

Bank Queue Management System

Non-Technical Report



PBX BANK Co.

Team A10

G2200754J #CHIANG, JO-CHEN#
G2201047B #KAUR, ISHMITA#
G2200732H #LIU, YI-CHUN (Victoria)#
G2200305H #SHI ZHUOYA#
G2102278D # TSAI HSING FEN#

Contents

| | |
|--|----------|
| 1. Introduction..... | 3 |
| 2. PBX Internal Information..... | 3 |
| 2.1 Branch | 3 |
| 2.2 Customer Category..... | 3 |
| 3. System Features | 4 |
| 3.1 Support multiple branches | 4 |
| 3.2 Support multiple counters per branch | 4 |
| 3.3 Email Notification..... | 4 |
| 3.4 Information Security | 5 |
| 3.5 Web Design..... | 5 |
| 4. User Interface URL Description..... | 6 |
| 5. User Interface and Manual Guide..... | 7 |
| 5.1 Customer Registration – Online..... | 7 |
| 5.2 Customer Registration – Walk in..... | 8 |
| 5.3 Counter Queue Management..... | 11 |
| 5.4 Customer Relationship Officer Guide | 15 |
| 5.5 Display Guide | 20 |

1. Introduction

The PBX bank queue management system is an application that streamlines the bank queue management procedure. This solution enhances the customer experience, reduces wait times, and increases the operational efficiency of the bank. This is a detailed user manual for the PBX bank queue management system, covering various aspects of the system for the three types of users: bank customers, counter officers, and customer relationship officers.

Bank Customers

- Bank customers can use the PBX online website and walk in system for registration.
- Customers will receive a confirmation email once register successfully online.

Counter Officer

- Counter officer can use the system to initiate or terminate the counter service.
- They can also call, clear customer service; hold the customer into the missing list if the customer no-show.

Customer Relationship Officer

- CRO can use the system to requeue no-show customer back to the queueing line.
- They can stop or re-initiate the receipt of each customer category (Diamond/ Gold/ Silver/ Normal).
- They can view the quantity and the current waiting list for each customer category.

The PBX bank queue management system is a comprehensive tool that gives various benefit to bank customers, counter operators, and customer relationship officers. This manual provides a thorough description of the system and its features, allowing users to employ the system more effectively and efficiently.

2. PBX Internal Information

2.1 Branch

PBX bank, a high-class bank, only provide unique and personalized service for its customers. The bank has two branches, located in Jurong and Orchard where Jurong is the head office. Each designed to cater to the diverse needs of its customers.

2.2 Customer Category

PBX Bank's customer base is divided into four distinct categories: Diamond, Gold, Silver, and Normal. This allows the bank to offer customized services and products that meet the specific needs of each customer segment.

Customer uses phone number as their unique identifier to register for getting the queue number.

3. System Features

This queue management system for PBX bank provides a seamless and efficient experience for both customers and staff. With features such as the ability to book appointments in advance through the website, walk-in service, and real-time recall for missed turns, customers can easily manage their time and avoid long wait times. The system's multiple counter support and real-time updates ensure that staff can effectively manage customer traffic and provide exceptional service. Additionally, customers receive confirmation via email after successful website registration, further improving the overall experience. With these advanced features, our queue management system sets itself apart as a cutting-edge solution for PBX bank.

The features are showcased in detailed below:

3.1 Support multiple branches

The queue management system currently covers multiple branches, namely Jurong and Orchard. Every branch has their unique identification code, the letter series for which is also used to assign the queue number to the customers. Therefore, at any given point in time, it is possible for any staff member such as the CRO to be able to immediately identify the appointment branch when the customer shares their queue numbers.

Additionally, the queue numbers allotted are auto incremented e.g., A001, A002 and so on and later called upon in an order determined by the customized priority logic set in the system.

With this approach, it will be easier to scale to add multiple branches in the future.

3.2 Support multiple counters per branch

Our queue management system offers exceptional support for multiple counters at each PBX bank branch. This feature ensures that multiple customers can be attended to simultaneously, reducing wait times and improving the overall customer experience. The counters are conveniently labeled as "Counter 1," "Counter 2," and so on, making it easy for customers and staff to navigate the system. The system is also scalable, allowing for the addition or removal of counters depending on the specific needs of each branch. This flexible approach ensures that PBX bank branches can provide efficient service to all customers, regardless of their volume of traffic.

3.3 Email Notification

The system provides a unique feature of auto-triggering an email acknowledgement to the customers after successful website registration, further improving the overall experience. Being mindful of customer privacy, this system does not maintain any email IDs in the database and will only utilise the email ID provided in the form page to trigger the email. Therefore, the system also provides flexibility in letting the customers enter their desired email ID and avoids the hassle of expecting the customers to remember any previously provided email IDs.

3.4 Information Security

Our queue management system for PBX bank prioritizes the security and privacy of customer information. In order to maintain a secure environment, only essential information is collected and stored in the database. Upon registration, only the customer's phone number is required to maintain a record of their priority level. The email ID is also collected for the purpose of sending an acknowledgement email but is not saved for future use. We take customer security and privacy seriously and do not collect any other confidential or personal data. This approach ensures a safe and secure banking experience for PBX customers.

3.5 Web Design

The user experience of a system can be greatly enhanced by a well-designed interface. In order to provide users with a straightforward and aesthetically pleasing interface, the PBX system interface makes use of CSS (Cascading Style Sheets). The PBX system can manage the typography, colours and backgrounds, layout and grid system, animations and transitions, and responsiveness of the interface by incorporating CSS into the HTML webpages. For example, in the customer walk-in and online booking user interfaces, we make a representative background and clear instructions, to ensure the PBX website is recognizable and the clients can easily direct to the operations they need. This not only improves the website's visual quality but also its usability and accessibility. With CSS, the PBX system interface can provide a smooth, effortless, and intuitive experience for users, allowing them to effectively navigate and use the system easily.

4. User Interface URL Description

Various webpages of the application can be accessed by adding the below extensions to <http://localhost:9000/>

| Customer | |
|------------------------------------|---|
| URL | Description |
| /onlineBooking | Registration page – Online |
| walk_in/Jurong | Registration page – Walk in at Jurong branch |
| walk_in/Orchard | Registration page – Walk in at Orchard branch |
| /walk_in/submit?phoneinput=xxxxxxx | Display queue number collection result |

| Queue Display | |
|----------------------|-----------------------------------|
| URL | Description |
| /display/Jurong | Display screen for Jurong branch |
| /display/Orchard | Display screen for Orchard branch |

| Sign In | |
|------------------|---|
| URL | Description |
| /sign_in/Jurong | Customer check-in page for the Jurong branch |
| /sign_in/Orchard | Customer check-in page for the Orchard branch |
| /get-number | Display check-in result |

| Counter | |
|-----------------------------------|---|
| URL | Description |
| /selectcounter | Counter officer branch select page |
| /counter?branch=Jurong&counter=1 | Jurong branch & counter 1 counter officer page |
| /counter?branch=Jurong&counter=2 | Jurong branch & counter 2 counter officer page |
| /counter?branch=Orchard&counter=1 | Orchard branch & counter 1 counter officer page |
| /counter?branch=Orchard&counter=2 | Orchard branch & counter 2 counter officer page |

| Customer Relationship Officer | |
|--|--|
| URL | Description |
| /cro/selectcro | CRO branch select page |
| /cro?branch=Jurong | Jurong CRO operation page |
| /cro?branch=Orchard | Orchard CRO operation page |
| /cro/queueDetail? member_category=Diamond | Diamond customer category queue display page |
| /cro/queueDetail? member_category=Gold | Gold customer category queue display page |
| /cro/queueDetail? member_category=Silver | Silver customer category queue display page |
| /cro/queueDetail? member_category=Normal | Normal customer category queue display page |

5. User Interface and Manual Guide

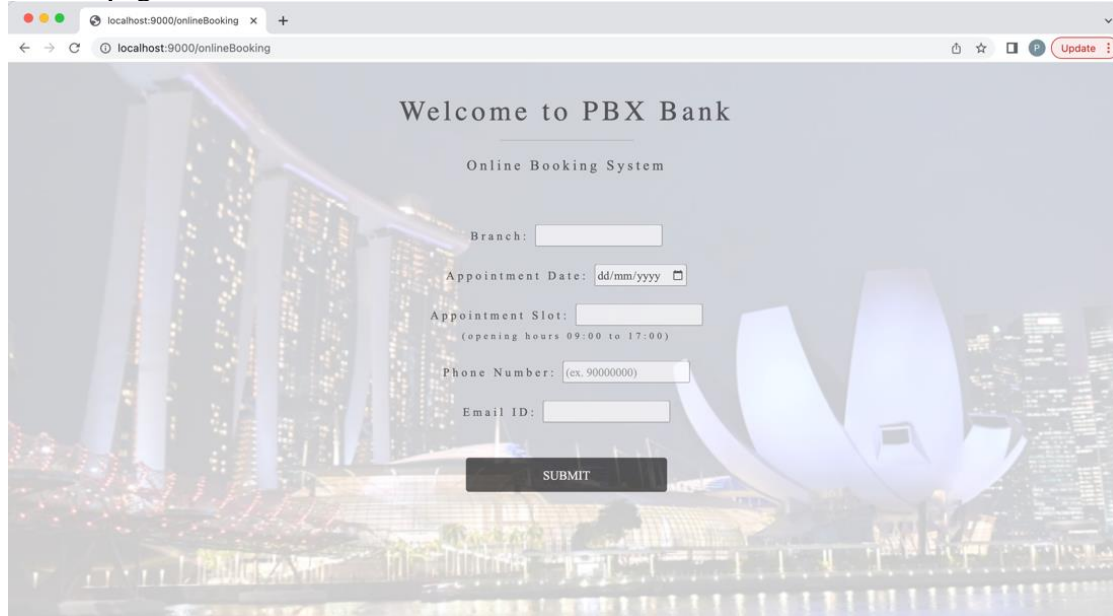
***Please use Firefox browser to open the webpage.**

5.1 Customer Registration – Online

a. Registration Page:

Open the browser and enter the URL: <http://localhost:9000/onlineBooking>

The below page will load:



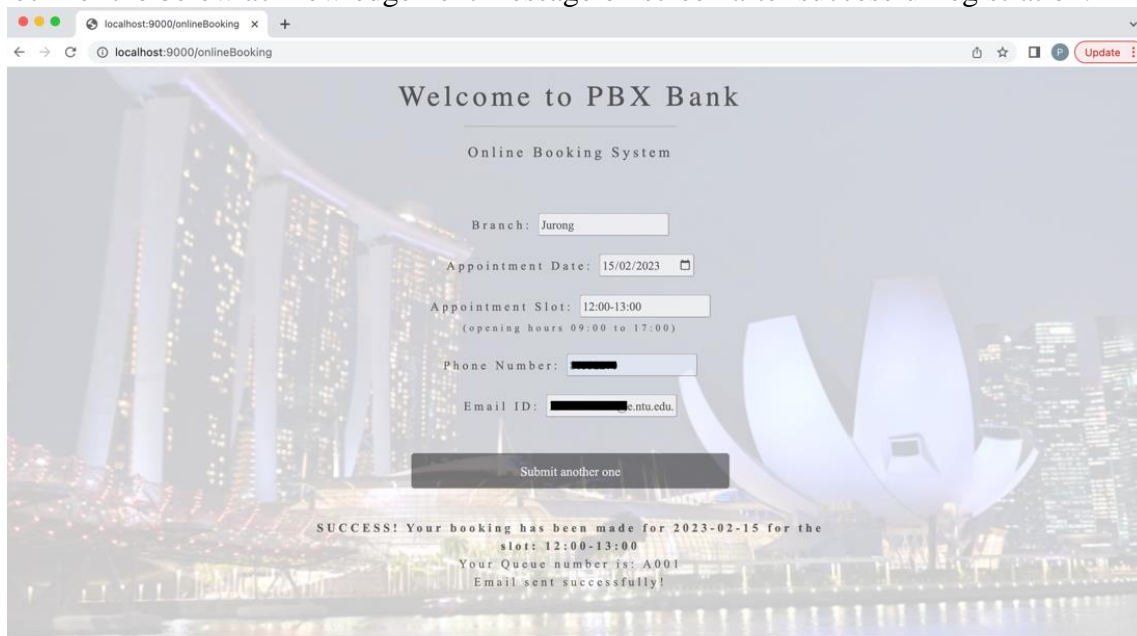
Key in all the above user input fields – Branch, Appointment Date, Appointment slot, Phone number and email ID.

Click on the ‘SUBMIT’ button.

b. Successful Page:

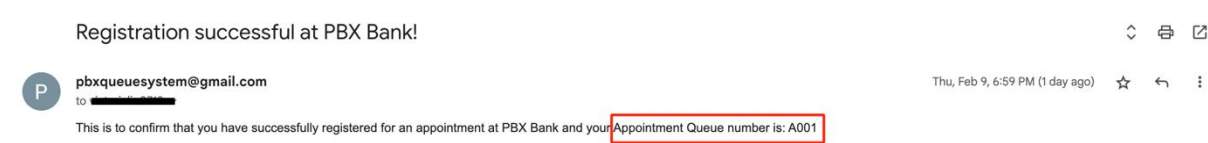
On successful registration:

Check for the below acknowledgement message on screen after successful registration:



c. Email confirmation:

Check for the below email in the email ID provided at the time of registration.

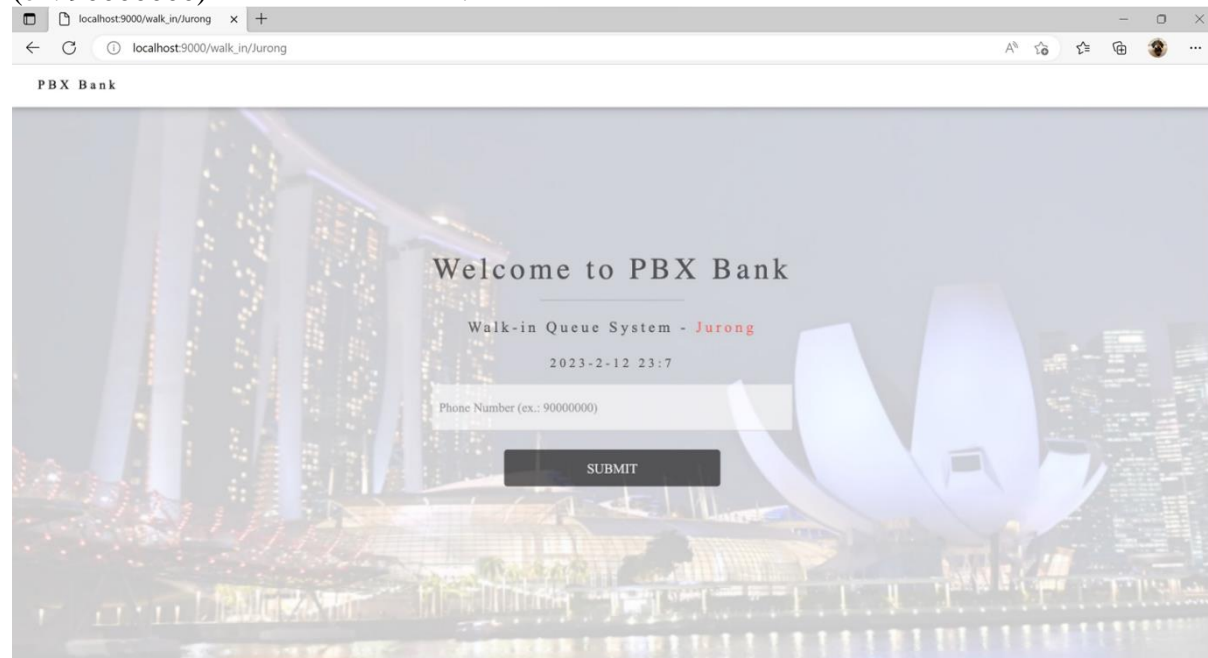


5.2 Customer Registration – Walk in

a. Registration Page

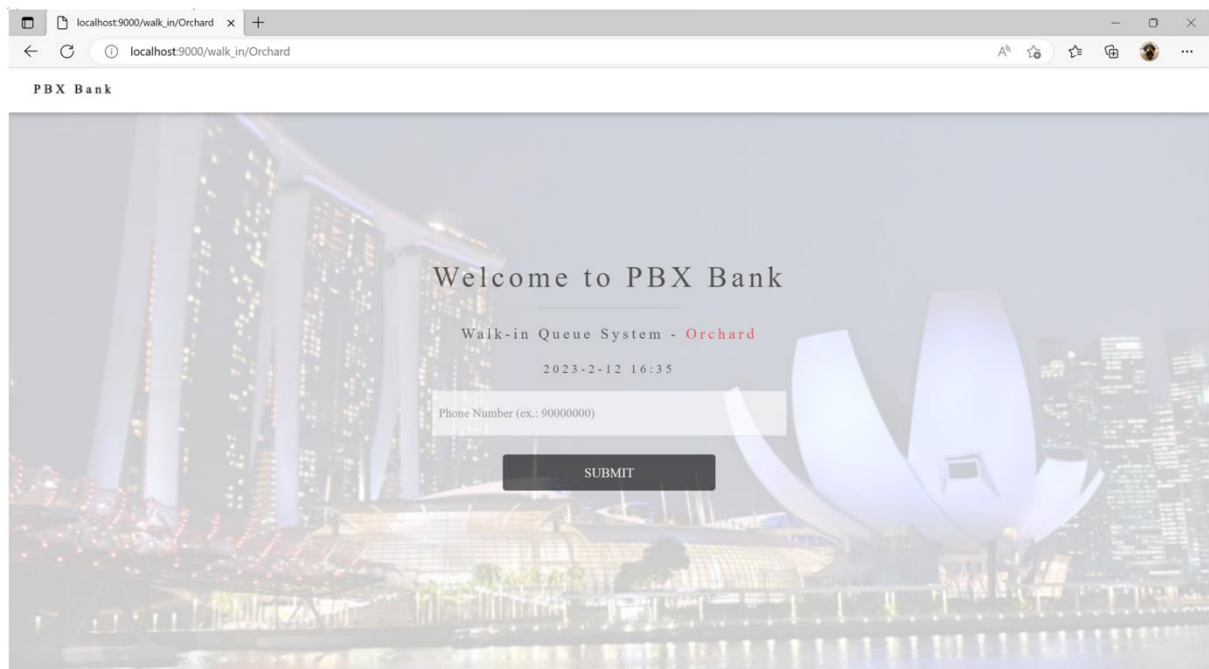
Jurong branch:

Open the browser and enter the URL: http://localhost:9000/walk_in/Jurong, the below page will load. To make registration, customers need to enter phone number in the format required (ex. 90000000) and click “Submit”.



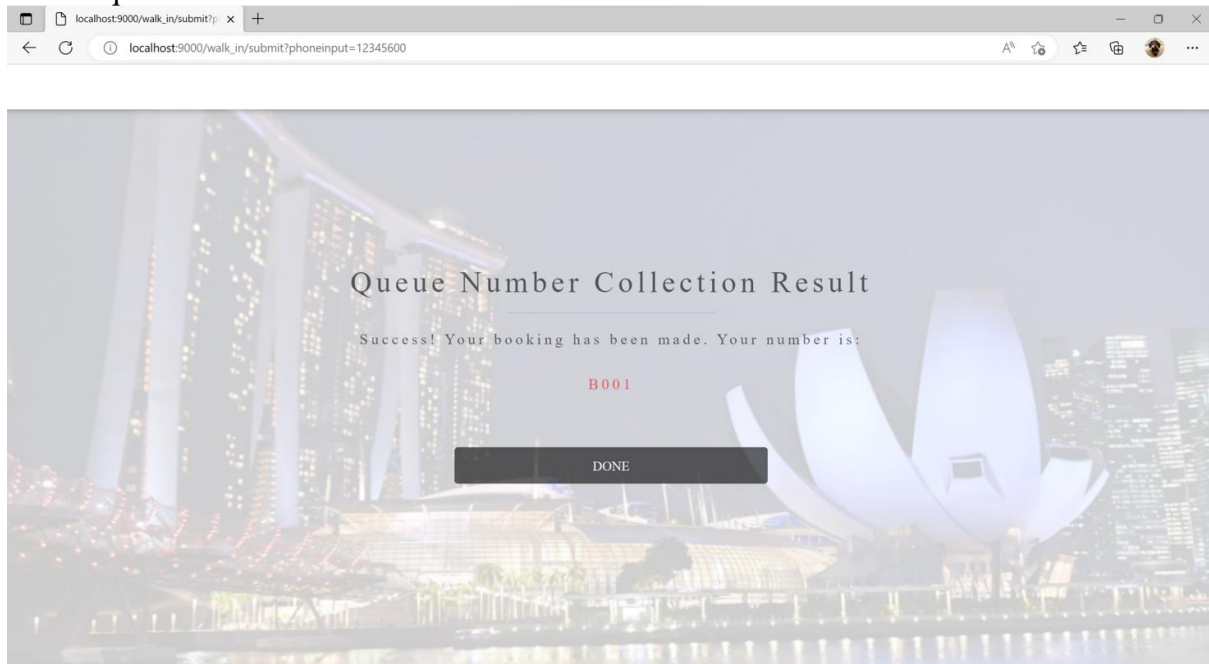
Orchard branch:

Open the browser and enter the URL: http://localhost:9000/walk_in/Orchard, the below page will load. To make registration, customers need to enter phone number in the format required (ex. 90000000) and click “Submit”.



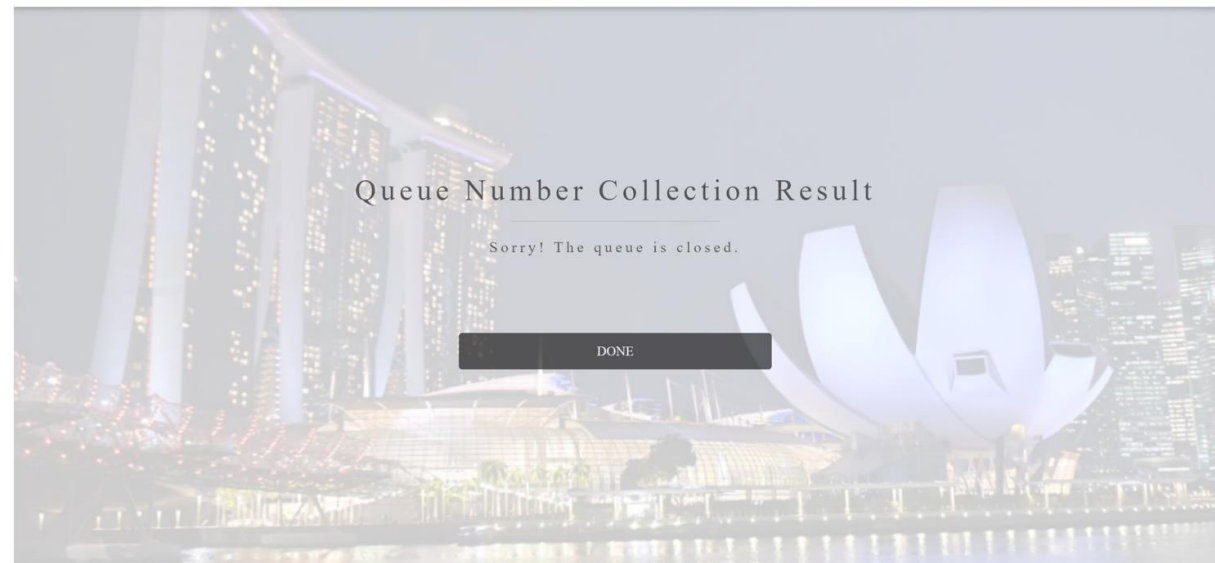
b. Queue Number Collection Result Page – Success

If the customer successfully registered, the page goes to the result page with the queue number provided.



c. Queue Number Collection Result Page – Fail

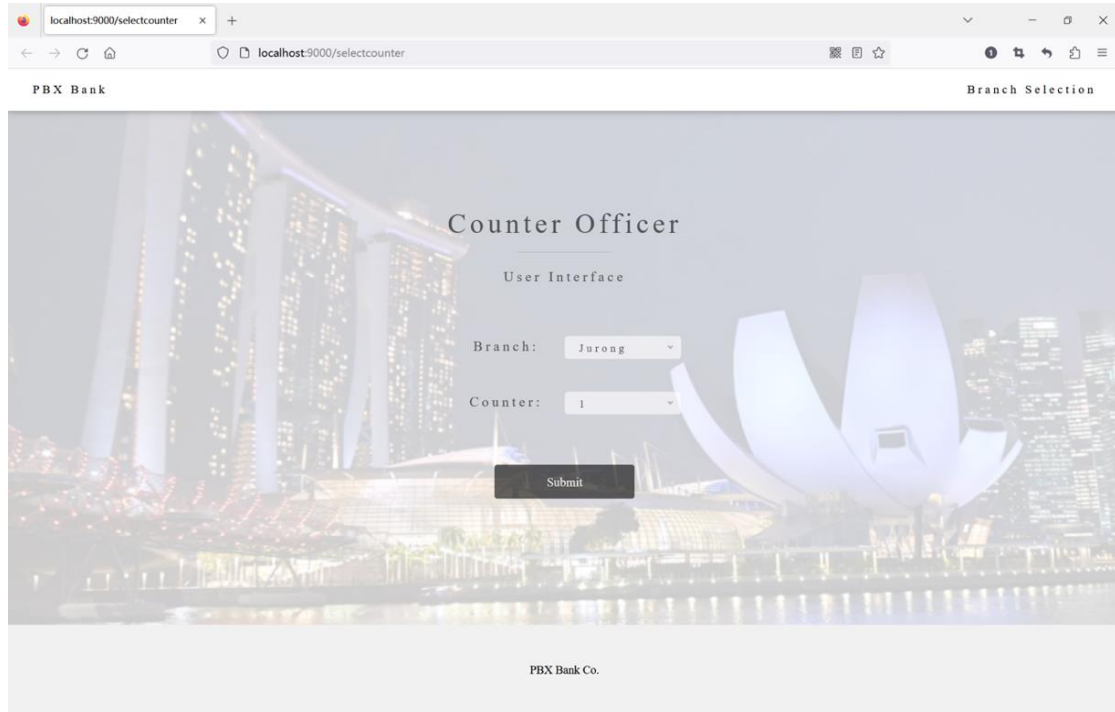
If the customer fails to register, the page goes to the result page with message provided.



5.3 Counter Queue Management

a. Branch Selection Page

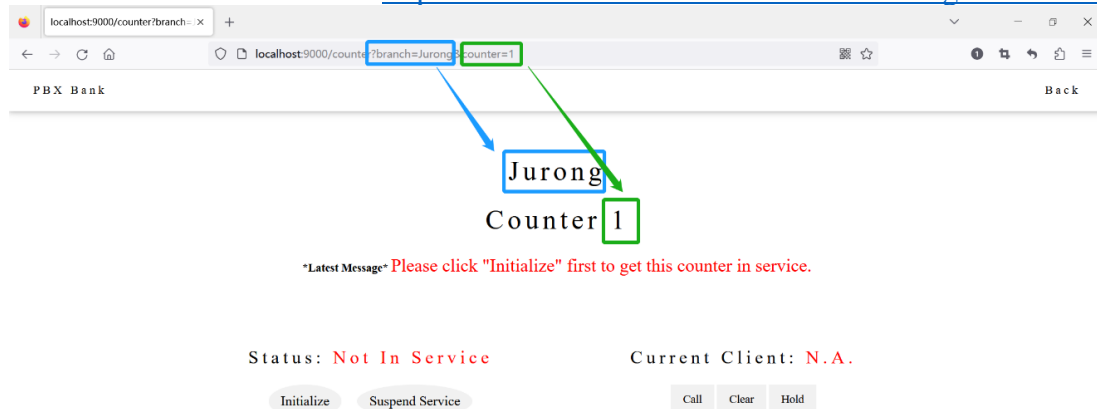
Open the browser and enter the URL: <http://localhost:9000/selectcounter>, the below page will load:



Select branch and counter then click on the ‘Submit’ button.

b. Counter Operation Page

After the ‘Submit’ action above, the operation page will be loaded automatically according to the selected branch and counter. <http://localhost:9000/counter?branch=Jurong&counter=1>



Summary Table

| No. | Queue No. | Status | Start Time | End Time | Duration |
|-----|-----------|--------|------------|----------|----------|
|-----|-----------|--------|------------|----------|----------|

The system is not in service by default, click ‘Initialize’ button to activate this counter. Otherwise, other functions will not work.

When there is no client being served right now, the ‘Clear’ button or ‘Hold’ button will not work.

localhost:9000/counter?branch=Jurong&counter=1

PBX Bank

Jurong Counter 1

Latest Message Error! Please "Call" for next client or "Suspend Service".

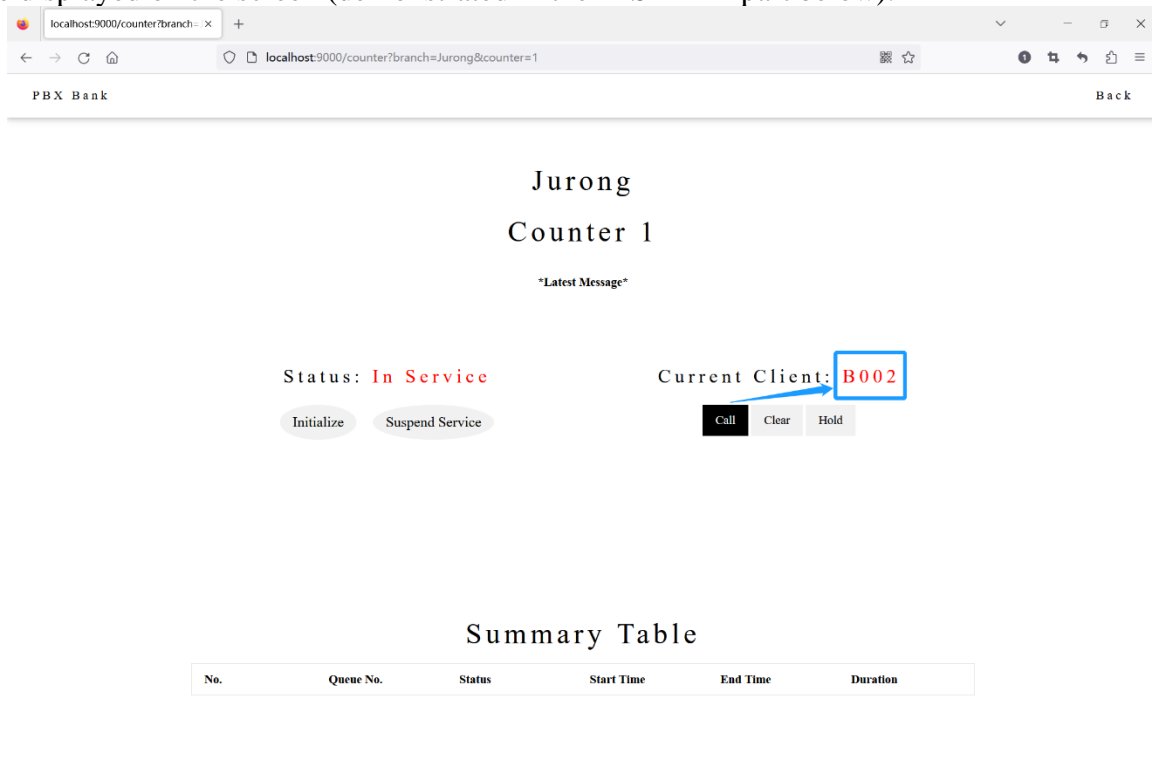
Status: **In Service** Current Client: **...loading...**

Initialize Suspend Service Call Clear Hold

Summary Table

| No. | Queue No. | Status | Start Time | End Time | Duration |
|-----|-----------|--------|------------|----------|----------|
|-----|-----------|--------|------------|----------|----------|

Click ‘Call’ button to guide the waiting client to this specific counter and this result will also be displayed on the screen (demonstrated in the DISPLAY part below).



PBX Bank Back

Jurong Counter 1

Latest Message

Status: **In Service**

Initialize Suspend Service

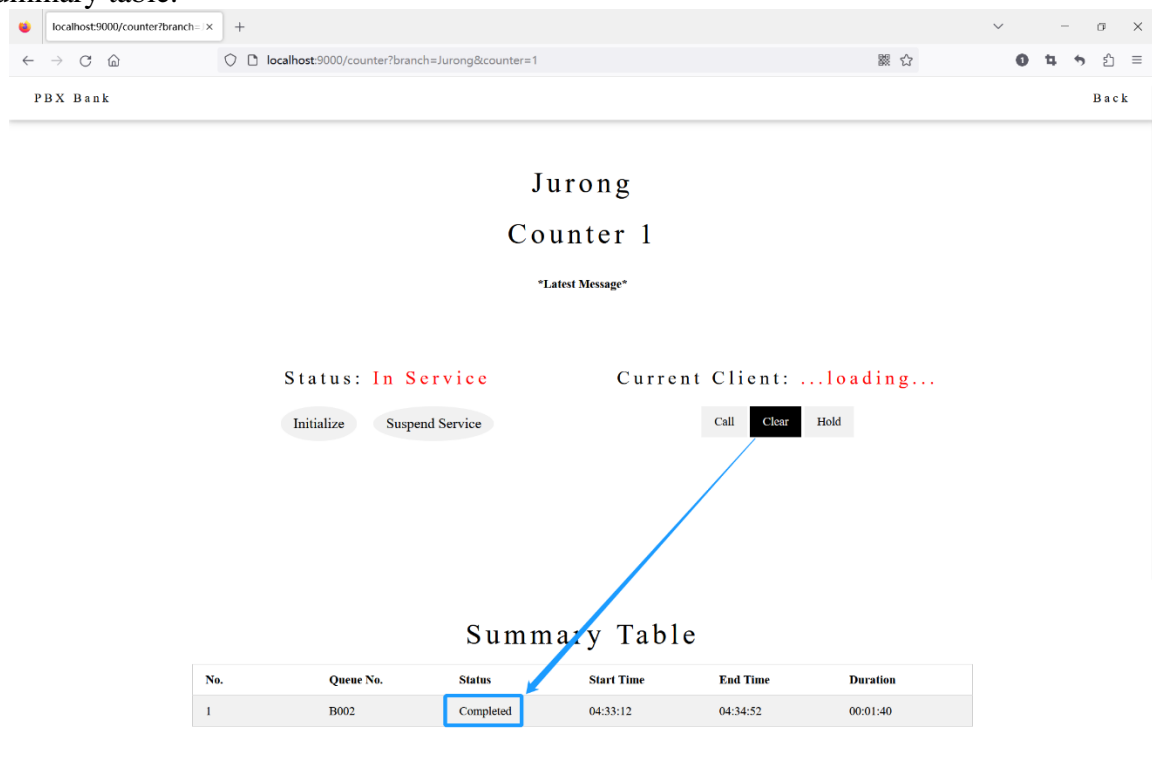
Current Client: **B002**

Call Clear Hold

Summary Table

| No. | Queue No. | Status | Start Time | End Time | Duration |
|-----|-----------|--------|------------|----------|----------|
|-----|-----------|--------|------------|----------|----------|

Once the service is finished, click ‘Clear’ button and the relevant details will be added to the summary table.



PBX Bank Back

Jurong Counter 1

Latest Message

Status: **In Service**

Initialize Suspend Service

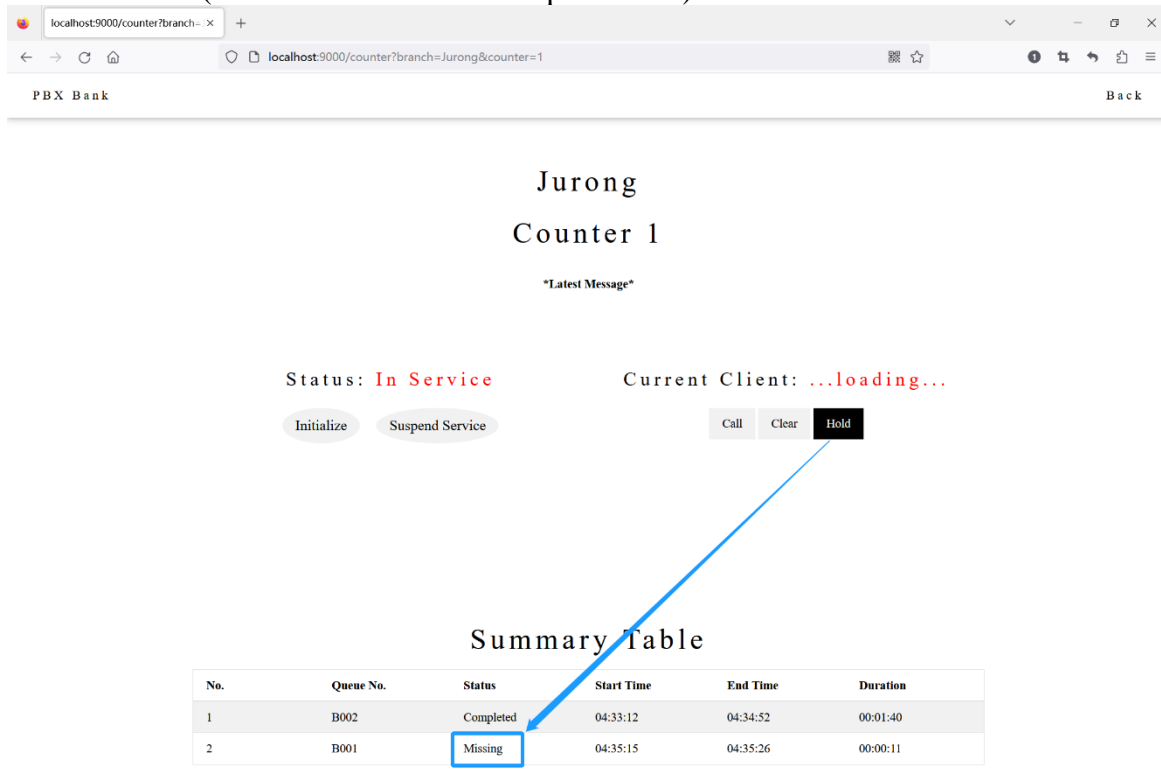
Current Client: **...loading...**

Call Clear Hold

Summary Table

| No. | Queue No. | Status | Start Time | End Time | Duration |
|-----|-----------|------------------|------------|----------|----------|
| 1 | B002 | Completed | 04:33:12 | 04:34:52 | 00:01:40 |

If some client is missing, click ‘Hold’ button to hold this client and the relevant details will be added to the summary table. If the missing client shows up later, he will be rescheduled by the CRO officer (demonstrated in the CRO part below).



PBX Bank Back

Jurong Counter 1

Latest Message

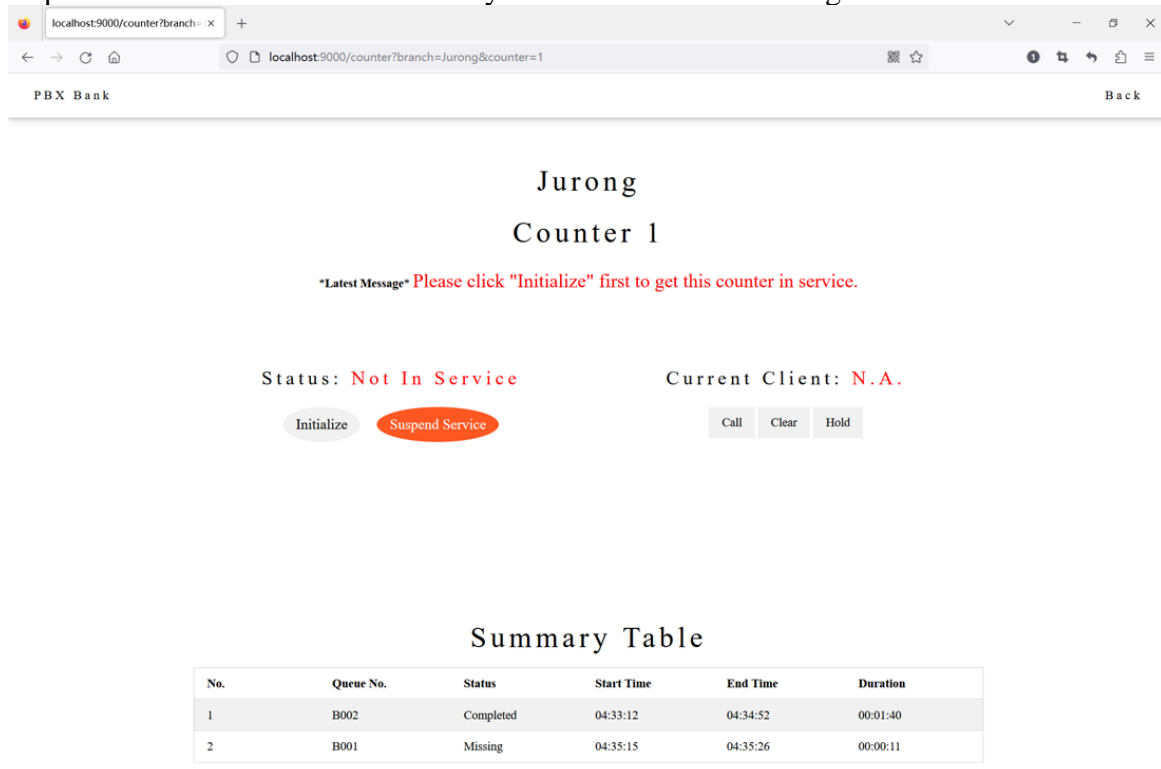
Status: **In Service** Current Client: ...loading...

Initialize Suspend Service Call Clear **Hold**

Summary Table

| No. | Queue No. | Status | Start Time | End Time | Duration |
|-----|-----------|-----------|------------|----------|----------|
| 1 | B002 | Completed | 04:33:12 | 04:34:52 | 00:01:40 |
| 2 | B001 | Missing | 04:35:15 | 04:35:26 | 00:00:11 |

When there is no new client or the employee has to be away from the counter, can click ‘Suspend Service’ button to close the system to avoid mis-clicking.



PBX Bank Back

Jurong Counter 1

Latest Message Please click "Initialize" first to get this counter in service.

Status: **Not In Service** Current Client: N.A.

Initialize **Suspend Service** Call Clear Hold

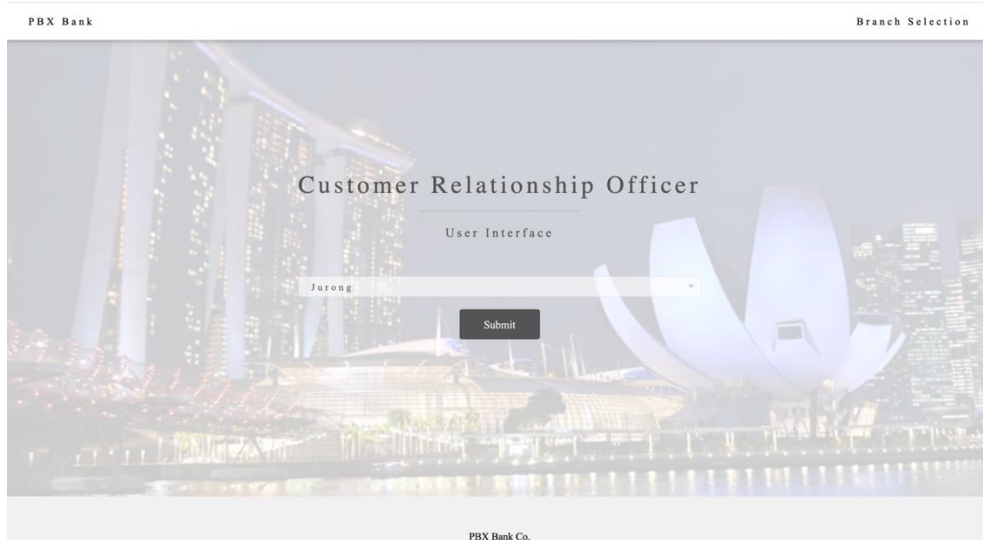
Summary Table

| No. | Queue No. | Status | Start Time | End Time | Duration |
|-----|-----------|-----------|------------|----------|----------|
| 1 | B002 | Completed | 04:33:12 | 04:34:52 | 00:01:40 |
| 2 | B001 | Missing | 04:35:15 | 04:35:26 | 00:00:11 |

5.4 Customer Relationship Officer Guide

a. Branch Selection Page

Open the browser and enter the URL: <http://localhost:9000/selectcro>, the below page will load:

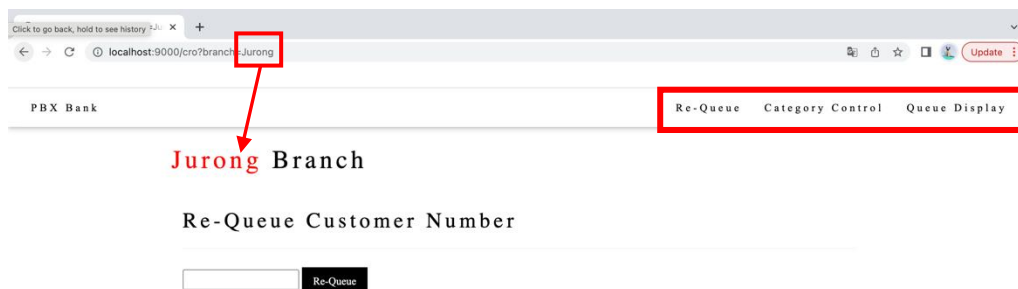


Select the branch to view and operate the system for that particular branch. Once the branch is selected and the submit button is pressed, it will redirect to the CRO function page.

b. Requeue Customer Page

After the 'Submit' action above, the operation page will be loaded automatically according to the selected branch. <http://localhost:9000/cro?branch=Jurong>

The CRO operation page has three functions: Re-queue, Category Control, and Queue Display. The branch name will be shown at the top of Re-queue page.



Input the queue number to re-join the customer back to the waiting line.
For example, queue number **B001** is inputted in the text box.

PBX Bank

Re-Queue

Category Control

Queue Display

Jurong Branch

Re-Queue Customer Number

B001

Re-Queue

Re-Queue Customer Number

B001

Re-Queue

Initially, B001 and B005 appear in the missing list displayed on the screen.

Jurong Display Screen

| Counter | Number |
|-----------|--------|
| Counter 1 | B004 |
| Counter 2 | A002 |

Waiting List: B002,B003,B006

Missing List: B001,B005

After B001 is requeued, the number is deleted and added to the waiting list again (the queue order will be determined by the category's priority and other criteria).

Jurong Display Screen

| Counter | Number |
|-----------|--------|
| Counter 1 | B004 |
| Counter 2 | A002 |

Waiting List: B001,B002,B003,B006

Missing List: B005

c. Category Queue Control Page

The number of individuals in line for each category is displayed in the *Numbers in Queue* column.

The **Refresh** button here is to get the latest numbers of queue in the waiting line.

PBX Bank Re-Queue Category Control Queue Display

Category Queue Management

The status of receiving for each customer category is displayed in the table below.

Refresh

Press the action button to control the receiving status.

| Category | Numbers in Queue | Status | Action |
|----------|------------------|----------|-------------|
| Diamond | 1 | On-going | Stop |
| Gold | 0 | On-going | Stop |
| Silver | 0 | On-going | Stop |
| Normal | 3 | On-going | Stop |

The queue is initially open to customers of all categories and in the *Status* column, "**On-going**" is displayed shown below.

To temporarily halt the receipt of customers, click the **Stop** button next to the appropriate category.

PBX Bank Re-Queue Category Control Queue Display

Category Queue Management

The status of receiving for each customer category is displayed in the table below.

Refresh

Press the action button to control the receiving status.

| Category | Numbers in Queue | Status | Action |
|----------|------------------|----------|-------------|
| Diamond | 1 | On-going | Stop |
| Gold | 0 | On-going | Stop |
| Silver | 0 | On-going | Stop |
| Normal | 3 | On-going | Stop |

Once the Stop button is clicked, a message will pop out alerting that "the respective category customer receiving is stopped!!"

Stock Coding Dictionary NTU MSBA Link localhost:9000 says exercise

ink

Category Queue Management

The status of receiving for each customer category is displayed in the table below.

Refresh

localhost:9000 says
Diamond Customer Receiving is Stopped!

OK

After stopping a category receipt, the Status column will display **”Stopped”** and the *Action* column will change to a **“Re-Initiate”** button for the selected category.

Category Queue Management

The status of receiving for each customer category is displayed in the table below.

Refresh

Press the action button to control the receiving status.

| Category | Numbers in Queue | Status | Action |
|----------|------------------|----------|-------------|
| Diamond | 1 | Stopped | Re-Initiate |
| Gold | 0 | On-going | Stop |
| Silver | 0 | On-going | Stop |
| Normal | 3 | On-going | Stop |

when clicking on the Re-Initiate button, a message will pop out alerting that the respective category customer receiving is Re-Initiate!

Theme Stock Coding Dictionary NTU MSBA Link

PBX Bank

localhost:9000 says

Diamond Customer Receiving is Re-initiate!

OK

exercise

Re-Queue Category Control Queue Display

Category Queue Management

localhost:9000 says

Diamond Customer Receiving is Re-initiate!

OK

| | | | |
|--------|---|----------|------|
| Gold | 0 | On-going | Stop |
| Silver | 0 | On-going | Stop |
| Normal | 3 | On-going | Stop |

d. Category Queue Display Page

Select the category to view the waiting queue number in the selected category.

PBX Bank

Re-QueueCategory ControlQueue Display

Queue Category Display

Select the category to view the current queueing list:

Diamond

Submit

The title will indicate the selected category.

The back button can return to the CRO function page.

PBX Bank

Queue Display

Diamond Waiting Queue

Category

B001

Back

PBX Bank

Re-QueueCategory ControlQueue Display

Queue Category Display

Select the category to view the current queueing list:

Normal

Submit

PBX Bank

Queue Display

Normal Waiting Queue

Category

B002

B003

B006

Back

5.5 Display Guide

a. Display Screen

Open the browser and type the following URL: <http://localhost:9000/display/Jurong>

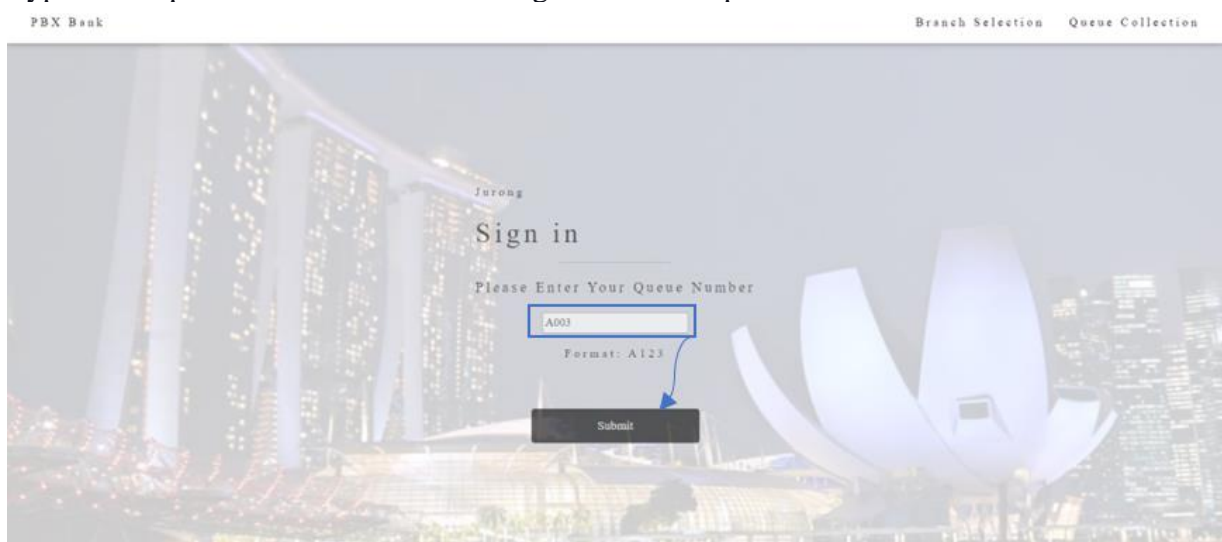
The page will show the queue number that each counter is serving, the waiting list, and the missing list. It will keep updating with the latest situation.



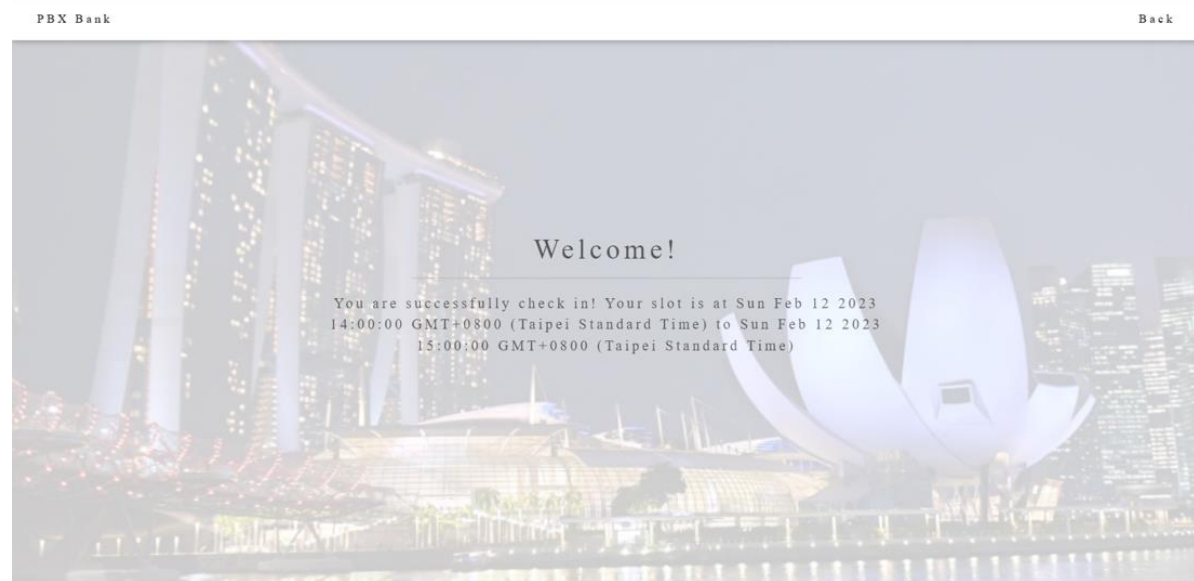
b. Sign In Page

Clients who make reversion online need to sign in when they arrive at the branch. Open the browser and type the URL : http://localhost:9000/sign_in/Jurong

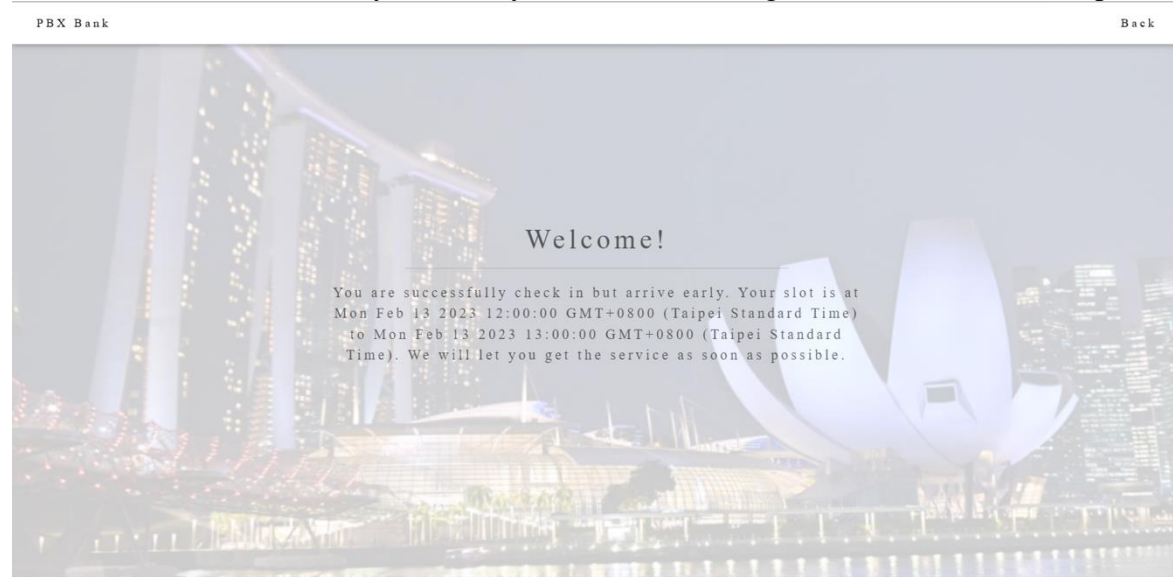
Type in the queue number that the client got online and press the submit button.



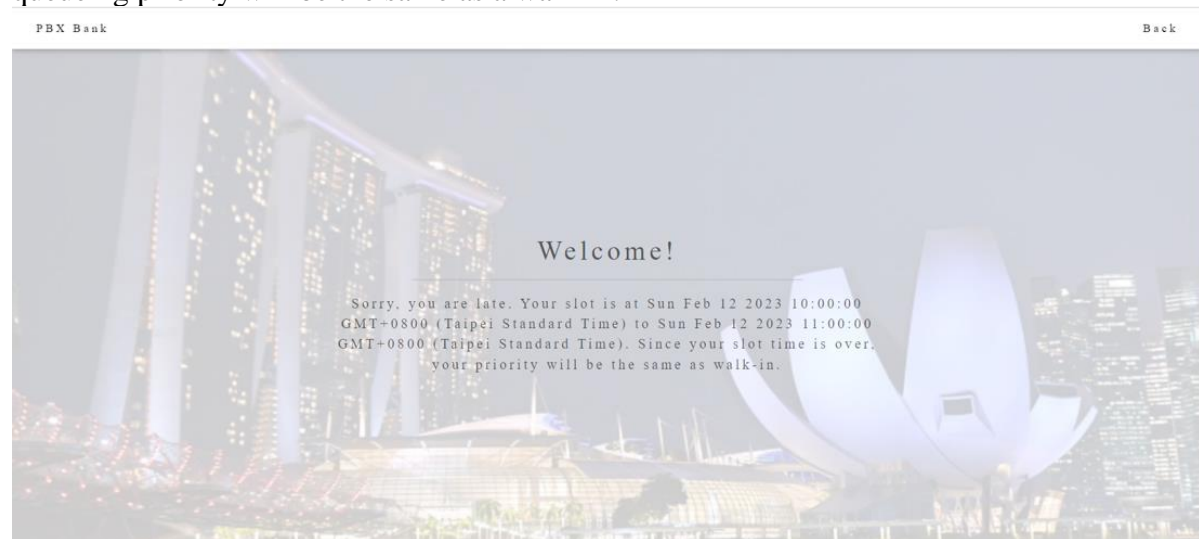
If the clients arrive on time (within the time range of the slot they chose), they will get the following message to confirm they check in successfully.



If the clients arrive earlier than the time slot they book, they will get a message to inform them to check in successfully and the system will let them get the service as soon as possible.



If the clients arrive later than the time slot they book, the system will inform them their queueing priority will be the same as a walk-in.



If the clients didn't make a reservation online, the system will inform them they didn't make a reservation.

