



CS 1112: Introduction To Programming

Booleans and Conditionals (II)

Dr. Nada Basit // [basit\[at\]Virginia\[dot\]edu](mailto:basit[at]Virginia[dot]edu)

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Friendly Reminders

- Your **safety** and **comfort** is important!
 - If you choose to wear a mask you are welcome to do so
 - *We will interpret wearing a mask as being considerate and caring of others in the classroom (not that you are sick), and realize that some may choose to mask to remain distanced*
- Be an **active** participant in your learning!
You're welcome and **encouraged** to ask questions during class!
- If you feel **unwell**, or think you are, **please stay home**
 - *We will work with you!*
 - Get some rest 😊
 - View the recorded lectures – *please allow 24-48 hours to post*
 - *Contact us!*



Announcements

- **PA01** is due by 11:00pm on Wednesday (*tonight*)!
 - Submit on Gradescope: your .py file and a screenshot of your turtle drawing.
- **Quiz 2** will be graded soon.

Review Solution

`turtle_conditionals.ica.py`

The Boolean Data Type

- Recall, the only two values a Boolean value can be is either **True** or **False**
- **and**
 - Used between 2 Boolean expressions (*binary* operator): `<bool> and <bool>`
 - Example: `x < 2 and x > 0`
- **or**
 - Used between 2 Boolean expressions (*binary* operator): `<bool> or <bool>`
 - Example: `x < 2 or x > 0`
- **not**
 - Precedes 1 Boolean expression (*unary* operator): `not <bool>`
 - Example: `not x`

The Boolean Data Type

- When using the **comparison operators** (< > <= >= == !=), a **bool** value is produced.
- Can use the **type()** function to determine what the data type is (*any* data type)
- *Let's look at the following example:*

```
a = 5
b = 10
c = a < b
d = a == b
```

```
print(type(c), c)    # prints: <class 'bool'> True
print(type(d), d)    # prints: <class 'bool'> False
```

Truth Tables

A	B	A and B	A	B	A or B	A	not A
True	True	True	True	True	True	True	False
True	False	False	True	False	True	False	True
False	True	False	False	True	True		
False	False	False	False	False	False		

P	Q	$\neg P$	$P \wedge Q$	$P \vee Q$
T	T	F	T	T
T	F	F	F	T
F	T	T	F	T
F	F	T	F	F

Different Versions of Decision Statements

```
if boolean expression:  
    statements
```

```
if boolean expression:  
    statements  
else:  
    statements
```

```
if boolean expression:  
    statements
```

```
elif boolean expression:  
    statements
```

} 1 or more

```
if boolean expression:  
    statements
```

```
elif boolean expression:  
    statements
```

} 1 or more

```
else:  
    statements
```

Remember...

An “**expression**” is a portion of a statement describing a value.

Small Boolean/Conditionals Example

Flow of Conversation

(Assume the Boolean variables have been initialized based on a given scenario.)

```
if greeted:  
    print("Hello!")  
    conversation_started = True  
  
if conversation_started and not conversation_finished:  
    talk  
  
if (conversation_started and said_farewell_to) or conversation_finished:  
    print("Goodbye!")
```

Conditional Practice

Let's try this together!

Practice

- **Pseudocode:**

- Create a for-loop that iterates through the numbers 1 to 14
- Then for each number, depending on the condition, print the following things to the console:
 - If the number is **low** (less than 8): `print "low"`
 - If the number is **even**: `print "-even"`
 - If the number is a **prime**: `print "-prime!"`

- Hints:

- For prime: let's create a list of primes and use the keyword "**in**" to check if a number is a member of (if the number is "in") this list. `primes = [2, 3, 5, 7, 11, 13]`





PYTHON DEMONSTRATION

Let's jump on PyCharm!

conditionals.py (`finish` + Q&A)

conditionals_examples1.py

conditionals_examples2.py

Activity on Conditionals

- In **pairs** or groups **up to three** work on the following activity.
- **conditionals_ica.py**
- *Use conditionals to determine what the GPA is given a percentage.*

Remember to **check-in** with a TA before leaving class today!

In-Class “lab” Activity!

Reminder: CS Laptop Loaner Program

- This course requires students to have a **laptop**
- I realize that not everybody might have one (nor necessarily need one for their desired major / path...)
- If you do not have a laptop for any reason... *not to worry!*
- The CS department's Systems staff has a notebook / laptop loaner program and will be able to loan you a notebook / laptop computer for the duration of the semester if you don't have one or if you cannot afford one.
 - Also available if your laptop is broken and under repair, we can arrange for you to receive a loaner laptop for a week or two until your own laptop is fixed

Interested? Link: https://www.cs.virginia.edu/wiki/doku.php?id=cs_laptop_loaner

I am happy to be your sponsor. Please let me know.