

CPS109 Lab 1

Most of the questions in this lab come from Chapter 1 or 2 of the course text, Introduction to Computing and Programming in Python, by Guzdial and Ericson. Please put your answers (numbered) in a document and submit it on D2L as a PDF file. Other formats are not accepted.

The learning objectives for Chapter 1 are to understand:

- what computer science is about
- why digitize media
- why study computer science
- what is encoding
- what are the basic components of a computer

The learning objectives of Chapter 2 are to understand:

- to make and show pictures
- to make and play sounds
- to use JES to enter and execute programs
- to store values and objects (pictures, sounds) in variables
- to create functions
- to recognize types: integers, floating-point numbers, media objects
- to sequence operations in a function

To do:

- 1) With the TA's help, find the JES (Jython Environment for Students) application in the Windows operating system of the computer. What is the output from `1/3`, when you enter that in the Command area on JES? Why do you get this output?
- 2) What is the value of `1.0/3`? Why?
- 3) What is the value of `10 + 3 * 7`? Why?
- 4) What is the value of `(10 + 3) * 7`? Why?
- 5) What is the value of `'Hi ' + 'there'`? Why?
- 6) What is the value of `'Hi ' + 10`? Why?
- 7) What is the value of `'Hi' + '10'`? Why?
- 8) What is the value of `'Hi' * 10`? Why?
- 9) What is the output of (but don't type the numbers)
 - 1) `a = 3`
 - 2) `b = 4`
 - 3) `c = a * b`
 - 4) `print c`
- 10) What is the output of
 - 1) `a = 4`
 - 2) `b = -3`
 - 3) `c = abs(b)`
 - 4) `d = a * c`
 - 5) `print d`
- 11) What is the output of
 - 1) `a = 'John'`
 - 2) `b = 'Tory'`
 - 3) `print a + b`
 - 4) `print a + " " + b`
- 12) Type the following function into the Program area in JES, then load the program and type into the Command area **`compute()`**. What is being computed and what is the answer? (As usual, do not type the prefix numbers -- they are just to help you see the indentation).
 - 1) `def compute() :`
 - 1) `distanceInMiles = 3279.8`

- 2) `metersPerMile = 1609.34`
- 3) `distanceInMeters = distanceInMiles * metersPerMile`
- 4) `turtleSpeed = 0.5`
- 5) `timeSeconds = distanceInMeters / turtleSpeed`
- 6) `print('Time in seconds for turtle to go from Miami to Seattle')`
- 7) `print(timeSeconds)`
- 8) `minutes = timeSeconds / 60`
- 9) `print(minutes)`
- 10) `hours = minutes / 60`
- 11) `days = hours / 24`
- 12) `weeks = days / 7`
- 13) `print("In weeks")`
- 14) `print weeks`
- 13) Type `pickAFile()` in the command area and notice the error message. What can you do to fix that error?
- 14) Fix the following code which gives an error. Show your debugged code.
 - 1) `a = 3`
 - 2) `b = 4`
 - 3) `c = d * a`
- 15) Use `pickAFile()` to find a picture from the the mediasources, which you can find via `MyComputer > Swshared O: > Courses > cps109 > mediasources-4ed > butterfly.jpg`. What is the output?
 - 1) `f = pickAFile()`
 - 2) `print f`
- 16) Convert that file to a picture. What is the output?
 - 1) `p = makePicture(f)`
 - 2) `print p`
- 17) Look at the picture. What are the two main colors?
 - 1) `show(p)`
- 18) Explore the picture. What are the R, G, B values when you click on the yellow?
 - 1) `explore(p)`
- 19) The 2013 Nobel Prize in Chemistry was in some sense a Nobel Prize given for work in Computer Science. What was the role of computers in that Nobel Prize?
- 20) Text characters are encoded in different ways. The bottom level is always binary in bytes, but different binary patterns can represent the characters. Two of these encodings are ASCII and unicode. Do a web search on ASCII and unicode and type here what is the basic difference and why would we want unicode if we have ASCII?