COSC 1336 Homework 1

Relevant reading: Chapters 1 & 2

Due: Sep. 6, 2:30 pm

(Late date: Sep. 13, 2:30 pm)

40 Points

Homework assignments may be submitted either electronically via Blackboard or as a hard copy. In either case, they are due at the beginning of lecture. Please adhere to the following guidelines:

Electronic copy: Please use a plain text format rather than a word processor format. Be sure to put your name at the top of the file. Submit your file on Blackboard. If you are unsure about any of these things, please do Lab 0 before continuing.

Hard copy: Please write your answers on a previously empty sheet of paper (that is, don't scrawl your answers in the margins of a printout of this handout; it's okay to use scratch paper with something else on the back). You do not need to submit a copy of the handout. Please staple all the pages of your answers together, and put your name on the first page. Doing fancy origami with the top left corner is not the same as using a staple!

Chapter 1 Questions

Problem 1. **[8 points]** For each of the following, fill in the blank. Remember to write your answers for the homework on a separate sheet of paper (or in a text file).

1. A(n) _____ is a set of instructions that a computer follows to perform a task.
2. The part of a computer that runs programs is called _____.
3. While a computer program is running, the program's instructions and data that the program is using are both stored in _____.
4. A _____ is made up of eight bits.
5. An ASCII character requires _____ byte(s) of storage space.
6. A(n) _____ translates a high-level program into a machine language executable.
7. A(n) _____ translates individual high-level instructions into machine language and immediately executes them.
8. The largest value that can be represented with half a byte (that is, four bits) is _____.

Problem 2. **[11 points] Binary and ASCII conversions**

a. Convert each of the following from binary to decimal

   i. 00001011

   ii. 10100110

b. Convert each of the following from decimal to a single 8-bit binary byte (meaning that you should specify a value for all eight bits in the byte)

   i. 142

   ii. 6

c. Convert each of the following from an ASCII character to a single 8-bit binary byte

i. 'E'
ii. '6'

d. Convert each of the following from binary to an ASCII character

i. 01101110
ii. 00111100

e. Convert the word "Python" to an ASCII string. Separate the bits for each character by a space to make it easier for me to read.

Chapter 2 Questions

Problem 3. [**6 points**] For each of the following, choose the best answer.

1. A string literal in Python most be enclosed in

   a. commas
   b. single quotes
   c. double quotes
   d. either single or double quotes

2. This symbol marks the beginning of a comment in Python.

   a. `&`
   b. `//`
   c. `/*`
   d. `#`

3. Which of the following statements will cause an error?

   a. `x = 17`
   b. `17 = x`
   c. `x = 'seventeen'`
   d. `x = '17'`

4. This operator performs integer division.

   a. `//`
   b. `%`
   c. `**`
   d. `/`

5. This operator performs integer division, but instead of returning the quotient, it returns the remainder.

   a. `//`
   b. `%`
   c. `**`
   d. `/`

6. Suppose the following statement is in a program: `price = 99.0`. After this statement executes, the `price` variable will reference a value of this data type.

   a. `int`
   b. `float`
   c. `currency`
   d. `str`

Problem 4. [**4 points**] **Short answer**

a. If a math expression adds a `float` called `num1` to an `int` `num2`, what will the data type of the result be? What will the types of `num1` and `num2` be after the expression has been evaluated?

b. What is the difference between floating-point division and integer division? Give examples to make your explanation concrete.

Problem 5. For each of the following, write statements that perform the following operations with variables `a`, `b`, and `c`.

a. Add 2 to `a` and assign the result to `b`.

b. Multiply `b` by 4 and store the result in `a`.

c. Assign `b` to be the result of dividing `a` by 3.14.

d. Set `a` to store the result of subtracting 8 from `b`.

Problem 6. [**11 points**] Assume the variables `result`, `w`, `x`, `y`, and `z` are all integers. Assume the following values for `w`, `x`, `y`, and `z`:

```
w = 5
x = 4
y = 8
z = 2
```

What value will be stored in `result` after each of the following statements execute? Obviously you can do these by typing them into a Python interpreter, but you will learn more if you first do them by hand and then check your answer with the interpreter.

a. `result = x + y`

b. `result = z * 2`

c. `result = y / x`

d. `result = y / w`

e. `result = y - z`

f. `result = y // x`

g. `result = y // w`

h. `result = y % z`

i. `result = z % y`

j. `result = y % 3`

k. `result = z ** x`