

Conditionals

- So far, we can Input, Output and Calculate
- How can we explore relationships between data?

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• How can our program only do certain things *sometimes*?

Decisions!

- Relational Expressions allow our program to *make a decision*
 - o based on the data in the program
- What are some decisions we might want our program to make?

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```
Relational Expression
• Relational expression: an expression that
uses a Relational Operator
• Relational expressions produce a value that is a
Boolean value (True or False)
int height = 32;
int minHeight = 34;
bool bVal;
bVal = height > minHeight;
bVal = height == minHeight;
bVal = height == minHeight;
bVal = height >= (minHeight - 2);
```

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Relational Operators		
Operator	Meaning	
>	Greater than	
<	Less than	
>=	Greater than or equal to	
<=	Less than or equal to	
==	Equal to	
!= o All operators are binary	Not equal to	
o Each operator is left asso	ociative. What does this mean again?	

Operator Precedence (highest to lowest)			
Unary plus & minus	+ -	Left associative	
Multiplication, division, and modulus	* / %	Left associative	
Addition & subtraction	+ -	Left associative	
Relational operators	< <= >>=	Left associative	
Relational operators	== !=	Left associative	
Assignment	=	Right associative	
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const Declarations

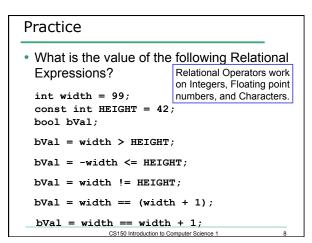
```
    Constant declaration
```

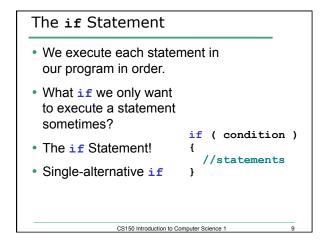
const double PI = 3.14;

- const double RADIUS = 5.4;
- Constant declarations are fixed and cannot be changed

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By convention, constants are always
 UPPERCASE





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Practice: What is the output?
int age;
const int VOTING_AGE = 18;
cin >> age;
if ( age >= VOTING_AGE )
{
  cout << age << " > " << VOTING_AGE;
  cout << " You can vote!" << endl;
}
```

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Practice

- Write a C++ program segment that allows the user the ability to enter 3 exam scores one at a time. If the average exam score is higher than 60, output "You Passed"; otherwise output "You failed". Sum the scores as they are entered.
- 1. What variables (including their types) are needed in this program segment?
- Hint: If the variable count contains the value 0, what is the value of count after executing the statement count = count + 1;
- 2. What do you need to do conditionally?
- 3. What data is necessary to use in the condition?

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Example

 Your local bookstore has asked you to write a program to help them determine the cost of shipping of customer orders. If the order is \$30 or less then shipping will cost \$5, if the order is over \$30 then shipping will be \$3.

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• Write the program to solve this problem

Problem

- The bookstore has now changed it's shipping policy so that
 - If the order is \$30 or less, shipping is \$5
 - If the order is over \$30 but less than \$50, shipping is \$3
 - If the order is \$50 or more then shipping is \$2

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• What would we need to change in the program?