
Relational Operators and the If Statement

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Conditionals

- So far, we can Input, Output and Calculate

- How can we explore relationships between data?

- How can our program only do things *sometimes*?

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Decisions!

- Relational Expressions allow our program to *make a decision*
 - 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**
 - its value is a **Boolean value** (True or False)

```
int height = 32;
int minHeight = 34;
bool bVal;

bVal = height > minHeight;
bVal = height == minHeight;

bVal = height >= (minHeight - 2);
```

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4

Relational Operators

Operator	Meaning
>	Greater than
<	Less than
>=	Greater than or equal to
<=	Less than or equal to
==	Equal to
!=	Not equal to

- All are binary operators
- Left to right associativity

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5

Precedence

Precedence Operators (Highest to Lowest)					
(unary negation) -					
* / %					
Arithmetic Operators					
+ -					
>	>=	<	<=		
Relational Operators					
==		!=			
=	+=	-=	*=	/=	%=
Assignment Operators					

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6

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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7

Practice

- What is the value of the following Relational Expressions?

```
int width = 99;
```

```
const int HEIGHT = 42;
```

```
bool bVal;
```

```
bVal = width > HEIGHT;
```

```
bVal = -width <= HEIGHT;
```

```
bVal = width != HEIGHT;
```

```
bVal = width == (width + 1);
```

```
bVal = width == width + 1;
```

Relational Operators work on Integers, Floating point numbers, and Characters.

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8

The if Statement

- We execute each statement in our program in order.
- What if we only want to execute a statement sometimes?

- The if Statement!

```
if ( condition )  
{  
    //statements  
}
```

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9

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;
}
```

Practice

- For the problem below:
 - what data will you need?
 - what will you need to do conditionally?
 - what data will you use in your decision?
- Calculate the average grade for all three exams in a course. Print a message stating if the student passed the course.
 - “You passed!”
 - “You failed!”

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.
- Write the program to solve this problem
