

CS 620–Introduction to Data Science and Analytics, HW2

For this problem you will use part of the actual customer dataset called “custdata.tsv” which contains 1000 records of customer data including the income, marital status, and other information. Here, “tsv” stands for tab-separated values. That means, instead of commas, the fields are separated using tabs.

Start with the skeleton code provided. Do not modify the function syntax.

i. **(30 pts)** By using the data from “custdata.tsv”, do the following.

- a. Extract a subset of customers that are married and has an income of more than \$50,000. `def married_with_50k_income`
- b. What percentage of them have health insurance? `def percentage_insured`
- c. How many of them have recently moved to Florida? `def num_moved_to_fl`
- d. How many of them are homeowners younger than 40? `def num_homeowners_below_40`

ii. **(30 pts)** By using the subset calculated from part (i), do the following.

- a. Assume that all customers are married filing jointly for their tax. If the standard deduction for Married Filing Jointly is \$24,800, write a function to calculate the taxable income of a customer. `def taxable_income`
- b. Using the part (a) taxable income, write a function to calculate the total tax that a customer is supposed to pay for the IRS. `def compute_tax`

You’ll be using the following tax brackets for your calculations.

Taxable Income Brackets	Tax Rate	Tax
0-20,000	0 if income is less than \$20,000. Otherwise 10%	2,000
20,001-80,000	12%	7,200
80,001-160,000	22%	17,600
160,001-300,000	24%	33,600
300,001-400,000	32%	32,000
400,001-600,000	35%	70,000
600,001 or more	37%	

For example, if your taxable income is \$350,000 then you’ll use the following equation to generate the tax amount, where S is the Start of the income bracket, R is the tax rate and A is the total tax amount owes from previous brackets.

$$\text{tax} = (\text{income} - S) * R + A$$

$$\text{tax} = (350,000 - 300,001) \times 32\% + 60,400 = \$76,399.68$$

- c. Use the functions from part (a) and (b) to calculate the tax amount owed by each customer and append them into a list. `def calculate_taxes_owed`

What to turn in: Update and commit your .py file through GitHub Classroom.

Your file should contain the following information at the top.

```
CS620
HW2
@author
```

Due: Sunday, Feb. 14, 11.59pm