General Computer Science for Engineers CISC 106 Lecture 33

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Lecture Overview

- More C++
  - Reserved words
  - Function calling
  - Relational/Logical Operators
  - If statements
  - Loops

C++ reserved words (keywords)

- Boolean: bool, true, false
- Types: char, float, int, unsigned, double, long
- Control flow: if, else, for, while, case, break
- Object Oriented: class, public, private, protected, new, delete, this
- Exceptions: try, catch, throw

Program with three functions

```
#include <iostream>

int  Square ( int ) ;                    // declares these 2 functions
int  Cube ( int ) ;

int  main ( void ) {
     cout  <<  "The square of 27 is " <<   Square (27)   <<    endl;
     cout  <<  "The cube of 27 is " <<  Cube (27)      <<    endl ;
}


int Square ( int  n )    { return   n * n ; }
int Cube ( int  n )      { return  n * n * n ; }
```

Relational Operators

- < (less than)
- <= (less than or equal to)
- > (greater than)
- >= (greater than or equal to)
- == (equal to)
- != (not equal to)

Logical Operators

- ! (Not)
- && (And)
- || (Or)

If Statements

- if (expression)
  statement1;
  else
  statement2;

Note: Else part is optional!

Simple if statements

```
if (age >= 18)
    cout << "Can vote." << endl;


if (songSize != 5)
    cout "Song is not equal to 5 megs" << endl;
```

Simple if statements

```
if (songSize > 2 && songSize < 5)
    cout "Song is greater than 2 megs and less
    than 5 megs" << endl;


if (!(songSize > 2 && songSize < 5))
    cout "Song is less than or equal to 2 megs or
    greater than or equal to 5 megs" << endl;
```

Short Circuit example

```
int Age, Height;

Age = 25;
Height = 70;
```

EXPRESSION

```
(Age > 50)   &&  (Height > 60)
```

false

Evaluation can stop now

Another short circuit example

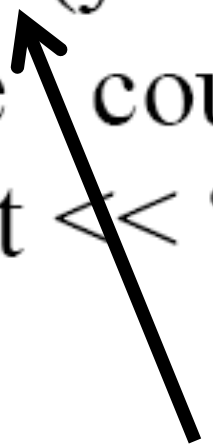
```
int    Number;
float  X;

( Number  !=  0)  &&  ( X  <  1  /  Number )
```

Protects from having a divide by zero error!
If Number != 0 then number is not zero and we can divide 1 by number.

Beware of dangling else problem

```
int x = 7, y = 8;
if (x == 0)
    if (y == 0) cout << "yes" << endl;
else  cout << "no" <<  endl;
cout << "end of output" << endl;
```

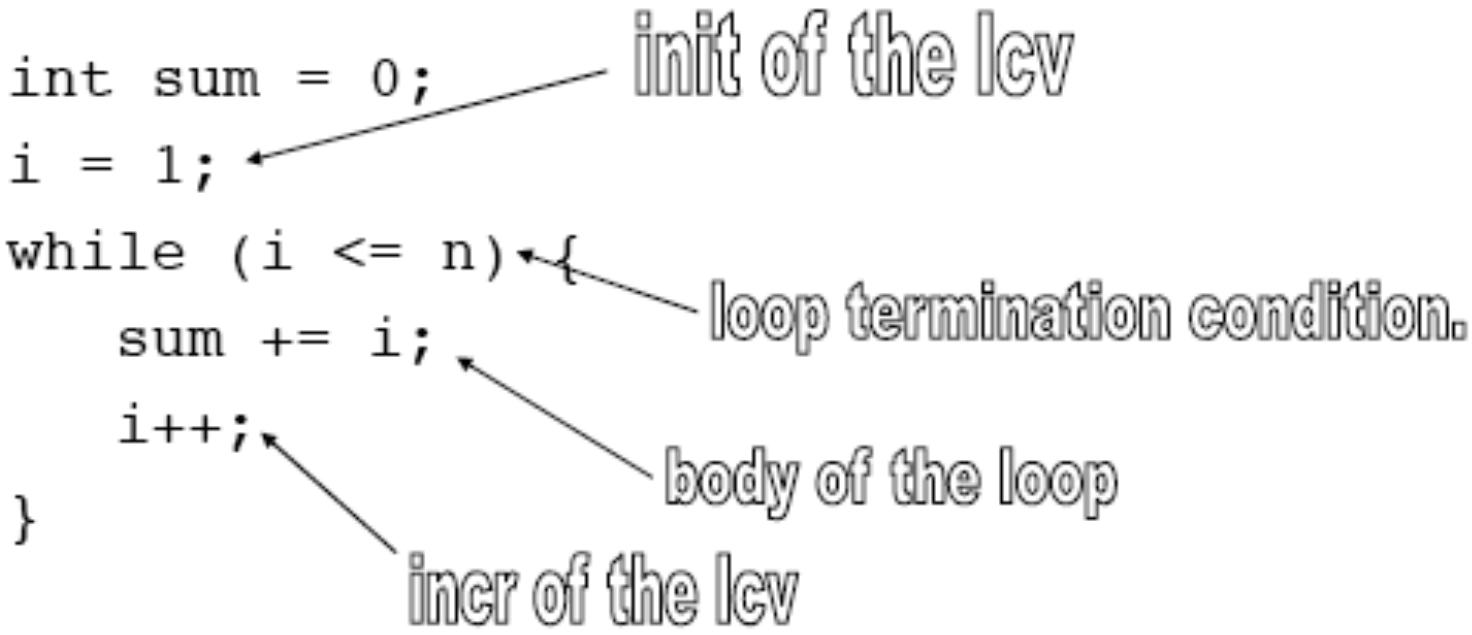


The else matches this if statement!

While Loops

```
// compute sum = 1 + 2 + ... + n

int sum = 0;
i = 1;
while (i <= n) {
    sum += i;
    i++;
}
```



For Loops

```
// compute sum = 1 + 2 + ... + n

int sum = 0;
for (int i = 1; i <= n; ++i) {
    sum += i;
}
```