Python Operators and Conditionals

September 15, 2021

Administrative Notes

Homework 1 due by midnight on Friday!!!

Quick Review of Operators

Arithmetic - **, -, +, *, /, //, %

Assignment- =, +=, --, /=, *=

Comparison- ==, >=, <=, !=, >, <

Logical - and, or, not

Operator precedence: arithmetic, then comparison, then logical

- Arithmetic: **, then *,/,//, and %; then + and -
- If you have two or more operators at the same precedence, go left to right

Code execution:

1. Sequential - execute each line of code, exactly once - no more, no less - then move on to the next line of code
2. Conditional - execute a line of code, once, IF and ONLY IF some condition (or set of conditions) is true. Otherwise, skip this line and do not execute it
3. Iterative - execute a line of code, or group of lines of code, multiple times

Conditionals

if, else, and elif

elif is short for “else if” It requires typing four characters instead of 7, and programmers tend to like shortcuts and optimization

Three cases:

1. One option: If a condition is true, do something. Otherwise, do nothing. “If” statement
2. Two options: If a condition is true, do something, Otherwise, do something else. “If….else…” statement
3. More than two options: If a condition is true, do something. Otherwise, check to see if another condition is true; do something else. Otherwise, keep checking conditions until we find one that’s true or we just give up. “If...elif...elif...else…” statement

“If” statement

if {some boolean condition is true}:

    print(“Yay it is true”)

Notes on this:

- Typically boolean conditions are True or False.
  - A trick: any integer value other than 0 is regarded as “True” and any value that’s equivalent to 0 is regarded as False
  - An empty string is False; any non-empty string is True
-
```
if 5:

    print (“5 is true”)
```

Further notes

The boolean condition is everything between “if” and the colon : A colon terminates the condition. It can be as simple or as complex as you want

Indentation matters!! To the python, white space - either tabs or spaces - indicates what’s in the code to be executed. You only have to indent one space, but I’m a believer that you should indent with tabs.

```
If x == 6:
    print (“X is 6”)
    print (“and we’re done”)
```

If x is really equal to 5, this doesn’t print out anything.
This still prints “and we’re done” because that’s not part of the conditional

```
if x == 6:
  print (“X is 6”)
print (“and we’re done”)
```

“if...else …” statement

Ask a student for her major. If she’s a CMSC major, print out “smart choice.” Otherwise print out “there is still time”

```
major = input(“please enter your current major”)

if major == “CMSC”:

    print(“smart choice”)

else:

    print(“there is still time”)
```

Remember that input returns a string, so this comparison is valid

Colon after else, as well!

Indent the code that’s part of the “else” block

“if...else…”

- There must always be at least one line of code under the “if” statement
- You don’t have to have an “else” part, but if you do have an “else” there must be at least one line of code under it.

“if...elif…else”

Input returns a string. This turns it into an integer

Ask a student her age. If it’s less than 18, tell her she’s a minor and faces some restrictions. If it’s between 18 and 21, tell her she’s an adult but still has some limitations. If she’s over 21, tell her she’s legally an adult.

This is called ‘pseudocode’ - an English-language description of what you want to do

```
age = int(input(“Please enter your current age in years.”))
if age < 18:
    print(“Sorry but you are a minor”)
    print(“there are a lot of things you cannot do on your own”)
elif age < 21:
    print(“you are an adult but there are still some things you can’t do”)
else
    print(“congratulations you are legally an adult”)
```

Notes on “if...elif...else”

- Only one case will have its code executed when the program runs; the rest of the code will be skipped
- There doesn’t have to be an ending “else” condition. If there’s not, we just do nothing and skip all the code
- There must be at least one statement - one line of code - in each case
- Keep your conditions simple. In the previous example, we only got to the ‘elif’ when the age was >= 18. So we didn’t have to put that in the condition - that is, no need to say `elif age >= 18 and age < 21:` We already know that first part is true.