Week 2 Worksheet

Instructions: Some of these problems ask you what the Python interpreter would do under various circumstances. You may use the interpreter to check your answer, but it is important to answer first without using the interpreter. This will refine your understanding of the language fundamentals, and help on quizzes (where no books or other resources are allowed).

(1) What is the difference between interactive mode (REPL) and script mode?

(2) For each example below, answer two questions:
- What would be the output in the REPL?
- What would be the output if this were the only line of code in a script?

   (a)   `print("alpha")`
   (b)   `"beta"`
   (c)   `2**3 + 1`
   (d)   `int(19.9999)`

(3) Some lines below have errors. Which ones? What is wrong? (If there is no error, what would the output be?)

   (a)   `print(I am learning a lot)`
   (b)   `print("I am "learning" a lot")`
   (c)   `print("I am \"learning\" a lot")`
   (d)   `print('I am learning a lot)`
   (e)   `print("In the first week we had",3,"lectures")`
   (f)   `print("In the first week we had" 3 "lectures")`

(4) Determine the value of each expression (remember PEMDAS!)

   (a)   `2**5 + 2**3 - 0b101000`
   (b)   `2**3/3+1`
   (c)   `1<<5 + (0xf0 & 0x0f)`
   (d)   `7 | 8`

(5) A variable s has been assigned the string value `"science!"`. Determine the value of each expression:

   (a)   `s[2]`
   (b)   `"it works" + s[7] * 3`
   (c)   `s[2]+s[5]+s[6]`

Also, suppose that i is a variable that has a positive integer value.
(d) What are the possible values of i if `s[i]` is equal to c?

Extensions: If you complete the problems above before the end of the discussion meeting, use the remaining time to explore the following. (These topics are not covered in quiz 2.)

- Can you get Python to produce an error due to a calculation with integers producing an integer that is too large?
- Can you get Python to produce an error due to a calculation with floats producing a float that is too large?
- Can you get Python to produce an error due to a string being too long?
- Another common bitwise operation is to simply flip all of the bits (0 becomes 1 and 1 becomes 0). This is called NOT. Can you see any problem with defining this operation on an integer?
- Does + on strings have a unit? That is, does there exist a string z so that s+z is always equal to s (where s is also a string)?

Revision history:

- 2020-08-30 Initial release