

CSE201 Advanced Programming

Assignment-02

IIIT-Delhi. 1st Oct 2022. Due by 11:59 pm on 9th Oct 2022

Syllabus: Interfaces, Inheritance, Polymorphism

Please read the below instructions very carefully before starting with the implementation.

- 1) There will be no extension to the deadline. However, there is a late submission policy. For every 6 hours, 5% will be deducted as a penalty. So there will be a 20% deduction each day and you can submit up to 5 days late.
- 2) The TAs will stop answering questions on Classroom (do not ask questions over any other medium including emails, phone calls, messages, etc.) 6 hours prior to the deadline.

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<https://www.iiitd.ac.in/sites/default/files/docs/education/AcademicDishonesty.pdf> Please note that you are not allowed to discuss the lab assignment's design/solution (e.g. classroom page discussions, etc.). Anyone who is found doing this will be treated as a plagiarism case. No Excuses!

The Great Indian Festival Season has begun and young entrepreneurs of our institute have just started their startup, "FLIPZON". It's a product based start-up where people can buy a plethora of products and get them delivered at home. "FLIPZON" founders Beff Jezos and Gill Bates want this product to be revolutionary and want you to build an application for the same.

You must employ OOP principles, e.g., interfaces, inheritance, polymorphism, whichever provides the best and most appropriate design.

The application needs to serve the following flow:

- 1) The application will have a command line based user interface where you can opt to enter as the admin of the application or as a customer.
- 2) The customers have been divided into three categories: "ELITE", "PRIME", "NORMAL". The difference between these 3 categories is on the basis of the discounts/perks they get. The details of the three categories will be explained separately below.
- 3) You as the admin of the application will add some product categories under which you need to add some products that the company wants to sell. (at least 3 products for each category, and a minimum of 3 categories is expected).

NOTE:- each product will have a unique ID. You should take care of this while implementing

- 4) We can now enter as users of the application. When you enter the application, the user can see all the products and explore them but one cannot add it to the cart and buy it when the user has not registered.
- 5) Once the user has registered on the application portal, the user becomes a "NORMAL" customer for the user by default. A user by default has Rs 1000 in its account. You can maintain a wallet attribute for each user (or customer) which stores the balance.
- 6) The user can buy a membership and purchase monthly/yearly subscriptions to upgrade to a "ELITE" / "PRIME" customer. An "ELITE" membership costs Rs 300 and a "PRIME" membership costs Rs 200. Both the costs are for one month membership.
- 7) To buy a membership you should redirect to payment and deduct that amount from the balance of the customer.
- 8) Customers also get one time use coupons which they can apply and get a discount on the total amount to be paid. The details of coupons will be explained further.
- 9) The Customer can go through the list of products and choose items to add in the cart. Once all items are added in the cart, the customer can choose to delete items from the cart or checkout from the cart to pay the total amount. Once paid, the total amount will be deducted from the account of the user.
- 10) Please note that if the customer has insufficient amount in the account, decline the payment saying that there is not sufficient balance in your account.
- 11) You need to return to the home page after payment.
- 12) Once you are done shopping, you can log out from the account and sign in as another user.

Let's see some of the functionalities of some of the entities that are important in this application.

Admin Functionalities

- 1) Enter as Admin: In this functionality, the application should take in your username and roll no. as password and if they're correct, then you must get all privileges of an admin.
- 2) Add Category: This functionality will help the admin to add a new category. It'll take the category ID and the name of the category as input. Also take in input a product name and its details because there can not be an empty category.
- 3) Delete Category: This functionality will help the admin to delete a new category. It'll take the name of the category and category ID as input. Once the input is taken the whole category (including the details of the products inside it) will be deleted.
- 4) Add Product: If you want to add a new product take in input the category ID and add the name of the product and its details (such as price, quantity) and it should get added in the respective category. (NOTE: the category should exist otherwise add a category first.)
- 5) Delete Product: If you want to delete a product take in input the name of the category and product ID. The product from that category should get deleted.

(NOTE:- you shouldn't keep a category empty, if there is no product in a category, you should ask to add a product or else the category would get deleted).

- 6) Set Discount on Product: this functionality will allow the admin to set the discount to be given on a particular product to specific customers. It will take in input the product ID , the discount percentage to be set and the customer categories which can avail this offer. Discount rates differ for each category of customer. (Look at the given test case to understand how to take input).
- 7) Add giveaway deals: this functionality allows the admin to give in the product ID of 2 products and give a lower price than their combined prices as a giveaway deal. (you can maintain an ID for deals also to make it convenient to track)

Customer functionalities

- 1) SignUp : This functionality will help the customer to first register and make an account on the application. It will take the name, age, phone number, email id and password as

input.

- 2) Log in: This functionality will allow the already registered customer to log in by providing the name, email id and password as input. A customer will be able to login only if the fields match with the ones in the database.
- 3) Upgrade status: this allows a customer to upgrade to an elite customer or a prime customer.
- 4) Explore Product Catalog: This functionality allows the customers to surf through the product categories and products under the categories. (For more details you can refer to the test case).
- 5) Add product to cart: user specifies a product ID and the quantity which is added to cart, depending on the availability of the product
- 6) Make Payment: This functionality will allow the customer to make payment and shows the total bill of all items in cart along with the list of coupons one can apply.

Below are the privileges that “ELITE” and “PRIME” customers enjoy.

- 1) The “ELITE” customers will be eligible for all the discounts/coupons set by the admin. They will enjoy a 10 % discount on each product they buy. Also they can get a free surprise from “FLIPZON”. This means that the “ELITE” customers can randomly get a free product as a surprise on making an order. All deliveries will be made within 2 days for all the “ELITE” customers. They have to pay delivery charges equal to Rs 100 flat on all their orders. Also, “ELITE” customers receive 3-4 coupons for every order above the limit of Rs 5000
- 2) For “PRIME” they will also be eligible for the discounts/coupons set by the admin. They will enjoy a 5% discount on each product they buy. All deliveries will be made within 3-6 days (this can be randomized in the implementation) and they have to pay delivery charges equal to flat Rs 100 + 2% of the order value. They receive 1-2 coupons on orders above Rs 5000.

Note: “NORMAL” customers do not receive any discount, deliveries are made within 7-10 days for them and have to pay delivery charges equal to 100 + 5% of order value. They receive no coupons whatsoever.

Note: Every coupon can range from anywhere between 5% - 15% discount, which can be randomly generated. Only one coupon per order can be applied and the coupon with the highest discount will be applied automatically.

Note: always apply product-wise discount. Out of all available discounts (from coupons, based on user category, individual product discount, pick the maximum one for each product)

There will also be a feature by FLIPZON for attracting customers by providing giveaway deals that are special deals which customers can enjoy. These deals will be set by the admin by combining 2 products and offering them at a lower combined price than the price after applying product specific discount on both the products. Note that no other discounts are to be applied on any deal for any user type. Each deal will have three prices associated with it corresponding to each product category.

For demonstration of the application, you need to show at least 3 categories of products and customers of each category. The Application should allow the following options:

- 1) Exit the application: this will terminate the entire application.
- 2) You can enter as admin or enter as a customer.
- 3) You should allow a visiting user who has not registered just to explore the application but not allow the user to buy anything.
- 4) The application should also have an option to show the available special deals to the users (the ones where 2 products are sold in combination)

NOTE: You are allowed to use inbuilt libraries and data structures. Also handle edge cases.

Input -

WELCOME TO FLIPZON

- 1) **Enter as Admin**
- 2) **Explore the Product Catalog**
- 3) **Show Available Deals**
- 4) **Enter as Customer**
- 5) **Exit the Application**

3

Dear User, there are no deals for now!!! Please check regularly for exciting deals.

- 1) **Enter as Admin**
- 2) **Explore the Product Catalog**
- 3) **Show Available Deals**

- 4) Enter as Customer
- 5) Exit the Application

1

Dear Admin,

Please enter your username and password

Beff Jezos

Welcome Beff!!!!

Please choose any one of the following actions:

- 1) Add category
- 2) Delete category
- 3) Add Product
- 4) Delete Product
- 5) Set Discount on Product
- 6) Add giveaway deal
- 7) Back

1

Add category ID

1

Add name of the category

Home Appliances

Add a Product:-

Product Name: Microwave

Product ID: 1.1

Capacity: 25L

Power Consumption: 1KW

Price: Rs. 25000/-

Please choose any one of the following actions:

- 1) Add category
- 2) Delete category

- 3) Add Product
- 4) Delete Product
- 5) Set Discount on Product
- 6) Add giveaway deal
- 7) Back

1

Add category ID

1

Dear Admin, the category ID is already used!!! Please set a different and a unique category ID

Add category ID

2

Add name of the category

Electronics and Gadgets

Add a Product:-

Product Name: Eye-phone

Product ID: 2.1

Operating System: EYe-OS

Storage capacity: 256GB Memory

RAM: 16GB

Price: Rs. 50000/-

Please choose any one of the following actions:

- 1) Add category
- 2) Delete category
- 3) Add Product
- 4) Delete Product
- 5) Set Discount on Product
- 6) Add giveaway deal
- 7) Back

1

Add category ID

3

Add name of the category

Groceries and Vegetables

Add a Product:-

Product Name: Basket of Daily Need

Product ID: 3.1

Items: Contains All vegetables,

Contains Flour, Cereals etc. for daily use,

Serves: 2 people

Time sufficient for consumption : 10 days

Price: Rs. 555/-

Please choose any one of the following actions:

- 1) **Add category**
- 2) **Delete category**
- 3) **Add Product**
- 4) **Delete Product**
- 5) **Set Discount on Product**
- 6) **Add giveaway deal**
- 7) **Back**

3

Enter category ID

2

Add a Product:-

Product Name: Eye-phone Charger

Product ID: 2.2

Power Usage: 30 W

Price: Rs. 100/-

Please choose any one of the following actions:

- 1) **Add category**
- 2) **Delete category**
- 3) **Add Product**
- 4) **Delete Product**
- 5) **Set Discount on Product**
- 6) **Add giveaway deal**
- 7) **Back**

3

Enter category ID

2

Add a Product:-

Product Name: Eye-phone Charger USB-cable

Product ID: 2.3

Price: Rs. 50/-

Please choose any one of the following actions:

- 1) Add category
- 2) Delete category
- 3) Add Product
- 4) Delete Product
- 5) Set Discount on Product
- 6) Add giveaway deal
- 7) Back

6

Dear Admin give the Product IDs you want to combine and giveaway a deal for

Enter the first Product ID :

2.2

Enter the second Product ID:

2.3

Enter the combined price(Should be less than their combined price):

Rs. 75/- Rs. 75/- Rs. 75/-

Please choose any one of the following actions:

- 1) Add category
- 2) Delete category
- 3) Add Product
- 4) Delete Product
- 5) Set Discount on Product

- 6) Add giveaway deal
- 7) Back

5

Dear Admin give the Product ID you want to add discount for

Enter the Product ID :

2.1

Enter discount for Elite, Prime and Normal customers respectively (in % terms)

10 5 0

Please choose any one of the following actions:

- 1) Add category
- 2) Delete category
- 3) Add Product
- 4) Delete Product
- 5) Set Discount on Product
- 6) Add giveaway deal
- 7) Back

7

- 1) Enter as Admin
- 2) Explore the Product Catalog
- 3) Show Available Deals
- 4) Enter as Customer
- 5) Exit the Application

4

- 1) Sign up
- 2) Log in
- 3) Back

1

Enter name

Roy Mustang

Enter password

flameAlchemist@123

customer successfully registered!!

1) Sign up

2) Log in

3) Back

1

Enter name

Ichigo Kurosaki

Enter password

W_starts_with_D

customer successfully registered!!

1) Sign up

2) Log in

3) Back

1

Enter name

Kone Uchiha

Enter password

password

customer successfully registered!!

1) Sign up

2) Log in

3) Back

2

Enter name

Roy Mustang

Enter password

flameAlchemist@123

Welcome Roy Mustang!!

- 1) browse products
- 2) browse deals
- 3) add a product to cart
- 4) add products in deal to cart
- 5) view coupons
- 6) check account balance
- 7) view cart
- 8) empty cart
- 9) checkout cart
- 10) upgrade customer status
- 11) Add amount to wallet
- 12) back

10

Current status: NORMAL

Choose new status: ELITE

Status updated to ELITE

- 1) browse products
- 2) browse deals
- 3) add a product to cart
- 4) add products in deal to cart
- 5) view coupons
- 6) check account balance
- 7) view cart
- 8) empty cart
- 9) checkout cart
- 10) upgrade customer status
- 11) Add amount to wallet

12) back

6

Current account balance is Rupees 700

- 1) browse products**
- 2) browse deals**
- 3) add a product to cart**
- 4) add products in deal to cart**
- 5) view coupons**
- 6) check account balance**
- 7) view cart**
- 8) empty cart**
- 9) checkout cart**
- 10) upgrade customer status**
- 11) Add amount to wallet**
- 12) back**

3

Enter product ID and quantity

3.1 2

Item successfully added to cart

- 1) browse products**
- 2) browse deals**
- 3) add a product to cart**
- 4) add products in deal to cart**
- 5) view coupons**
- 6) check account balance**
- 7) view cart**
- 8) empty cart**
- 9) checkout cart**
- 10) upgrade customer status**
- 11) Add amount to wallet**
- 12) back**

9

Insufficient balance!! Please try again

- 1) browse products
- 2) browse deals
- 3) add a product to cart
- 4) add products in deal to cart
- 5) view coupons
- 6) check account balance
- 7) view cart
- 8) empty cart
- 9) checkout cart
- 10) upgrade customer status
- 11) Add amount to wallet
- 12) back

8

Cart successfully emptied

- 1) browse products
- 2) browse deals
- 3) add a product to cart
- 4) add products in deal to cart
- 5) view coupons
- 6) check account balance
- 7) view cart
- 8) empty cart
- 9) checkout cart
- 10) upgrade customer status
- 11) Add amount to wallet
- 12) back

3

Enter product ID and quantity

3.1 1

- 1) browse products
- 2) browse deals
- 3) add a product to cart
- 4) add products in deal to cart
- 5) view coupons
- 6) check account balance
- 7) view cart
- 8) empty cart

- 9) checkout cart
- 10) upgrade customer status
- 11) Add amount to wallet
- 12) back

9

Your order is placed successfully. Details:

Product Name: Basket of Daily Need

Product ID: 3.1

Items: Contains All vegetables,

Contains Flour, Cereals etc. for daily use,

Serves: 2 people

Time sufficient for consumption : 10 days

Price: Rs. 555/-

Delivery charges: Rs 100

Discount: 10% of 555 = 55.50 // discount doesn't apply on delivery charges

Total cost = Rs 599.50

Your order will be delivered within 2 days

- 1) browse products
- 2) browse deals
- 3) add a product to cart
- 4) add products in deal to cart
- 5) view coupons
- 6) check account balance
- 7) view cart
- 8) empty cart
- 9) checkout cart
- 10) upgrade customer status
- 11) Add amount to wallet
- 12) back

12

Bye Roy Mustang!!

- 1) Sign up
- 2) Log in
- 3) Back

2

Enter name

Ichigo Kurosaki

Enter password

W_starts_with_D

Welcome Ichigo Kurosaki

- 1) browse products
- 2) browse deals
- 3) add a product to cart
- 4) add products in deal to cart
- 5) view coupons
- 6) check account balance
- 7) view cart
- 8) empty cart
- 9) checkout cart
- 10) upgrade customer status
- 11) Add amount to wallet
- 12) back

11

Enter amount to add

100000

Amount successfully added

- 1) browse products
- 2) browse deals
- 3) add a product to cart
- 4) add products in deal to cart
- 5) view coupons
- 6) check account balance
- 7) view cart
- 8) empty cart
- 9) checkout cart
- 10) upgrade customer status
- 11) Add amount to wallet
- 12) back

10

Current status: NORMAL

Choose new status: PRIME

Status updated to PRIME // balance is 100000 + 1000 - 200 at this point

- 1) browse products
- 2) browse deals
- 3) add a product to cart
- 4) add products in deal to cart
- 5) view coupons
- 6) check account balance
- 7) view cart
- 8) empty cart
- 9) checkout cart
- 10) upgrade customer status
- 11) Add amount to wallet
- 12) back

3

Enter product ID and quantity

2.1 1

Product added to cart

- 1) browse products
- 2) browse deals
- 3) add a product to cart
- 4) add products in deal to cart
- 5) view coupons
- 6) check account balance
- 7) view cart
- 8) empty cart
- 9) checkout cart
- 10) upgrade customer status
- 11) Add amount to wallet
- 12) back

9

Proceeding to checkout. Details:

Product Name: Eye-phone

Product ID: 2.1

Operating System: EYe-OS

Storage capacity: 256GB Memory

RAM: 16GB

Price: Rs. 50000/-

Delivery charges: Rs 100 + 2% of 50000 = 100 + 1000 = Rs 1100

Discount: 5% of 50000 = 2500 // discount doesn't apply on delivery charges

Total cost = Rs 48600

Order placed. It will be delivered in 3-6 days.

You have won two coupons of 10% and 15% discount. Congratulations!!

- 1) browse products
- 2) browse deals
- 3) add a product to cart
- 4) add products in deal to cart
- 5) view coupons
- 6) check account balance
- 7) view cart
- 8) empty cart
- 9) checkout cart
- 10) upgrade customer status
- 11) Add amount to wallet
- 12) back

6

Current account balance is Rs 52200 // (100000 + 1000 - 200 - 48600)

- 1) browse products
- 2) browse deals
- 3) add a product to cart
- 4) add products in deal to cart
- 5) view coupons
- 6) check account balance
- 7) view cart
- 8) empty cart
- 9) checkout cart
- 10) upgrade customer status

- 11) Add amount to wallet
- 12) back

3

Enter product ID and quantity

2.2 10

Product added to the cart

- 1) browse products
- 2) browse deals
- 3) add a product to cart
- 4) add products in deal to cart
- 5) view coupons
- 6) check account balance
- 7) view cart
- 8) empty cart
- 9) checkout cart
- 10) upgrade customer status
- 11) Add amount to wallet
- 12) back

9

Proceeding to checkout. Details:

Product Name: Eye-phone Charger

Product ID: 2.2

Power Usage: 30 W

Price: Rs. 1000/- // for 10 pieces

Delivery charges: Rs 100 + 2% of 1000 = 100 + 20 = Rs 120

Discount: 15% of 1000 = 150 // maximum discount is taken from the coupons

Total cost = Rs 970

Order placed. It will be delivered in 3-6 days.