Data structure used to design the services:

We didn't use a specific data structure like array or linked list we just used Strings and Integers.

Errors handling:

The program will run smoothly if you do everything the right way, but if the client enters a wrong thing like entering nothing while it supposed to enter menu or exit the program will freeze, we fixed it by adding a while loop that keeps asking until the client enters the right thing same thing with yes/no part, and when the client enters the amount of items the server will check if the amount is available if not it will give the max amount passable but if the client enters negative amount the server will change it to 0.

Summary:

The program is very simple it start with the client connecting with the server then it will request to log in if you are administrator you can change the available amount of items, then it will display the menu then it take the amount you want for each item and print the total price.

Explanation

Client side:

```
Socket s = new Socket("localhost",9999);

PrintStream pr = new PrintStream(s.getOutputStream());

InputStreamReader in = new InputStreamReader(System.in);
BufferedReader bf = new BufferedReader(in);

InputStreamReader sin = new InputStreamReader(s.getInputStream());
BufferedReader sbf = new BufferedReader(sin);
```

This section is setup for socket connection to the server,

We used PrintStream to send data to the server,

Then the first BufferedReader is the way the client enters data,

The second BufferedReader is to receive data from the server.

```
System.out.println("Hello welcome to our Online Grocery Store");
System.out.println("If you are an Administrator please log in or type anything else");

String admin = bf.readLine();
 pr.println(admin);
if(admin.equalsIgnoreCase("admin")) {

    for(int i = 0 ;i < 4 ; i++) {
        String tmp2 = sbf.readLine();
        System.out.println(tmp2);
        int number = Integer.parseInt(bf.readLine());
        pr.println(number);
    }
}
```

This section for the administrator to fill in the amount of available items.

```
while(!tmp.equalsIgnoreCase("menu") && !tmp.equalsIgnoreCase("exit")) {
    System.out.println("You can requset our menu by typing (menu) or if you want to exit type (exit)");

    tmp = bf.readLine();
}
if(tmp.equalsIgnoreCase("exit")) {
    System.out.println("Good bye");
    s.close();
 } else if(tmp.equalsIgnoreCase("menu")){

     pr.println(tmp);

     for(int i = 0;i<5 ;i++) {
     String menu = sbf.readLine();
     System.out.println(menu);
     }
```

This section you can exit or request the menu from the server then display it.

```
while(!order.equalsIgnoreCase("yes") && !order.equalsIgnoreCase("no")) {
    System.out.println("Do you want to order type (yes) or (no)");
    order = bf.readLine();
}


   if(order.equalsIgnoreCase("no")) {
       System.out.println("Good bye");
       s.close();
   }else if(order.equalsIgnoreCase("yes")) {
       pr.println(order);
       for(int i = 0 ;i < 4 ; i++) {
           String tmp2 = sbf.readLine();
           System.out.println(tmp2);
           int number = Integer.parseInt(bf.readLine());
           pr.println(number);
       }

       System.out.println("Total price :" + Integer.parseInt(sbf.readLine()));
       System.out.println("Thank you for visiting our Online Grocery Store");
   }
```

This section after you see the menu you have to options to exit or to order it takes the amount from the client then send it to the server to calculate it then send back the total price.

Server side:

```
ServerSocket ss = new ServerSocket(9999);
Socket s = ss.accept();

System.out.println("Client Connected");

InputStreamReader in = new InputStreamReader(s.getInputStream());
BufferedReader bf = new BufferedReader(in);


PrintStream pr = new PrintStream(s.getOutputStream());
```

This section is setup for the client connection and the setup for data transfer (receiving date from the client and send back data).

```
String log = bf.readLine();

if(log.equalsIgnoreCase("admin")) {
    pr.println("Welcome admin, enter available quantity of Milk");
    milk = Integer.parseInt(bf.readLine());

    pr.println("Enter available quantity of Water");
    water = Integer.parseInt(bf.readLine());

    pr.println("Enter available quantity of Chocolate");
    chocolate = Integer.parseInt(bf.readLine());

    pr.println("Enter available quantity of Potato Chips");
    potatochips = Integer.parseInt(bf.readLine());

    menu1 = "Item name    \t\t Price(SR) \t\t Available Quantity ";
    menu2 = "Milk         \t\t 7         \t\t " + milk;
    menu3 = "Water        \t\t 1         \t\t " + water;
    menu4 = "Chocolate    \t\t 4         \t\t " + chocolate;
    menu5 = "Potato Chips \t\t 2         \t\t " + potatochips;
}
```

This section the server receives the first input from the client if its admin it will take the amount of every item available then change the available amount.

```
String m = bf.readLine();

if(m.equalsIgnoreCase("menu")) {

    pr.println(menu1);
    pr.println(menu2);
    pr.println(menu3);
    pr.println(menu4);
    pr.println(menu5);
}
```

This section the server receives the second input from the client if its menu it will send the menu to the client side.

```
String order = bf.readLine();

if(order.equalsIgnoreCase("yes")) {

    pr.println("How many Milk you want ?");
    temp = Integer.parseInt(bf.readLine());
    if(temp < 0)
        temp = 0;
    if(temp > milk)
        temp = milk;
    sum += 7 * temp;
    milk -= temp;

    pr.println("How many Water you want ?");
    temp = Integer.parseInt(bf.readLine());
    if(temp < 0)
        temp = 0;
    if(temp > water)
        temp = water;
    sum += 1 * temp;
    water -= temp;

    pr.println("How many Chocolate you want ?");
    temp = Integer.parseInt(bf.readLine());
    if(temp < 0)
        temp = 0;
    if(temp > chocolate)
        temp = chocolate;
    sum += 4 * temp;
    chocolate -= temp;

    pr.println("How many Potato Chips you want");
    temp = Integer.parseInt(bf.readLine());
    if(temp < 0)
        temp = 0;
    if(temp > potatochips)
        temp = potatochips;
    sum += 2 * temp;
    potatochips -= temp;

    }
pr.println(sum);
```

This section the server receives the third input from the client if its yes then the server will take the amount of each item from the client and calculate the total price then send it back.

Results:

```
Hello welcome to our Online Grocery Store
If you are an Administrator please log in or type anything else
admin
Welcome admin, enter available quantity of Milk
200
Enter available quantity of Water
500
Enter available quantity of Chocolate
50
Enter available quantity of Potato Chips
50
You can requset our menu by typing (menu) or if you want to exit type (exit)
menu
Item name               Price(SR)               Available Quantity
Milk                    7                       200
Water                   1                       500
Chocolate               4                       50
Potato Chips            2                       50
Do you want to order type (yes) or (no)
yes
How many Milk you want ?
2
How many Water you want ?
10
How many Chocolate you want ?
2
How many Potato Chips you want
1
Total price :34
Thank you for visiting our Online Grocery Store
```

```
Hello welcome to our Online Grocery Store
If you are an Administrator please log in or type anything else
customer
You can requset our menu by typing (menu) or if you want to exit type (exit)
menu
Item name               Price(SR)               Available Quantity
Milk                    7                       50
Water                   1                       100
Chocolate               4                       200
Potato Chips            2                       150
Do you want to order type (yes) or (no)
yes
How many Milk you want ?
1
How many Water you want ?
4
How many Chocolate you want ?
1
How many Potato Chips you want
0
Total price :15
Thank you for visiting our Online Grocery Store
```

```
Hello welcome to our Online Grocery Store
If you are an Administrator please log in or type anything else
admin
Welcome admin, enter available quantity of Milk
500
Enter available quantity of Water
100
Enter available quantity of Chocolate
200
Enter available quantity of Potato Chips
50
You can requset our menu by typing (menu) or if you want to exit type (exit)
test
You can requset our menu by typing (menu) or if you want to exit type (exit)
test
You can requset our menu by typing (menu) or if you want to exit type (exit)
test
You can requset our menu by typing (menu) or if you want to exit type (exit)
exit
Good bye
```

```
Hello welcome to our Online Grocery Store
If you are an Administrator please log in or type anything else
admin
Welcome admin, enter available quantity of Milk
200
Enter available quantity of Water
100
Enter available quantity of Chocolate
10
Enter available quantity of Potato Chips
20
You can requset our menu by typing (menu) or if you want to exit type (exit)
menu
Item name               Price(SR)               Available Quantity
Milk                    7                       200
Water                   1                       100
Chocolate               4                       10
Potato Chips            2                       20
Do you want to order type (yes) or (no)
test
Do you want to order type (yes) or (no)
test
Do you want to order type (yes) or (no)
test
Do you want to order type (yes) or (no)
no
Good bye
```