CSCA20 - Lab 8

CSV to Pretty Graphs

Learning Objectives

Now that we've covered all the cool things you can do with Python directly, it's time to practice using external tools to push the boundaries of what's possible. This lab has a lot to do, but if you focus on small pieces at a time, it's manageable.

Prelab

To make the most of your time in the lab, spend some time beforehand making some simple plots in matplotlib. Play around and make sure you're comfortable with looking up examples on the website and putting them into practice.
You should also complete a function that will take in a csv file, and the title of two of the columns, and (using the imported CSV module) returns a dictionary mapping one column to another. (see functions for more detail)

Demonstration & Evaluation

In this lab, you will have the opportunity to demonstrate loops, selection, loops + selection, lists, documentation (internal + external), functions, file I/O, dictionaries, CSV files and 3rd party tools.

The Scenario

The Universally Tallying Shopping Cart (UTSC) is an application that tracks purchases by users, and compares those purchases against that user's budget, with nice graphs to show who is buying what products, when they are buying them, and who is exceeding their weekly budget. Your job is to build this app.

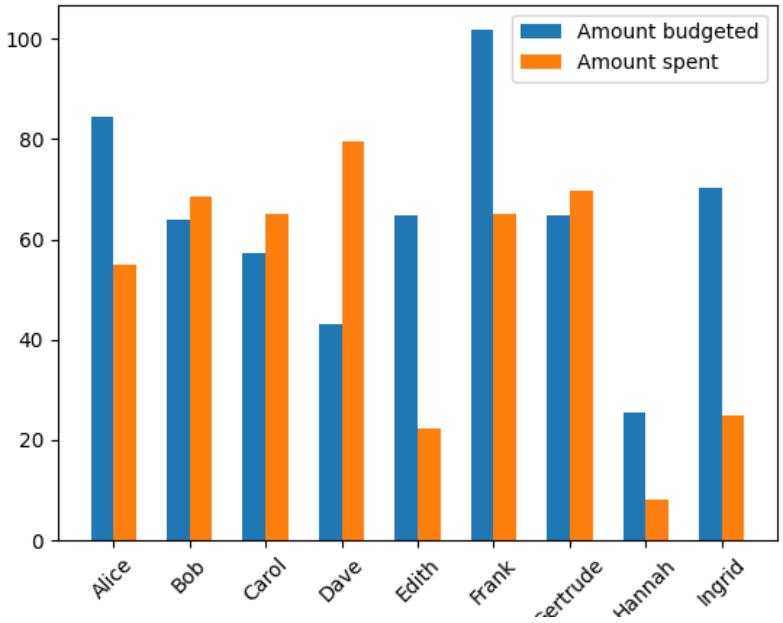

Figure 1: An Example Output Graph (You don't have to replicate this exactly, but the basics should be there)

Data Files

You have been provided with 3 example files:

- a budget file with information about individuals and their weekly budget
- a price file with items for sale and the cost of each item[1]
- a purchases file that shows who used the cart on each day, and which items they bought

Completing the lab

In order to demonstrate all relevant skills, you will need to build a program that generates a menu, allows the user to choose files, produces appropriate data structures, and produces a graph showing the budget and expenditure for each person (See Figure 1 for an example). Also, your code must make appropriate use of functions to break up tasks into smaller sections and avoid repeated code.

Steps in the code

This program is complicated, so let's break it down into smaller pieces

[1] As a 'behind the scenes' peek... I used random to build these files, so a lot of the prices won't make sense, but they're just examples

- User I/O - prompt the user for a budget file, a price file and a purchases file. You may assume that the input files are correctly formatted and contain no errors
- Functions - you will need at least one function that will take in a csv file, and the title of two of the columns, and (using the imported CSV module) returns a dictionary mapping one column to another. For example, taking in prices.csv, 'food item', and 'price', would return a dictionary mapping food items to prices. You may want other functions as well (e.g., it's probably a good idea to build one or more functions to draw the various graphs)
- Dictionaries - Once you have a dictionary mapping names to budgets and food items to prices, the next step you'll likely want to cover is going over the budget file to build a dictionary that will map names to total expenditure.
- Matplotlib - Producing graphs is finicky. Matplotlib isn't the easiest tool to use, but on the plus side, odds are that any graph you want to make, someone else has already made and provided code on how they made it. So try to find examples you can tinker with to learn how it works rather than trying to learn every little detail of the tool.