CSE115.12 - Lab3

C if...else Statement

In this lab, you will learn about if statement (including if...else and nested if..else) in C programming with the help of examples.

C if Statement

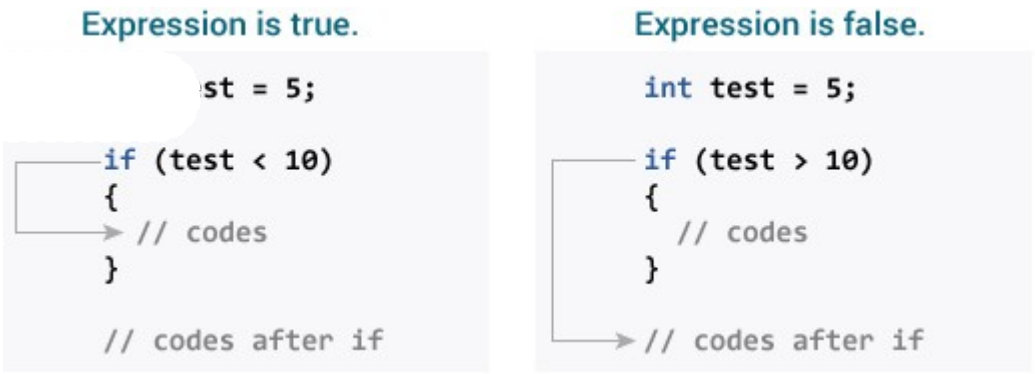
The syntax of the `if` statement in C programming is:

```
if (test expression)
{
    // statements to be executed if the test expression is true
}
```

How if statement works?

The `if` statement evaluates the test expression inside the parenthesis `()`.

- If the test expression is evaluated to true, statements inside the body of `if` are executed.
- If the test expression is evaluated to false, statements inside the body of `if` are not executed.



To learn more about when test expression is evaluated to true (non-zero value) and false (0), check relational and logical operators.

Example 1: if statement

```
// Program to display a number if it is negative

#include <stdio.h>
int main()
{
      int number;

      printf("Enter an integer: ");
      scanf("%d", &number);

      // true if number is less than 0
      if (number < 0)
      {
            printf("You entered %d.\n", number);
      }

      printf("The if statement is easy.");

      return 0;
}
```

Output 1

```
Enter an integer: -2
You entered -2.
The if statement is  easy.
```

When the user enters -2, the test expression is evaluated to true. Hence, `You`

`number<0` `entered -2` is displayed on the screen.

Output 2

```
Enter an integer: 5
The if statement is  easy.
```

When the user enters 5, the test expression `number<0` is evaluated to false and the statement inside the body of `if` is not executed

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C if...else Statement

The `if` statement may have an optional `else` block. The syntax of the `if..else` statement is:

```
if (test expression) {
     // statements to be executed if the test expression is true
}
else {
     // statements to be executed if the test expression is false
}
```

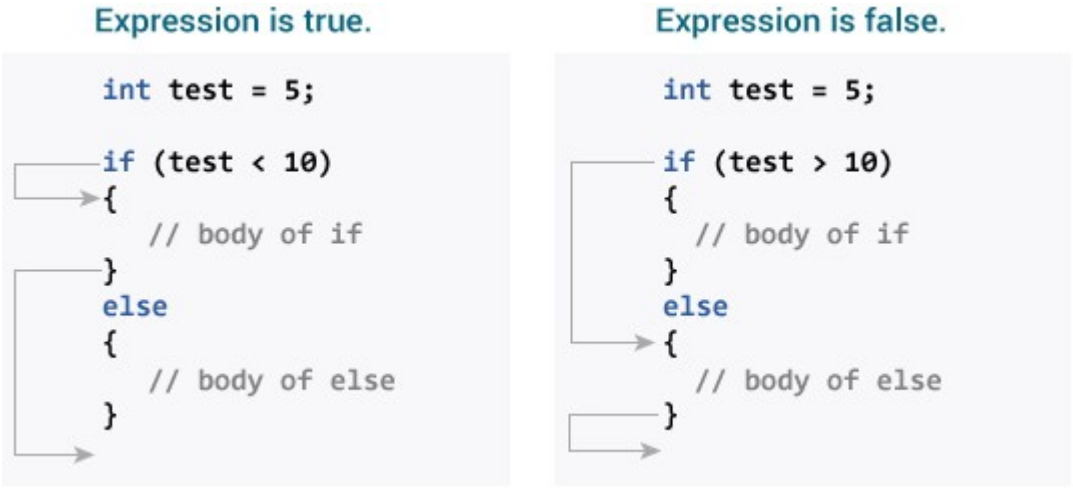
How if...else statement works?

If the test expression is evaluated to true,

- statements inside the body of `if` are executed.
- statements inside the body of `else` are skipped from execution.

If the test expression is evaluated to false,

- statements inside the body of `else` are executed
- statements inside the body of `if` are skipped from execution.



Example 2: if...else statement

```
// Check whether an integer is odd or even

#include <stdio.h>
int main()
{
      int number;
      printf("Enter an integer: ");
      scanf("%d", &number);

      // True if the remainder is 0
      if   (number%2 == 0)
      {
            printf("%d is an even  integer.",number);
      }
      else
      {
            printf("%d is an odd  integer.",number);
      }

      return 0;
}
```

Output

```
Enter an integer: 7
```

```
7 is an odd  integer.
```

When the user enters 7, the test expression `number%2==0` is evaluated to false. Hence, the statement inside the body of `else` is executed.

C if...else Ladder

The `if...else` statement executes two different codes depending upon whether the test expression is true or false. Sometimes, a choice has to be made from more than 2 possibilities.

The if...else ladder allows you to check between multiple test expressions and execute different statements.

Syntax of nested if...else statement.

```
if (test expression1)
{
    // statement(s)
}
else if(test expression2)
{
    // statement(s)
}
else if (test expression3)
{
    // statement(s)
}
.
.
else
{
    // statement(s)
}
```

Example 3: C if...else Ladder

```
// Program to relate two integers using =, > or < symbol

#include <stdio.h>
int main()
{
     int number1, number2;
```

```
    printf("Enter two integers: ");
    scanf("%d %d", &number1, &number2);

    //checks if the two integers are equal.
    if(number1 == number2)
    {
        printf("Result: %d = %d",number1,number2);
    }

    //checks if number1 is greater than number2.
    else if (number1 >  number2)
    {
        printf("Result: %d > %d", number1, number2);
    }

    //checks if both test expressions are false
    else
    {
        printf("Result: %d < %d",number1,  number2);
    }

    return 0;
}
```

Output

```
Enter two integers: 12
23
Result: 12 < 23
```

Nested if...else

It is possible to include an `if...else` statement inside the body of another `if...else` statement.

Example 4: Nested if...else

This program given below relates two integers using either `<` , `>` and `=` similar to the `if...else` ladder's example. However, we will use a nested `if...else` statement to solve this problem.

```
#include <stdio.h>
int main()
```

```
{
      int number1, number2;
      printf("Enter two integers: ");
      scanf("%d %d", &number1, &number2);

      if (number1 >= number2)
      {
         if (number1 == number2)
         {
            printf("Result: %d = %d",number1,number2);
         }
         else
         {
            printf("Result:  %d  > %d", number1, number2);
         }
      }
      else
      {
            printf("Result: %d < %d",number1,  number2);
      }

      return 0;
}
```

If the body of an `if...else` statement has only one statement, you do not need to use brackets `{}`.

For example, this code

```
if (a > b)  {
      print("Hello");
}
print("Hi");
```

is equivalent to

```
if (a > b)
      print("Hello");
print("Hi");
```
