While Construct in C++

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Repeat Decision Making

• Computers are great at repeating tasks
  – Building cars on the assembly line
  – You can picture this is the task of building one car being repeated, as long as there are parts

• Give user three attempts at entering password

• Calculating averages for each student for an entire class.
While Loop Model

- Model:

```python
while ( comparison_is_true )
{
    //do something here
}
```
While Loop Model Example

• Example:

```cpp
int number;
cout << "Enter a positive number: ";
cin >> number;

while ( number <= 0 )
{
    cout << "Try again: ";
    cin >> number;
}
```
Counting in While Loop

• Sometimes we need to repeat a task specific number of times:
  – We will have to setup a counter before the loop
  – Check to see if counter has been met before and each time we loop
  – Update the counter each time we loop
While Loop Model (counter)

• Model:
  
  //initialize counter
  while ( comparison on counter )
  {
    //do something processing here
    //update counter, prevent infinite loop
  }
While Loop Example (counter)

• Example:

```cpp
int counter = 1; //initialize
while ( counter <= 10 ) //compare
{
    cout << counter << endl; //do something
    counter = counter + 1; //update
}
```
Parts of the While Loop

• For every while loop to function properly three components must exist:
  – Initialization
  – Comparison
    • done repeatedly to check for termination condition

• Update
  – Changes the condition every time, makes loop meaningful
Incrementing in C++

• Suppose we want to increment a number, how do we do so?

```cpp
int counter = 1;
counter = counter + 1;
```

• You can also do any of the following:

```cpp
++counter;
counter++;
counter += 1;
```
Decrementing in C++

• Suppose we want to decrement a number, how do we do so?

```cpp
int counter = 10;
counter = counter - 1;
```

• You can also do any of the following:

```cpp
--counter;
counter--;
counter -= 1;
```