ITI1120D – Assignment 4
(100 points)

Purpose:

To allow you to exercise with a logical thinking process to formulate algorithms, and to implement the algorithms using the Python Programming Language. The logic will include inputs and outputs, lists, files, and functions. This is an individual assignment.

Questions:

Write a separate Python program for each of the following:

a. Create a method merge(list1, list2) that takes two lists, interleaves their contents into a new list, and returns that back. For example, if list 1 is [1, 2, 3] and list2 is [4, 5, 6], the method will return back a list that contains [1, 4, 2, 5, 3, 6].

b. Create a program that reads the name of an input file, processes it, and outputs to the screen a histogram of all the characters in the file. Upper case characters and lower case are different, as well as special characters like space. For example, if the file contains "This is a sample", the output will be as below. You can create the text file yourself to test your program.

Character	Count
T	1
h	1
i	2
s	3

and so on …

c. Create a method *outputGrid*(x) that prints the following values to the screen. You must use loops.

x	2*x	3*x	4*x
5*x	6*x	7*x	8*x
9*x	10*x	11*x	12*x

d. Create a method called *primes(x)* that returns back a list that contains all prime numbers starting from 2 all the way to x (inclusive). For example, if x is 8, the list will contain 2, 3, 5, 7. If x is less than or equal to 1, you should return back an empty list. Part of the logic of your function needs to be able to compute whether any given number is prime or not (you cannot simply hard code all the list of prime numbers up to a certain limit and use them).

e. Create a method called *encrypt (source, destination)* that reads the contents of a source file and encrypts its contents into the destination file by simply reversing its contents such that the first character in the source file becomes the last in the destination file, and so on. For example, if the source file contains “Hello”, the destination file will contain “olleH”.

You will be graded as follows for each problem (20 points each):

- 10 points for the correctness of the logic.
- 2 points for using proper usage of meaningful names for variables.
- 2 points for documentation (inserting proper comments).
- 2 points for an efficient implementation of your logic.
- 4 points for a professional judgment of your overall solution.