Sri Lanka Institute of Information Technology

ElectroGrid

Project Report

Programming Applications and Frameworks project 2022

Project ID: 138

Submitted by:

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2. IT20165352 - Peiris M.I.M
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6. IT20202354 – M.N Aaisha

April 25, 2022

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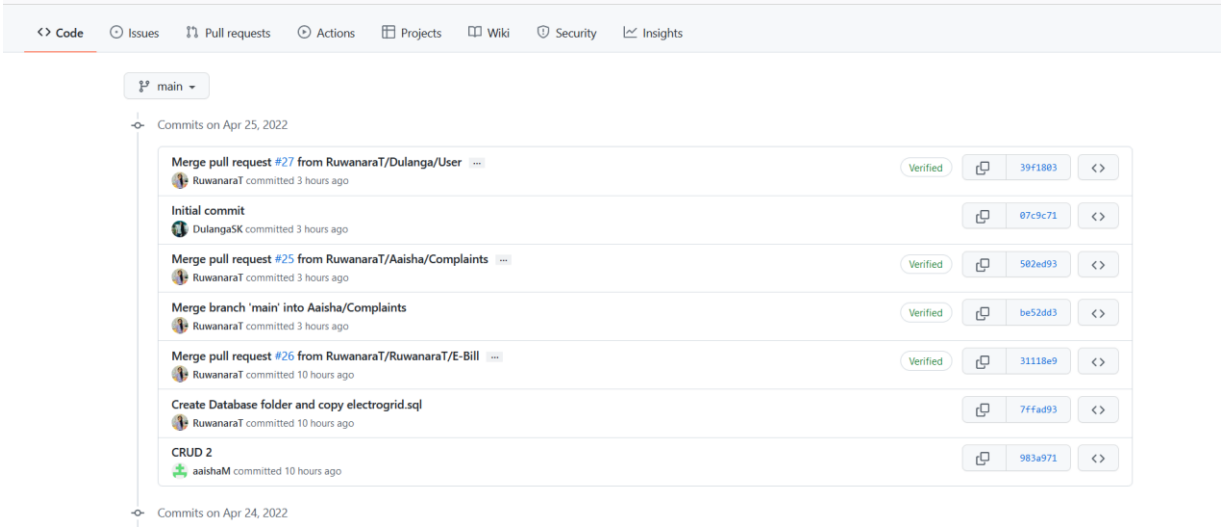
1. Member Details and Workload Distribution

Registration No	Student Name	Web Service	Description
IT20201364	Thathsarani R.P.H.S.R	E-Bill Handling	♦ Create E-Bill ♦ Retrieve E-Bill / E-Bills ♦ Update E-Bill ♦ Delete E-Bill ♦ Send E-Bill
IT20165352	Peiris M.I.M	Device Handling	♦ Add a device. ♦ Remove a device. ♦ Update device information. ♦ Calculate power consumption. ♦ View power consumption.
IT20187828	Isurika M.D.A.	Payment Handling	♦ Add the payment for calculated bill amount. ♦ View all the transaction history. ♦ Filter specific transaction and View. ♦ Add card details. ♦ Update card details. ♦ Remove card details.
IT20157500	Kandanaarachchi H.L.D.S	User Handling	♦ Insert User ♦ Retrieve Users/User ♦ Update User Details ♦ Delete User
IT20212940	A.K.F Hasna	Interrupt Handling	♦ Insert Interrupt Notice ♦ View all Interrupt Notices ♦ Retrieve details of a particular Interrupt Notice ♦ Update interrupt details ♦ Delete old or cancelled Interrupt Notices
IT20202354	M.N Aaisha	Complaint Handling	♦ Make new complaint ♦ Update complaint details ♦ View complaint details ♦ Delete old/sorted complaints ♦ Admin view all existing complains.

2. Link to the VCS and Commit Log

Link: https://github.com/RuwanaraT/ElectroGrid-EG-GID_138.git

Commit Log:

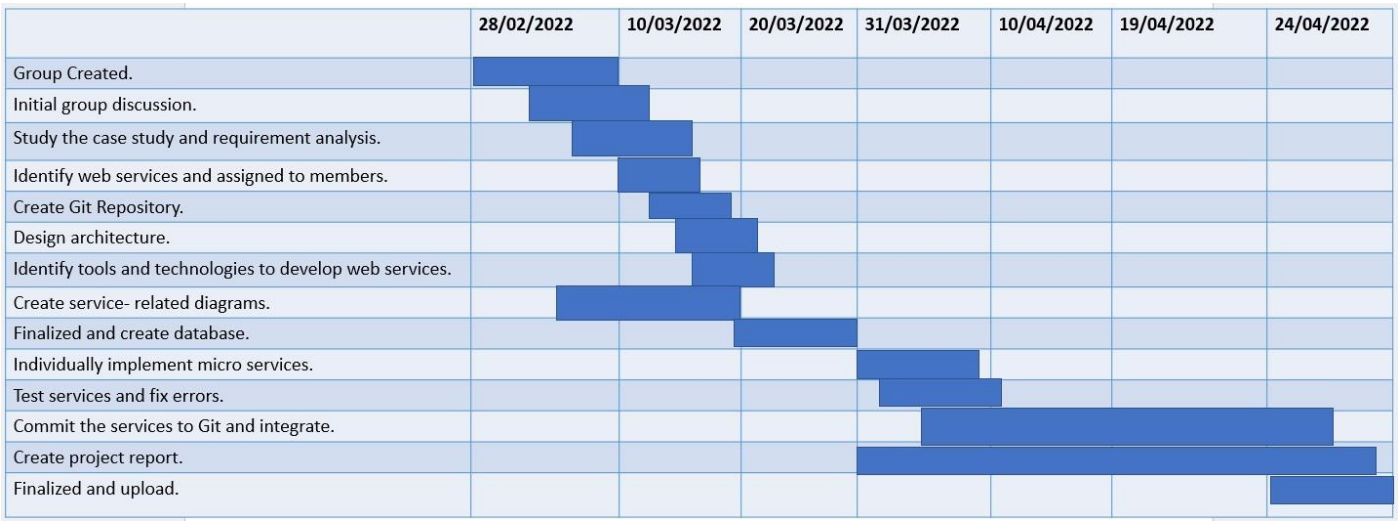


Latest screenshot of the commit log is attached above and please access the repository through the mentioned link to view the complete commit log.

3. SE Methodology

The methodology used to develop ElectroGrid(EG) system was one of the agile methods called scrum which is a management and control process that cuts through complexity to focus on building software that meets business needs. Even though the requirements did not change with time, the idea derived from the given requirements surely changed with time. Therefore, using scrum methodology, facilitates us to evolve those obstacles. In our project we have planning the API details in server-side application. In each web service we could invent ideas and we integrate as a project.

4. Gantt Chart



5. Requirements

1) Stakeholder analysis (onion diagram)

The following onion diagram illustrated intercommunication among parts of a process. As shown elements in each circle depends on the elements in the smaller rings. The ElectroGrid(EG) system is shown in the smallest circle. This diagram indicates truly clear and precise representation of the system and gives the consumer an accurate idea of the system and its functionalities. .The onion diagram is attached under appendix (Group diagrams – figure 1.1)

2) Requirement Analysis.

Micro-Service	Functional	Non-Functional	Technical
E-Bill Handling	Create E-Bill Retrieve E-Bills Retrieve single E-Bill Update E-Bill Delete E-Bill Send E-Bill	Availability Reliability Scalability Performance Usability Data Integrity Backup	Create E-Bill for the current month Retrieve and display all the existing E-Bills Retrieve and display specific E-Bill by passing billID Update E-Bill/s as required Delete previous month E-Bill, after deleting that entry is included to another table. Send E-Bill to the customer
Device handling	Add a new device to user's device lists. View each user owns device list.	Usability Security Portability Compatibility Reliability	Each user who are already registered in the system, owns a self-calculator which provides daily power consumption and monthly

	Update device information previously saved. Delete device from device list that are no longer need for calculate power consumption.	Availability Maintainability	power consumption of each saved device. According to the user's devices those are used in their houses , user can add, remove, or update devices. Device service is connected to E-Bill service which can calculate cost per each device's monthly power consumption and calculate monthly total amount of power usage.
Payment handling	Add the payment for calculated bill amount. View all the transaction history. Filter specific transaction and View. Add card details. View card details. Update card details. Remove card details.	Availability Reliability Performance Scalability Capacity Data Integrity Usability backup	Users make payments according to the e-bill generated by the system. User can view all the payment history with the date it has done. Administrator can view all the payments made by users. User can add card details to the system and can save if they want. This card details can be viewed, updated, or removed at any time.
User Handling	Add user. Update User. Delete User. Retrieve Users.	Availability Reliability Performance Capacity Data Integrity Usability	Users can register to the system as new users. Retrieve and display all the existing Users. Retrieve and display specific User by passing username. User can update their details as required. User can remove their details from the system.
Interrupt Handling	Add a new Interrupt Notice. View Interrupt Notices. View Details of a particular Interrupt Notice. Update Interrupt Notice Details. Delete old or Cancelled Interrupt Notices.	Availability Reliability Performance Scalability Capacity Data Integrity Usability	Administrator can add, update, and delete Interrupt Notices. Interrupt Notice scheduled date, time region and reason can be updated. Cancelled or old Interrupt Notices can be deleted All the Interrupt Notices can be viewed. The details of a particular Interrupt Notice can be viewed using the ID.

Complaint Handling	Create new complaint Update details of a particular complaint View details of a particular complaint View all complains Delete old/sorted complains	Availability Reliability Performance Scalability Capacity Data Integrity Usability Security	Customer can make a new complaint when required. Customer can update all details except status date and status. Both customer and admin can delete complaints if necessary. Admin can update only the status of the complaint. Customers and admins can view complaints.

3) Requirements Modelling

Use case diagram

The following Use Case Diagram illustrated who are the actors of the ElectroGrid(EG) system and what sort of operations they can perform within the system scope. The use case diagram is attached under appendix (Group diagrams – figure 1.2)

The main actors of the ElectroGrid system in this use case diagram are customer, meter reader and administrator.

6. System Overall Design

1) Overall Architecture

The following Overall Architecture give the overview of the ElectroGrid(EG) system by representing dedicated micro service and interconnection between them .The overall architecture is attached under appendix (Group diagrams – figure 1.3)

2) Activity Diagram

The following Activity Diagram describes the activity flow of the ElectroGrid(EG) system. The activity diagram is attached under appendix (Group diagrams – figure 1.5)

3) Entity Relationship Diagram

The following Entity Relationship(ER) Diagram implies the database tables and connections between them. The Entity Relationship diagram is attached under appendix (Group diagrams – figure 1.4)

7. Individual Sections

1) Team Member 1 – Thathsarani R.P.H.S.R / IT20201364

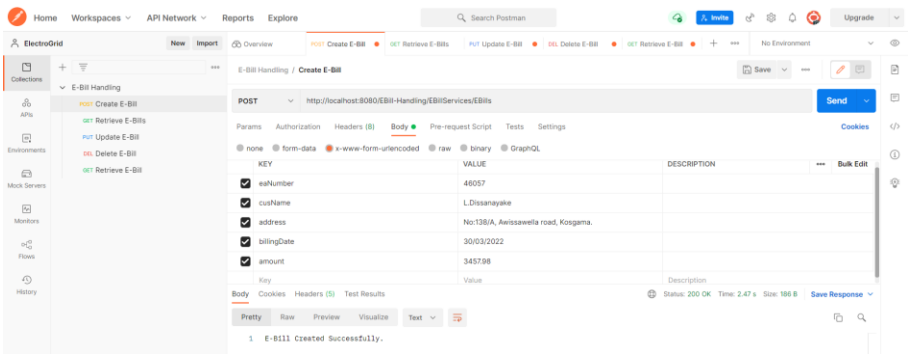
- Individual Service – E-Bill Handling

Service Design

I. API Design of the Service

- **POST – Create E-Bill**

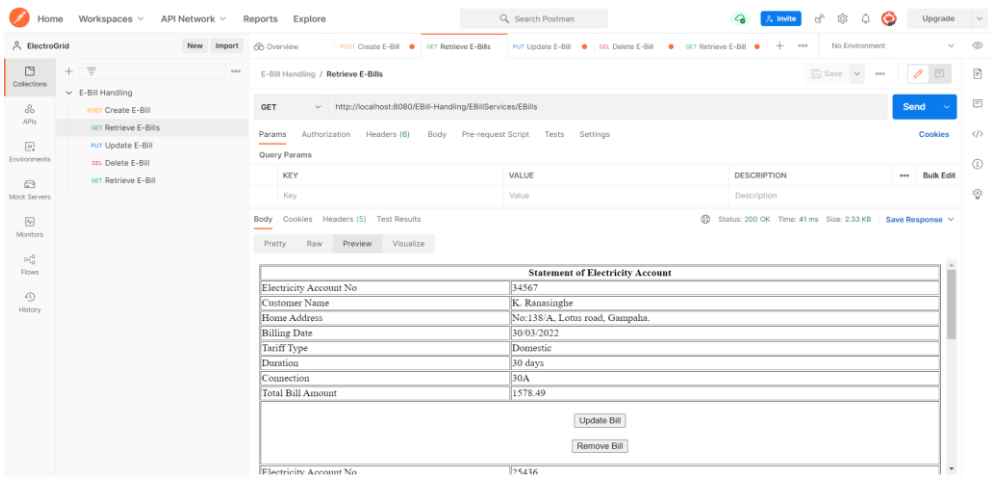
URL:- http://localhost:8080/EBill-Handling/EBillServices/EBills



✓ Insert Electricity Account Number, Customer Name, Address, Billing Date and Bill Amount to create the E-Bill.

- **GET – Retrieve E-Bills**

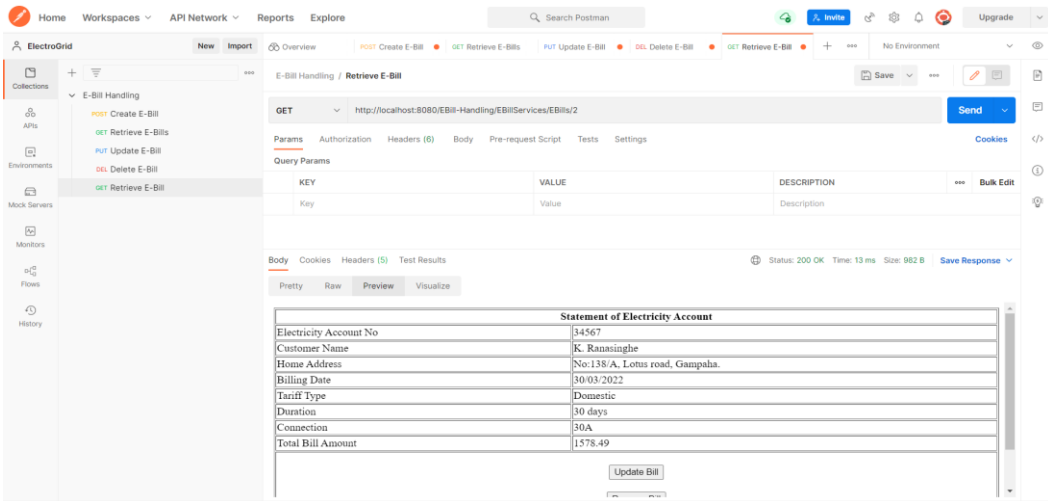
URL:- http://localhost:8080/EBill-Handling/EBillServices/EBills



✓ Retrieve (Display) all the existing E-Bills from the system.

- **GET – Retrieve E-Bill**

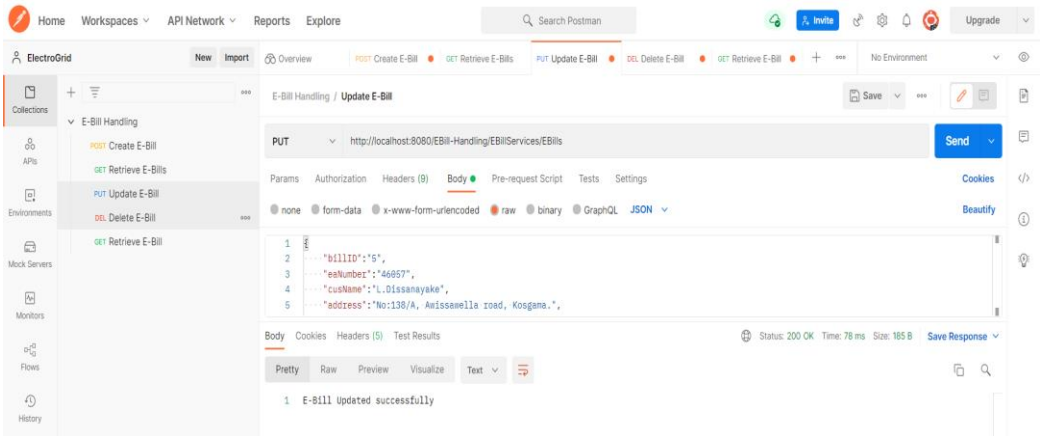
URL:- http://localhost:8080/EBill-Handling/EBillServices/EBills/2



✓ Retrieve (Display) single E-Bill from the system by passing the bill id.
✓ The above API design is illustrated request of bill id 2.

- **PUT – Update E-Bill**

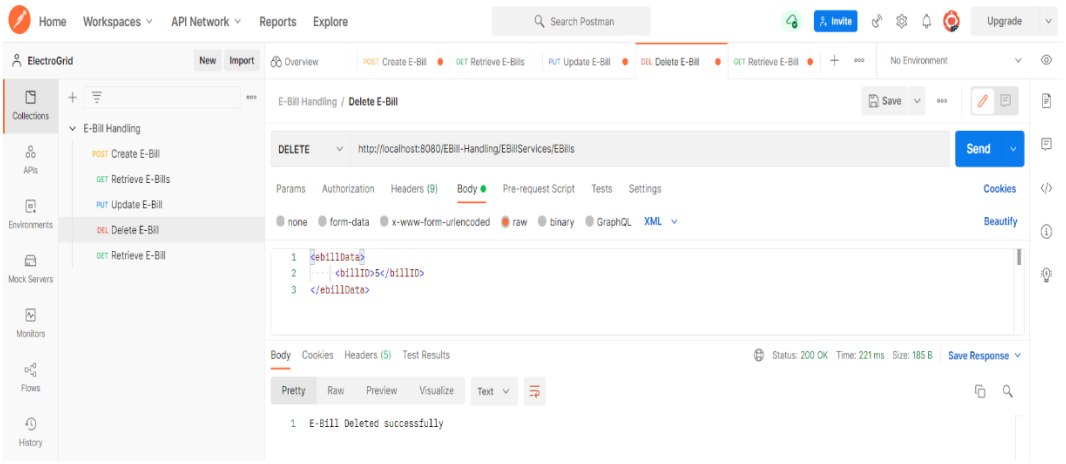
URL:- http://localhost:8080/EBill-Handling/EBillServices/EBills



✓ Update or edit some details of the E-Bill as required.
✓ The above API design is illustrated update request of bill id 5 from Jason format.

- **DELETE – DELETE E-Bill**

  URL:- http://localhost:8080/EBill-Handling/EBillServices/EBills



- ✓ Delete particular E-Bill from the system.
- ✓ The above API design is illustrated delete request of bill id 5 from xml format.

II. Internal Logic

○ Class Diagram

Basically, EBill class is covered E-Bill Management service. The above, part of the class diagram is illustrated attributes and methods of the EBill class. . Class diagram is attached under Appendix (IT20201364 – figure 2.1)

○ Activity Diagrams

The activity diagram is illustrated steps of preparing a E-Bill. Activity diagram is attached under Appendix (IT20201364– figure2.2)

○ Flowchart

The flowchart is illustrated mechanism of calculating electricity bill. . Flow chart is attached under Appendix (IT20201364– figure 2.3)

○ Sequence Diagram

The sequence diagram is illustrated sequence of preparing a E-Bill. Sequence diagram is attached under Appendix (IT20201364– figure 2.4)

III. Service Development and Testing

A. Tools

- **IDE** - Eclipse
- **Database** - phpMyAdmin
- **Back End** - Java, JAX-RS (Jersy) on Tomcat
- **Dependency Management Tools** - Maven
- **Testing Tool** - Postman
- **Code Quality Checking Tool** - SonarLint
- **Version Control** - GitHub

B. Testing Methodology and Results

Test ID	Test Description / Test Steps	Test Input(s)	Expected Output(s)	Actual Output(s)	Result (Pass/Fail)
01	Insert E-Bill Details	eaNumber cusName address billingDate amount (Attributes of the E-Bill)	E-Bill Created Successfully	E-Bill Created Successfully	Pass
02	Display existing E-Bills	URL for the API send GET Request	Display all the E-Bills	Display all the E-Bills	Pass
03	Display a single E-Bill	URL for the API send GET request along with the billID	Display relevent E-Bill according to the given billID	Display relevent E-Bill according to the given billID	Pass
04	Update E-Bill Details	Attributes to be updated along with billID	E-Bill Updated Successfully.	E-Bill Updated Successfully.	Pass
05	Delete E-Bill Details	billID of the E-Bill to be deleted	E-Bill Deleted Successfully	E-Bill Deleted Successfully	Pass

IV. Assumptions

- ✓ Design the APIs , assuming that system is maintaining current month E-Bill operations.

2) Team Member 2 – Peiris M.I.M / IT20165352

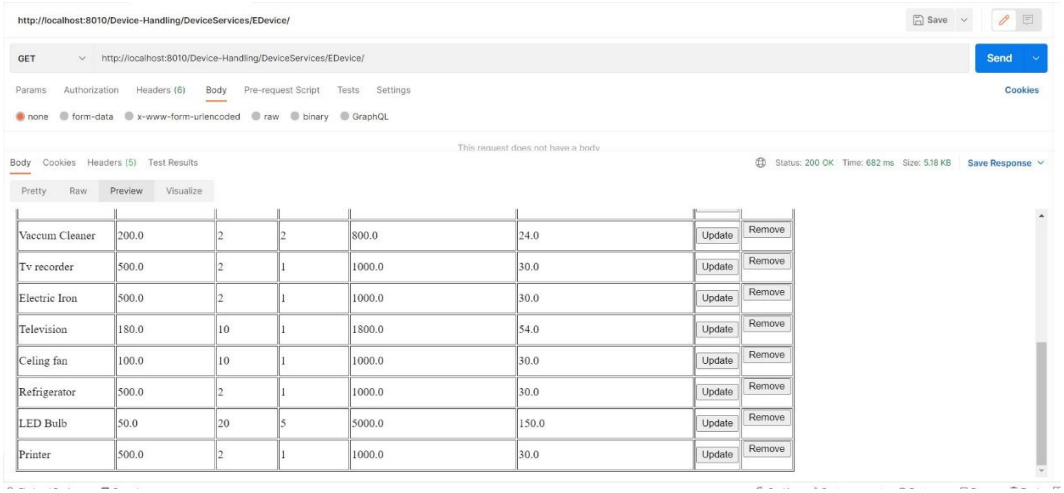
- Individual Service – Device Handling

Service Design

I. API Design of the Service

- **GET - Retrieve device list saved by a user**

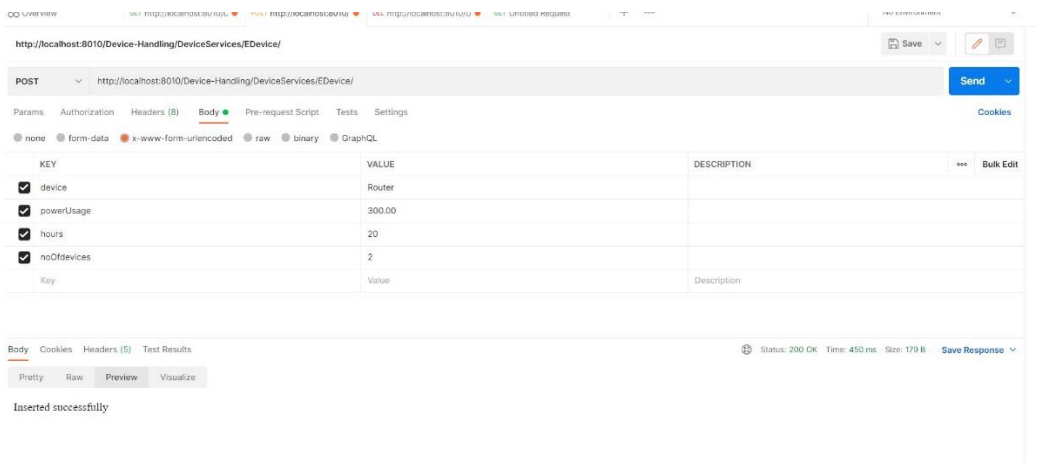
URL: http://localhost:8010/Device-Handling/DeviceServices/EDevice/



✓ Retrieve all the devices saved by one user. Daily power consumption and monthly power consumption for each device is also displayed in front of each device.

- **POST - Add device by one user.**

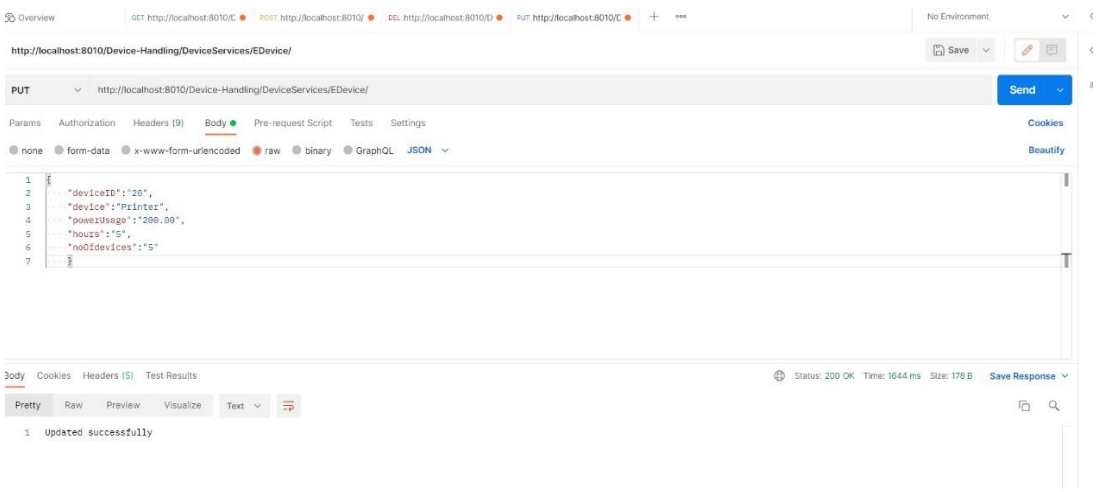
URL : http://localhost:8010/Device-Handling/DeviceServices/EDevice/



✓ Add a device to the device list, device ID is auto generated.

- **PUT – Update device information.**

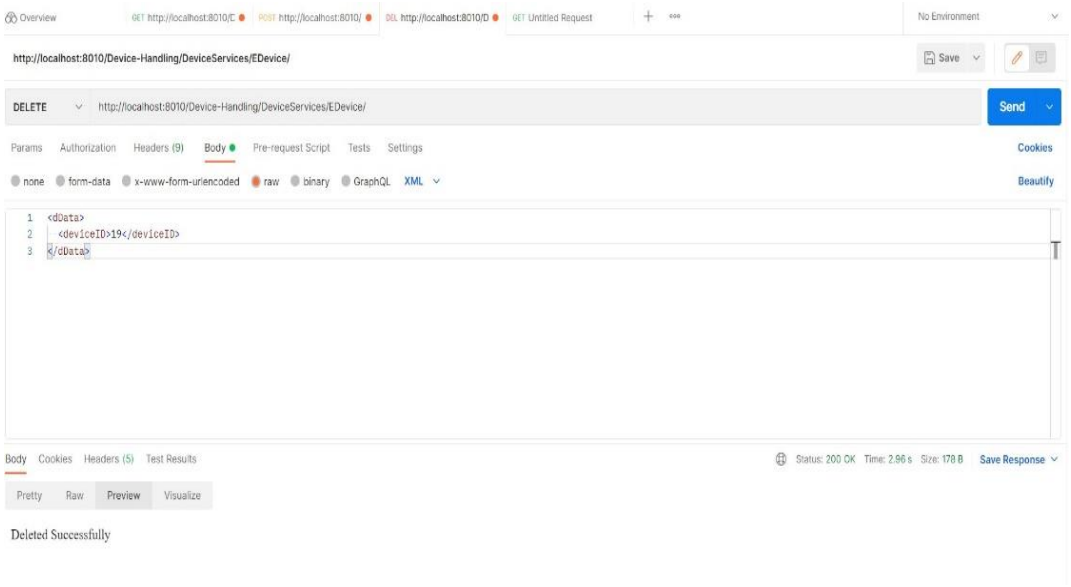
URL : http://localhost:8010/Device-Handling/DeviceServices/EDevice/



✓ Update inserted device information.
✓ Above API design depicts the PUT request of device id 20 using Jason format.

- **DELETE- Delete a device from the device list.**

URL : http://localhost:8010/Device-Handling/DeviceServices/EDevice/



✓ Delete one or more devices from the device list.
✓ Above API design depicts the DELETE request of device id 19 using XML format.

II. Internal Logic

○ Class Diagram

Device class diagram depicts the attributes and methods owns by device class to build the operations to develop the Electro-Grid system . Class diagram is attached under Appendix (IT20165352 – figure 3.1)

○ Activity Diagrams

The activity diagrams depict the flow of each operation is reflected accordingly. Activity diagram is attached under Appendix (IT20165352– figure 3.2,3.3,3.4)

○ Flow Chart

The flow chart depicts the flow of calculating power consumption. Flow chart is attached under Appendix (IT20165352– figure 3.5)

○ Sequence Diagram

The sequence diagram depicts the sequence of device management of the system. Sequence diagram is attached under Appendix (IT20165352– figure 3.6)

III) Service Development and Testing

A. Tools

- **IDE** - Eclipse
- **Database** - phpMyAdmin
- **Back End** - Java, JAX-RS (Jersy) on Tomcat
- **Dependency Management Tools** - Maven
- **Testing Tool** - Postman
- **Code Quality Checking Tool** - SonarLint
- **Version Control** - GitHub

B. Testing Methodology and Results

Test ID	Test Description / Test Steps	Test Input(s)	Expected Output(s)	Actual Output(s)	Result (Pass/Fail)
01	Insert a device.	Attributes for device.	Display message as "Inserted Successfully."	Display message as "Inserted Successfully."	Pass
02	Update device details for a selected device.	Attributes to be updated along with device.	Display Message as "Updated Successfully."	Display Message as "Updated Successfully."	Pass
03	Delete a device.	Device id of the device to be deleted.	Display Message as "Deleted Successfully."	Display Message as "Deleted Successfully."	Pass
04	View device list.	URL for the API Send Get request	Display device details.	Device details displayed.	Pass.

IV) Assumptions

- Assume, above mentioned APIs are designed for a one customer.
- Assume, a customer already registered to manage devices.
- Assume, device handling service, monitor the power consumption of users of the system.

3) Team Member 3 – Isurika M.D.A / IT20187828

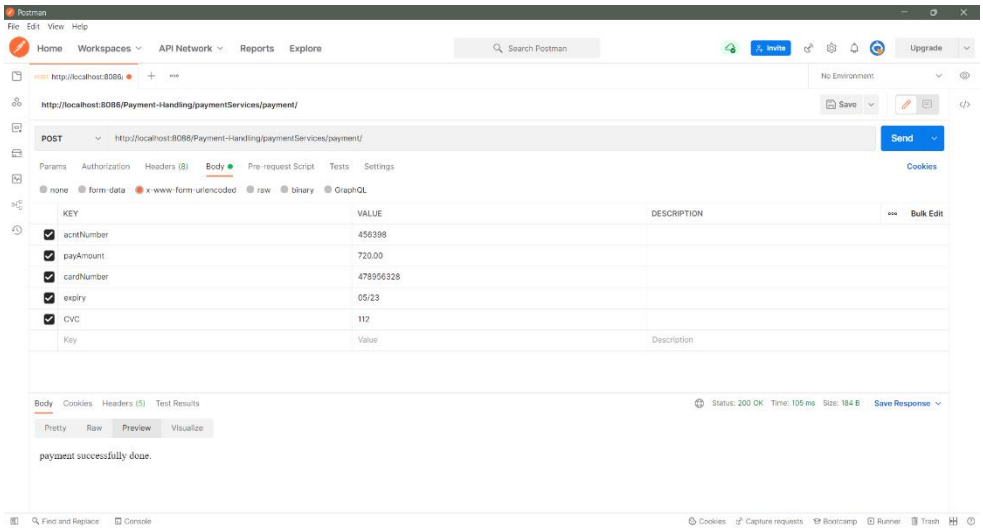
- Individual Service – Payment-Handling

Service Design

I. API Design of the Service

- **POST – add the payment**

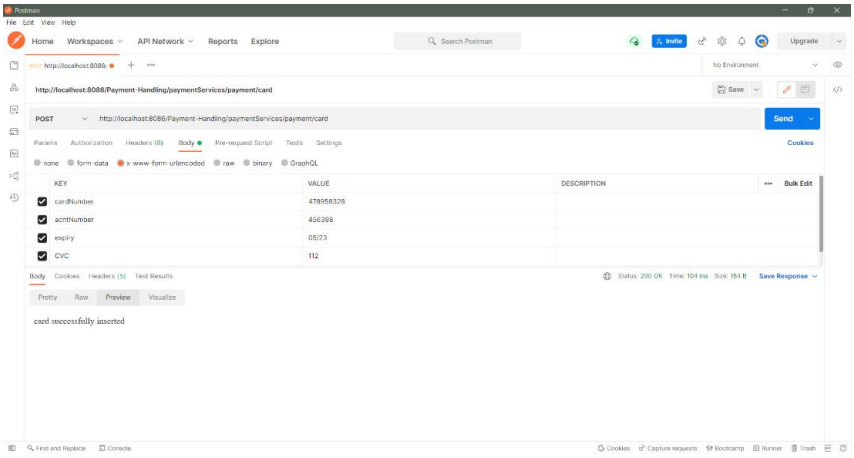
URL:- http://localhost:8086/Payment-Handling/paymentServices/payment/



✓ Insert account number, card number, expiry date and CVC to do the payment.

- **POST – save card details.**

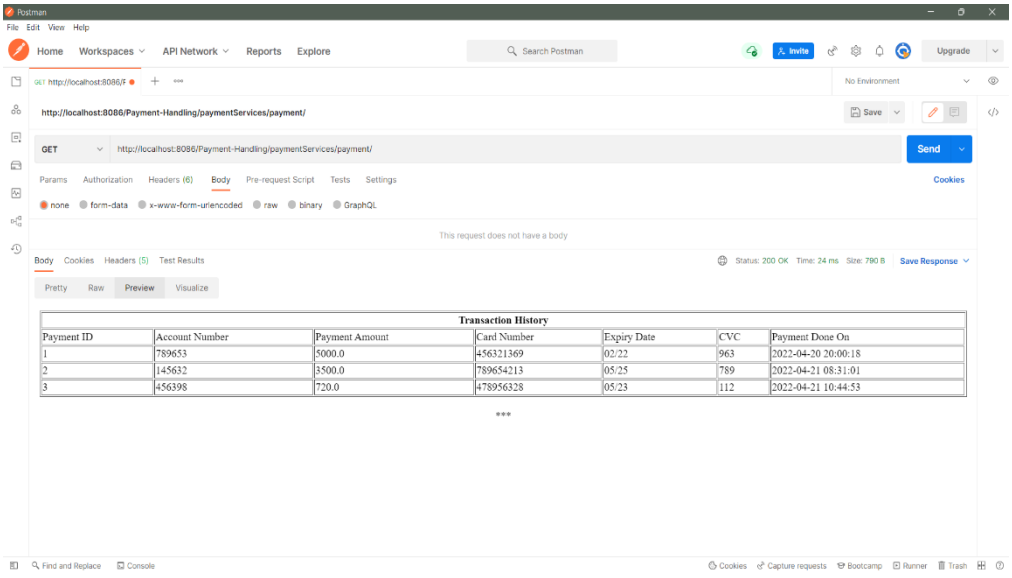
URL: - http://localhost:8086/Payment-Handling/paymentServices/payment/card



✓ Insert card number, account number, expiry date and CVC to save card details in the system.

- **GET – get all the payment history**

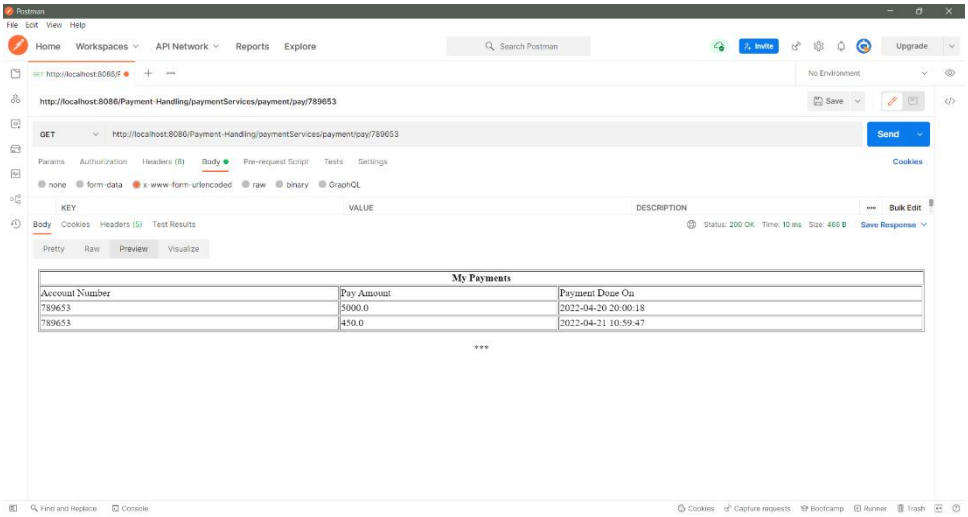
URL: - http://localhost:8086/Payment-Handling/paymentServices/payment/



✓ Retrieve all the existing payments in the system.

- **GET – get all the payment history related to one user account**

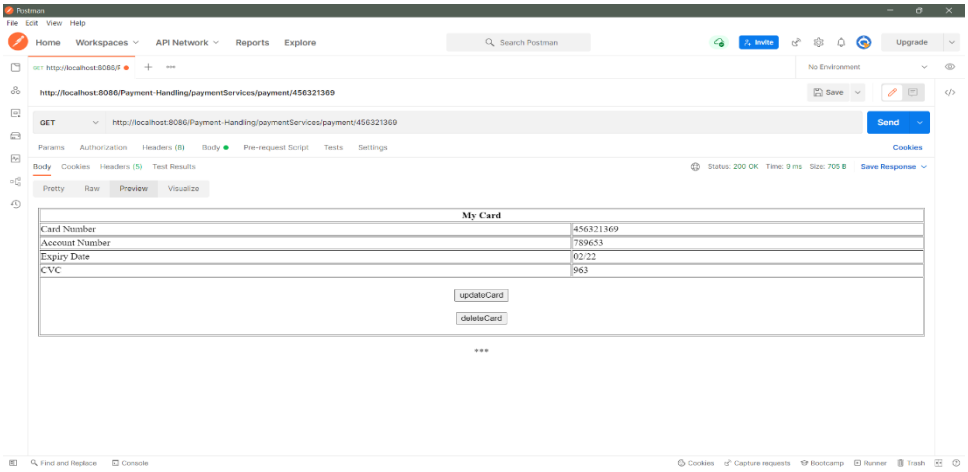
URL:http://localhost:8086/PaymentHandling/paymentServices/payment/pay/789653



- ✓ Retrieve only specific payment details from the system by passing the account number as parameter value.
- ✓ The above API design illustrates the transaction details of a user whose account number is requested as '789653'.

- **GET – get card details**

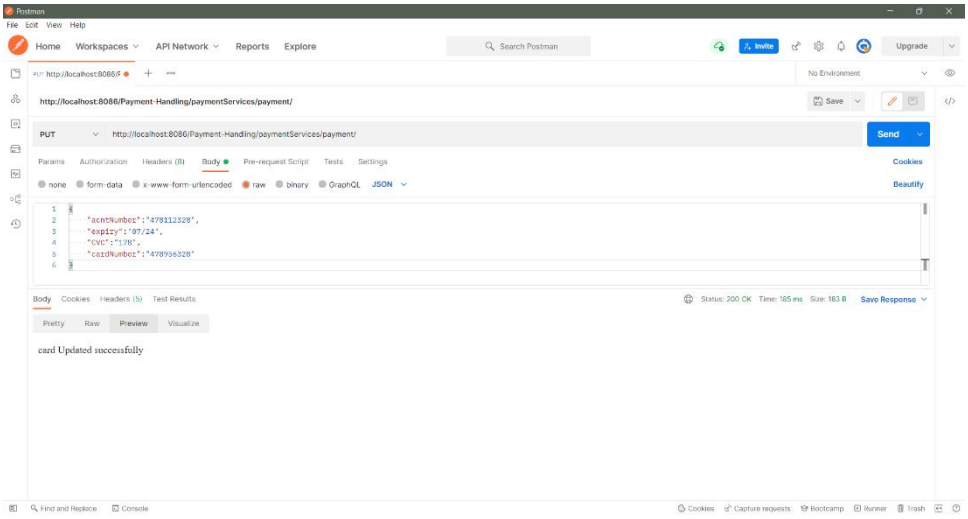
URL:http://localhost:8086/PaymentHandling/paymentServices/payment/456321369



- ✓ Retrieve all card details from the system by passing the card number as parameter value.
- ✓ The above API design illustrates the card details of requested card number '456321369'.

- **PUT – update card details**

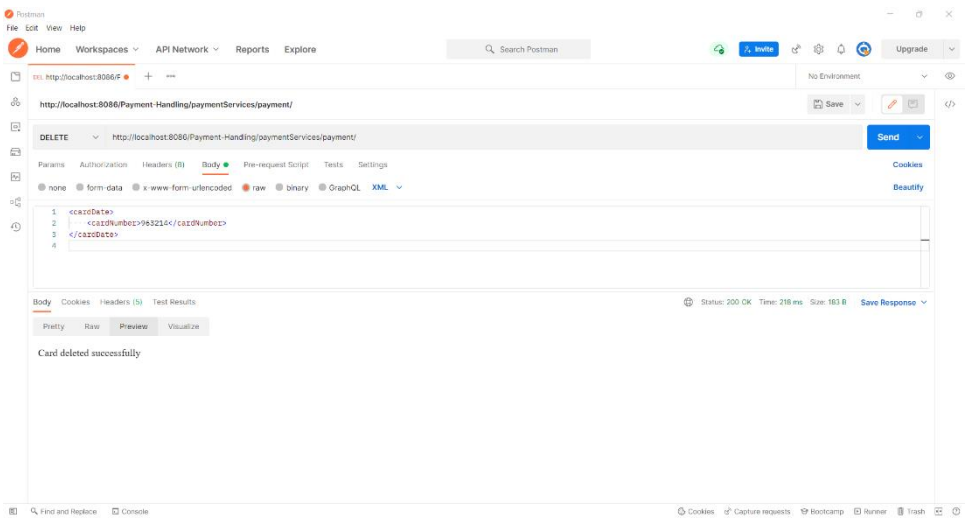
URL: - http://localhost:8086/Payment-Handling/paymentServices/payment/



- ✓ Update some details of the card as required.
- ✓ The above API design illustrates update card details of card number '478956328' from Jason format.

- **DELETE – delete card details**

URL: - http://localhost:8086/Payment-Handling/paymentServices/payment/



- ✓ Delete card details from the system.
- ✓ The above API design illustrates deletion of the card '963214' from xml format.

II. Internal Logic

Class Diagram

The part of the class diagram is illustrated attributes and methods of the pay class and card class. These two classes used to manage payment handling service. Class diagram is attached under Appendix (IT20187828 – figure 4.1)

Activity Diagram

The activity diagram is illustrated steps of preparing a payment and handling card details. Activity diagram is attached under Appendix (IT20187828– figure 4.2)

- **Flow Chart**

The flowchart is illustrated flow of steps of payment handling service. Flow chart is attached under Appendix (IT20187828– figure 4.3)

- **Sequence Diagram**

The sequence diagram is illustrated sequence of steps of preparing a payment. Sequence diagram is attached under Appendix (IT20187828– figure 4.4)

III. Service Development and Testing

A. Tools

- **IDE** - Eclipse
- **Database** - phpMyAdmin
- **Back End** - Java
- **Dependency Management Tools** - Maven
- **Testing Tool** - Postman
- **Code Quality Checking Tool** - SonarLint
- **Version Control** - GitHub

B. Testing Methodology and Results

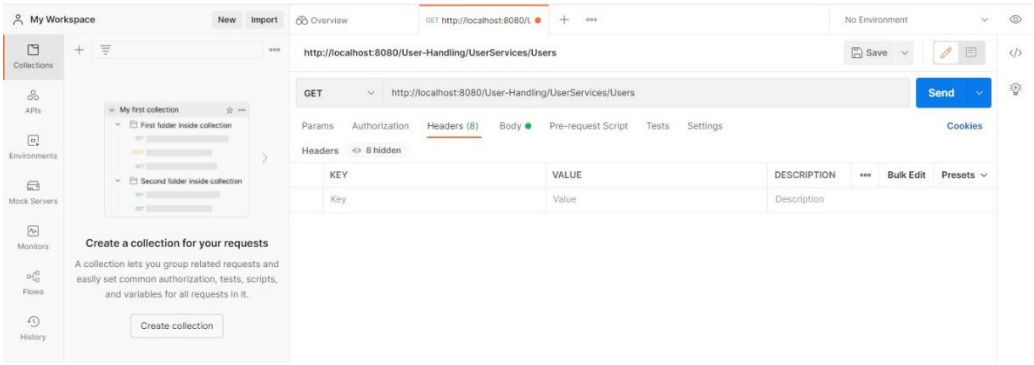
Test ID	Test Description / Test Steps	Test Input(s)	Expected Output(s)	Actual Output(s)	Result (Pass/Fail)
01	Create payment	payAmount AcntNumber billID cardNumber expiry CVC	Add the Payment.	Add the payment.	Pass
02	View specific payment details.	URL for the API send GET Request with acntNumber.	Display payments according to the given acntNumber.	Display payments according to the given acntNumber.	Pass
03	View all the payments.	URL for the API send GET request.	Display all the payments.	Display all the payments.	Pass
04	View all the card details.	URL for the API send GET Request with cardNumber.	Display card details according to the given cardNumber.	Display card details according to the given cardNumber.	Pass
05	Update card Details	Attributes to be updated along with acntNumber.	Card details Updated Successfully.	Card details Updated Successfully.	Pass
06	Delete card Details	Card number to be deleted.	Card details Deleted Successfully.	Card details Deleted Successfully.	Pass

4) Team Member 4 - Kandanaarachchi H.L.D.S/ IT20157500

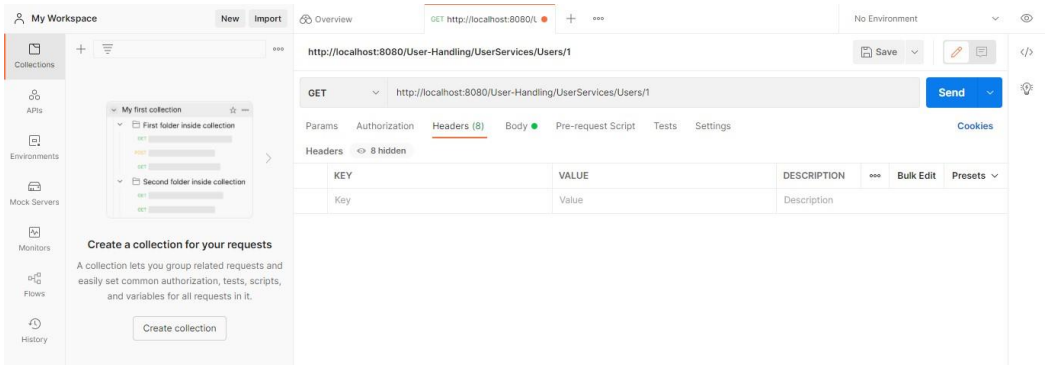
- Individual Service – User Handling

I. API Design of the Service

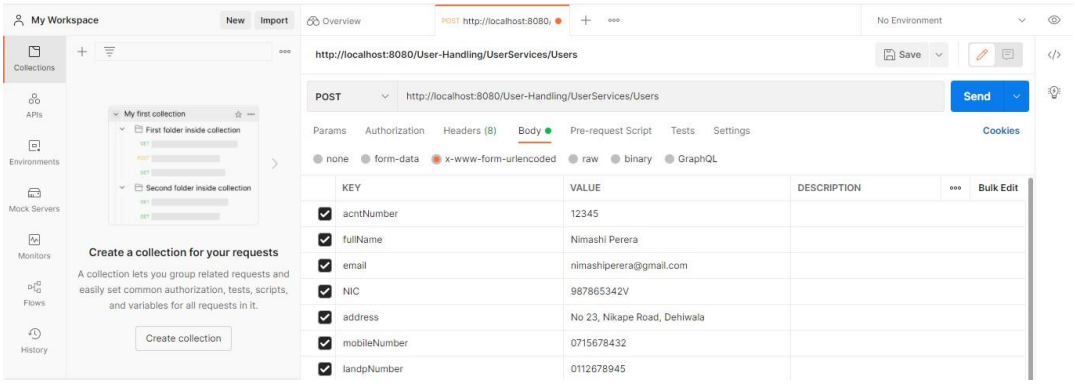
o GET – Retrieve all Users in the system



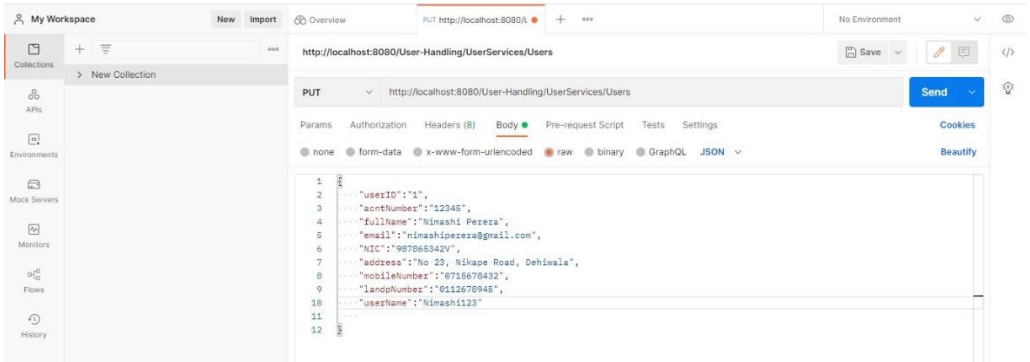
o GET 1 – Retrieve particular User



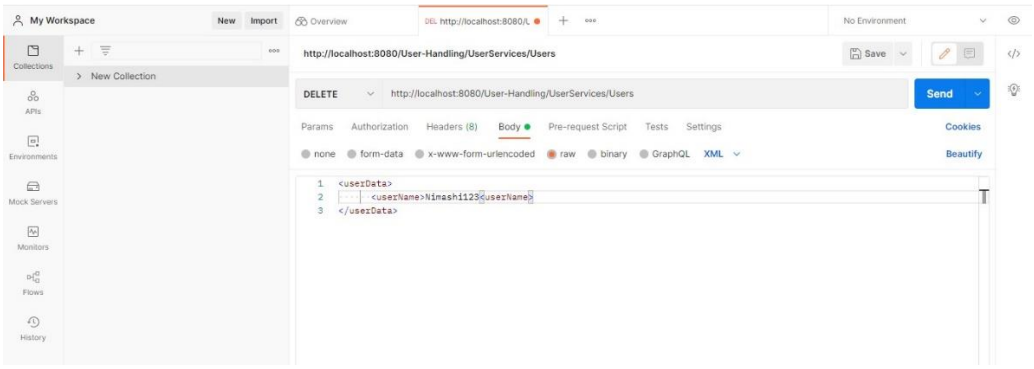
o POST – Insert a User



o PUT – Update User



- **DELETE – Delete User**



II. Internal Logic

- **Class Diagram**

User class is covered User Management service. The part of the class diagram is illustrated attributes and methods of the User class. Class diagram is attached under Appendix (IT20157500 – figure 5.1)

- **Activity Diagrams**

The activity diagram is illustrated activities of User. Activity diagram is attached under Appendix (IT20157500– figure 5.2)

- **Flow Chart**

The flowchart is illustrated separate steps of User Handling. Flow chart is attached under Appendix (IT20157500– figure 5.3)

- **Other Diagrams**

The sequence diagram is illustrated sequence of preparing a User Handling. Sequence diagram is attached under Appendix (IT20157500– figure 5.4)

I. <u>Service Development and Testing</u>

A. Tools

- **IDE** - Eclipse
- **Database** - phpMyAdmin
- **Back End** - Java
- **Dependency Management Tools** - Maven
- **Testing Tool** - Postman
- **Code Quality Checking Tool** - SonarLint
- **Version Control** - GitHub

B. Testing Methodology and Results

Test ID	Test Description / Test Steps	Test Input(s)	Expected Output(s)	Actual Output(s)	Result (Pass/Fail)
01	Insert User Details	acntNumber fullName email NIC address mobileNumber landpNumber userName password (Attributes of the User)	User Created Successfully.	User Created Successfully.	Pass
02	Display existing Users	URL for the API send GET Request.	Display all the Users.	Display all the Users.	Pass
03	Display a single User	URL for the API send GET request along with the userName.	Display relevant User according to the given userName.	Display relevant User according to the given userName.	Pass
04	Update User Details	Attributes to be updated along with userName.	User Updated Successfully.	User Updated Successfully.	Pass
05	Delete User Details	UserName of the User to be deleted.	User Deleted Successfully.	User Deleted Successfully.	Pass

5) Team Member 5 – Hasna A.K.F / IT20212940

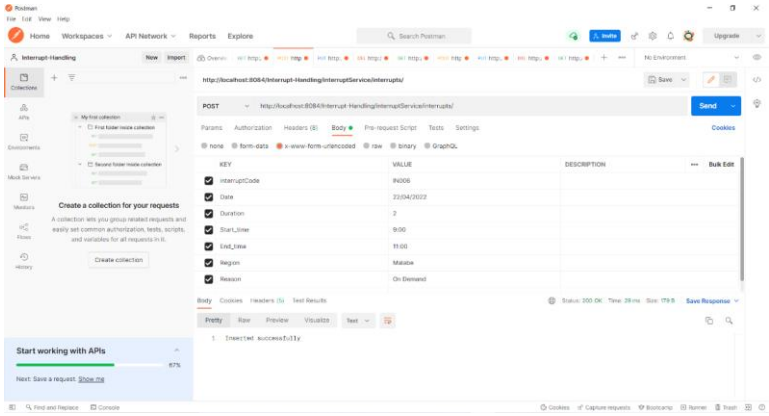
- Individual Service – Interrupt Handling

Service Design

I) API Design of the Service

- **POST – Create Interrupt Notice**

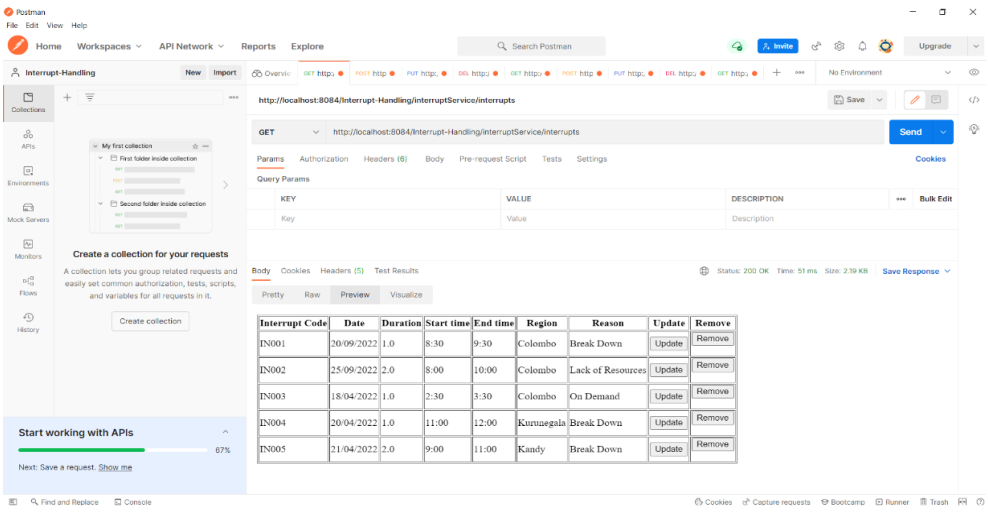
URL :- localhost:8086/Interrupt-Handling/interruptService/Interrupts



- ✓ Insert Interrupt Code, Date, Duration, start time, End time, Region, and Reason in order to create an Interrupt Notice.

- **GET – Retrieve All Interrupt Notices**

URL :- localhost:8086/Interrupt-Handling/interruptService/Interrupts

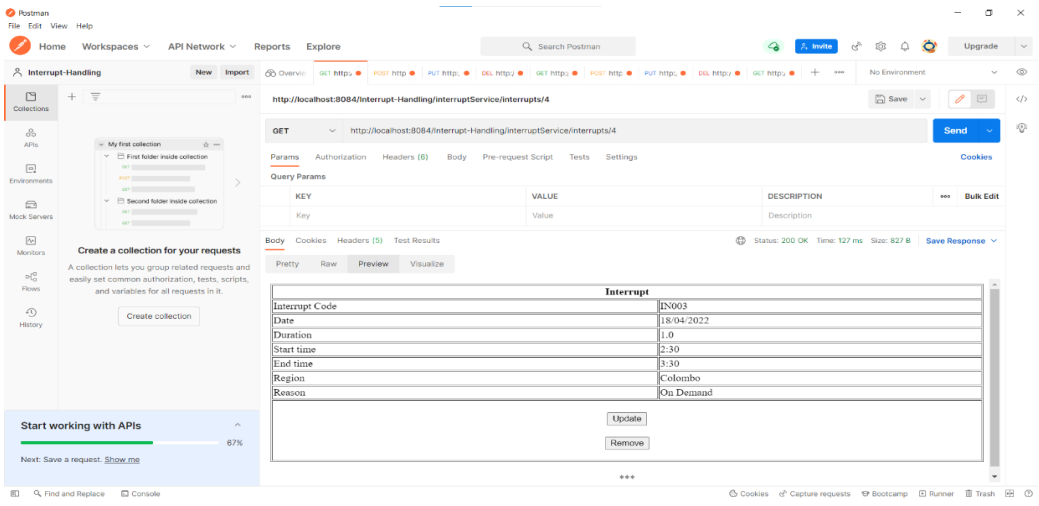


Interrupt Code	Date	Duration	Start time	End time	Region	Reason	Update	Remove
IN001	20/09/2022	1.0	8:30	9:30	Colombo	Break Down	Update	Remove
IN002	25/09/2022	2.0	8:00	10:00	Colombo	Lack of Resources	Update	Remove
IN003	18/04/2022	1.0	2:30	3:30	Colombo	On Demand	Update	Remove
IN004	20/04/2022	1.0	11:00	12:00	Kurunegala	Break Down	Update	Remove
IN005	21/04/2022	2.0	9:00	11:00	Kandy	Break Down	Update	Remove

- ✓ Retrieve (Display) all the existing Interrupt Notices from the system.

- **GET – Retrieve an Interrupt Notice**

URL :- localhost:8086/Interrupt-Handling/interruptService/Interrupts/2

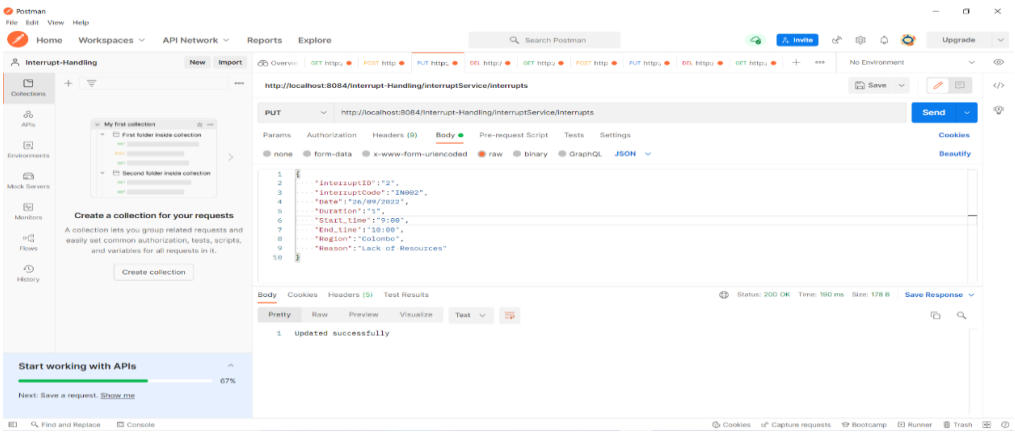


Interrupt	
Interrupt Code	IN003
Date	18/04/2022
Duration	1.0
Start time	2:30
End time	3:30
Region	Colombo
Reason	On Demand

- ✓ Retrieve (Display) single Interrupt Notice from the system by passing the interrupt id.
- ✓ The above API design is illustrated to request for Interrupt id 2.

- **PUT – Update Interrupt Notice**

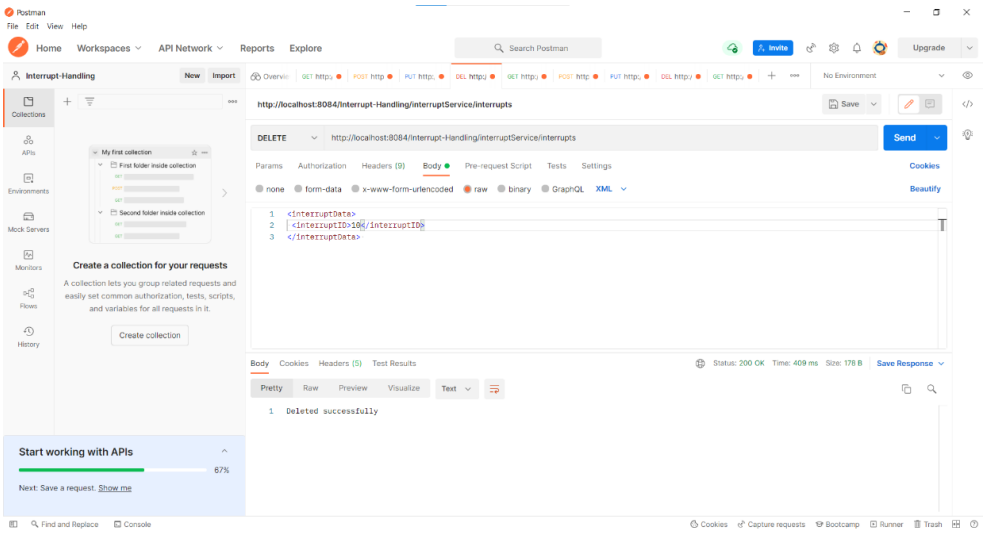
URL :- localhost:8086/Interrupt-Handling/interruptService/Interrupts



- ✓ Update or edit some details of the Interrupt Notice as required.
- ✓ The above API design is illustrated to update the Interrupt Notice with the id 6 from Jason format.

- **DELETE – DELETE Interrupt Notice**

URL :- localhost:8086/Interrupt-Handling/interruptService/Interrupts



- ✓ Delete a particular Interrupt Notice from the system.
- ✓ The above API design is illustrated to delete Interrupt Notice with the id 9 from xml format.

II. Internal Logic

Class Diagram

Basically, Interrupt class covers Interrupt Notice Management service. The part of the class diagram illustrates the attributes and methods of the interrupt class. Class diagram is attached under Appendix (IT20212940 – figure 6.1)

- **Activity Diagrams**

The insert, update, delete, retrieve activity diagrams depict the flow of each operation is reflected accordingly. Activity diagram is attached under Appendix (IT20212940– figure 6.2,6.3,6.4,6.5)

- **Flow Chart**

The flowchart illustrates the mechanism of handling interrupt notices. Flow chart is attached under Appendix (IT20212940– figure 6.6)

- **Sequence Diagrams**

The sequence diagram illustrates sequence handling interrupt notices. Sequence diagram is attached under Appendix (IT20212940– figure6.7)

III. Service Development and Testing

A. Tools

- **IDE** - Eclipse
- **Database** - phpMyAdmin
- **Back End** - Java
- **Dependency Management Tools** - Maven
- **Testing Tool** - Postman
- **Code Quality Checking Tool** - SonarLint
- **Version Control** - GitHub

B. Testing Methodology and Results

Test ID	Test Description / Test Steps	Test Input(s)	Expected Output(s)	Actual Output(s)	Result (Pass/Fail)
01	Insert Interrupt Notice Details	Valid interruptCode, valid Date, valid duration, valid start_time, valid End_time, valid region, valid reason and valid AdminID	Inserted Successfully	Inserted Successfully	Pass
02	Insert Interrupt Notice Details	Valid interruptCode, invalid Date format, valid duration, valid start_time, valid End_time, valid region, valid reason and valid AdminID	Error while inserting	Error while inserting	Pass
03	Insert Interrupt Notice Details	Valid interruptCode, valid Date, invalid duration, valid start_time, valid End_time, valid region, valid reason and valid AdminID	Error while inserting	Error while inserting	Pass
04	Insert Interrupt Notice Details	Valid interruptCode, valid Date, valid duration, invalid	Error while inserting	Error while inserting	Pass

		start_time format, valid End_time, valid region, valid reason and valid AdminID			
05	Insert Interrupt Notice Details	Valid interruptCode, valid Date, valid duration, valid start_time format, valid End_time, valid region, valid reason and unavailable AdminID	Error while inserting	Error while inserting	Pass
06	Display existing Interrupt Notices	URL for the API send GET Request	Display all the Interrupt Notices	Display all the Interrupt Notices	Pass
07	Display Interrupt Notices Based on Region	URL for the API send GET request along with the region	Display relevant interrupt Notices according to the given region	Display relevant interrupt Notices according to the given region	Pass
08	Display Interrupt Notices Based on Region	URL for the API send GET request along with the unavailable region	Error while Displaying interrupt based on region	Error while Displaying interrupt based on region	Pass
07	Update Interrupt Notice Details	Attributes to be updated along with the interrupt ID	Updated Successfully.	Updated Successfully.	Pass
08	Update Interrupt Notice Details	Valid interruptCode, invalid Date format, invalid duration, invalid start_time format, invalid End_time format, valid region, valid reason and unavailable AdminID along with the interrupt ID	Error while Updating interrupt notice	Error while Updating interrupt notice	pass
09	Update Interrupt Notice Details	Attributes to be updated along with unavailable interrupt ID	Error while Updating interrupt notice	Error while Updating interrupt notice	Pass
10	Delete Interrupt Notice Details	InterruptID of the Interrupt Notice to be deleted	Deleted Successfully	Deleted Successfully	Pass
11	Delete Interrupt Notice Details	Unavailable InterruptID of the Interrupt Notice to be deleted	Error while Deleting interrupt notice	Error while Deleting interrupt notice	Pass

6) Team Member 6 – M.N Aaisha / IT20202354

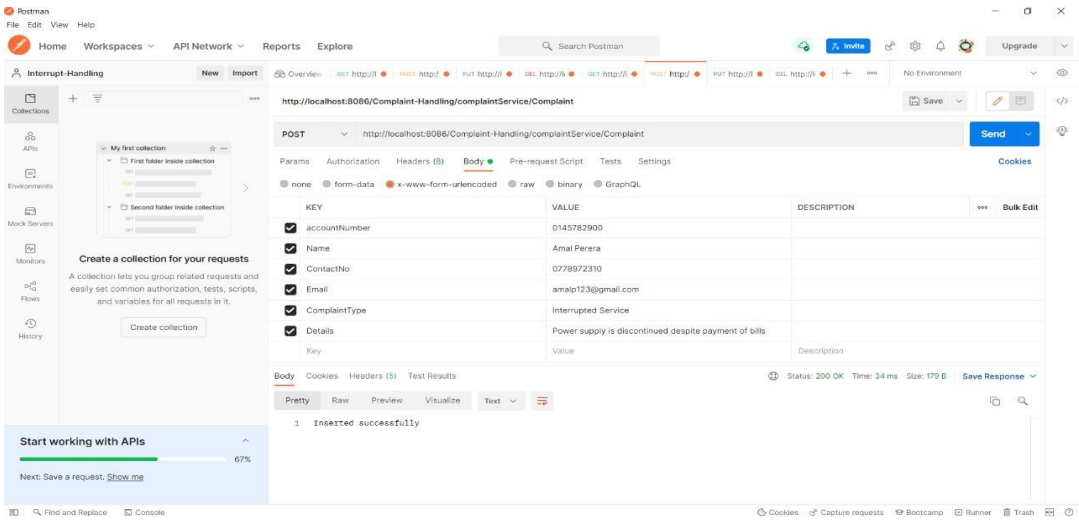
- Individual Service – Complaint Handling

Service Design

II. API Design of the Service

- **POST – Create New Complaint**

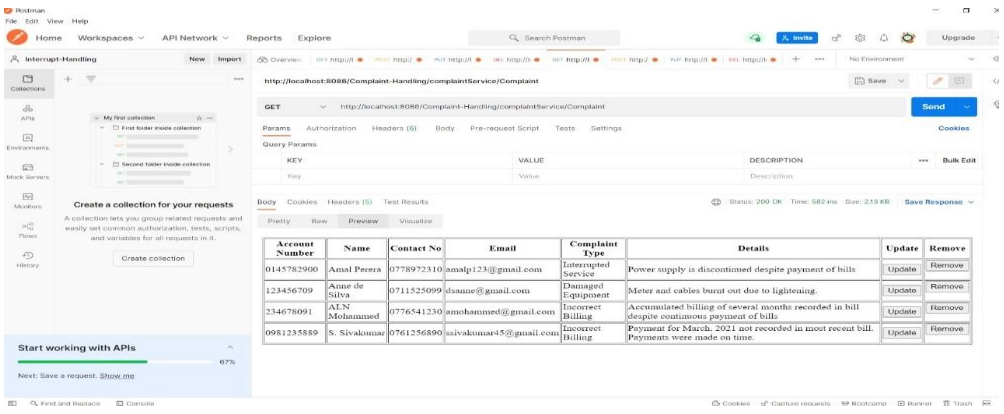
URL :- http://localhost:8086/Complaint-Handling/complaintService/Complaint



- ✓ Insert details such as account number, name, contact number, Email, type of complaint and details regarding the complaint to create a new complaint .
- ✓ Status is set to the default value of 'Unresolved.'

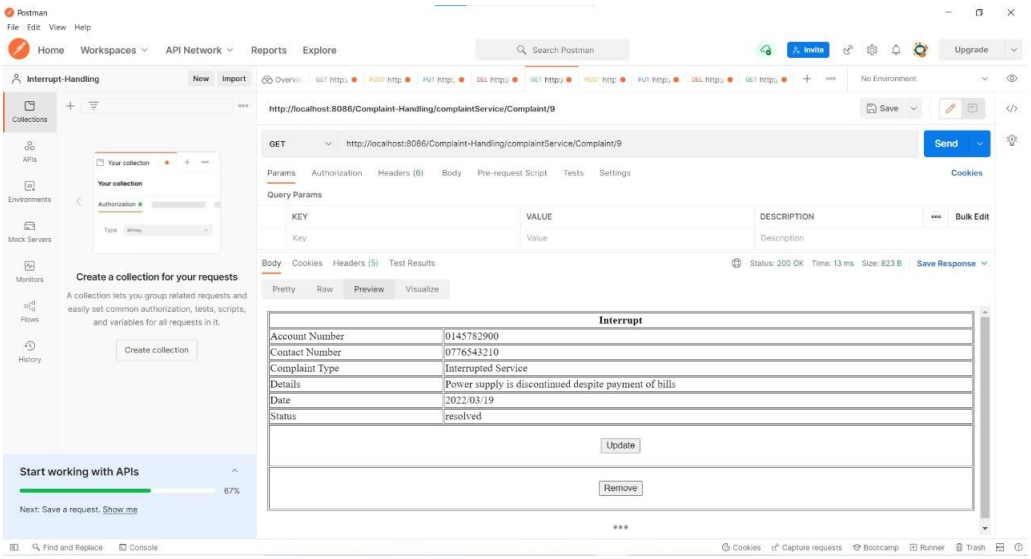
- **GET – Retrieve All Complaintss**

URL :- http://localhost:8086/Complaint-Handling/complaintService/Complaint



- **GET – Retrieve a particular complaint**

URL: http://localhost:8086/ComplaintHandling/complaintService/Complaint/7

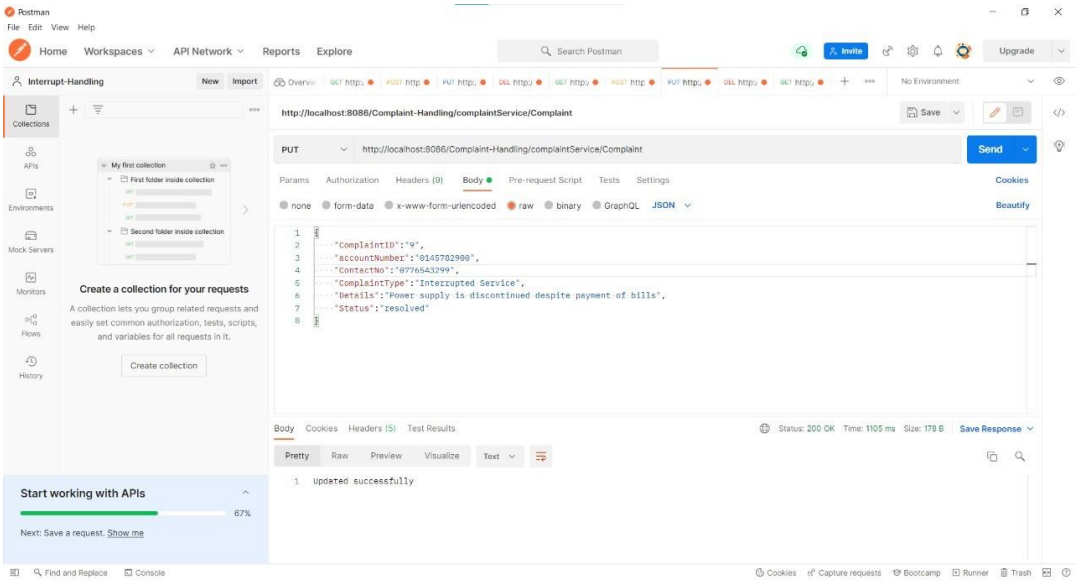


✓ Retrieve and display a single complain by passing the complaint ID.
✓ The above API design is illustrated to request for complaint ID 9.

- **PUT– Update Details of a Complaint**

  URL:

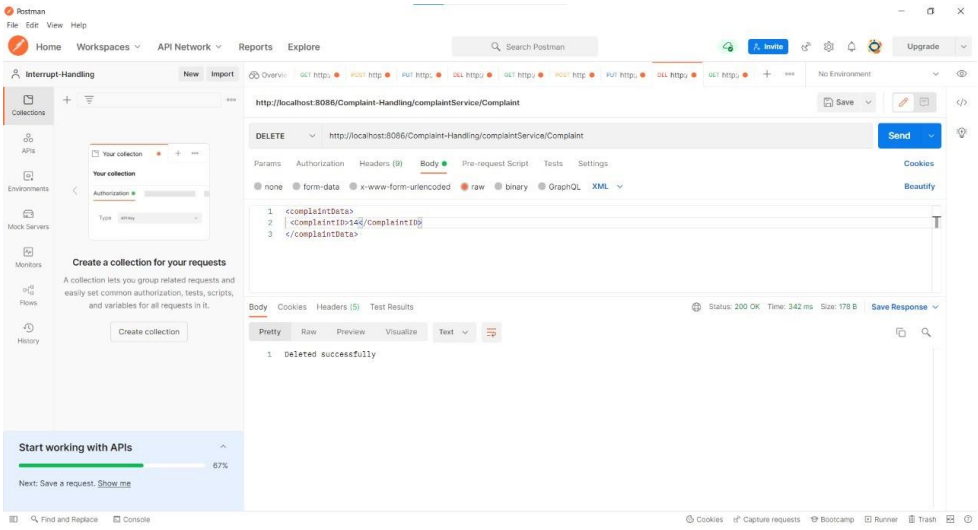
  http://localhost:8086/ComplaintHandling/complaintService/Complaint



✓ The above API design is illustrated to update the complaint with the id 9 using Jason format

- **DELETE – DELETE Complaint**

URL :- http://localhost:8086/Complaint-Handling/complaintService/Complaint



- ✓ Delete a particular Complaint from the system.
- ✓ The above API design is illustrated to delete Complaint with the id 14 from xml format.

III. Internal Logic

○ Class Diagram

The part of the class diagram illustrates the attributes and methods of the complaint class. Class diagram is attached under Appendix (IT20202354– figure 7.1)

○ Activity Diagrams

The insert, update, delete, retrieve activity diagrams depict the flow of each operation is reflected accordingly. Activity diagram is attached under Appendix (IT20202354– figure 7.2,7.3,7.4,7.5,7.6,7.7)

○ Flow Chart

The flowchart illustrates the mechanism of handling Complaints. Flow chart is attached under Appendix (IT20202354– figure 7.8,7.9,7.10)

○ Other Diagrams

The sequence diagram illustrates sequence handling complaints. Sequence diagram is attached under Appendix (IT20202354– figure 7.11)

IV. Service Development and Testing

A. Tools

- ○ **IDE** - Eclipse
- ○ **Database** - phpMyAdmin
- ○ **Back End** - Java
- ○ **Dependency Management Tools** - Maven
- ○ **Testing Tool** - Postman
- ○ **Code Quality Checking Tool** - SonarLint
- ○ **Version Control** - GitHub

B. Testing Methodology and Results

Test ID	Test Description / Test Steps	Test Input(s)	Expected Output(s)	Actual Output(s)	Result (Pass/Fail)
01	Insert new Complaint Details	Valid ComplaintID, valid Contact, valid type, valid details, valid date	Inserted Successfully	Inserted Successfully	Pass
02	Insert new Complaint Details	Valid ComplaintID, invalid Contact Number valid type, valid details, valid date	Error while inserting	Error while inserting	Pass
03	Display existing Complaints	URL for the API send GET Request	Display all the complaints	Display all the Complaints	Pass
04	Display Complaint belonging to a particular ID	URL for the API send GET request with the ComplaintID	Display relevant Complaint	Display relevant Complaint	Pass
05	Update Complaint Details	Attributes to be updated along with the Compalint ID	Updated Successfully.	Updated Successfully.	Pass
06	Update Complaint Details	Valid ComplaintID, invalid Contact, valid type, valid details,valid status along with complaint ID	Error while Updating Complaint	Error while Updating Complaint	Pass
07	Update Complaint Details	Attributes to be updated along with unavailable Complaint ID	Error while Updating Complaint	Error while Updating Complaint	Pass
08	Delete Complaint	URL of API send DELETE with Complaint ID of the complaint to be deleted	Deleted Successfully	Deleted Successfully	Pass
09	Delete Complaint	URL of API send DELETE with an unavailable complaint ID	Error while Deleting Complaint	Error while Deleting Complaint	Pass

7) System Integration Details (techniques used, how was it tested, etc.).

The services of the ElectroGrid system were implemented separately following the MVC architecture. Three packages were made for each service to store database connection (util), one to implement the RESTful API services (com) and another package to implement the server model (model).

Separate maven projects were created in the git repository and once the services were implemented by the team members, it was integrated. It was discussed for each team member to use different tomcat ports. The Tomcat ports used by members are mentioned below:

Web Service	Tomcat Port No
User	8080
Device	8010
E-Bill	8080
Payment	8086
Interrupts	8084
Complaints	8086

Once the system is developed and executed in five separate ports, system was tested through postman. The black box testing method used to test services individually was followed when testing the system. Moreover, to detect code quality and code security of entire project 'SonarLint' plugin is used. All the requests under services were tested by passing the URL accordingly (with the allocated port number). A single database was maintained for the entire project.

8) References

- **https://courseweb.sliit.lk/**
- **https://stackoverflow.com/**
- **https://helpdeskgeek.com/**
- **https://www.sonarlint.org/?gclid=EAIaIQobChMIvdKcoeOn9wIVVCUrCh2ShAJjEAAYASAAEgKBrfD_BwE**
- **https://crunchify.com/how-to-build-restful-service-with-java-using-jax-rs-and-jersey/**
- **https://learning.postman.com/docs/getting-started/introduction/**

9) Appendix

1. Group Diagrams

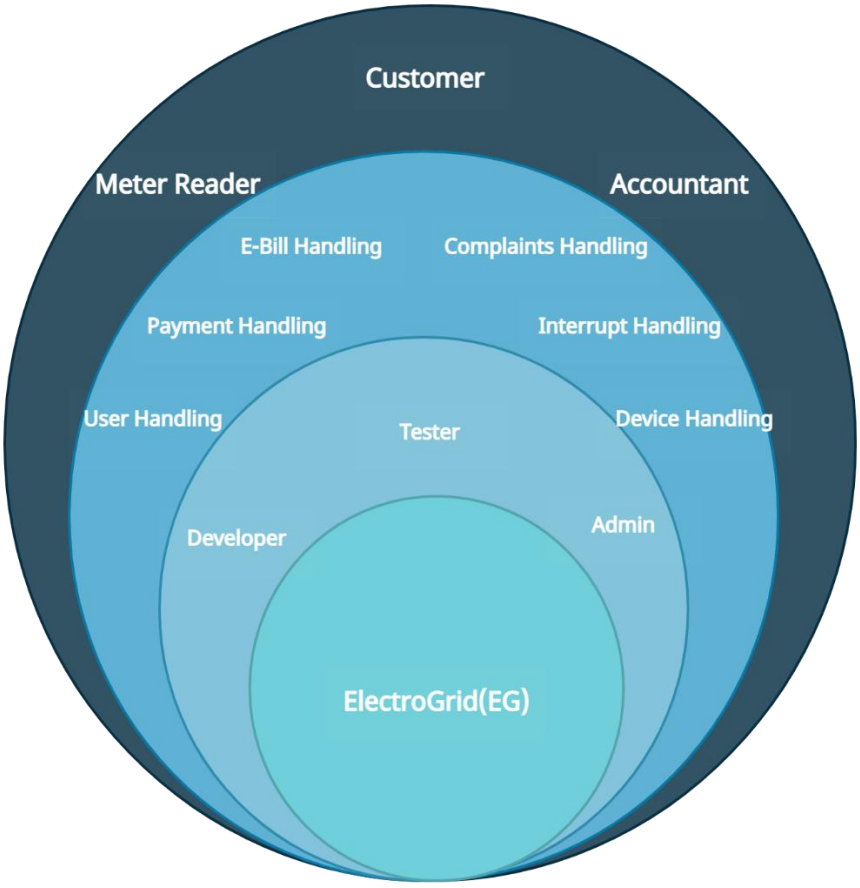


Figure 1.1 – Onion Diagram

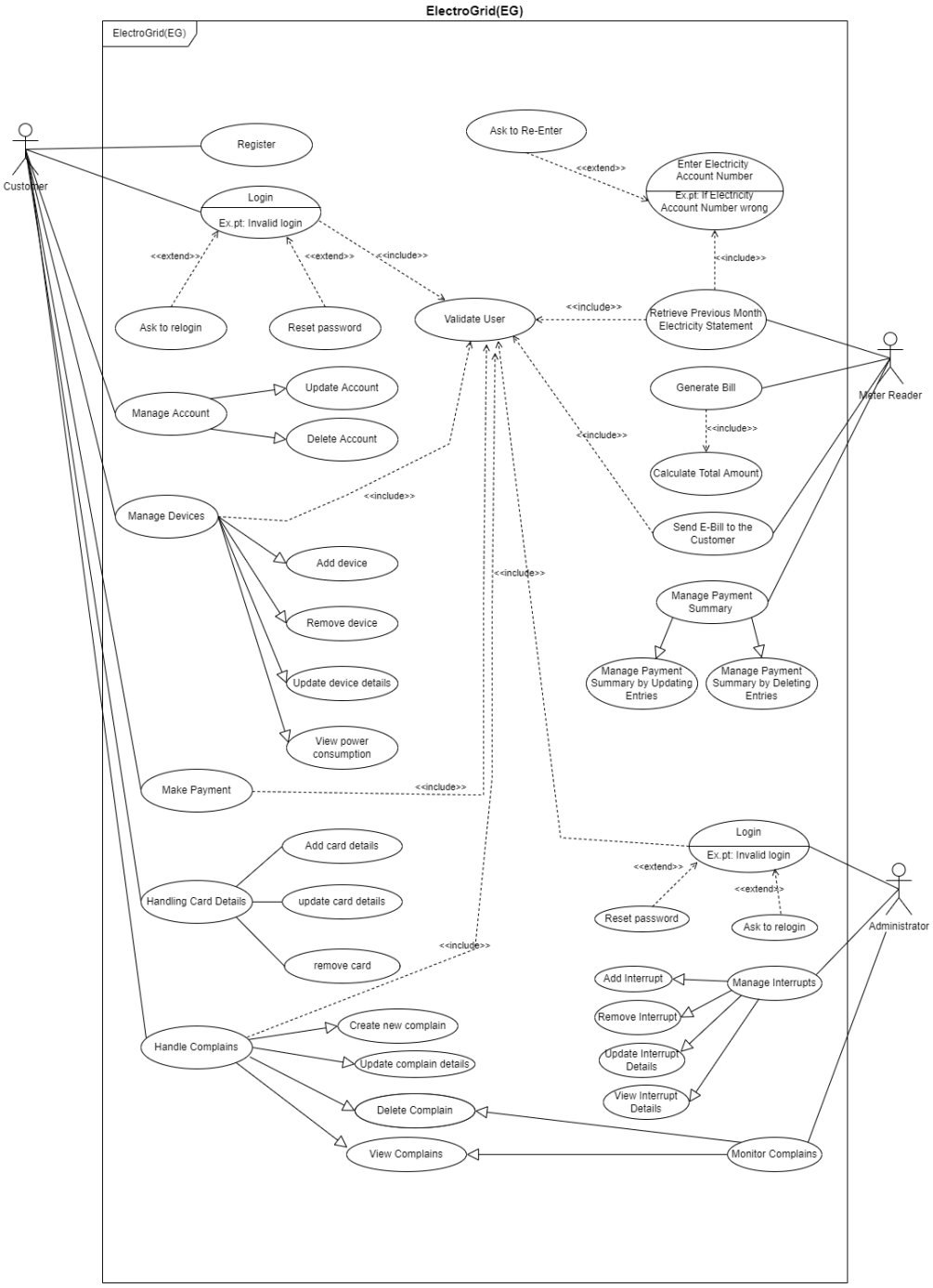


Figure 1.2 – Use Case Diagram

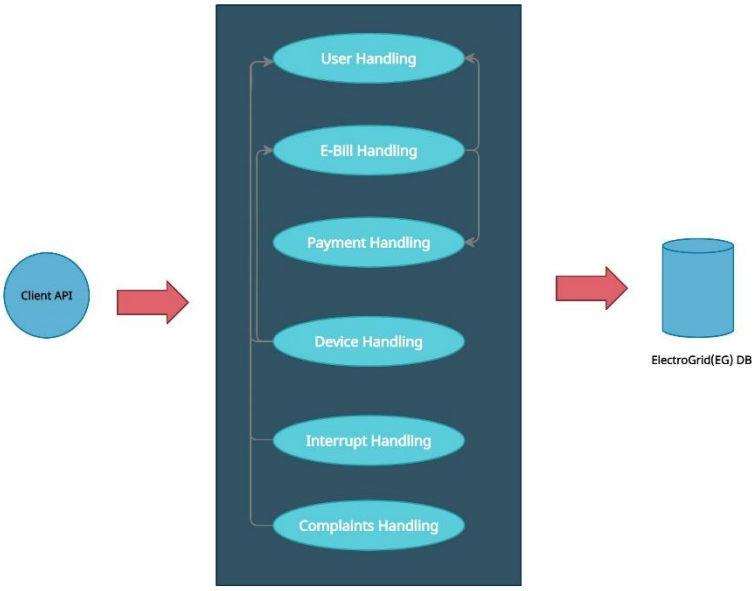


Figure 1.3 – Overall Architecture

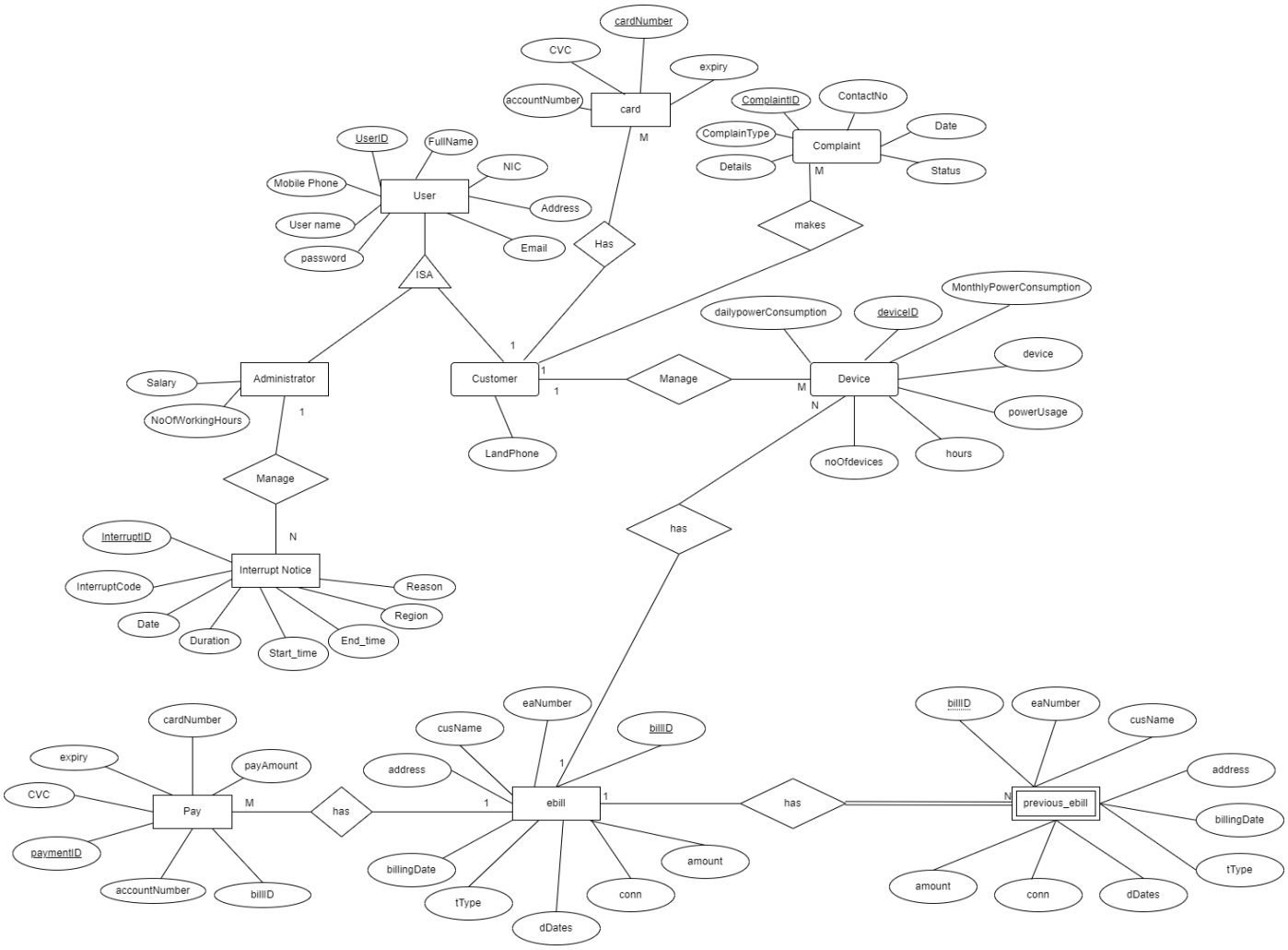


Figure 1.4 – ER Diagram

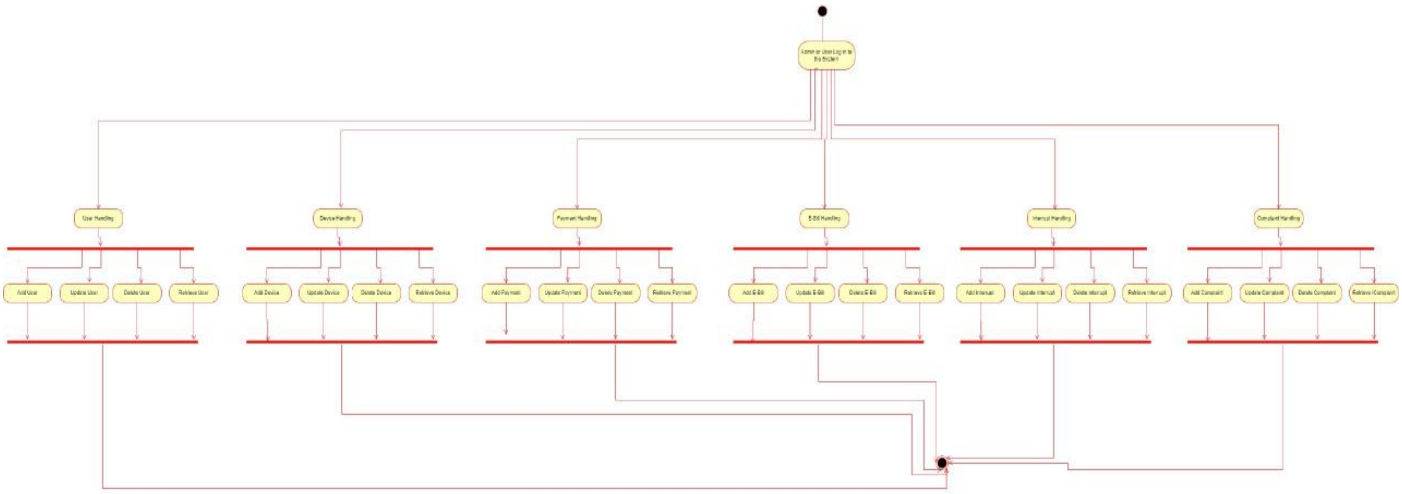


Figure 1.5 – Activity Diagram

2. Team Member 1 – Thathsarani R.P.H.S.R / IT20201364

Class Diagram

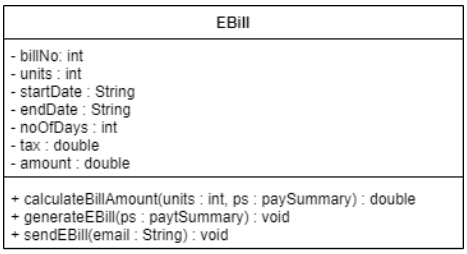


Figure 2.1

Activity Diagram

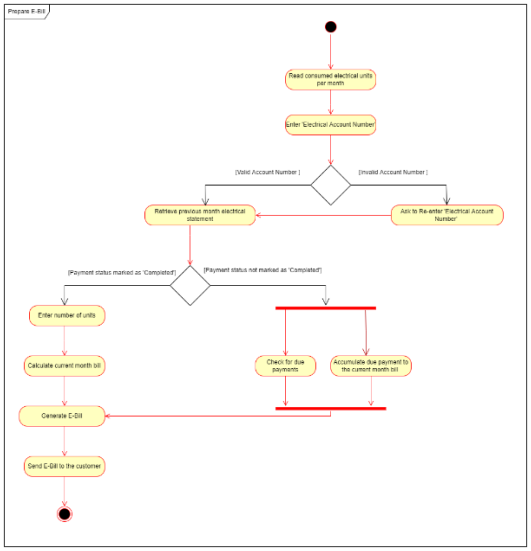


Figure 2.2

Flow Chart

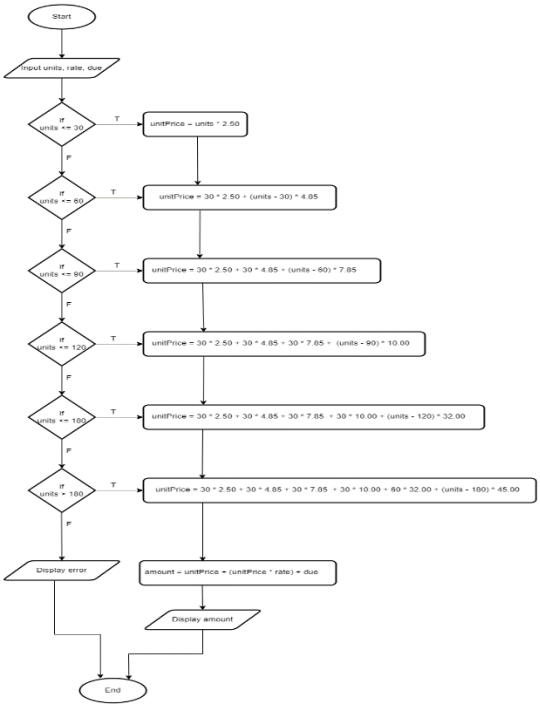


Figure2.3

Sequence Diagram

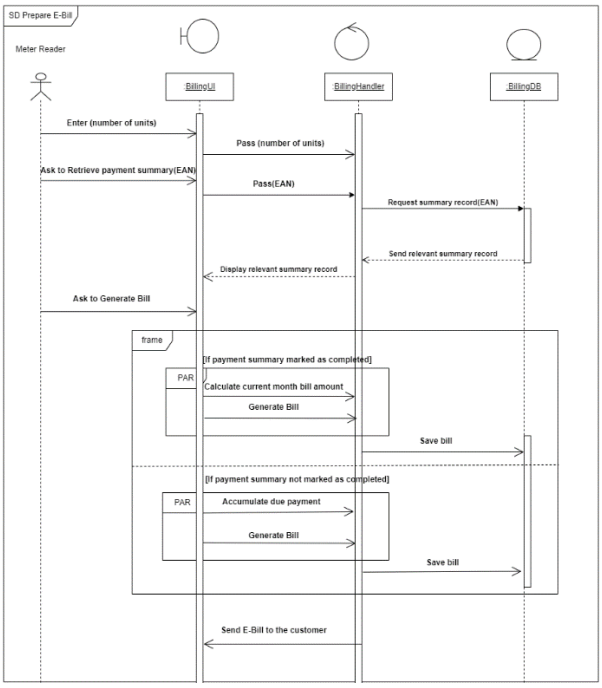


Figure 2.4

3. Team Member 2 – Peiris M.I.M / IT20165352

Class Diagram

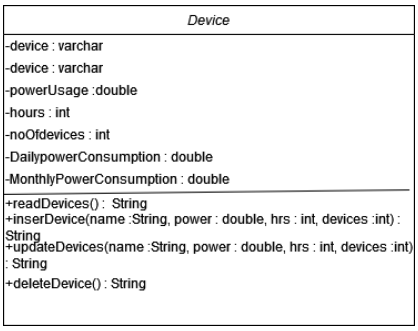


Figure3.1

Activity Diagram

Insert a device

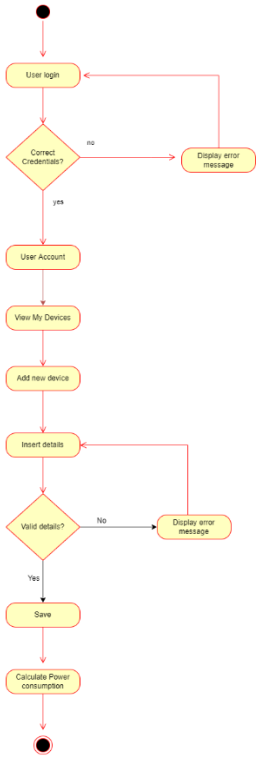


Figure 3.2

Update device details

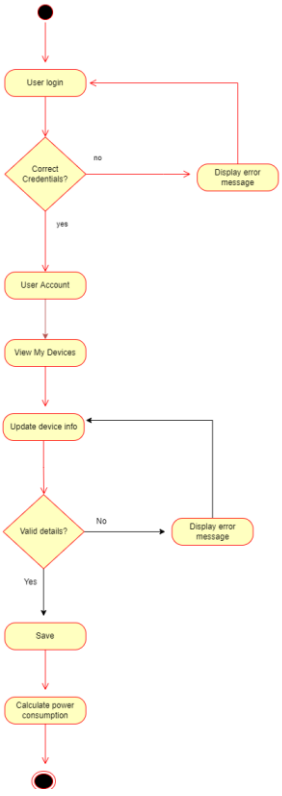


Figure 3.3

Delete device

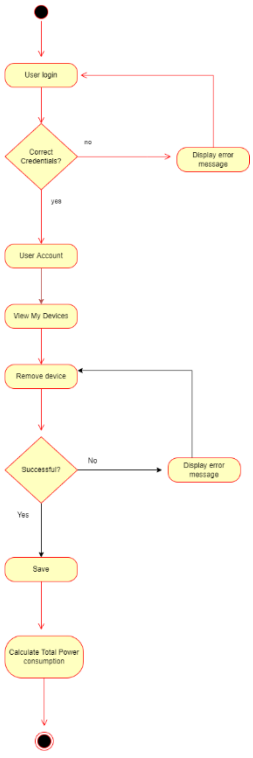


Figure 3.4

Flow Chart

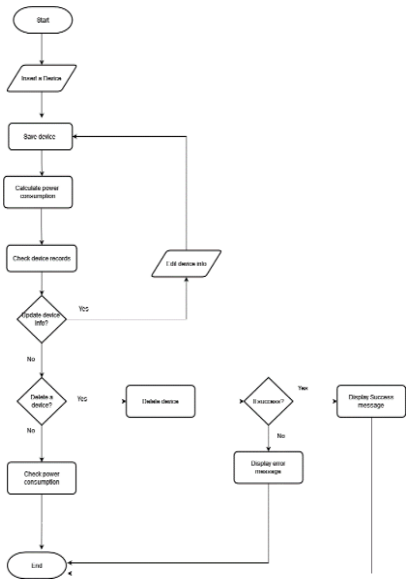


Figure 3.5

Sequence Diagram

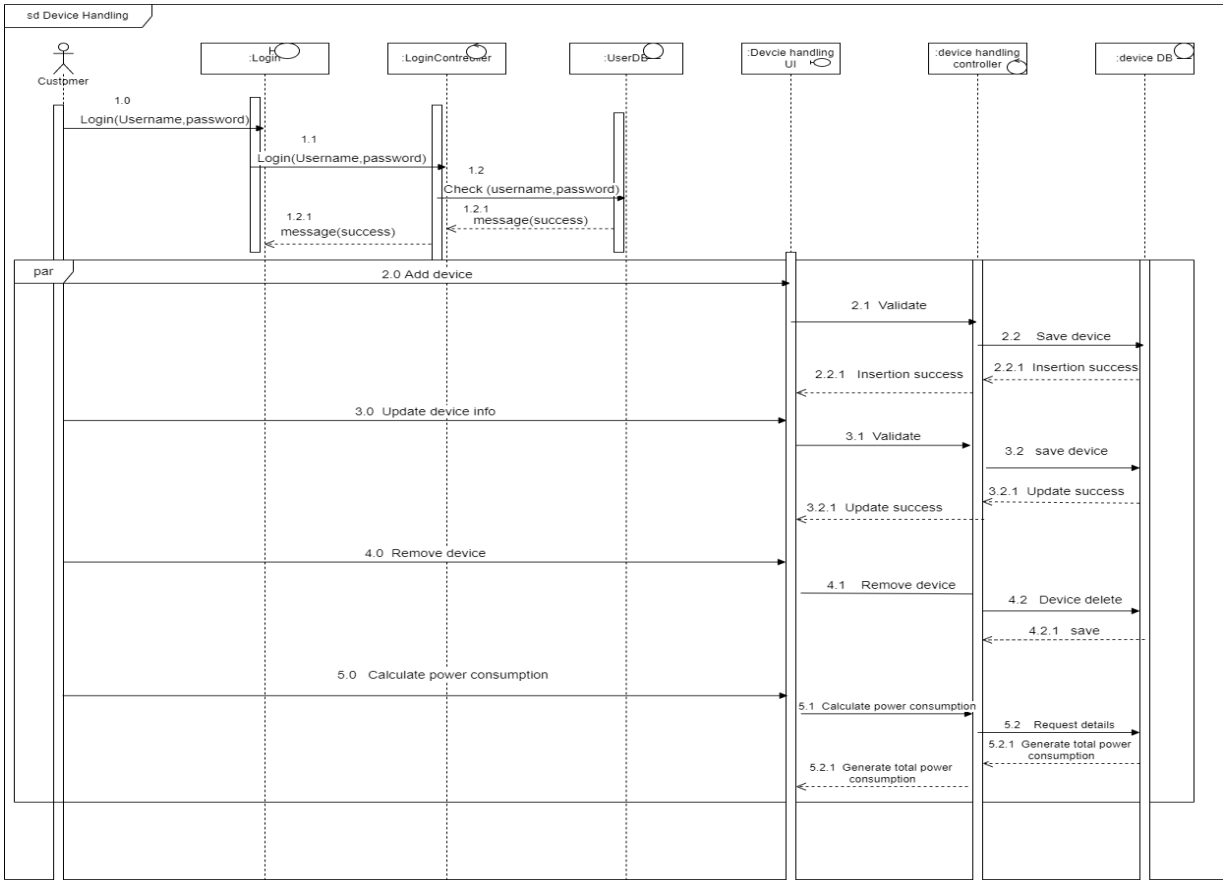


Figure 3.6

4. Team Member 3 - Isurika M.D.A / IT20187828

Class Diagram

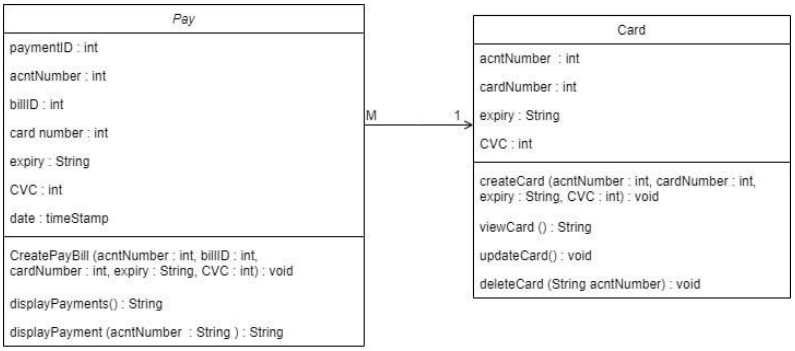


Figure 4.1

Activity Diagram

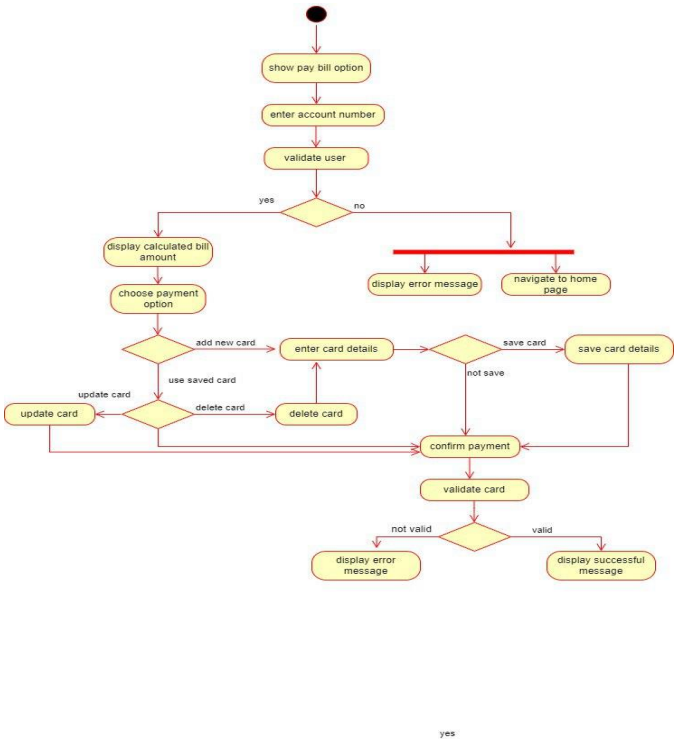


Figure 4.2

Flow Chart

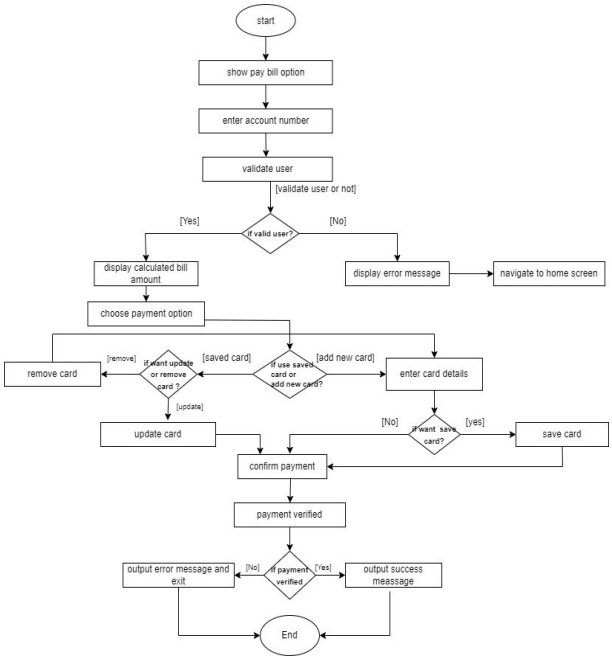


Figure 4.3

Sequence Diagram

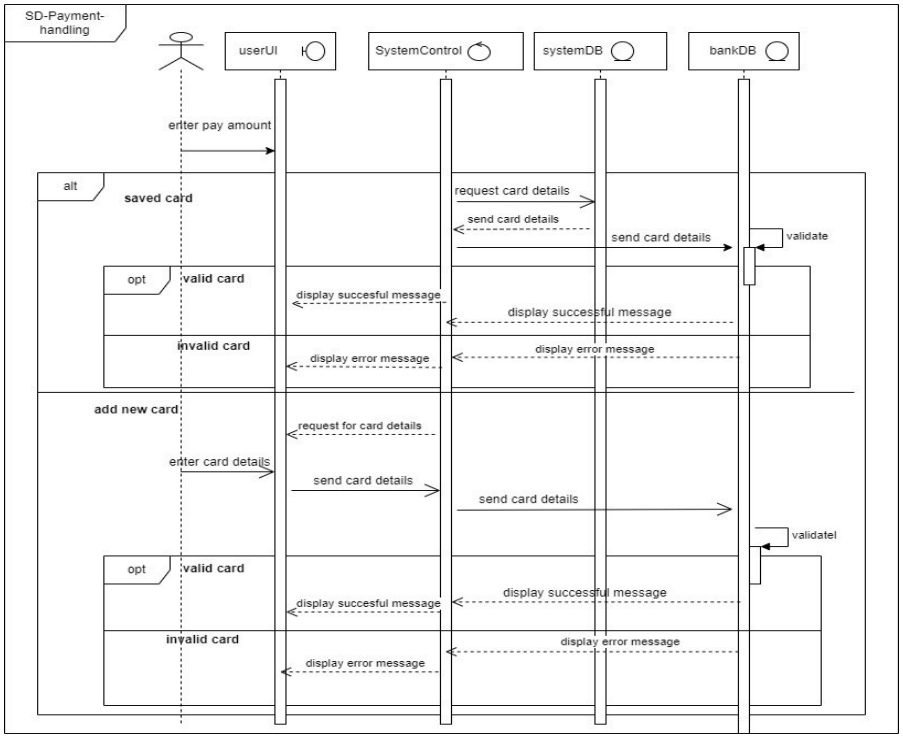


Figure 4.4

5. Team Member 4 - Kandanaarachchi H.L.D.S/ IT20157500

Class Diagram

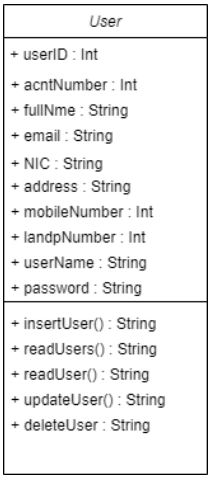


Figure 5.1

Activity Diagram

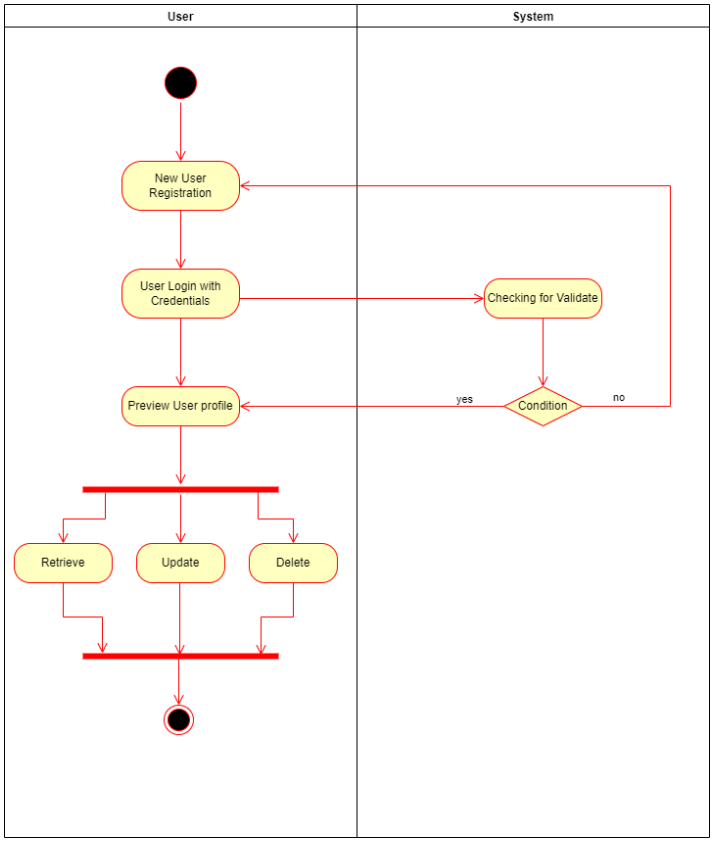


Figure 5.2

Flow Chart

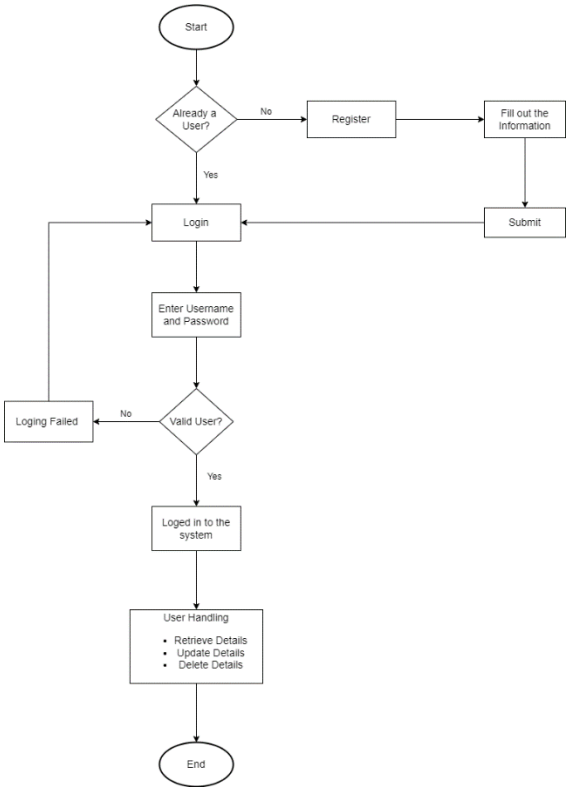


Figure 5.3

Sequence Diagram

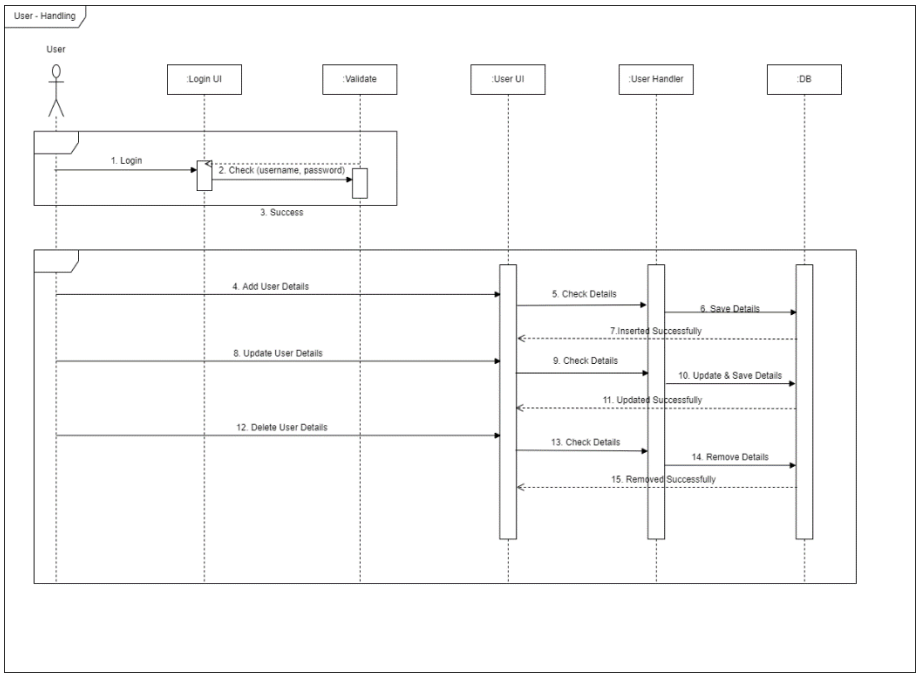


Figure 5.4

6. Team Member 5 - A.K.F Hasna/ IT20212940

Class Diagram

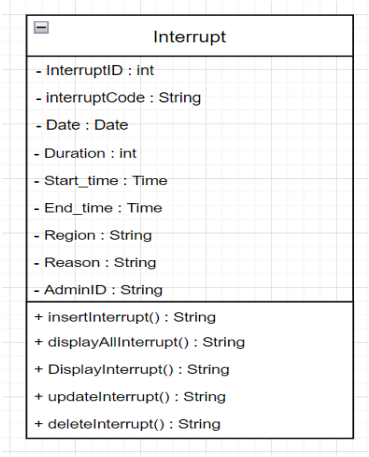
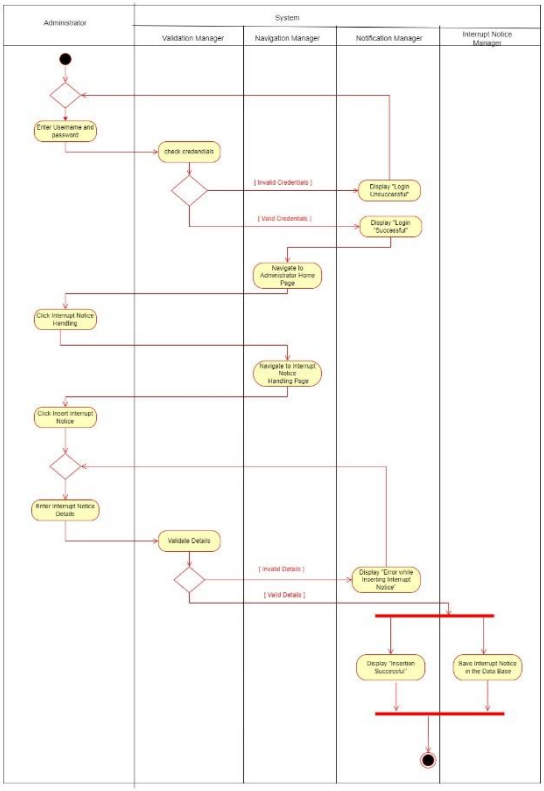


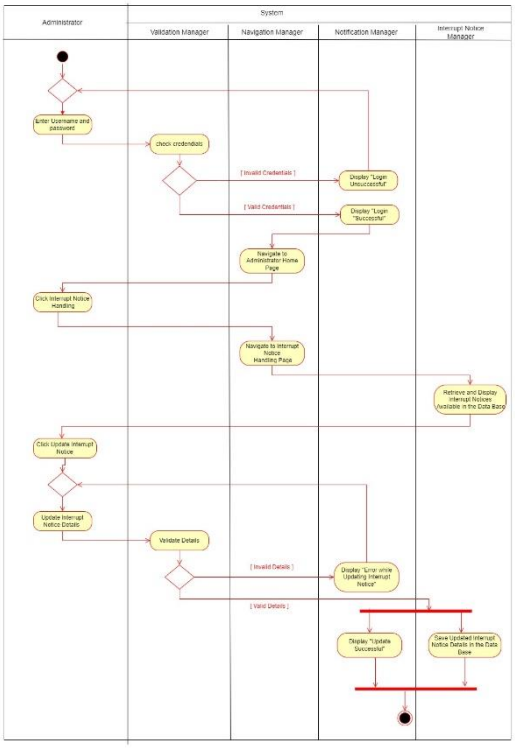
Figure 6.1

Activity Diagram



inserting an interrupt Notice.

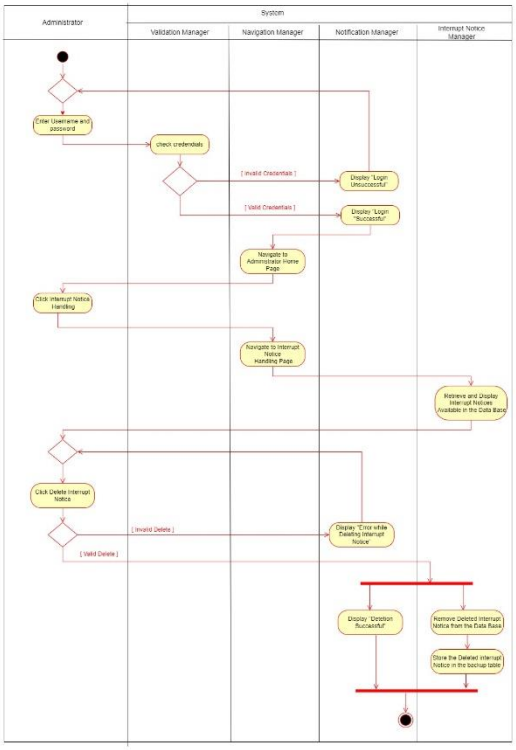
Figure 6.2



Updating an Interrupt Notice

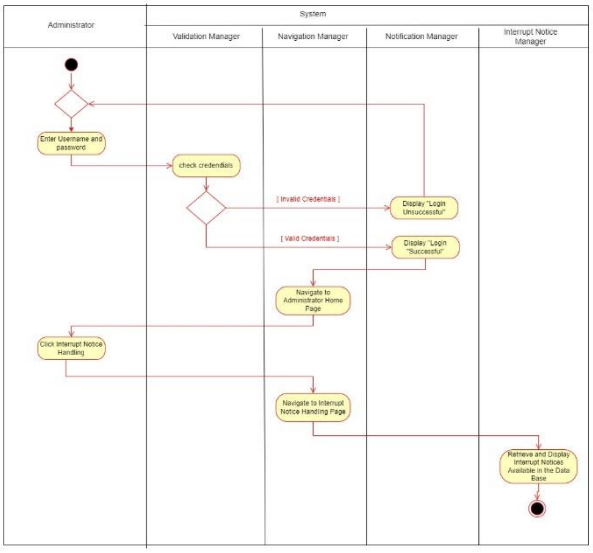
Figure 6.3

Figure 6.4



deleting an Interrupt Notice

Figure 6.5



retrieving Interrupt Notices

Flow Chart

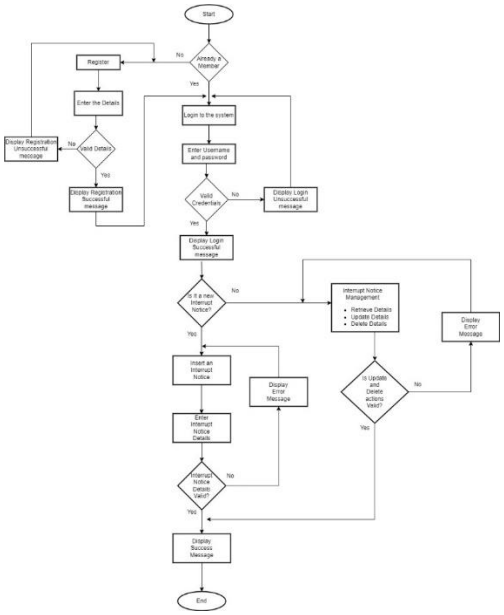


Figure 6.6

Sequence Diagram

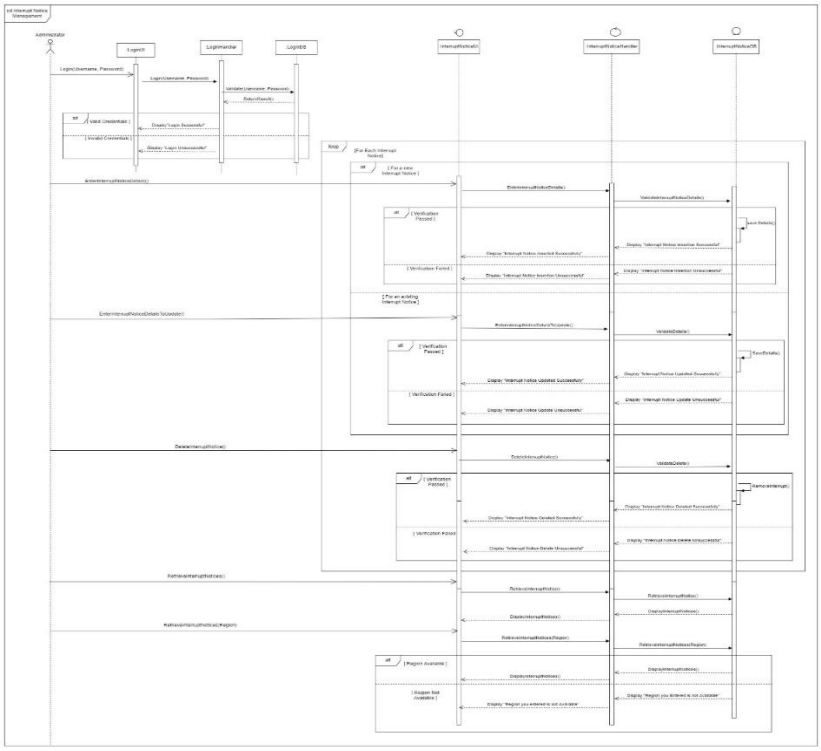


Figure 6.7

7. Team Member 6 - M.N Aaisha/ IT20202354

Class Diagram

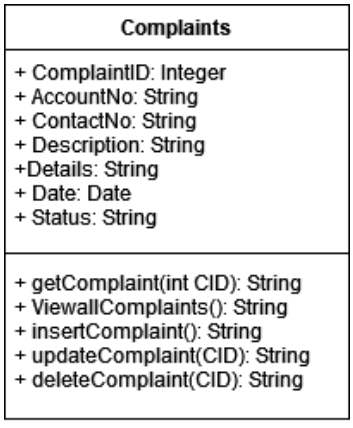


Figure 7.1

Activity Diagram

Insert

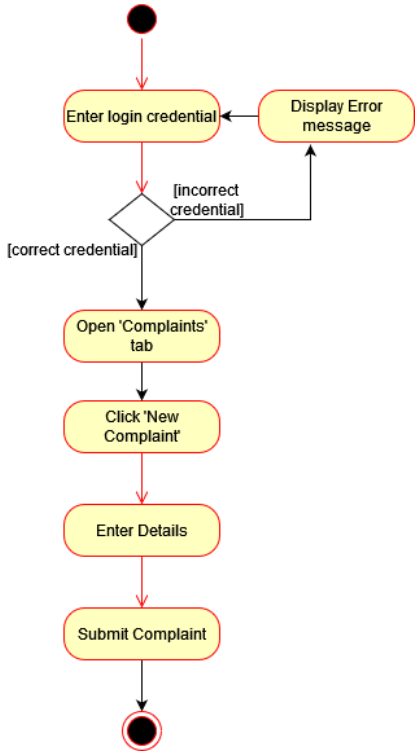


Figure 7.2

Update

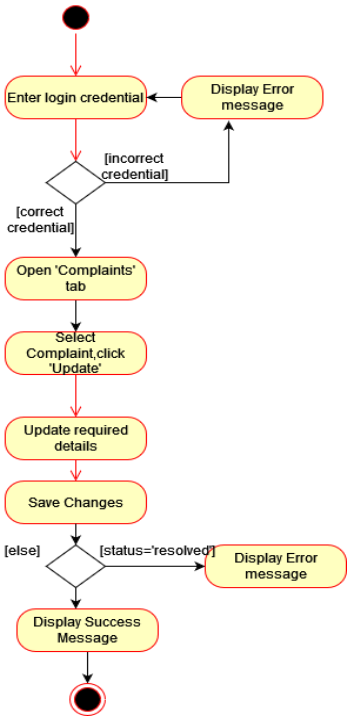


Figure 7.3

Delete

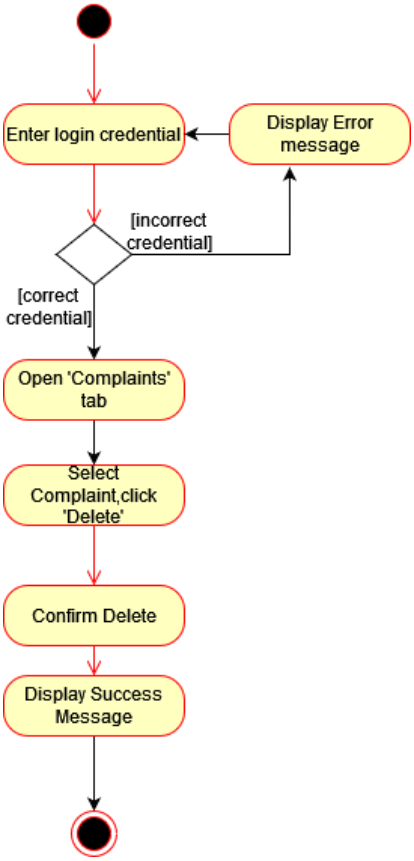


Figure 7.4

Update Status

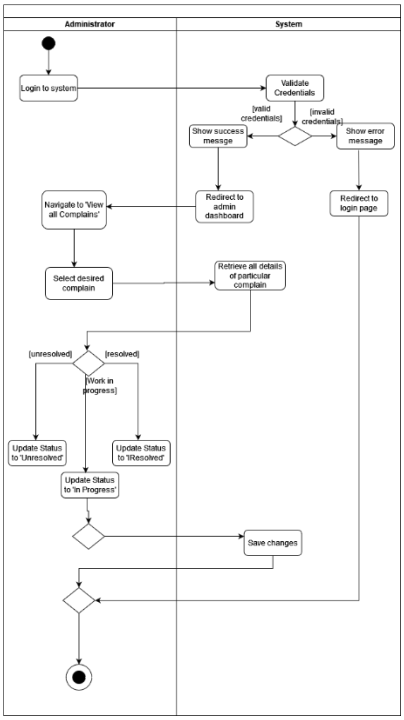


Figure 7.5

View

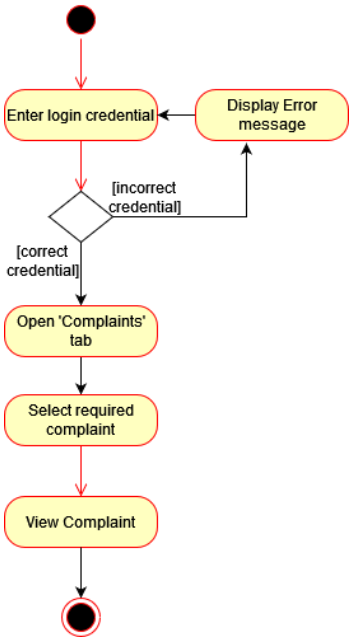


Figure 7.6

Flow Chart

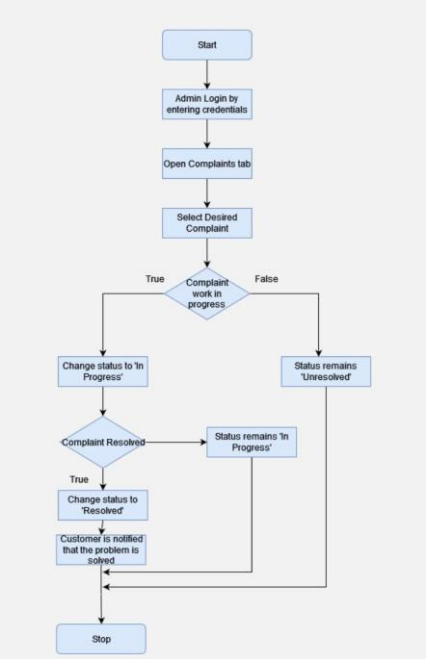


Figure 7.7

Sequence Diagram

Create

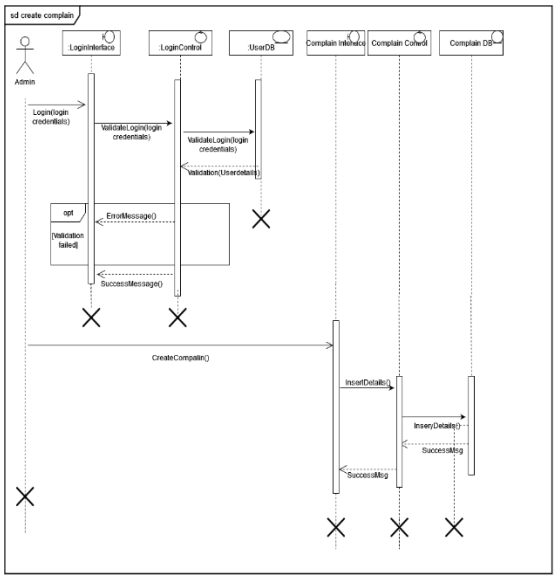


Figure 7.8

Delete

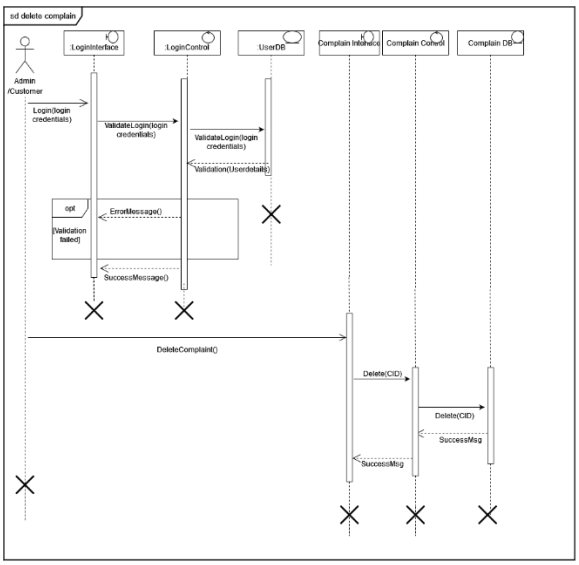


Figure 7.9

Update

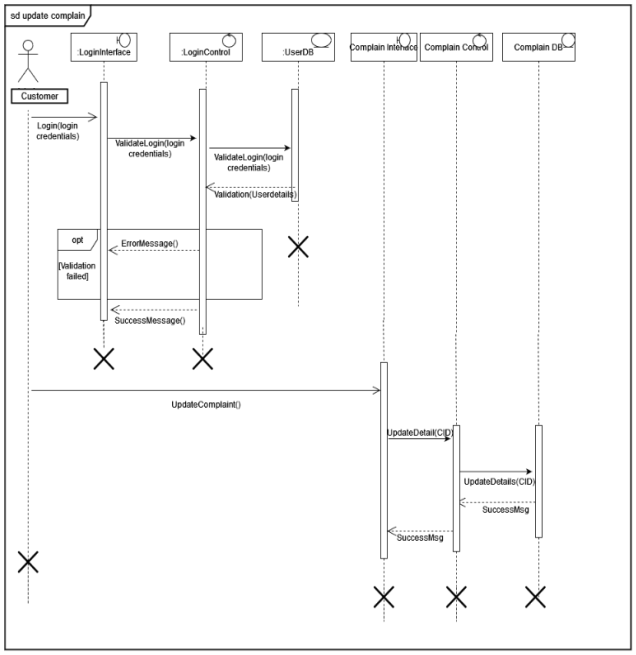


Figure 7.10

Status Update

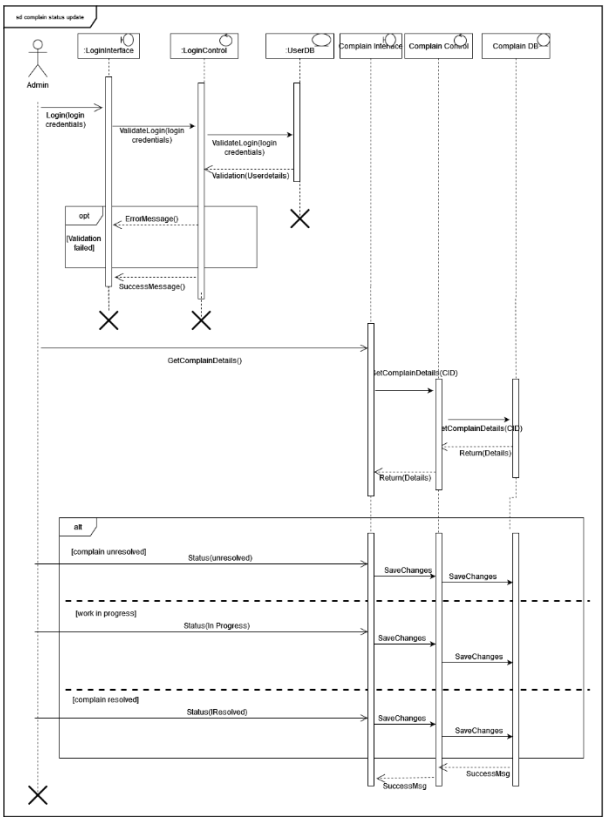


Figure 7.11