

11. Testing Plan

a. Functional Testing:

Use Case	Positive Case	Negative Case
Login	If username and password are correct and a row exists in the corresponding table for that role then login is successful.	If the pair (username, password) doesn't exist in the corresponding table for that role then login is unsuccessful.
View Employee details	If User login as a manager, then opens SingleEmployeePage to view details.	If not logged in as a manager, then go to LoginPage and says that, you don't have the permission.
Delete Employee details	If the employee details entered match with a row in the database then that row is deleted.	If the employee details entered do not match with a row in the database then a error message saying "the given details don't match with any employee" is shown.
Add Employee Details	Giving all the required inputs of the employee(username,pswd,name,ph_no,addr) and the User logged in as a manager.	Not giving some field of employee(like username or pswd) or the User not logged in as a Manager.
View Dish details	If logged in as any user, then opens SingleDishPage to view Dish details.	If not logged in, then goes to LoginPage and says to Login.
Delete dish	If the dish details entered match with a row in the dish table in the database then that row is deleted.	If the dish details entered do not match with a row in the database then a error message saying "the given details donot match with any dish" is shown.
Add Dish details	Giving all the required inputs of the Dish(dish_name,dish_type,cost) and the User logged in as a manager or a Chef.	Not giving some required field of Dish(like dish_name or dish_type or cost) or the User not logged in as a Manager and Chef.
View Item details	If logged in as any employee, then opens ItemsPage to view Items details.	If not logged in as a employee, then goes to LoginPage and says that, you don't have the permission.

View Items purchased and used up on that day	If logged in as a Manager, then opens PerDayPage to view DailyUsage Details	If not logged in as a manager, then goes to LoginPage and says that, you don't have the permission.
View Table Status	If logged in as any employee, then opens TablesPage to view Tables status.	If not logged in as a employee, then goes to LoginPage and says that, you don't have the permission.
View order history details	If logged in as a Manager or Billing Manager, then opens PerDayPage to view Order History.	If not logged in as a Manager or a Billing Manager, then goes to LoginPage and says that, you don't have the permission.
View customer details	If logged in as a Manager or Customer, then opens CustomerDetailsPage.	If not logged in as a Manager or a Customer, then goes to LoginPage and says that, you don't have the permission.
View offer details	If logged in as a Manager or Customer, then opens SingleOfferPage.	If not logged in as a Manager or a Customer, then goes to LoginPage and says that, you don't have the permission.
View delivery person details	If logged in as a Manager, then opens DeliveryPersonPage	If not logged in as a Manager, then goes to LoginPage and says that, you don't have the permission.
View menu and select items	If logged in as a customer, then goes to DishesPage and selecting an item goes to SingleDishPage.	If not logged in as a Customer, then goes to LoginPage and says that, you have to Login.
View cart and confirm the order	If logged in as a customer, then goes to CartPage.	If not logged in as a Customer, then goes to LoginPage and says that, you have to Login.
View previous orders	If logged in as a customer, then shows their previous orders.	If not logged in as a customer then this page will not be accessible.
Change account details	If logged in as a customer then we will allow them to change their account details if the changes done are valid.	If not logged in as a customer then we will show an error message.

Change table status	If logged in as manager or head waiter and If the given table exists then it will change the table's status accordingly.	If not logged in as manager or if the specified table does not exist then it will give an appropriate error message.
Update about items	If logged in as manager or chef ,or automatically when a order is delivered/served. if the given items exist then they get updated.	If the login is not as a manager or chef or if the given item does not exist then we show an appropriate error message.
Create an order	If logged in as manager or head waiter or customer and the dishes are all available then the order will be accepted	If logged in as a delivery person or waiter or if any of the dishes is not available.
Assign a delivery person (This happens automatically or can be done by manager/ head waiter so if it is done manually we will also check if the person assigning the delivery person has corresponding authority to do so.)	If the given delivery person exists in the employee table and checks if they are out for delivery or on leave or they left , if not then it changes the status of the delivery person to out for delivery.	If the given delivery person doesn't exist or if he has left or on leave or out for delivery then it gives an appropriate error message.

b. Load Testing:

We plan to use Apache JMeter for load testing.

We plan to measure the time elapsed to get the results for each query for different sizes of data, we also plan to measure other statistics like number of requests that can be served per second and the throughput using JMeter.

We plan to use thread groups functionality in Jmeter to simulate load using multiple clients. We will vary the number of clients in between 1 and 100 keeping the amount of data the same and measure all the previously mentioned statistics.

We plan to measure all the statistics for different sizes of data. We will vary the data as follows -

First we will have 100s of rows in the orders, order_dishes and dish_items and 10s of rows for the remaining tables and we plan to increase the number of rows in all the tables in the order of 10 till 10,000 rows for orders table.

12. Testing Results

a. Functionality Testing

These use cases are tested in our application, which is available at the github link provided on the cover page.

The results are mainly - Pass, Fail, Doesn't Apply.

We have decided not to implement a separate login page, but rather implement it as a popup, and so, wherever we intend to redirect to the login page, we just give an error alert and stop any submit functionality.

Use Case	Positive Case	Result	Negative Case	Result
Login	If username and password are correct and a row exists in the corresponding table for that role then login is successful.	Pass	If the pair (username, password) doesn't exist in the corresponding table for that role then login is unsuccessful.	Pass
View Employee details	If User login as a manager, then opens SingleEmployeePage to view details.	Pass- Note that we don't have a singleEmployeePage, and rather show all employees at once with their details	If not logged in as a manager, then go to LoginPage and says that, you don't have the permission.	Pass- The unprivileged user will not have a natural browsing route to view employee details. But if visited via forced browsing, he is

				given an error message.
Delete Employee details	If the employee details entered match with a row in the database then that row is deleted.	Pass	If the employee details entered do not match with a row in the database then an error message saying "the given details don't match with any employee" is shown.	Doesn't Apply - We always show a employee from the database
Add Employee Details	Giving all the required inputs of the employee(username,pswd,name,ph_no,addr) and the User logged in as a manager.	Pass	Not giving some field of employee(like username or password) or the User not logged in as a Manager.	Pass
View Dish details	If logged in as any user, then opens SingleDishPage to view Dish details.	Pass- Note that we show details of all dishes at once, rather than alone	If not logged in, then goes to LoginPage and says to Login.	Pass
Delete dish	If the dish details entered match with a row in the dish table in the database then that row is deleted.	Pass	If the dish details entered do not match with a row in the database then an error message saying "the given details don't match with any dish" is shown.	Doesn't Apply - We always show a dish from the database
Add Dish details	Giving all the required inputs of the Dish(dish_name,dish_type,cost) and the User logged in as a manager or a Chef.	Pass	Not giving some required field of Dish(like dish_name or dish_type or cost) or the User not logged in as a Manager and Chef.	Fail- Did Not check for empty inputs

View Item details	If logged in as any employee, then opens ItemsPage to view Items details.	Pass	If not logged in as an employee, then goes to LoginPage and says that, you don't have the permission.	Pass
View Items purchased and used up on that day	If logged in as a Manager, then opens PerDayPage to view DailyUsage Details	Doesn't Apply- Didn't implement the frontend page. Implemented the backend API partially.	If not logged in as a manager, then goes to LoginPage and says that, you don't have the permission.	Doesn't Apply- Didn't implement the frontend page. Implemented the backend API partially.
View Table Status	If logged in as any employee, then opens TablesPage to view Tables status.	Pass	If not logged in as an employee, then goes to LoginPage and says that, you don't have the permission.	Doesn't Apply - No routing to Login page intended
View order history details	If logged in as a Manager or Billing Manager, then opens PerDayPage to view Order History.	Pass Implemented all orders page and not in PerDayPage	If not logged in as a Manager or a Billing Manager, then goes to LoginPage and says that, you don't have the permission.	Pass We have decided to include Head Waiter also to view orders
View customer details	If logged in as a Manager or Customer, then opens CustomerDetailsPage.	Pass	If not logged in as a Manager or a Customer, then goes to LoginPage and says that, you don't have the permission.	Pass
View offer details	If logged in as a Manager or Customer, then opens SingleOfferPage.	Pass	If not logged in as a Manager or a Customer, then goes to LoginPage and says that, you don't have the permission.	We have decided to let all users to

				view offers
View delivery person details	If logged in as a Manager, then opens DeliveryPersonPage	Pass	If not logged in as a Manager, then goes to LoginPage and says that, you don't have the permission.	Pass We have also allowed a Delivery Person to view details of other delivery people
View menu and select items	If logged in as a customer, then goes to DishesPage and selecting an item goes to SingleDishPage.	Pass	If not logged in as a Customer, then goes to LoginPage and says that, you have to Login.	Pass
View cart and confirm the order	If logged in as a customer, then goes to CartPage.	Pass	If not logged in as a Customer, then goes to LoginPage and says that, you have to Login.	Pass
View previous orders	If logged in as a customer, then shows their previous orders.	Pass	If not logged in as a customer then this page will not be accessible.	Pass
Change account details	If logged in as a customer then we will allow them to change their account details if the changes done are valid.	Pass	If not logged in as a customer then we will show an error message.	Pass- We will ask the user to login
Change table status	If logged in as manager or head waiter and If the given table exists then it will change the table's status accordingly.	Pass	If not logged in as manager or if the specified table does not exist then it will give an appropriate error message.	Pass
Update about items	If logged in as manager or chef ,or automatically when a order is delivered/served. if the given items exist then they get updated.	Pass	If the login is not as a manager or chef or if the given item does not exist then we show an appropriate error message.	Pass

Create an order	If logged in as manager or head waiter or customer and the dishes are all available then the order will be accepted	Pass	If logged in as a delivery person or waiter or if any of the dishes is not available.	Pass
Assign a delivery person (This happens automatically or can be done by manager/head waiter so if it is done manually we will also check if the person assigning the delivery person has corresponding authority to do so.)	If the given delivery person exists in the employee table and checks if they are out for delivery or on leave or they left , if not then it changes the status of the delivery person to out for delivery.	Pass	If the given delivery person doesn't exist or if he has left or on leave or out for delivery then it gives an appropriate error message.	Pass

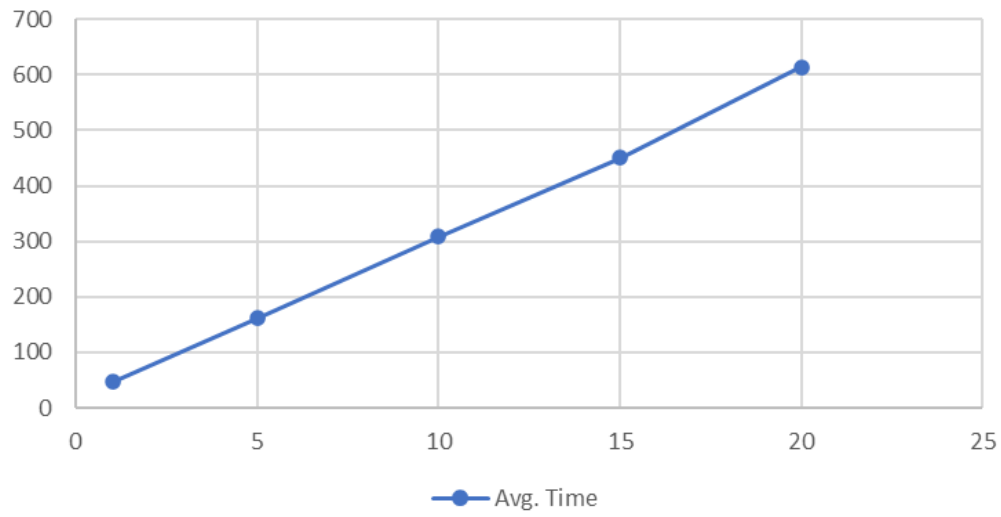
b. Load Testing

These are the results obtained for Manager, when we used 1 thread and it sends 20 loops of all the below API calls to the backend

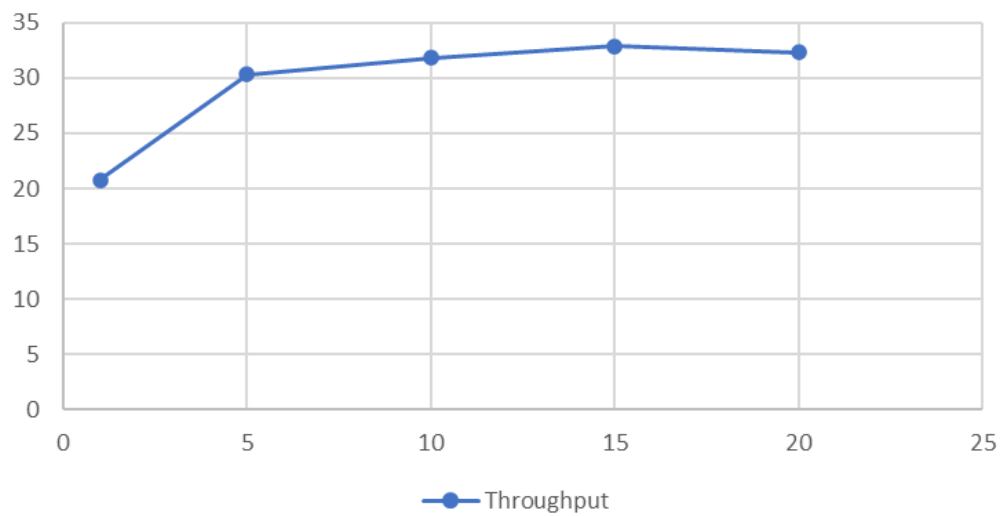
	Avg time	Throughput(per second)	Avg. Bytes
Login	132	1.8	809
All dishes	31	1.8	3740
All offers	35	1.8	704
All customers	52	1.8	3518
All Employees	37	1.8	3609
All items	34	1.8	1048
Analytics-1	47	1.8	617
Analytics-2	33	1.8	502
Analytics-3	34	1.8	659
Delivery People	46	1.8	1044
All Tables	38	1.8	808
All Orders	50	1.8	31182
Total	47	20.8	4020

These are the plots obtained when we changed the number of threads and recorded Average Time and Throughput

Avg. Time (in ms) vs threads - Manager



Throughput (req per sec) vs threads - Manager

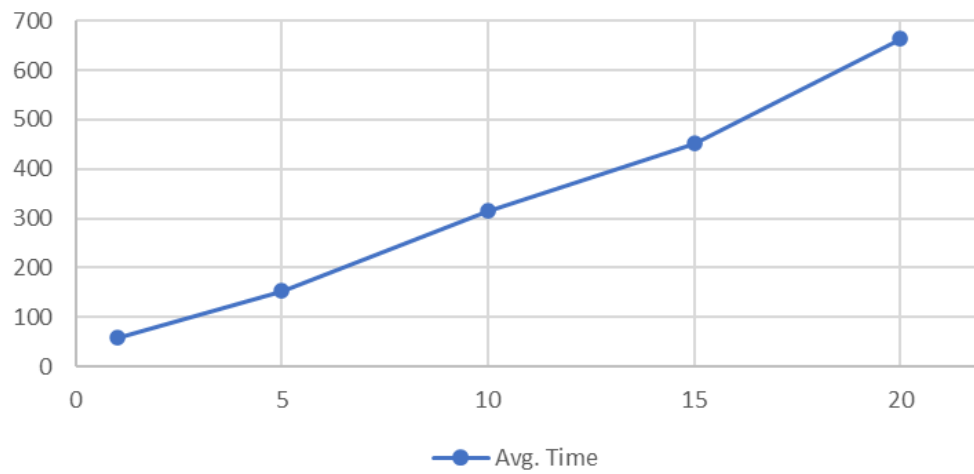


These are the results obtained for Customer, when we used 1 thread and it sends 20 loops of all the below API calls to the backend

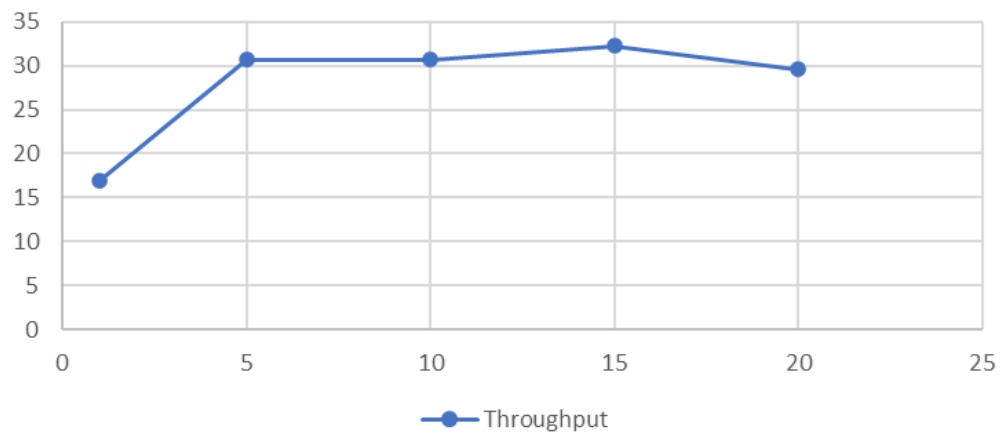
Customers	1-Thread		
	Avg time	Throughput(per second)	Avg. Bytes
Login	127	3.5	669
Prev. Orders	38	3.5	1299
All dishes	46	3.5	3740
All offers	40	3.5	704
Cart	41	3.5	636
Total	58	16.9	1409

These are the plots obtained when we changed the number of threads and recorded Average Time and Throughput

Avg. Time (in ms) vs threads - Customer



Throughput (req per sec) vs threads - Customer



c. Possible Improvements and future ideas

- We have planned to but couldn't implement a separate page for each delivery person to view the current order assigned to him for delivery. We couldn't do this because the data we generated wasn't very accurate and might have more than 1 order for the same delivery person. We can try to clean our data and then we can create this page.
- We also wanted to implement a page for the chef where he can see the orders he has to prepare, but we couldn't do this because of time constraints.
- We also wanted to implement a separate page for each day to show the dishes made, orders done, items bought and used for that particular day. With the data available we couldn't implement this because it was taking a lot of time and also our data didn't have much information for a particular day.