For Loop

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Repeating Tasks

• C++ provides another way for us to repeat our tasks
• This is called a for loop
• For loop has the same three parts as the while loop:
  – Initialize Counter
  – Comparison on Counter
  – Update Counter
Two type of loops, why?

• Why did C++ provide two types of looping constructs?
• The for loop is designed with conveniences of the programmer in mind.
• When designing programs you think ahead of time how many times the loop needs to be repeated.
• C++ for loops are set up that exact way.
Model:
for( initialize ; comparison ; update )
{
   //do something here many times
}

• Notice that the three parts of the while loop is pack together in one place in the for loop.
Example:

```c
for( int c = 1 ; c <= 10 ; ++c )
{
    //do something here 10 times
}
```
While Loop vs. For Loop

• There are no definitive rules stating when to use which loop, here are my recommendations:

• Use while loop if...
  – Do not know number of times to loop in advance
  – Loop condition is based on user input

• Use for loop if...
  – Number of times to loop is known in advance
  – If nesting loops is needed for logical flow
For loops and while loops are very similar; you can turn any while-loop into an equivalent for-loop and vice versa.

```plaintext
initialization
while (boolean statement) {
    perform action(s)
    update
}
```

```plaintext
for (initialization; boolean statement; update) {
    perform action(s)
}
```
For Vs While Example

```cpp
int count = 1;  //initialization
while (count <= 10) {  //test
    cout << count
    ++count;  //update
}
```

```cpp
for (int count = 1; count <= 10; ++count){  //more compact
    cout << count << " ";
}
```

Output (For Both Loops)
1 2 3 4 5 6 7 8 9 10