Boolean Expressions and Logical Operators

CSE 1310 – Introduction to Computers and Programming
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The Boolean Type

- Expressions of type boolean can only have two values: True, or False.
  - True and False are reserved keywords in Python.

```
>>> 3 > 2
True
>>> type(True)
<type 'bool'>
```

```
>>> a = 3 == 2
>>> a
False
>>> a = (3 == 2)
>>> a
False
```

Preferred style (parenthesize)

```
>>> b = 4;
>>> a = (b != 5)
>>> a
True
```

Comparisons Generating Booleans

- The following operators comparing numerical values generate boolean results:

  == equality
  != not equal
  < less than
  > greater than
  <= less than or equal to
  >= greater than or equal to

Logical Operators

- The following logical operators can be used to produce boolean results:

  not

  and

  or

Using Logical Operators

```
>>> a = 3
>>> b = 4

>>> (a == b) or (a+b == 7)
True

>>> (a == b) and (a+b == 7)
False

>>> not(a == b)
True
```

Combining operators

- What does this line do?

```
>>> (3 == 5) and (2 < 3) or (3 >= 0)
```

Combining operators

- What does this line do?

```
>>> (3 == 5) and (2 < 3) or (3 >= 0)
```

- I don't know, and I don't want to know.
  - Use parentheses to make the meaning of these statements clear.

```
>>> ((3 == 5) and (2 < 3)) or (3 >= 0)     → True
>>> (3 == 5) and ((2 < 3) or (3 >= 0))     → False
```