**Lab 02 – Loops**

**COMP130 - Introduction to Computing**

**Dickinson College**

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Recall that most labs require you to submit a responses document in PDF (.pdf) and at least one Python script (.py). This lab does require a responses document and either one or two Python scripts: lab02.py and (optionally) turtleCircles.py. Therefore, you will submit a total of two or three files to Moodle.

Before beginning, the driver partner should create a lab02 folder in OneDrive and share it with the navigator partner. See the previous lab for detailed instructions.

**Qu 1.** Create your lab02.py file and save in OneDrive. Write some code that uses a for loop to print out one of your favorite song lyrics 50 times. Note: don’t forget to put a title, both partners’ names, and a date at the top of the file in Python comments. Remember to delineate each question with a line of # characters. Finally, after you’ve tested that your code is working correctly, comment it out before moving on to the next question. Go back to lab 1 for an example of what your file should look like at this point.

**Qu 2.** Write a short program that asks the user to input a positive integer. The program then prints out the numbers from 1 up to the input number, inclusive. Example: If the user inputs 5, then the output is

1

2

3

4

5

If you haven’t switched roles already, **switch roles now**. The new driver continues to edit the same files by using their own computer, accessing the shared folder on OneDrive. Continue switching every 20-30 minutes for the remainder of the lab.

**Qu 3a.** Write a short program that asks the user to input a string. The program then prints out the numbers from 1 up to the length of the string, inclusive. Example: if the user inputs abcd, then the output is

1

2

3

4

Hint: You will need the built-in len function. For example, len('abcd') is 4.

**Qu 3b.** In your reflections document, write a brief description of any problems you encountered or mistakes you made while writing the program for question 3a. If you did not encounter any problems, give a description of how you were able to write the program with no mistakes.

**Qu 4.** Consider the following Python statements:

maxPrice = max(maxPrice, price)

print("The highest price item costs " + str(maxPrice))

price = float(input("Enter the price: "))

for item in range(items-1):

items = int(input("How many items?"))

maxPrice = float(input("Enter the price: "))

Rearrange the above statements, adding indentation where necessary, into a program that prompts the user for a number of items, records the price of each item, then prints the most expensive price that was entered.

The remaining questions are optional. By completing them, you may receive a small amount of bonus credit in your grade for the lab. However, the main benefit of completing these questions is that you will improve your ability on skills that are essential for this course.

**[optional] Qu 5.** Create a new program similar to the one from the previous question. This program must print both the most expensive and the least expensive price that was entered.

**[optional] Qu 6.** A magical treasure chest operates as follows. The chest contains gold coins and silver coins. Every day, the owner first removes one gold coin and two silver coins. Then, the chest magically creates some new gold coins equal to the current number of silver coins. Then, the chest magically doubles the number of silver coins. The process of magically creating the coins in this way occurs once every day, immediately after the owner has removed one gold and two silver coins. Write a program that prints out the number of coins in the chest at the start of the day, from days 1 to 10 inclusive. Assume there are five gold and five silver coins at the start of day 1.

**[optional] Qu 7.** By altering and experimenting with your program from the previous question, determine on which day the chest will contain more than 1 million gold coins at the start of the day. Give your answer in your reflections document, and explain in one or two sentences how you determined the answer.

**[optional] Qu 8.** Create a new script called turtleCircles.py. In this new file, write a program that uses turtle graphics to draw circles on the screen. Specifically, the program should first ask the user how many circles should be drawn. Then, it draws the requested number of circles in random locations. The randomly-determined centers of the circles can have $x$ and $y$ coordinates between $-300$ and $+300$ inclusive. Each circle should have a random radius of between 10 and 50 units inclusive.

**[optional] Qu 9.** Add code to your script from the previous question, so that the total area of all circles drawn is printed out. The result should be rounded to two decimal places.