

Write a Program: Invoice Revisited

Use Assignment 4 as your starting point.

A customer makes a purchase at the store. The tax rate is 8% on all purchases except groceries. The store offers a 5% discount to seniors 60 and over. You should ask the user three questions:

1. what they have bought: use a menu displaying choices from 1 to 10: Bread, Milk, Soap, Eggs, Deodorant, Juice, Chips, Forks, Spoons, and Cups,
2. what the purchase price is, and
3. how old they are.

You should define a function that maps the choice (number) to the item (string), and output the menu using a loop that calls this function.

You should define two functions for getting input values from the user, one for integer values and one for double values. Each one should prompt the user to enter a value, read it from the console, and return it. Your program should call one of these functions for any input you need from the user.

You should validate the user input for the choice using a loop and printing an error message if the choice is invalid.

You should define a function that takes a choice (number) and returns true if this choice is taxable and false otherwise. Your program should call this function when you compute the tax for the purchase.

You should define a function that formats and prints each line of the invoice. Your program should call this function for each line of the output.

Your goal is to print a formatted invoice with the following line items: purchased item, tax, discount, and total. The discount should only be printed if applicable.

You should test your program with 4 data sets: with and without tax and with and without the senior discount. The first data set should also test an invalid choice of the menu item on both sides of the valid interval.

You can earn **2 points** of extra credit if you define a function that prints each line of the menu and in turn calls the choice-to-item mapping function. Your menu printing loop will then use this function instead (this is optional).

Your program should have the following:

- Include 4 comment lines at the top: description of the program, author, section, and date. **(1 point)**
- Create as many variables as you need, use the appropriate type, name them appropriately (camelback notation preferred), and remember to not leave them uninitialized. **(1 points)**
- Create named constants for what's appropriate. Decide what constants need to be in the global scope. Use the standard convention for constant names. **(2 points)**
- Define the 5 functions as described above. **(2 points each)**
- Display a menu to the user using a loop, read their choice from the console, and validate their input. This should use 2 functions you defined. **(2 points)**
- Ask the user for the purchase price and for their age and read them from the console. This should use 2 functions you defined. **(1 point)**
- Use conditional statements to calculate the tax and the discount based on the user input. Both tax and discount are calculated as a percentage of the price entered by the user. The tax calculation should use one function you defined **(2 points)**
- Output the invoice. All amounts should have two digits after the decimal point and be aligned into a column. Each line should be formatted and printed using one function you defined **(2 points)**
- Include your console output using the four data sets described above. All four runs must be present in the submission. **(2 points)**

Notes:

- Your program should produce one output when it runs, not all four, but you should run your program four times with different data.
- Pay attention to where you create and how you initialize your variables. Unsafe code is an automatic **1-point** deduction.
- Comment your code. Uncommented code is also an automatic **1-point** deduction.

Example Output:

Note: Only two data sets are shown – you still need to have all four

```
What would you like to buy?
1. Bread:
2. Milk:
3. Soap:
4. Eggs:
5. Deodorant:
6. Juice:
7. Chips:
8. Forks:
9. Spoons:
10. Cups:
Please enter choice: 0
Sorry, 0 wasn't a valid choice
Please enter choice: 11
Sorry, 11 wasn't a valid choice
Please enter choice: 10
Please enter price: 5.95
Please enter age: 60
```

```
      Invoice
Cups:      $5.95
Tax:       $0.48
Discount:  $-0.30
Total:     $6.13
```

```
What would you like to buy?
1. Bread:
2. Milk:
3. Soap:
4. Eggs:
5. Deodorant:
6. Juice:
7. Chips:
8. Forks:
9. Spoons:
10. Cups:
Please enter choice: 6
Please enter price: 3.50
Please enter age: 21
```

```
      Invoice
Juice:     $3.50
Tax:       $0.00
Total:     $3.50
```