Cairo University **Faculty of Computers and Artificial Intelligence**

Software design specification document

2022

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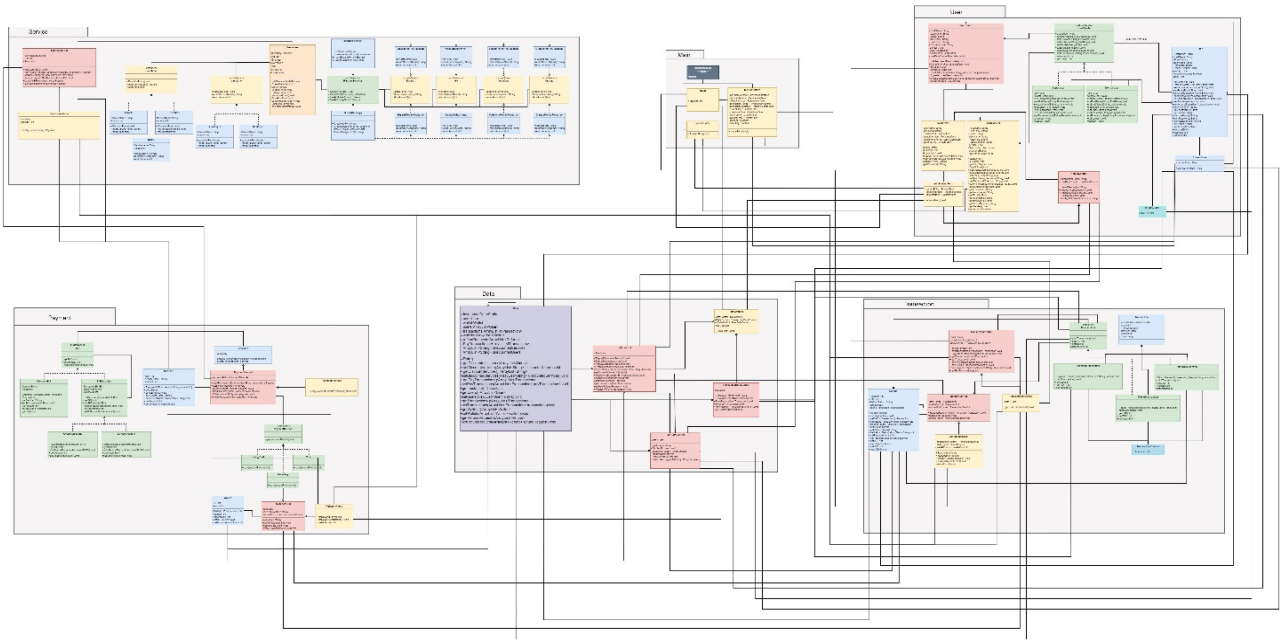

For a better view please click here:
https://drive.google.com/file/d/1tVYl4UyvBcfQ3l5xPG_laV2iPClr9vtd/view?usp=sharing
Open the link above then click on ***open with*** and choose ***diagrams.net***.

https://drive.google.com/file/d/1tVYl4UyvBcfQ3l5xPG_laV2iPClr9vtd/view?usp=sharing

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Class diagram Explanation

we have a service class that combine between two patterns

- Abstract factory
- Strategy pattern

it helps us to avoid class explosion and easily control the objects

The abstract factory pattern:

we have two services that are factories – mobile recharge - internet payment

they control to produce products -> service providers:

- We
- Orange
- Vodafone
- Etisalat

Every service provider controls the forms if it's a mobile recharge or internet payment

The service providers have a various code families related with products

Example of a concrete product (we Internet payment)

Each concrete product depends on interface product

Also, abstract factory helps us to add a new service provider ass an abstract product without any changes on the main code

The strategy pattern:

At the donation and land line we used a strategy pattern for each

The strategy pattern helps us in these tow services that we have the same need of creating form but every form has its own algorithm

- At land line each QuartlyLL – MonthlyLL has its own algorithm for creating a form
- At donations each hospital – schools – NGOs has its own algorithm for creating a form

That different algorithm depends on interface services donations and land line

also, the strategy pattern helps us for adding any new algorithm without any changes on the code just adding the new code

At the end:

There is a service control class that control with every class at the package and control the communication between other components

With help from service interface class

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The Decorator pattern:

We used the decorator pattern to decorate the bill with the bill with 2 types of discounts overall discount and service discount as both need to alter the behavior of the bill without a change in structure. This is implemented by using Bill <<interface>> which is a common interface for both BillDecorator and ConcreteBill. The Concrete bill has the basic behavior which will be altered by the decorator. Then the BillDecorator implements one or both of the Discounts Available through concrete Decorators OverallDiscount and ServiceDiscount

The Builder pattern:

for the user component we applied the builder pattern to avoid the large constructor of the user class ... by adding IUserBuilder as the builder to build the NormalUser and the SuperUser classes to the client which is the UserControl

The Singleton pattern:

for the Data component we used the singleton pattern to the class data because we need one instance from the data class in the whole system by privately create the constructor of data and add a public method called getInstance()

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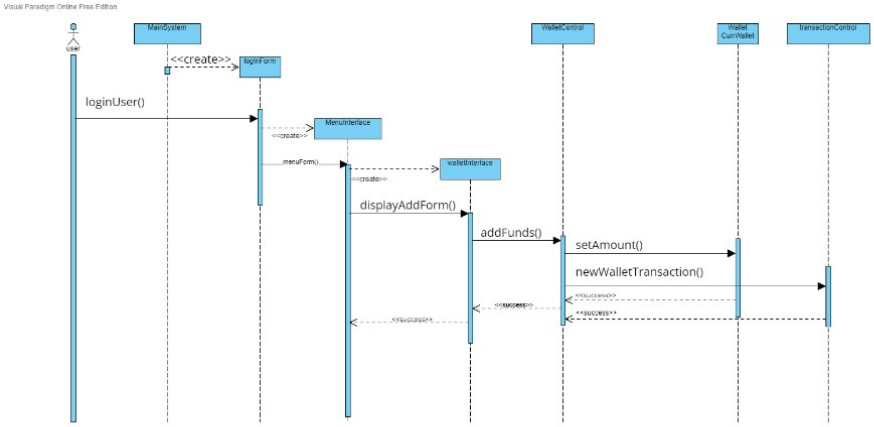
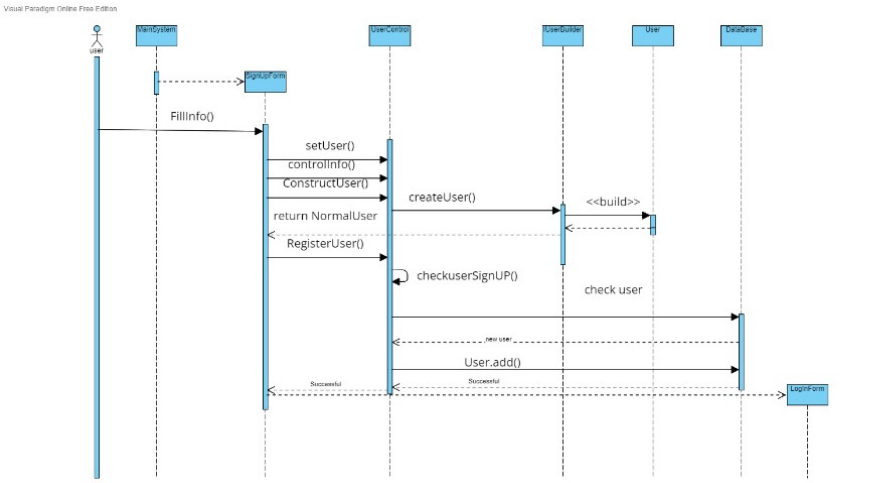
Sequence diagram design





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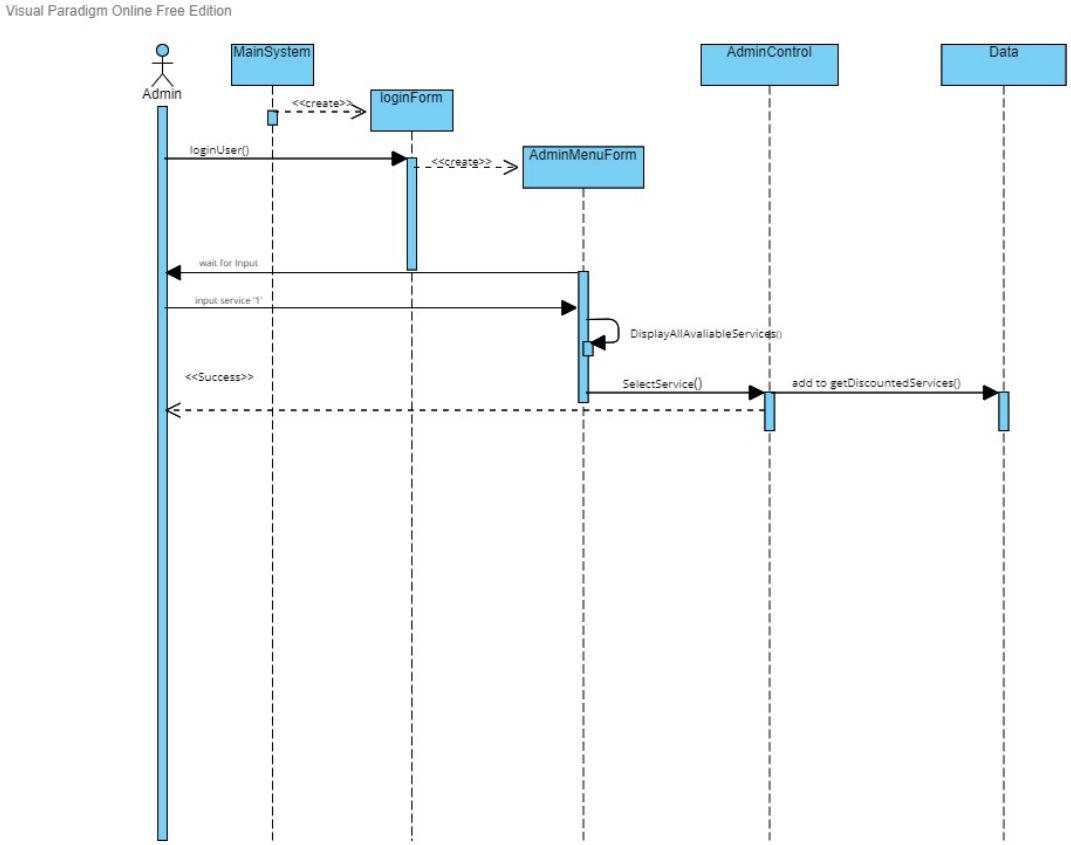

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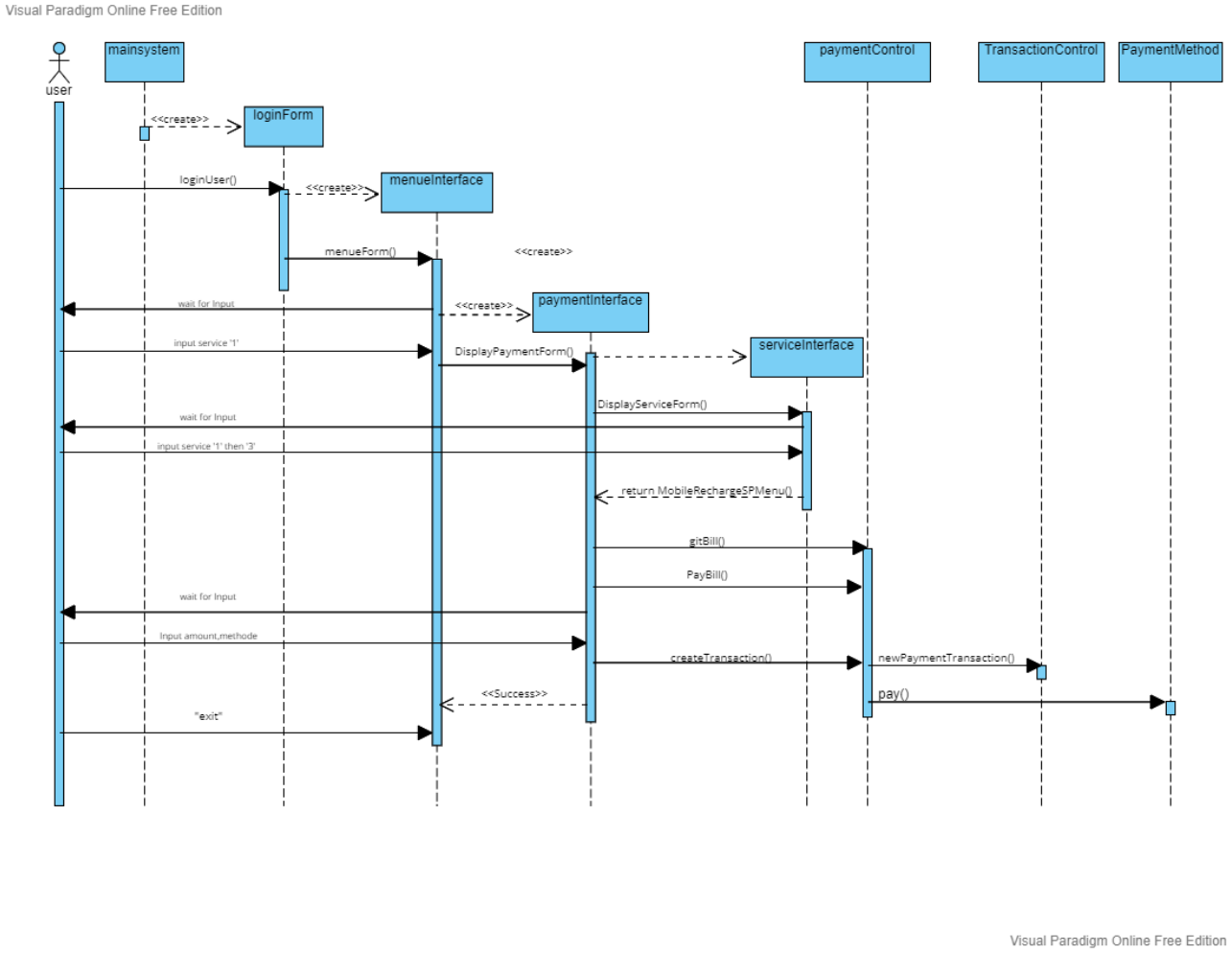

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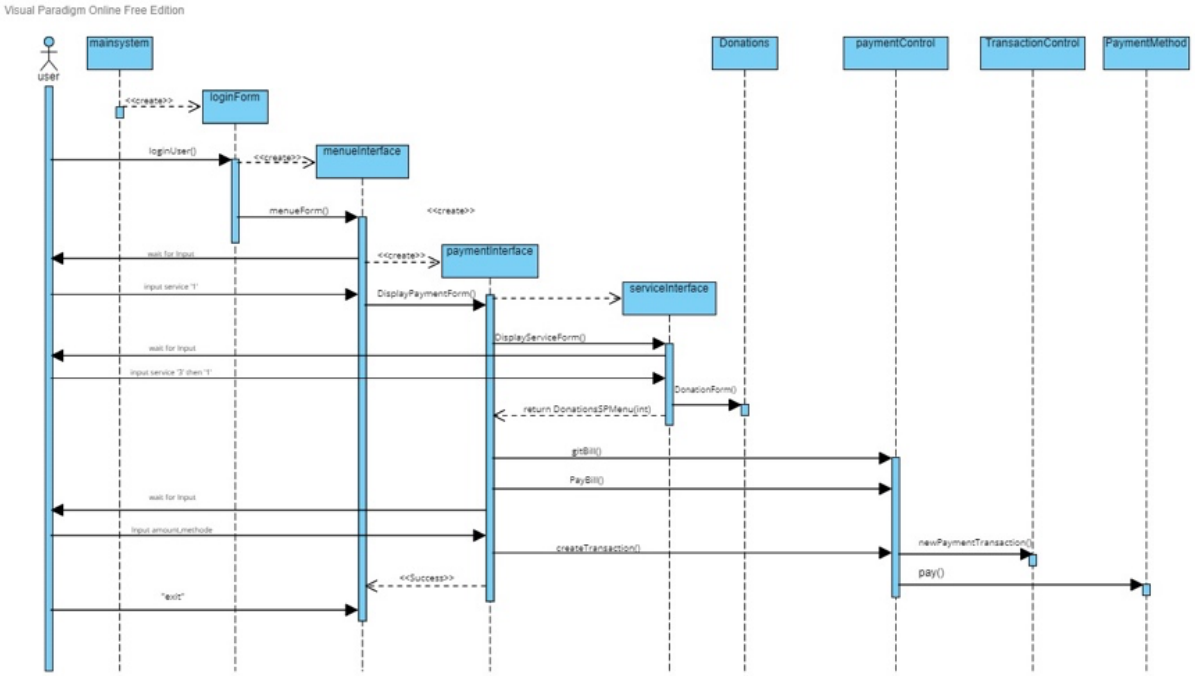

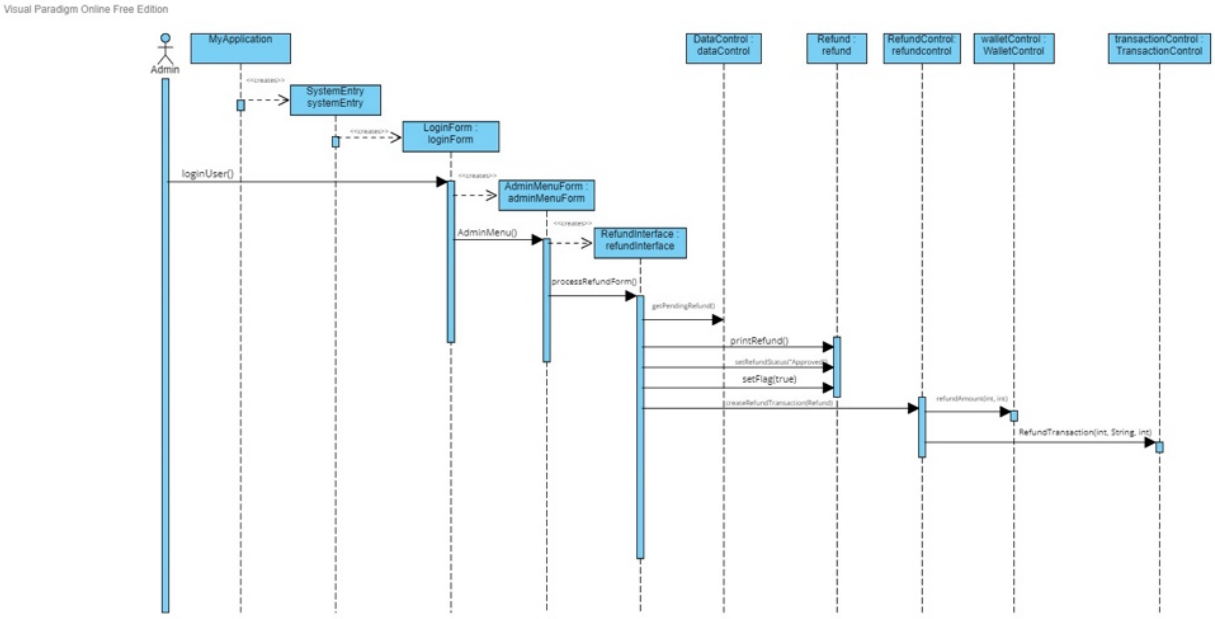

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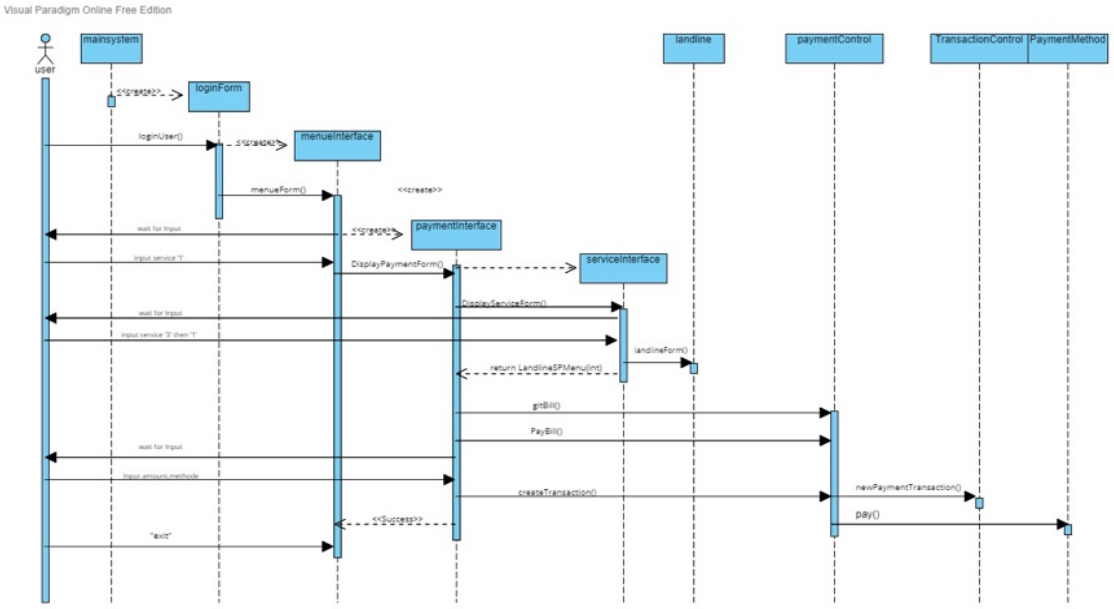

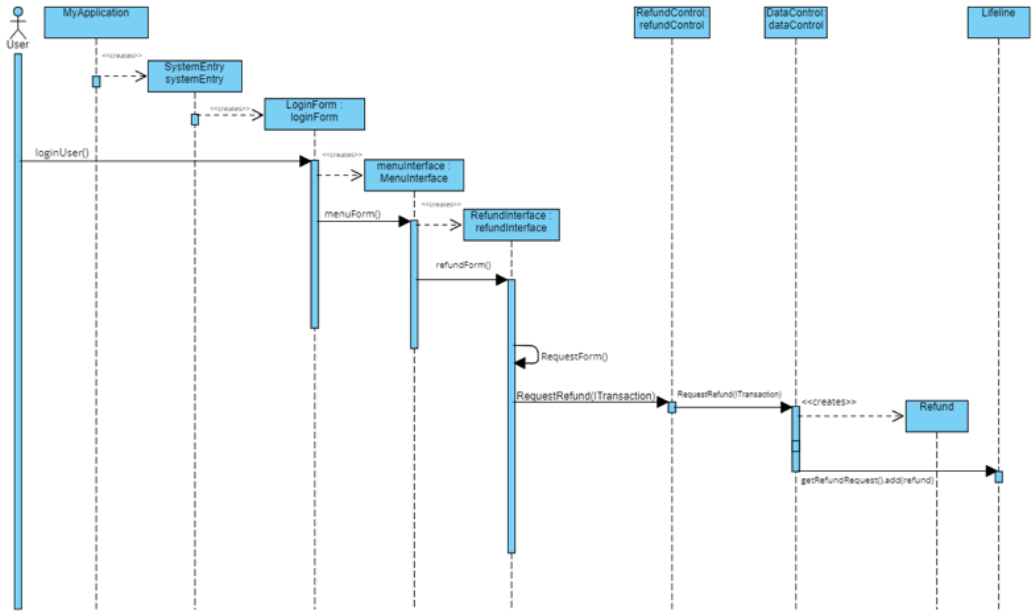

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Requirements Exposure as Web Service API

Part 1: Exposed Postman Collection

https://ae-coding.postman.co/workspace/My-Workspace~1a7d7998-e7b1-4939-8efd-6eb1106fa809/collection/25121317-c3a1b2d0-af56-4fac-b436-96220e88088f?action=share&creator=25121317

Part 2:

Explain here the exact mapping between every single requirement and its corresponding web service API operation. A sample example is provided to better explain the concept.

For the best experience display all the users firstly (GET /Admin/Display/AllUsers) and then set one of the users as the current user (POST /User/CurrentUser/{id})

Requirement		**Exposed API**
Display all users using id.		1- GET /Data/Display/User/{id} A service to retrieve the user with a specific id. **Input: id**
Display all the users on the system		2- GET /Data/Display/AllUsers This prints all the users saved on the system with their data **No Input**
Display all the transactions completed		3- GET /Data/Display/Transactions This prints all the transactions saved on the system with their info **No Input**
Display all the payment transactions		4- GET /Data/Display/PaymentTransactions

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		This prints all the transactions saved on the system with their info but only the payment transactions **No Input**
Display all Services with a discount		5- GET /Data/Display/DiscountedService This prints all the discounted services saved on the system **No Input**
Display all the Users with a discount		6- GET /Data/Display/DiscountedUsers This prints all the discounted services saved on the system **No Input**
Display the Refund Requests		7- GET /Data/Display/RefundRequests This prints all the Refund Requests saved on the system **No Input**
Check if the user has discount		8- GET /Data/Check/OverallDisount/{id} Checks if the user has a discount and displays the result. Input: UID
Chich if the service has discount		9- GET /Data/Check/ServiceDisount/{Service} Checks if the user has a discount and displays the result. Input: ServiceName
Show the user's wallet data		10- GET /Data/Wallet/{id} Displays the wallet data of the user (UID & amount in wallet). Input: id
Add discount to a service		11- GET /Data/Add/ServiceDiscount/{Service} This adds a 20% discount to a service Input: ServiceName
Add a discount to a user		12- POST /Data/Add/UserDisount/{id} This adds a 20% discount to a user Input: UID

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Checks if the user had signed up		13- GET /Data/Check/User/SignUp This takes a JSON input of a user and outputs whether the user have signed up or not Input: User
Add a wallet		14- POST /Data/Add/Wallet This takes a wallet and saves it on the system Input: Wallet
Registers a User to the system		15- POST /Data/Add/User This Registers the user and saves him on the system Input: User (JSON)
Check If the user exists		16- GET /Data/Check/User/Login/{userName} /{password} This checks if the user is saved on this system using the username and the password. Input: username, password
Display the Pending Refund Requests		17- GET /Data/Display/PendingRefundRequest This Displays all the pending refund requests saved on the system No Input
Add a Transaction		18- POST /Data/Add/Transaction Adds the Transaction to the data saved on the system Input : ITransaction (JSON)
Display User Refund Requests		19- GET /Data/Display/PendingRefund/{id} Displays all the pending refund requests of a specific user Input: UID
Display User Transactions		20- GET /Data/Display/UserTransactions Displays all the transactions of the Current user

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		No Input
Add a payment Transaction		21- POST /Data/Add/PaymentTransaction/{Service}/{amount} Adds a payment transaction to the data saved on the system Input: ServiceName, amount
Display User payment Transactions		22- GET /Data/Display/UserPayTransactions Displays all the payment transactions of the Current user No Input
Display User Refund Requests		23- GET /Data/Display/UserRefund Displays all the refund requests of the Current user No Input
Add Refund Request		24- POST /Data/Add/Refund Adds a refund request to the data saved on the system No Input
Search for a service		25- GET /Data/Service/Search/{Service} Search for a service on the system by taking the service name or a part of the name ie: Voda shows Vodafone Mobile Recharge and Vodafone Internet payment. Input: ServiceName
Display All Available Services		26- GET /Data/Service/Display Displays all the available services on the system. No Input
Select a Service		27- GET /Admin/SelectService/{num} Allow the user to select a service by inputting a numer Input: num

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Add Service Discount		28- POST /Admin/Add/ServiceDiscount/{num} Add a 20% discount to the service with the given the number of the service in the menu Input: num
Add User Discount		29- POST /Admin/Add/UserDiscount/{id} Add a 20% discount to the user with the given UID Input: UID
Display All Users		30- GET /Admin/Display/AllUsers Displays all the users in the system No Input
Display all available Services		31- GET /Admin/Display/AllServices Displays all the available services No Input
Build a User		32- POST /User/Build Builds a user using the builder pattern. No Input
Register a user		33- POST /User/Register Adds the user to the system Input: User (JSON)
Check if user exists		34- GET /User/Check//{userame} /{password} Input: username, password
Check if user is admin		35- GET /User/CheckAdmin/{userame} /{password} Checks if the user is admin or not Input: username, password
Set User as Current User		36- POST /User/CurrentUser/{id} Makes the user become the current user of the system Input: id
Get User Wallet		37- GET /Wallet/Get/{id}

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Add Funds To wallet		38- POST /Wallet/AddFuds/{id}/{amount}
Add Refund To wallet		39- POST /Wallet/Refund/{id}/{amount}
Display Wallet Balance		40- GET /Wallet/Balance/{id}
Pay Using Wallet		41- POST /Wallet/Pay/{id}/{amount}
Start Payment		42- POST /Payment/Start/{id}/{service} /{amount}
Get Bill with the Discount		43- GET /Payment/Bill/{id}/{service} /{amount}
Pay Using Cash		44- POST /Payment/Cash/{amount}
Pay Using Credit Card		45- POST /Payment/Credit/{amount}
Pay Using Wallet		46- POST /Payment/Wallet/{amount}
Create Transaction		47- POST /Payment/Transaction/{id}/{service} /{amount}
Get Current User id		48- GET /Service/User/ID
Pay For Service		49- POST /Service/Pay/{id}/{service} /{amount}
Mobile Recharge Service		50- POST /Service/MobileRecharge/{id}
Internet payment service		51- POST /Service/InternetPayment/{id}
Landline service		52- POST /Service/Landline/{id}
Donation Service		53- POST /Service/Donations/{id}
Get User ID for Transaction		54- GET /Transaction/GetUID

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Print the Transaction		55- GET /Transaction/Print
Save Transaction		56- POST /Transaction/Save
Get A transaction		57- GET /Transaction/Get/{id}
Display All Transactions		58- GET /Transaction/GetAll
New Payment Transaction		59- POST /Transaction/Payment/{service} /{amount}
New Wallet Transaction		60- POST /Transaction/Wallet/{amount}
New Refund Transaction		61- POST /Transaction/Refund/{id}/{amount}
Display Payment Transaction		62- GET /Transaction/GetPay

Github repository link

https://github.com/aemoein/MyServices