

## COMP 690 Data Fusion Fall 2008 Programming Assignment 1

Due in the digital drop box by 11:00 PM on Wednesday, Sept. 3

1. Write a Python program that reads in names and corresponding incomes (integers, without a '\$' or commas,) and makes a dictionary of the associations. You can prompt the user first for how many name-income pairs (s)he wants to enter. Use `raw_input()` for input. Define functions that do the following.

- Passed the dictionary, return the average income in the dictionary
- Passed the dictionary, output the dictionary as a nicely formatted table
- Passed a name, return the name and associated income
- Passed a name and an increment, add that increment to the value associated with that name in the dictionary.
- Passed a new name and a new income, add the association of the two to the dictionary

The script should contain a loop that repeatedly outputs a menu that allows the user to choose one of these functions or to exit the loop. Sometimes the user will have to be prompted for values to be passed to the selected function. (The functions themselves should not read values from the terminal.) Some functions produce output, some return values (which must be output by the caller), and some simply update the dictionary. Functions should check for valid input parameter values and take appropriate actions when an input value is invalid.

2. Write a Python program that prompts for and inputs two lists, *A* and *B* of integers. It then outputs the following

- The list of elements in *A* but not in *B*
- The list of elements in *B* but not in *A*
- The list of elements in both *A* and *B*
- The list of elements in *A* that are greater than the corresponding (by position) elements in *B*. If *minL* is the length of the shorter list, then consider only the first *minL* elements in each list.
- The mean of the values in *A*
- The sample standard deviation of the values in *A* (calculated in the same pass over the values as the mean –see the formula below)
- The square root of the sum of the squares of the differences between the corresponding (by position) elements. Again, consider only the first *minL* elements in each list.

$$s = \sqrt{\frac{N \sum_{i=1}^N x_i^2 - \left(\sum_{i=1}^N x_i\right)^2}{N(N-1)}}$$