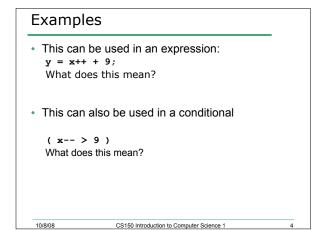


Increment and Decrement Operators (5.1)
• C++ provides a shortcut to increment or
decrement a variable by 1
int x = 99, y = 90;
x++; // this is equivalent to x += 1
x--; // this is equivalent to x -= 1

In a Loop

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```
• Often, this is used to increment a loop
counter
int x = 1;
while(x < 5)
{
    cout << " x : " << x << endl;
    x++; // increment
}</pre>
```



Practice

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• Write one statement of code to do each of the following:

int x = 0, y = 1;

- Add x + 9 to y and increment x by 1
- Add x * 4 to y and increment x by 1
- Add y 13 to x and decrement y by 1

Prefix vs Postfix • ++x is prefix • The x += 1 happens before the expression is evaluated		
	<i>postfix</i> += 1 happens <i>after</i> the expression is Jated	
int y = x = y+- y = ++= z = x+-	z;	
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Examples

```
int x = 0, y = 0;
x = y++ * 2;
y = ++x / 2;
x = x++ + 1;
x = ++x + 1;
y = (y + x++) * 2;
x = y++ + ++x;
```



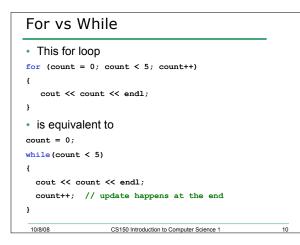
Practice

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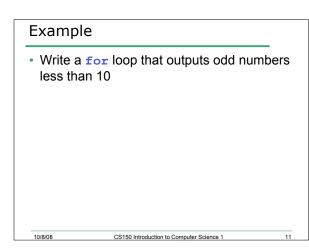
- Write a single C++ statement to do each of the following:
 int y = 0, x = 0, z = 0;
- Decrement x by 1 then add 2x to y
- Add 2y to x then increment y by 1
- Add Zy to X then increment y by T
- Subtract 9x 1 from y then decrement x by 1
- Increment y by 1 then add 8-2y to x
- Increment x and y each by 1 then add x+y to z

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for loops (5.6) • 3 main steps for loops: o Initialize, Test, Update • for loops provide a concise way to do this // initialize test update for (count = 0; count < 5; count++) { cout << count << endl; } 10/208 C\$150 Introduction to Computer Science 1 9</pre>







Practice

What does this output?

```
for (i = 5; i < 10; i += 2)
{
    cout << i;
}
• Rewrite the for loop as a while loop
</pre>
```

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Problem

Write a program that will print the sum of the odd integers between 1 and 50 inclusive. Write one program using a while and the other using a for loop

Practice

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 Write a program that computes the factorial of a number. The factorial of a number is given by the formula

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- The user will input N
 - N! = N*(N-1)*...*2*1
 where 0!=1, 1!=1, 2!=2, 3!=6, ...

Localized Declarations for (int i = 0; i < n; i++) { cout << i << endl; } cout << i << endl; // This will cause an error i is declared ONLY in the loop Convert this to a while loop</pre>

```
Potential Pitfalls
• What is the output of the following loop
for (count = 0; count < 5; count++)
{
    cout << count << endl;
    count++;
}</pre>
```



Practice

```
• What is the output of the following loop
for (count = 0; count < 10; count += 2)
{
    cout << count << endl;
}</pre>
```

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Problem

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- Write a program that allows the user to enter 20 integers, you should then print out the following:
 - o The sum of all integers inputted
 - $_{\circ}\,$ The average of all integers inputted
 - The largest integer of all integers inputted