CS 1112: Introduction To Programming

Booleans and Conditionals (II)

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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*
- Remember to always be **kind, respectful, supportive, compassionate and mindful of others!** ☺
- 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
  - *Contact us!* *We will work with you!*
  - Get some rest ☺
  - View the recorded lectures – *please allow 24-48 hours to post*

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
True	True	True
True	False	False
False	True	False
False	False	False

A	B	A or B
True	True	True
True	False	True
False	True	True
False	False	False

A	not A
True	False
False	True

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
else:
    statements
```

1 or more

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

In-Class "lab" Activity!

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!

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

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