CS 1101 A-Term 2022 Engling Ahrens Bohrer

Homework 3 - Writing functions for Lists of Structs (190 Points)

Due: Tuesday, September 20 at 1:00 pm

Read the Expectations on Homework posted on Canvas.

Assignment Goals

- To be able to define a list of structures
- To make sure you can write functions for lists of structs

The Assignment: Data Definitions and Functions for Lists of Structs

That's Entertainment is our local "pop culture emporium". In the following problems, you will write data definitions and functions that model the purchases of merchandise bought by That's Entertainment's customers.

1. **(20 Points)** Purchased merchandise listings contain the **name** of the various item sold, the **kind** (action figure, board game, costume, manga/comic book, trading card, etc.), whether or not the item is **autographed?**, the **quantity** of items sold, and the **price** of a single item. Provide a data definition for **Merchandise** that represents the given information.

   Give at least 3 examples of merchandise.

2. **(5 Points)** Write the template for functions over merchandise.
   (Or merchandises? -- English is weird.)

3 **(10 Points)** Define a **Receipt** (a ListOfMerchandise).
   Give at least two examples of receipts.
   Your lists should contain more than a single merchandise.

4 **(5 Points)** Write the template for functions over a receipt (a ListOfMerchandise).

As you develop the following functions over receipts, develop auxiliary (helper) functions over merchandise items.

5. **(30 Points)** Develop a function *list-cheap-autograph* that consumes a receipt and a number (representing a threshold cost) and produces a receipt. The receipt that is produced contains only those items from the original receipt that are autographed and that cost no more than the number given. (Do not count duplicates here, just distinct merchandise items from the receipt, i.e. ignore quantity.)

6. **(30 Points)** Develop the function *count-trading-cards*, that consumes a receipt and returns the total number of items in the order that are trading cards. When calculating the total number of trading cards, you must take into account the quantity of each merchandise item.

7. **(30 Points)** Develop a function *receipt-total*. The function consumes a receipt and produces the total cost of all the merchandise items (a number). When calculating the total cost, you must take into account the quantity of each item ordered.

8. **(30 Points)** Develop a function *board-games-cost* that consumes a receipt and produces a number. The function calculates the total cost of all the board games contained in the receipt. (Again, taking quantities into account).

9. **(30 Points)** Develop a function called *halloween-sale*. The function consumes a receipt and a number representing the discount on costume items (in decimal form). The function produces the total cost of the receipt, with the discount applied only to costume merchandise. Example: 25% discount is entered as 0.25.

What to Turn In

The rubric the graders will use for Homework 3 is posted below this assignment on Canvas. Programs must run in order to receive credit.

Note that code that is commented out will not be graded.

Using Canvas, turn in a single file containing all code and documentation for this assignment.

Name your file according to the naming conventions posts in the Assignments block on Canvas.

Make sure your name(s) and login(s)--for both partners, if applicable--appear at the top of the file in a comment.