Grades 9-12
Distance Learning Module 9: Week of: 6/1/2020-6/5/2020

Introduction to Computer Science Honors - *Modified from Unit 7 - Lists, Arrays and Problem Solving*

Targeted Goals from Stage 1: Desired Results

Content Knowledge: Polya's four steps for problem solving, how to pass lists to functions, how to return lists from functions, when to use a list, how to iterate over lists, how to index into a list.

Vocabulary: array, list, shuffle, reduce, "big O notation", lambda expression

Skills: declaring, assigning values to, and iterating over lists of integers, floating point numbers, and strings, comparing elements in lists, sorting a list using built in methods, merging lists, performing a sequential search on a list

Expectation:

Description of Task (s):	Resources and Materials:	Daily Checks (Return to Google Classroom or snapshots from a cell phone)
Monday: Introduction to Lists in Python ● creating list explicitly ● creating list using the list() function ● iterating over a list via a for..each loop and by index ● slicing/indexing syntax ● changing the contents of a list	Live lesson Examples: ● find largest item in a list ● find number of occurrences of a string in a list ● convert a list of words to their uppercase versions	Write a function, num_chars(words), that accepts a list of words and returns the total number of characters. For example, num_chars(["dog", "house"]) would return 8.
Tuesday: Using common list methods and operators ● append() ● extend() ● insert() ● remove() ● pop() ● sort() ● in	Live instruction Examples: ● Function that accepts a list of integers and returns a list of only odd integers (without changing the original list) ● Function that jumbles a word using .pop() ● Return the first n perfect squares	Lab Exercises - choose 3 (due Thursday)
Wednesday: Students will continue to work on selected lab exercises.	Professional Development: Live help sessions	Lab Exercises - choose 3 (due Thursday)

Description of Task (s):	Resources and Materials:	Daily Checks (Return to Google Classroom or snapshots from a cell phone)
Thursday: List functions ● len(list) ● del(slice) ● sum(list) ● min(list) ● max(list) ● sort() ● sorted(list, reverse=True) → new list ● sorted(list, key=function to call) Object references	Live instruction	Lab Exercises - choose 3 (due Thursday)
Friday: Write lambda expressions Use lambda expression in sort, filter (optional: map) commands	Live instruction	Write a function long_words(the_list, min_length) that uses filter and a lambda expression to return a list containing all the words in the_list that have at least min_length characters in them.

Week criteria for success (attach student checklists or rubrics):

By the end of this module, students should be able to:

- create a list
- iterate over a list by index or value
- modify the number of and values of elements in a list
- write algorithms involving lists
- create single line lambda expressions to filter and sort lists

Supportive resources and tutorials for the week (plans for re-teaching):

Think Python, 3rd Edition (free online Python book)

Coding Bat

Office hours

Python Programming Third Education by John Zelle. This textbook provides additional examples and content, and is available for purchase from Amazon and other retailers.