ECE 568: Embedded Systems

Spring 2022

Lab 0 – Python refresher

To be done individually; Due by 11:59pm, Monday, February 21, 2021.

1. Overview

This lab will familiarize you with the *Python* programming language and the *Thonny IDE*, which you will use throughout this course. Python is one of the fastest-growing programming languages for embedded systems. In this course, you will use *MicroPython*, which is a lean and efficient implementation of the Python3 programming language specification. Before you start working with MicroPython on your ESP32 board in subsequent labs, this lab is meant to serve as a quick refresher of your Python skills. ***Please note that you do not need the ESP32 board to complete this lab.***

2. Installing the Thonny IDE on your PC/Mac

Thonny is a Python IDE meant for learning programming. You can learn more about Thonny at https://thonny.org and https://github.com/thonny/thonny/wiki. Installation instructions for Windows, Linux, and MacOS are provided at https://thonny.org. You might get a *Windows Smart Screen Filter* warning when trying to install Thonny on Windows. If so, please ignore it and go ahead. More details can be found at https://github.com/thonny/thonny/wiki/Windows. *Install the latest version, v3.3.13*. By default, Thonny comes with Python 3.7 built in, so, a separate installation of Python is not needed.

3. Python refresher programming exercises

Again, you do not need the ESP32 for this lab. You can use the default python interpreter.

3.1. Character Input (Upload as program1.py)

Write a program that asks the user to enter his/her name and age as of today. The program then prints out a message that says when the user will turn 100 years old (note that age alone is insufficient to exactly determine this).

Hint: Use **input** command to get user input

```
>>> python program1.py
```

```
What is your name? Xavier
How old are you? 43
Xavier will turn 100 years old in either 2078 or 2079.
```

3.2. Lists and Conditional Statements (Upload as program2.py)

Write a program to initialize a list of numbers, print the list, and ask the user for a number and return a list that contains only elements from the original list that are smaller than the number given by the user.

```
>>> python program2.py
a = [1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89]
Enter number: 25
The new list is [1, 1, 2, 3, 5, 8, 13, 21]
```

3.3. Loops

3.3.1. While loop: (Upload as program3a.py)

Write a program to get Fibonacci series between 0 to a **user input number** using a **while** loop.

```
>>> python program3a.py
How many Fibonacci numbers would you like to generate? 10
The Fibonacci Sequence is: 1, 1, 2, 3, 5, 8, 13, 21, 34, 55
```

3.3.2. For loop: (Upload as program3b.py)

Write a program that generates a random number (0-10) and asks the user to guess it within three chances. If user guesses correctly, print 'You win!', otherwise print 'You lose!'

```
>>> python program3b.py
Enter your guess:3
Enter your guess:2
Enter your guess:10
You win!
```

3.4. Dictionary (Upload as program4.py)

Write a program to create a dictionary of names and birthdays. Upon execution, it should ask the user to enter a name, and return the birthday of that person back to them.

```
>>> python program4.py
Welcome to the birthday dictionary. We know the birthdays of:
Albert Einstein
Benjamin Franklin
Ada Lovelace
Whose birthday do you want to look up?
Benjamin Franklin
Benjamin Franklin's birthday is 01/17/1706.
```

4. Submission

Since this is just a warmup lab, it will be graded for completion credit only (i.e., if you submit your code, you will be awarded 100% credit). You need to turn in your code on Brightspace. Please create a directory named *username_lab0*, where *username* is your Purdue CAREER

account login ID. Put all your Python code files into this directory. This directory should contain only source code files, i.e., no executables, no temporary files, etc. Zip the parent directory (i.e., *username_lab0*) and name it as *username_lab0.zip* and upload the *.zip* file to Brightspace.