COMPUTING LAB - II
ADVANCED SYSTEM SOFTWARE LAB - CSE 5261
MTech - CSE

Week - 1 Basics of Python Programming

Lab Exercises:

1) Write a program that computes and prints the result of $512 - 282/47 \cdot 48 + 5$. It is roughly .1017.

2) Write a program that asks the user for a weight in kilograms and converts it to pounds. There are 2.2 pounds in a kilogram.

3) Write a program that asks the user to enter three numbers (use three separate input statements). Create variables called total and average that hold the sum and average of the three numbers and print out the values of total and average.

4) Write a program that prints out a list of the integers from 1 to 20 and their squares. The output should look like this:
Output - 1 -- 1, 2 -- 4, 3 -- 9, ... , 200 - 400.

5) The Fibonacci numbers are the sequence below, where the first two numbers are 1, and each number thereafter is the sum of the two preceding numbers. Write a program that asks the user how many Fibonacci numbers to print and then prints that many. [use while and for loop] 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89 . .

6) Write a Python program that computes the factorial of a number. The factorial, n!, of a number n is the product of all the integers between 1 and n, including n. For instance, 5! = 1 x 2 x 3 x 4 x 5 = 120. [use while and for loop].

7) Write a Python program that asks the user to enter a string. The program should then print the following:
(a) The total number of characters in the string
(b) The string repeated 10 times
(c) The first character of the string (remember that string indices start at 0)
(d) The first three characters of the string
(e) The last three characters of the string
(f) The string backwards
(g) The seventh character of the string if the string is long enough and a message otherwise
(h) The string with its first and last characters removed
(i) The string in all caps
(j) The string with every a replaced with an e
(k) The string with every letter replaced by a space

8) At a certain school, student email addresses end with @student.college.edu, while professor email addresses end with @prof.college.edu. Write a Python program that first asks the user how many email addresses they will be entering, and then has the user enter those addresses. After all the email addresses are entered, the program should print out a message indicating either that all the addresses are student addresses or that there were some professor addresses entered.

9) Start with the list [8,9,10]. Write a Python program to do the following:
(a) Set the second entry (index 1) to 17
(b) Add 4, 5, and 6 to the end of the list
(c) Remove the first entry from the list

(d) Sort the list
(e) Double the list
(f) Insert 25 at index 3
The final list should equal [4,5,6,25,10,17,4,5,6,10,17]

10. Write a Python program that asks the user to enter some text and then counts how many articles are in the text. Articles are the words 'a', 'an', and 'the'.

Additional Exercises:

1) Write a Python program that asks the user to enter a length. The program should ask them what unit the length is in and what unit they would like to convert it to. The possible units are inches, yards, miles, millimeters, centimeters, meters, and kilometers. While this can be done with 25 if statements, it is shorter and easier to add on to if you use a two dimensional list of conversions, so please use lists for this problem.

2) A simple way of encrypting a message is to rearrange its characters. One way to rearrange the characters is to pick out the characters at even indices, put them first in the encrypted string, and follow them by the odd characters. For example, the string message would be encrypted as msaeesg because the even characters are m, s, a, e (at indices 0, 2, 4, and 6) and the odd characters are e, s, g (at indices 1, 3, and 5).
(a) Write a Python program that asks the user for a string and uses this method to encrypt the string.
(b) Write a Python program that decrypts a string that was encrypted with this method.