CS150 Intro to CS I

Fall 2016
Chapter 5
Increment, Decrement, Looping

- Reading: pp. 227-232
- Good Problems to Work: p.232 [5.1], p.241 [5.2, 5.3]
Write a `while` loop that lets the user enter a number. The number should be multiplied by 10 and the result stored in the variable `product`. The loop should iterate as long as the `product` contains a value less than 100.
Combined Assignments

- We have seen that the same variable can be used on the left hand side of the assignment and on the right hand side

  \[
  \text{notes} = \text{notes} / 20; \\
  \text{notes} = \text{notes} \% 20; \\
  \]

- These are common in programming, so the two operators can be combined as follows:

  \[
  \text{notes} /= 20; \\
  \text{notes} %= 20; \\
  \]
Combined Assignments

- Combined assignments can be combined with arithmetic operators
  
  \[
  y -= a * 2; \\
  a /= b + c; \\
  c %= d - 3;
  \]

- What is the long form of these statements?
Increment and Decrement Operators

- C++ provides a shortcut to increment or decrement a variable by 1
  - Always by 1

```cpp
int x = 99;

x++;  // this is equivalent to x += 1
x--;  // this is equivalent to x -= 1
```
# Prefix and Postfix

<table>
<thead>
<tr>
<th>Prefix</th>
<th>Postfix</th>
</tr>
</thead>
<tbody>
<tr>
<td>$k = --x;$</td>
<td>$k = x--;$</td>
</tr>
<tr>
<td>$k = ++x;$</td>
<td>$k = x++;$</td>
</tr>
</tbody>
</table>

- Increment/decrement $x$ then assign value of $x$ to $k$
- Assign value of $x$ to $k$, then increment or decrement $x$
int y = 0, x = 0, z = 0;

x = y++;

cout << x << " " << y << " " << z << endl;

y = ++z;

cout << x << " " << y << " " << z << endl;

z = x++ + 1;

cout << x << " " << y << " " << z << endl;
Tricky ... What is the Output?

```cpp
int count = 0, sum = 0;
while (count++ < 5)
{
    sum += count;
    ++count;
    cout << count << ' ' << sum << endl;
}
cout << count << ' ' << sum << endl;
```
Input Validation

cout << "Enter a number in range 1-10: ";
cin >> number;
while (number < 1 || number > 10)
{
    cout << "Enter a number in range 1-10: ";
cin >> number;
}