Exercises: Lists, Tuples, Dictionaries, and Sets

For all the exercises you should write a test program as well as the program itself. NB The test program may well be bigger and more complex than the program itself!

Part A

Write a Python module that provides two functions that calculate a sequence of prime numbers. One of the functions should calculate primes up to a given value, the other function should calculate a given number of primes.

A prime number is a number whose only factors are 1 and the number itself.

The first 10 primes, and the primes less than 30 are: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29.

Part B

Write a Python program that can take a list of directories as parameters, defaulting to the current directory if there are no parameters, and finds, counts and prints the path of all files ending with a .py extension.

Part C

Write a Python program that can take a list of directories as parameters, defaulting to the current directory, which counts the number of files of each extension present in the tree.

Part D

Write a Python program that processes command line options, providing variables that can be used to control further execution. Options to process should include:

> -h and –help for printing out a usage statement.
> -v and –verbose for making execution verbose.
> -q and –quiet for making execution quiet, i.e. anti-verbose.

Execution is normally in the 'normal' state, quiet and verbose mode change the amount of output that will be done.

Part E

Extend the program from Part D so that there can be any number of quiet and verbose options on a command line and their effect is cumulative. So the verbosity level is an integer and each quiet option decrements the verbosity and each verbose option increments it.