

CENG 212

Programming Assignment 1

In this programming assignment, you are supposed to write a Scheme (Racket) program. For the given transaction data tables, you should implement expected functionalities.

Functions:

- Retrieve all items: Return a list of all unique items.
- Retrieve all categories: Return a list of all unique categories.
- Retrieve items by category: Take a category name as input and return a list of items belonging to that category.
- Get Customer Information: Retrieve information about a specific customer by providing their name as an argument.
- Get Item Information: Retrieve information about a specific item by providing its name as an argument.
- Most expensive item: Find the most expensive item.
- Cheapest item: Find the cheapest item.
- Total cost of items: Calculate the total cost of all items purchased for a specific customer by providing their name as an argument.
- Items bought by a specific customer: Retrieve all items bought by a specific customer.
- Total cost of transactions: Calculate the total cost of all transactions.
- Items purchased on a specific date: Retrieve all items purchased on a specific date.
- Revenue by category: Calculate the total revenue generated by each category.
- Most popular category: Determine the most popular category based on the number of items sold.
- Items purchased by age group: Retrieve all items purchased by customers within a certain age range.
- Average spending per transaction by location: Calculate the average spending per transaction in each location.

You should also add one example usage for each function. If possible, you should implement higher-order functions. Also, please note that implementation of each function changes according to definition of the transaction data.

Submission Rules

The submission must:

- be performed via Microsoft Teams
- be a scheme file that contains the source code
- include comments if necessary
- follow a specific naming convention: HW1_212_ID.scm (for example: HW1_212_100201001.scm)
- be submitted before the due date

Submissions that do not comply with the rules above are penalized.

Tables:

Customer	Age	Location
John Smith	35	New York
Alice Johnson	28	Los Angeles
Michael Brown	45	Miami
Emily Davis	32	Houston
Robert Wilson	40	Miami
Sophia Martinez	30	New York
William Taylor	38	Houston
Emma White	25	Los Angeles
James Harris	32	Houston
Olivia Clark	29	Los Angeles

Item	Category	Price
Apples	Fruits	2.30
Coffee	Beverages	3.50
Bread	Bakery	2.00
Milk	Dairy	3.50
Bananas	Fruits	1.75
Eggs	Dairy	4.75
Orange Juice	Beverages	3.25
Tea	Beverages	2.75
Fish	Seafood	12.50
Broccoli	Vegetables	1.80
Orange	Fruits	1.25
Chicken	Meat	7.00
Lettuce	Vegetables	1.20
Pasta	Pantry	3.75
Salmon	Seafood	9.50
Yogurt	Dairy	2.75
Bacon	Meat	6.25
Cheese	Dairy	5.50
Beef	Meat	8.00
Potatoes	Vegetables	2.50
Chicken Soup	Canned Goods	3.50
Rice	Grains	2.25
Carrots	Vegetables	1.10
Spinach	Vegetables	1.60
Tomatoes	Vegetables	1.50
Apple Juice	Beverages	3.40
Onions	Vegetables	1.20

Customer	Items	Date
John Smith	Apples, Coffee, Bread	15.03.2024
	Milk, Bananas	22.03.2024
	Eggs, Orange Juice	29.03.2024
	Tea, Fish, Broccoli, Orange	5.04.2024
	Chicken, Lettuce, Pasta, Salmon	12.04.2024
Alice Johnson	Milk, Bananas	20.03.2024
Michael Brown	Orange Juice, Yogurt	24.03.2024
	Bacon	28.03.2024
	Coffee, Bread, Apples	2.04.2024
	Milk, Bananas, Eggs	5.04.2024
	Cheese, Beef, Potatoes, Chicken Soup	10.04.2024
Emily Davis	Chicken, Lettuce	24.03.2024
	Pasta, Salmon, Rice, Potatoes	28.03.2024
	Carrots, Spinach	1.04.2024
Robert Wilson	Salmon, Rice	21.03.2024
	Potatoes, Chicken, Lettuce, Pasta	25.03.2024
	Milk, Bananas, Eggs, Orange Juice	29.03.2024
	Bacon	2.04.2024
	Fish, Broccoli	6.04.2024
Sophia Martinez	Carrots, Spinach	26.03.2024
	Tea, Fish, Broccoli, Orange	30.03.2024
William Taylor	Beef, Potatoes	19.03.2024
	Chicken Soup, Tomatoes, Apple Juice, Bread	23.03.2024
Emma White	Tomatoes, Chicken Soup	23.03.2024
	Milk, Salmon, Rice, Potatoes	27.03.2024
	Chicken, Lettuce, Pasta, Salmon	31.03.2024
James Harris	Onions, Apple Juice	25.03.2024
	Cheese, Beef, Potatoes, Chicken Soup	29.03.2024
Olivia Clark	Fish, Broccoli	25.03.2024
	Orange, Chicken, Lettuce, Pasta	29.03.2024