Assignment “Web-Shop”

Implement a web-shop enabling users to search items, add and delete items to the shopping cart and calculate the sum of all items in the shopping cart.

Abstract

Implement the application by using the Scala programming language.
To get started quickly we strongly recommend the official “Tour of Scala”:
https://docs.scala-lang.org/tour/tour-of-scala.html

Requirements

The application needs to cover the following functions:

- Add new items to the shopping cart
- Delete items from the shopping cart
- Search for items based on different criteria
- Calculate the sum of all items currently stored in the shopping cart

To achieve these functionalities we recommend a basic architecture which will be lay

1. Trait “Item”

An item in the application must implement the following variables:

```
var id: Int
var name: String
var value: Int
```

Please choose the getters and setters accordingly.

2. Trait “Logger”

To be able to log each single action in the web-shop you need to define the trait “Logger”.
Implement the trait in the file “Logger.scala” and expose the following method:

```
def logAction(actionName: String, name: String): Unit = { }
```

The logged string on the console needs to match the following string:

Laptop stored.

3. Class “StoreItem”

Implement the class “StoreItem” in the file “StoreItem.scala”.
The class needs to use the previously defined traits “Logger” and “Item” to inherit the methods and variables accordingly.

4. Trait “ShoppingCart”

Implement the trait “ShoppingCart” in the file “ShoppingCart.scala” and expose the following methods:

1. `def delete(id: Int): Array[StoreItem]`
2. `def search(name: String): Array[StoreItem]`
3. `def sortByValueAsc(): Array[StoreItem]`
4. `def sortByValueDesc(): Array[StoreItem]`
5. `def store(item: StoreItem): Array[StoreItem]`
6. `def sumUp(): Int`

The class “Database” will implement the functionality of this trait.

5. Class “Database”

Implement the class “Database” in the file “Database.scala” which defines a private variable `storedItems`.

This variable needs to be able to store several items of type StoreItem - choose the type of this variable accordingly.

Hint:
The storage of items in a variable is volatile and does not need to be persisted to survive an application restart. In a production environment this constraint is of course way more strict and the items stored in the shopping cart need to survive application restarts.

Implement the methods defined in trait “ShoppingCart” in the class “Database”.

1. Search

The “search” method receives the parameter name of type String. The function compares each single item stored in the storedItems array by matching the attribute name with the passed name parameter and returns all matching items.
Be sure to call the method logAction on the matching storeItems to print the message on the console.

Sample output:
```
> PC found
```
If the item was not found, print out the following error message:
```
> PC not found
```

2. Store

The method “store” receives an item of type StoreItem as parameter. Add the passed item to the storedItems array and return the new array as result.
Call the method logAction on the added item to print out the message on the console.
Sample output:
```
> Laptop stored
```

3. SumUp

The method “sumUp” returns a result of type Int. The function sums up all values of the items in storedItems and returns the result.

4. FilterByName

The method “filterByName” filters - as the name implies - results by name. The method takes two parameters: name of type String and items of type Array[StoreItem]. The method then filters the passed items by matching the name attribute of each item with the passed name parameter. The results are then sorted by ascending value.

Application

Implement the main application MainApp in the file MainApp.scala. Use an Object with a suitable method to define the main entry point in the application.
The next step is to create a new instance of the class Database.
After successfully creating the instance, read the data.csv file and iterate through all the lines.
For a detailed output refer to Appendix A.

Hint:
The data.csv file is already available in the same directory as your source code and must not be provided. You can find the code for the CSV loading in MainApp.scala. The first line in the data.csv file is the so called "header line" and needs to be skipped. Be sure to handle this accordingly.

The file contains 29 items and each single item needs to be stored in the database instance by using the previously implemented methods.

After successfully storing all items in the database call the method `db.sumUp()` and print the result on the console.
Begin this new section with
```
> - - - SUM UP - - -
```
to indicate a new section. Refer to Appendix A for a detailed sample output.

Now filter all items by the name "ASUS" and sort the results by value ascending.
Print out the name of each item in a new line. Finally print out the number of filtered items in the console.
Begin this new section with
```
> - - - FILTERED BY ASUS - - -
```
Sample output:
```
> "ASUS Chromebook CX1 15.6"" FHD N3350 8GB/64GB eMMC ChromeOS"
> "ASUS ExpertBook 11.6"" HD Touch N6000 4GB/64GB eMMC Win10 Pro"
```

In the next step filter all items by the name "Lenovo" and sort the results by value ascending.
Print out the name of each item in a new line. Finally print out the number of filtered items in the console.
Begin this new section with
```
> - - - FILTERED BY Lenovo - - -
```
Sample output:
```
> "Lenovo IdeaPad 3 Chromebook 14APO 14""FHD 3015C 4GB/64GB eMMC ChromeOS"
> "Lenovo IdeaPad 3 Chromebook 15IJL 82N4000XGE 15""FHD N4500 4GB/64GB
ChromeOS"
```

Finally filter all items by the name “HP” and sort the results by value ascending.
Print out the name of each item in a new line. Finally print out the number of filtered items in the console.
Begin this new section with

```
> - - - FILTERED BY HP - - -
```

Sample output:

```
> "HP Chromebook 14"" FHD IPS Laptop N5030 4GB/64GB eMMC ChromeOS"
> "HP 15.6"" FHD Notebook silber N4500 4GB/128GB SSD Windows 11 S"
```

For a detailed output refer to Appendix A.

In the last step sort all items by value descending and print out the name and the value of each item in a new line.
Sample output:

```
> "Lenovo IdeaPad 3 Chromebook 15IJL 82N4000YGE 15""FHD N6000 4GB/128GB
ChromeOS" 338
> "HP Laptop 15.6"" FHD R3-3250U 8GB/256GB SSD Windows 11" 328
```

For a detailed output refer to Appendix A.

Submission

Deadline: **Wednesday, 11.01.2023 12:00** on the online platform.

Do not use any packages in your submission - define all classes and objects in the default package.

For a positive submission you need to pass in the (Scala) application before the deadline on the online platform.
Further information can be found in the course and on Moodle.

Appendix A

```
"ASUS Chromebook CX1 15.6"" FHD N3350 8GB/64GB eMMC ChromeOS" stored
"DELL Inspiron 15 3502 G426X 15.6"" FHD N5030 4GB/128GB SSD Win10S" stored
"ASUS ExpertBook 11.6"" HD Touch N6000 4GB/64GB eMMC Win10 Pro" stored
"Lenovo IdeaPad 3 Chromebook 14APO 14""FHD 3015C 4GB/64GB eMMC ChromeOS" stored
"HP Chromebook 14"" FHD IPS Laptop N5030 4GB/64GB eMMC ChromeOS" stored
"Lenovo IdeaPad 3 Chromebook 15IJL 82N4000XGE 15""FHD N4500 4GB/64GB ChromeOS" stored
"Lenovo IdeaPad 1 11IGL 11""HD N4020 4GB/128GB SSD Win10 S" stored
"Acer Chromebook Spin 511 11"" HD N4120 4GB/32GB eMMC 2in1 ChromeOS" stored
"HP 15.6"" FHD Notebook silber N4500 4GB/128GB SSD Windows 11 S" stored
"Campus: HP Education Special 15.6"" FHD silber N4500 4GB/128GB SSD Win11 S" stored
"HP 15.6"" FHD Laptop silber N4500 4GB/128GB SSD Win11 S" stored
"ASUS VivoBook 14"" FHD blau Celeron N4500 4GB/128GB eMMC Win10 S" stored
"Acer Chromebook Spin 311 11.6""HD TS MT8183 4GB/64GB eMMC ChromeOS" stored
"Acer Aspire 3 15.6"" FHD Notebook N5100 4GB/256GB SSD DOS" stored
"Acer Chromebook 314 14""HD N4100 4GB/64GB eMMC ChromeOS" stored
"HP 15.6"" FHD IPS schwarz Pentium Gold 7505 8GB/256GB SSD DOS" stored
"ASUS Chromebook Flip CR1 11.6"" HD N4500 4GB/64GB eMMC ChromeOS" stored
"Lenovo IdeaPad 3 Chromebook 14APO 14""FHD Touch 3015C 8GB/128GB eMMC ChromeOS" stored
"Lenovo IdeaPad 3 14ITL 14""FHD 7505 4GB/128GB SSD Win10 S" stored
"HP Chromebook 14"" HD Touch R3-3250U 8GB/64GB eMMC ChromeOS" stored
"Lenovo Chromebook Flex 5 13ITL 82M7001MGE 13""FHD i3-1115G4 4GB/128GB ChromeOS" stored
"Lenovo Chromebook Flex 5 13ITL 82M70029GE 2in1 13""FHD 7505 4GB/128GB ChromeOS" stored
"Lenovo IdeaPad 3 14ITL 82H700CCGE 14""FHD 6305 4GB/128GB SSD Win10 S" stored
"Acer Chromebook 311 11.6"" HD IPS A73/A53 4GB/32GB eMMC ChromeOS" stored
"Acer Aspire 1 15.6"" FHD schwarz N4120 4GB/128GB eMMC Win11 S" stored
"HP 15s-fq3402ng 15"" FHD" stored
"HP Laptop 15.6"" FHD R3-3250U 8GB/256GB SSD Windows 11" stored
"HP 250 G8 15.6"" FHD IPS N5030 8GB/1TB HDD" stored
"Lenovo IdeaPad 3 Chromebook 15IJL 82N4000YGE 15""FHD N6000 4GB/128GB ChromeOS" stored
--- SUM UP ---
8387
--- FILTERED BY ASUS ---
"ASUS Chromebook CX1 15.6"" FHD N3350 8GB/64GB eMMC ChromeOS"
"ASUS ExpertBook 11.6"" HD Touch N6000 4GB/64GB eMMC Win10 Pro"
"ASUS VivoBook 14"" FHD blau Celeron N4500 4GB/128GB eMMC Win10 S"
"ASUS Chromebook Flip CR1 11.6"" HD N4500 4GB/64GB eMMC ChromeOS"
4
--- FILTERED BY Lenovo ---
"Lenovo IdeaPad 3 Chromebook 14APO 14""FHD 3015C 4GB/64GB eMMC ChromeOS"
"Lenovo IdeaPad 3 Chromebook 15IJL 82N4000XGE 15""FHD N4500 4GB/64GB ChromeOS"
"Lenovo IdeaPad 1 11IGL 11""HD N4020 4GB/128GB SSD Win10 S"
"Lenovo IdeaPad 3 Chromebook 14APO 14""FHD Touch 3015C 8GB/128GB eMMC ChromeOS"
"Lenovo IdeaPad 3 14ITL 14""FHD 7505 4GB/128GB SSD Win10 S"
"Lenovo Chromebook Flex 5 13ITL 82M7001MGE 13""FHD i3-1115G4 4GB/128GB ChromeOS"
"Lenovo Chromebook Flex 5 13ITL 82M70029GE 2in1 13""FHD 7505 4GB/128GB ChromeOS"
"Lenovo IdeaPad 3 14ITL 82H700CCGE 14""FHD 6305 4GB/128GB SSD Win10 S"
"Lenovo IdeaPad 3 Chromebook 15IJL 82N4000YGE 15""FHD N6000 4GB/128GB ChromeOS"
9
--- FILTERED BY HP ---
"HP Chromebook 14"" FHD IPS Laptop N5030 4GB/64GB eMMC ChromeOS"
"HP 15.6"" FHD Notebook silber N4500 4GB/128GB SSD Windows 11 S"
"Campus: HP Education Special 15.6"" FHD silber N4500 4GB/128GB SSD Win11 S"
"HP 15.6"" FHD Laptop silber N4500 4GB/128GB SSD Win11 S"
```

"HP 15.6"" FHD IPS schwarz Pentium Gold 7505 8GB/256GB SSD DOS"
"HP Chromebook 14"" HD Touch R3-3250U 8GB/64GB eMMC ChromeOS"
"HP 15s-fq3402ng 15"" FHD"
"HP Laptop 15.6"" FHD R3-3250U 8GB/256GB SSD Windows 11"
"HP 250 G8 15.6"" FHD IPS N5030 8GB/1TB HDD"
9
--- SORTED ITEMS ---
"Lenovo IdeaPad 3 Chromebook 15IJL 82N4000YGE 15""FHD N6000 4GB/128GB ChromeOS" 338
"HP Laptop 15.6"" FHD R3-3250U 8GB/256GB SSD Windows 11" 328
"HP 250 G8 15.6"" FHD IPS N5030 8GB/1TB HDD" 328
"HP 15s-fq3402ng 15"" FHD" 327
"Acer Aspire 1 15.6"" FHD schwarz N4120 4GB/128GB eMMC Win11 S" 324
"Acer Chromebook 311 11.6"" HD IPS A73/A53 4GB/32GB eMMC ChromeOS" 310
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"Lenovo IdeaPad 3 14ITL 14""FHD 7505 4GB/128GB SSD Win10 S" 308
"HP Chromebook 14"" HD Touch R3-3250U 8GB/64GB eMMC ChromeOS" 308
"Lenovo Chromebook Flex 5 13ITL 82M7001MGE 13""FHD i3-1115G4 4GB/128GB ChromeOS" 308
"Lenovo Chromebook Flex 5 13ITL 82M70029GE 2in1 13""FHD 7505 4GB/128GB ChromeOS" 308
"Lenovo IdeaPad 3 14ITL 82H700CCGE 14""FHD 6305 4GB/128GB SSD Win10 S" 308
"HP 15.6"" FHD IPS schwarz Pentium Gold 7505 8GB/256GB SSD DOS" 299
"ASUS Chromebook Flip CR1 11.6"" HD N4500 4GB/64GB eMMC ChromeOS" 299
"Acer Chromebook 314 14""HD N4100 4GB/64GB eMMC ChromeOS" 297
"Acer Chromebook Spin 311 11.6""HD TS MT8183 4GB/64GB eMMC ChromeOS" 296
"Acer Aspire 3 15.6"" FHD Notebook N5100 4GB/256GB SSD DOS" 296
"ASUS VivoBook 14"" FHD blau Celeron N4500 4GB/128GB eMMC Win10 S" 289
"Acer Chromebook Spin 511 11"" HD N4120 4GB/32GB eMMC 2in1 ChromeOS" 277
"HP 15.6"" FHD Notebook silber N4500 4GB/128GB SSD Windows 11 S" 277
"Campus: HP Education Special 15.6"" FHD silber N4500 4GB/128GB SSD Win11 S" 277
"HP 15.6"" FHD Laptop silber N4500 4GB/128GB SSD Win11 S" 277
"Lenovo IdeaPad 1 11IGL 11""HD N4020 4GB/128GB SSD Win10 S" 267
"HP Chromebook 14"" FHD IPS Laptop N5030 4GB/64GB eMMC ChromeOS" 257
"Lenovo IdeaPad 3 Chromebook 15IJL 82N4000XGE 15""FHD N4500 4GB/64GB ChromeOS" 257
"Lenovo IdeaPad 3 Chromebook 14APO 14""FHD 3015C 4GB/64GB eMMC ChromeOS" 237
"ASUS ExpertBook 11.6"" HD Touch N6000 4GB/64GB eMMC Win10 Pro" 232
"DELL Inspiron 15 3502 G426X 15.6"" FHD N5030 4GB/128GB SSD Win10S" 229
"ASUS Chromebook CX1 15.6"" FHD N3350 8GB/64GB eMMC ChromeOS" 221