DSA

PROJECT REVIEW-3

“SHOPPING SUGGESTIONS”

BY

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Submitted to KAUSER AHMED P

GOOGLE DRIVE LINK FOR PROJECT CODE:
https://drive.google.com/file/d/1qxa3BSVUr30FhSvU8GDE0KlOQUd4RVJU/view

YOU TUBE LINK:
https://youtu.be/tV3x7dU-VPA

ABSTRACT:

* We all know that every field surrounding us are being digitalized.
* A lot of new ideas and new efficient algorithms are being published by many students during Hack a thons every year.
* Many of our daily life needs and activities are being enhanced by the new technologies and innovations leading us to next level civilization.
* Now-a-days many people have started using mobile phones and internet all over the world and their needs are being solved and enhanced by many software applications in the mobile phones.

* My Project “Shopping Suggestions” is to enhance the Online Shopping of the customer.
* Shopping is playing very important role in our daily life. And now-a-days many people have started shopping online.
* My project is to provide suggestions to the customer based on their previous online shopping lists and reviews.
* When customer wanted to do online shopping, products are suggested based on the review given by the customers in previous purchases. If the review of particular product is not good then it is least suggested.

PROBLEM STATEMENT:

* Especially while purchasing grocery items in online, these suggestions remember the customer so that they won’t miss any familiar items. If they miss to order any item while ordering bulk of items at a time then they have to order that particular item separately, this lead to extra delivery charge as that particular item is delivered separately.

* So these suggestions help the user to purchase good products and reduce the extra delivery charge. And users don’t have to spend lot of time in thinking of what they have missed while they are ordering many items at a time.

Aim:

To suggest some items based on previous inputs and offers. And analyzing the purchased datas.

Applicabiltiy:

This program can be used in apps based on Online Shopping. Users are suggested some items based on their interest and seasonal offers offered by retailers.

And Statistical Analysis of the customers interest of certain items in certain region may help retailers to predict the demand of certain products for future in that particular region. So this analysis and suggestions are helpful for both retailers and customers.

Project Plan:

For each and every purchase, collect the user data from both customer and shop keeper. Every customer data for each and every purchase is stored in a singly linked list. And offers of shop keeper are stored in a stack data structure.

Further assistence for customer input for each and every purchase is also provided like updating certain item they chosen before and deleting certain unwanted item from the linked list. All purchase linked list are stored in the source data structure for future use.

After taking offers from the shop keeper, search the items that are in that offer stack in the customer chosen items. Then print the offer suggestion items that have offers and not chosen by the customer.

For Suggest box suggestions, some statistical analysis on previous purchases are need to be made. In the alpha data structure which contain 26 nodes each for every alphabet used for hashing, I have defined average frequency , Variance of frequency. Those variable values are processed based on the singly linked list containing items having same initial letter attached to each and every node of alpha data structure. Frequency is number of times a certain item bought by the customer until now.

As the items in the singly linked list attached to nodes of alpha data structure increase with increase in number of purchases, we can’t suggest every previously purchased item which is worst quality suggestion.

So for quality suggestion,top most items in the nodes with high average frequency and low variance of frequency are suggested.

Time and space complexity handling also comes under project planing. I have used dynamic memory allocation for storing names of items instead array structure. And used hashing to reduce the search time for an item and used stack, linked list data structure so that nodes for details of items are created only when necesssary and deleted after done with that.I have used bubble sort algorithm for sorting the tempalpha structure and it is not dependent upon the input size as we need to just loop for 26 nodes.

Phases:

* Understanding the necessities of the problem.

* Determining the suitable data structures.

* Using efficient algorithm/solution.

* spliting the problem into small modules for easier updates.

* Implementing the project by programming.

* Analyzing the output for various inputs.

* Looking for further improvements or adding some more features.

* Finializing the program.

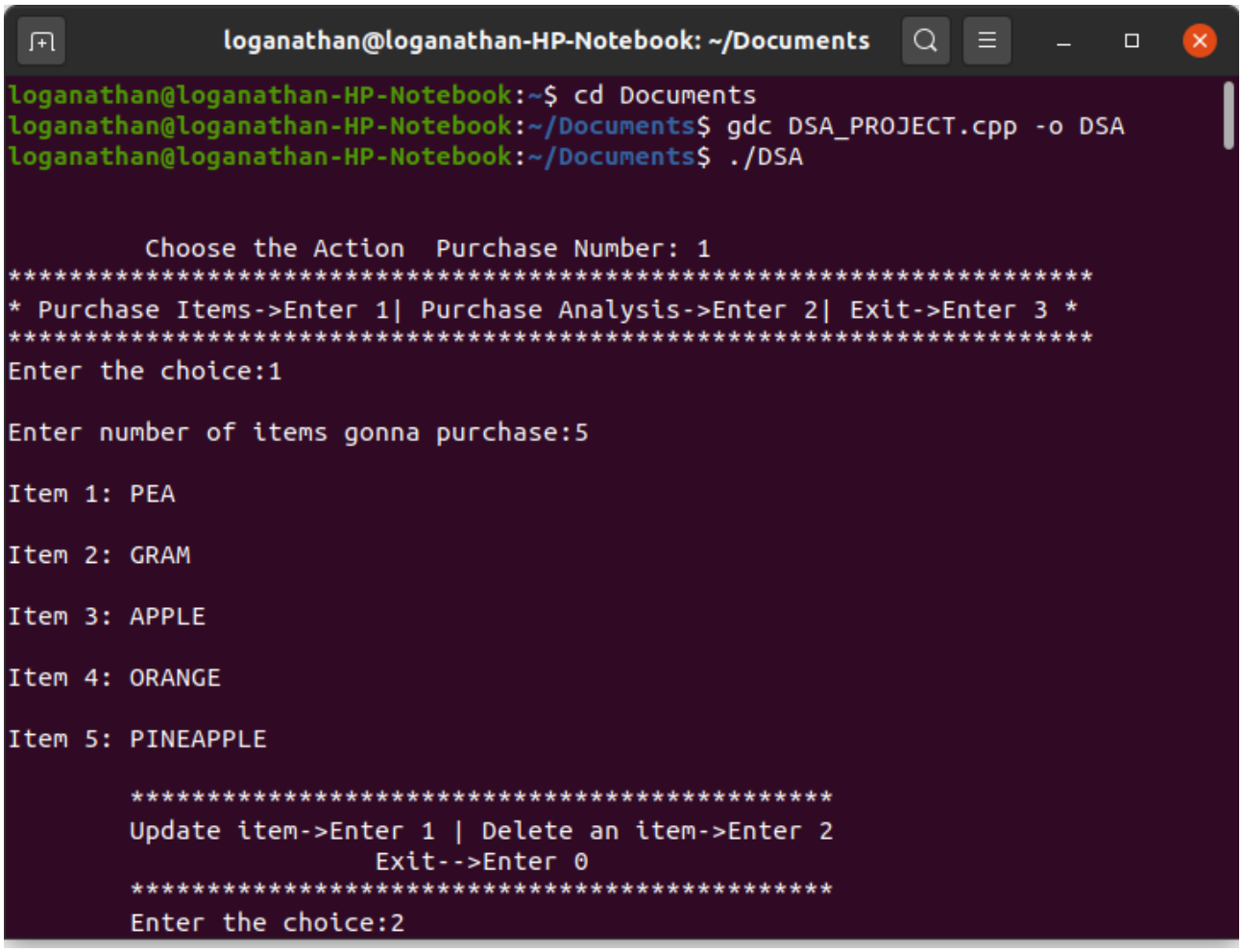
Implentation Details:

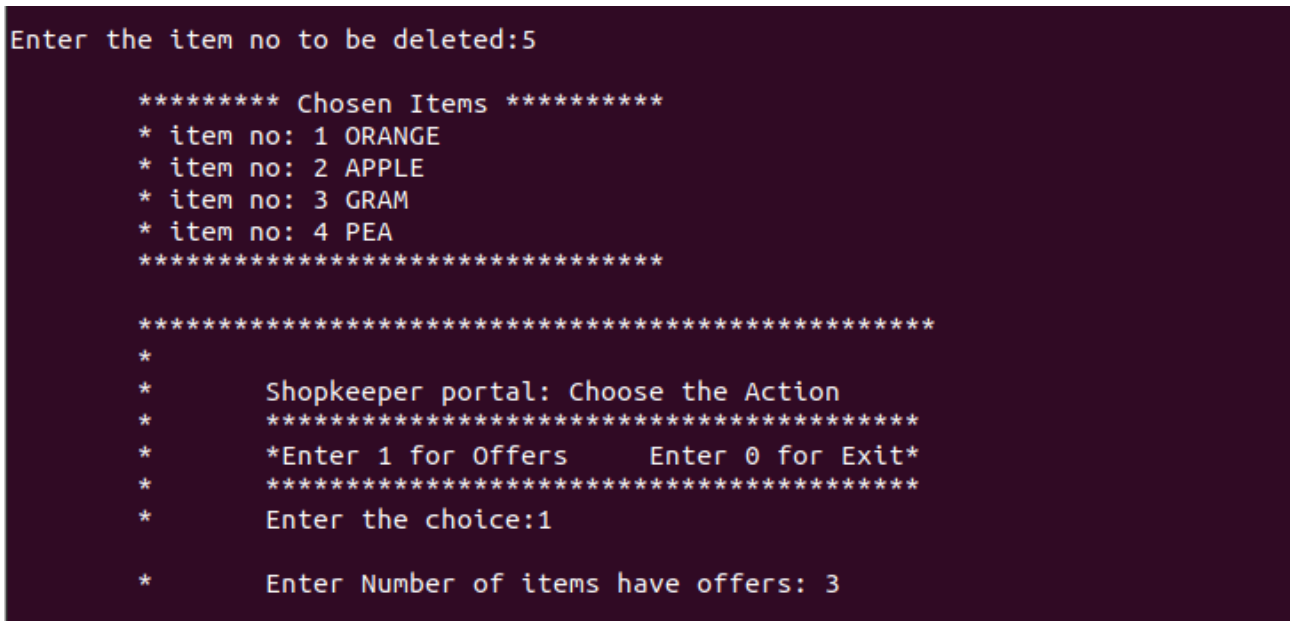
Programming Language: C++
Platform : Any C++ complier

CODE:

https://drive.google.com/file/d/1qxa3BSVUr30FhSvU8GDE0KlOQUd4RVJU/view

RUNNING PROGRAM:





```
        *       Item no. 1
        *               Item: PEA

        *               Discount: 4

        *       Item no. 2
        *               Item: SUGAR

        *               Discount: 9

        *       Item no. 3
        *               Item: ONION

        *               Discount: 7

        ************************************************

                        Offer Suggestions
  ************************************************************
  * Item             Discount  |  Item             Discount  *
  * ONION              7         SUGAR              9
  ************************************************************

                        Suggested Items
          ****************************************
          ****************************************
```

```
         Choose the Action  Purchase Number: 2
**************************************************************************
* Purchase Items->Enter 1| Purchase Analysis->Enter 2| Exit->Enter 3 *
**************************************************************************
Enter the choice:1

Enter number of items gonna purchase:6

Item 1: ONION

Item 2: GARLIC

Item 3: TOMOTA

Item 4: PINEAPPLE

Item 5: PEA

Item 6: GRAM

        ********************************************
        Update item->Enter 1 | Delete an item->Enter 2
                        Exit-->Enter 0
        ********************************************
        Enter the choice:1

Enter the item number to be updated:5

Enter the item:PEANUT

        ********* Chosen Items **********
        * item no: 1 PEANUT
        * item no: 2 PEA
```

```
* item no: 3 PINEAPPLE
* item no: 4 TOMOTA
* item no: 5 GARLIC
* item no: 6 ONION
*********************************

***********************************************
*
*       Shopkeeper portal: Choose the Action
*       ************************************
*       *Enter 1 for Offers     Enter 0 for Exit*
*       ************************************
*       Enter the choice:1

*       Enter Number of items have offers: 4

*       Item no. 1
*               Item: PEA

*               Discount: 8

*       Item no. 2
*               Item: APPLE

*               Discount: 9

*       Item no. 3
*               Item: GREENGRAM

*               Discount: 6

*       Item no. 4
*               Item: PEANUT
```

```
*               Discount: 3

***********************************************

                Offer Suggestions
************************************************************
* Item            Discount  |  Item            Discount  *
* GREENGRAM         6         APPLE             9
************************************************************

                Suggested Items
        ****************************************
        *    ORANGE                GRAM
        *    APPLE
        ****************************************
```

```
        Choose the Action  Purchase Number: 3
**********************************************************************
* Purchase Items->Enter 1| Purchase Analysis->Enter 2| Exit->Enter 3 *
**********************************************************************
Enter the choice:1

Enter number of items gonna purchase:4

Item 1: GRAM

Item 2: NUT

Item 3: GROUNDNUT

Item 4: ORANGE

        ******************************************
        Update item->Enter 1 | Delete an item->Enter 2
                        Exit-->Enter 0
        ******************************************
        Enter the choice:0

        ********* Chosen Items **********
        * item no: 1 ORANGE
        * item no: 2 GROUNDNUT
        * item no: 3 NUT
        * item no: 4 GRAM
        *********************************
```

```
       ************************************************
       *
       *       Shopkeeper portal: Choose the Action
       *       ************************************
       *       *Enter 1 for Offers     Enter 0 for Exit*
       *       ************************************
       *       Enter the choice:1

       *       Enter Number of items have offers: 1

       *       Item no. 1
       *               Item: ORANGE

       *               Discount: 9

       ************************************************

                       Offer Suggestions
 ************************************************************
 * Item             Discount  |  Item             Discount  *
 ************************************************************

                       Suggested Items
         ****************************************
         *    TOMOTA                APPLE
         *    PEA                   PEANUT
         *    PINEAPPLE             ONION
         *    GARLIC
         ****************************************
```

```
        Choose the Action  Purchase Number: 4
**********************************************************************
* Purchase Items->Enter 1| Purchase Analysis->Enter 2| Exit->Enter 3 *
**********************************************************************
Enter the choice:1

Enter number of items gonna purchase:3

Item 1: PEA

Item 2: GRAM

Item 3: APPLE

        *******************************************
        Update item->Enter 1 | Delete an item->Enter 2
                        Exit-->Enter 0
        *******************************************
        Enter the choice:2

Enter the item no to be deleted:2

        ********* Chosen Items **********
        * item no: 1 APPLE
        * item no: 2 PEA
        *********************************
```

```
        ************************************************
        *
        *       Shopkeeper portal: Choose the Action
        *       ************************************
        *       *Enter 1 for Offers     Enter 0 for Exit*
        *       ************************************
        *       Enter the choice:0

        ************************************************

                        Offer Suggestions
  ************************************************************
  * Item             Discount  |  Item             Discount  *
  ************************************************************

                        Suggested Items
          ****************************************
          *    TOMOTA                  NUT
          *    PEANUT                  PINEAPPLE
          *    ORANGE                  ONION
          *    GRAM                    GARLIC
          *    GROUNDNUT
          ****************************************

        Choose the Action  Purchase Number: 5
**********************************************************************
* Purchase Items->Enter 1| Purchase Analysis->Enter 2| Exit->Enter 3 *
**********************************************************************
Enter the choice:1

Enter number of items gonna purchase:3
```

```
Item 1: SUGAR

Item 2: SALT

Item 3: TOMATO

        ********************************************
        Update item->Enter 1 | Delete an item->Enter 2
                        Exit-->Enter 0
        ********************************************
        Enter the choice:0

        ******** Chosen Items **********
        * item no: 1 TOMATO
        * item no: 2 SALT
        * item no: 3 SUGAR
        *********************************

        ************************************************
        *
        *       Shopkeeper portal: Choose the Action
        *       ************************************
        *       *Enter 1 for Offers     Enter 0 for Exit*
        *       ************************************
        *       Enter the choice:1

        *       Enter Number of items have offers: 1

        *       Item no. 1
        *               Item: ORANGE

        *               Discount: 9
```

```
        ************************************************

                        Offer Suggestions
  ************************************************************
  * Item             Discount  |  Item             Discount  *
  * ORANGE             9
  ************************************************************

                        Suggested Items
          ****************************************
          *    TOMOTA                  NUT
          *    PEA                     PEANUT
          *    PINEAPPLE               ORANGE
          *    ONION                   GRAM
          *    GARLIC                  GROUNDNUT
          *    APPLE
          ****************************************

         Choose the Action  Purchase Number: 6
**********************************************************************
* Purchase Items->Enter 1| Purchase Analysis->Enter 2| Exit->Enter 3 *
**********************************************************************
Enter the choice:1
```

```
Enter number of items gonna purchase:6

Item 1: PEA

Item 2: NUT

Item 3: APPLE

Item 4: GROUNDNUT

Item 5: GARLIC

Item 6: SALT

        ********************************************
        Update item->Enter 1 | Delete an item->Enter 2
                        Exit-->Enter 0
        ********************************************
        Enter the choice:0

        ********* Chosen Items **********
        * item no: 1 SALT
        * item no: 2 GARLIC
        * item no: 3 GROUNDNUT
        * item no: 4 APPLE
        * item no: 5 NUT
        * item no: 6 PEA
        *******************************
```

```
        ************************************************
        *
        *       Shopkeeper portal: Choose the Action
        *       ************************************
        *       *Enter 1 for Offers     Enter 0 for Exit*
        *       ************************************
        *       Enter the choice:1

        *       Enter Number of items have offers: 2

        *       Item no. 1
        *               Item: PEA

        *               Discount: 10

        *       Item no. 2
        *               Item: GRAM

        *               Discount: 20

        ************************************************

                        Offer Suggestions
  ***********************************************************
  * Item             Discount  |  Item             Discount  *
  * GRAM               20
  ***********************************************************
```

```
                    Suggested Items
         ****************************************
         *    TOMOTA                TOMATO
         *    SUGAR                 PEANUT
         *    PINEAPPLE             ORANGE
         *    ONION                 GRAM
         ****************************************

        Choose the Action  Purchase Number: 7
**************************************************************************
* Purchase Items->Enter 1| Purchase Analysis->Enter 2| Exit->Enter 3 *
**************************************************************************
Enter the choice:2
```

```
*************************************************************
* StartLetter|  N  | Avg.freq | freq.Varaince | Items_List
*************************************************************
*     A      |  1  |   3.00   |     0.00      |  |-->APPLE>3
*     _      |  0  |   0.00   |     0.00      |  |
*     _      |  0  |   0.00   |     0.00      |  |
*     _      |  0  |   0.00   |     0.00      |  |
*     _      |  0  |   0.00   |     0.00      |  |
*     _      |  0  |   0.00   |     0.00      |  |
*     G      |  3  |   2.00   |     0.00      |  |-->GROUNDNUT>2 -->GARLIC>2 -->GRAM>2
*     _      |  0  |   0.00   |     0.00      |  |
*     _      |  0  |   0.00   |     0.00      |  |
*     _      |  0  |   0.00   |     0.00      |  |
*     _      |  0  |   0.00   |     0.00      |  |
*     _      |  0  |   0.00   |     0.00      |  |
*     _      |  0  |   0.00   |     0.00      |  |
*     _      |  0  |   0.00   |     0.00      |  |
```

```
*     N      |  1  |   2.00   |     0.00      |  |-->NUT>2
*     O      |  2  |   1.50   |     0.25      |  |-->ONION>1 -->ORANGE>2
*     P      |  3  |   2.00   |     2.00      |  |-->PINEAPPLE>1 -->PEANUT>1 -->PEA>4
*     _      |  0  |   0.00   |     0.00      |  |
*     _      |  0  |   0.00   |     0.00      |  |
*     S      |  2  |   1.50   |     0.25      |  |-->SUGAR>1 -->SALT>2
*     T      |  2  |   1.00   |     0.00      |  |-->TOMATO>1 -->TOMOTA>1
```

```
*      _      |  0  |   0.00   |     0.00      |  |

*      _      |  0  |   0.00   |     0.00      |  |

*      _      |  0  |   0.00   |     0.00      |  |

*      _      |  0  |   0.00   |     0.00      |  |

*      _      |  0  |   0.00   |     0.00      |  |

*      _      |  0  |   0.00   |     0.00      |  |

**************************************************************
```

```
         Choose the Action  Purchase Number: 7
**************************************************************************
* Purchase Items->Enter 1| Purchase Analysis->Enter 2| Exit->Enter 3 *
**************************************************************************
Enter the choice:1

Enter number of items gonna purchase:3

Item 1: TOMATO

Item 2: APPLE

Item 3: GRAM

        ********************************************
        Update item->Enter 1 | Delete an item->Enter 2
                        Exit-->Enter 0
        ********************************************
        Enter the choice:0

        ********* Chosen Items **********
        * item no: 1 GRAM
        * item no: 2 APPLE
        * item no: 3 TOMATO
        ********************************
```

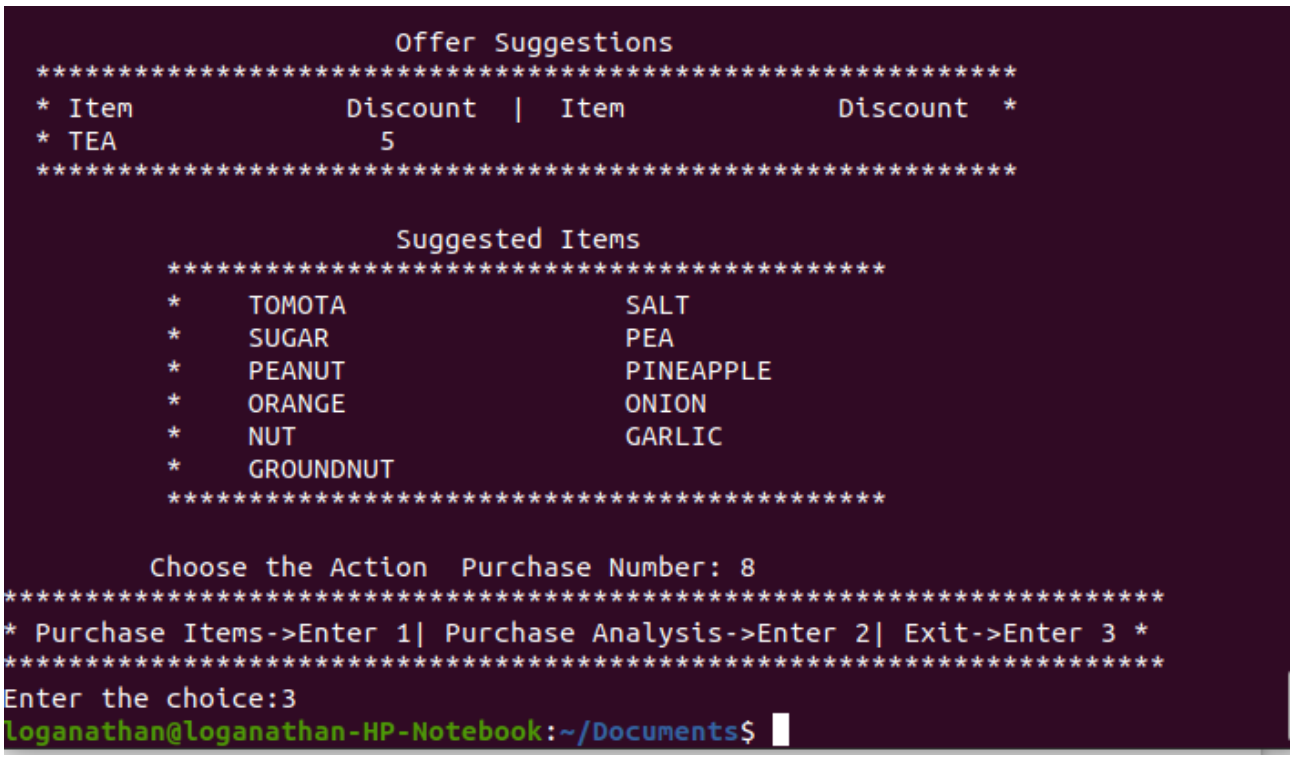
```
        ************************************************
        *
        *       Shopkeeper portal: Choose the Action
        *       ************************************
        *       *Enter 1 for Offers     Enter 0 for Exit*
        *       ************************************
        *       Enter the choice:1

        *       Enter Number of items have offers: 1

        *       Item no. 1
        *               Item: TEA

        *               Discount: 5

        ************************************************
```



Conclusion and Future Enhancement:

This project suggest some items to the customer after performing some statistical analysis on previously purchased items data to improve the quality of suggestion.And also these analysis is helpful to the retailers or production industries to predict the demand of certain items in the certain region.

Time complexity for this overall project is reduced to atmost possible. Due to hashing, most of the search time is reduced to find a certain data in previous purchases.And Space complexity is also controlled a lot. All the string variables are dynamic memory allocatedin instead of array structure. And even for offer suggestions and suggestbox stack and linked list data structure is used respectively so that we can extend or free the structure based on the need. All these things made this project efficient to atmost possible.

In Future, Some other algorithm can also be used to suggest certain items based on the season (like mangoes in summer). And some other efficient statistical measures can be used for handling different kind of datas.

References:

https://www.geeksforgeeks.org/data-structures/linked-list/

https://www.geeksforgeeks.org/stack-data-structure/

https://www.geeksforgeeks.org/hashing-data-structure/

https://www.geeksforgeeks.org/data-structures/

https://www.geeksforgeeks.org/sorting-algorithms/

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