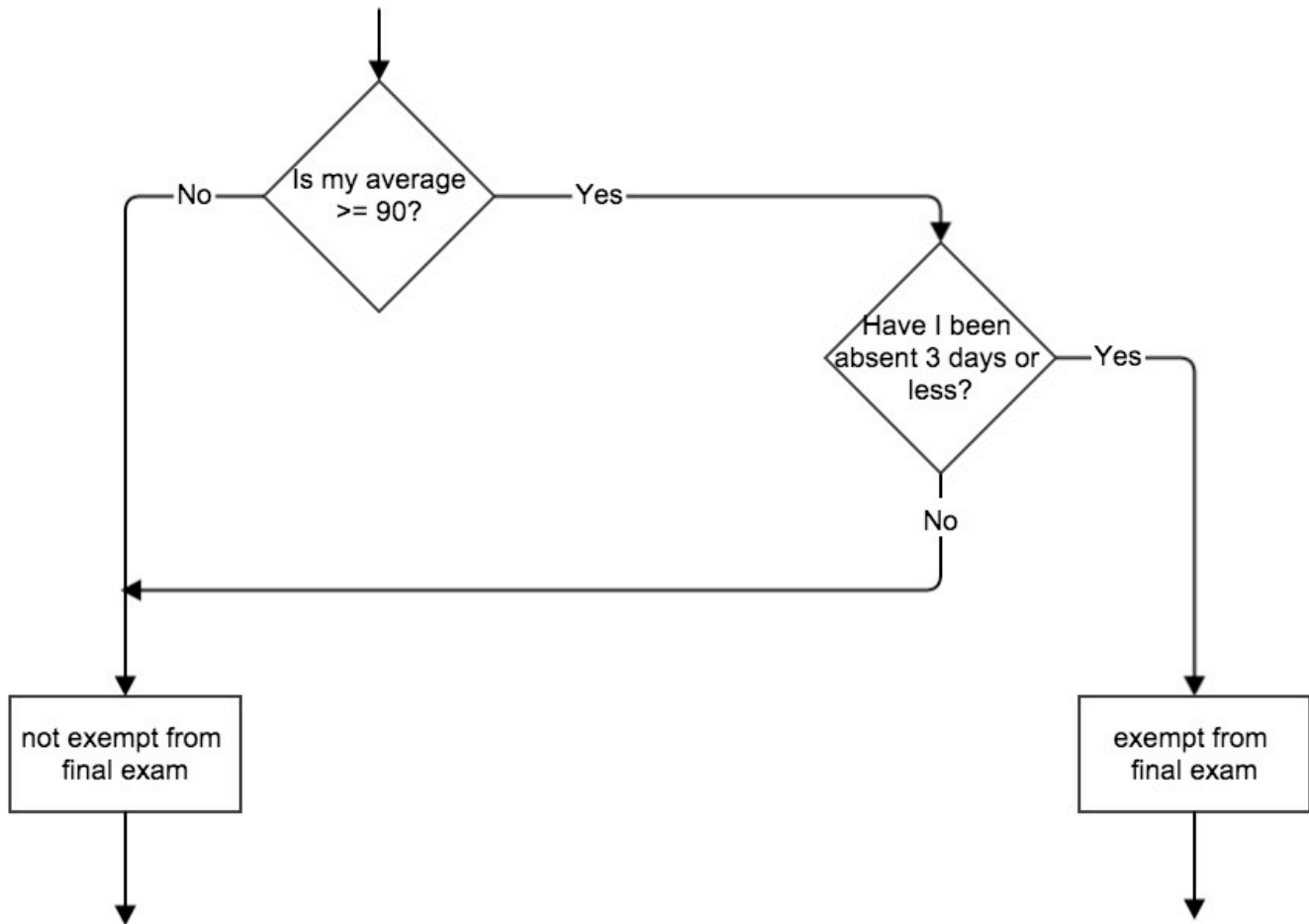
```
if (i < 0)
    {cout << "The number is negative!" << endl;}
else
    {cout << "The number is zero or positive!" << endl;}
```

Nested if Structures

You can place structures within other structures.

When an if/else structure is placed inside another if/else structure they structure is said to be **nested**.

The following flowchart decides whether a student is exempt from a final exam based on grade average and days absent.



To be exempt from the final a student must have a 90 average or better and cannot have missed more than 3 days of class.

```
exempt_from_final = false;

if (my_average >= 90)
{
    if (my_days_absent <= 3)
    {
        exempt_from_final = true;
    }
}
```