

DESIGN OF MOBILE APPLICATION FOR SCHEDULING APPOINTMENT WITH BANK PERSONNEL FOR BANKING SERVICES



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I would like to express my sincere gratitude to the *Institute for Development and Research in Banking Technology (IDRBT) Hyderabad* and *Dr. V. N. Sastry* for providing me this opportunity. The opportunity of developing a mobile application for scheduling appointments for banking services has become a good fortune for me.

I wish to express my profound gratitude to my Professor *Dr. V. N. Sastry* for guiding me throughout this project *Mobile Application for Scheduling Appointment with Bank Personnel for Banking Services*.

I extend my gratitude to *Sri. Lalit Mohan S.* for supporting me in the designing this application and helping me to develop this application.

This project was quite learning for me at each and every step, at the same time it gave me the confidence to work in the real life and professional set up. I feel the experience gained during the project would lead me towards a good professional life.

I would also thank the faculty of *Indian Institute of Technology Patna*, for allowing me to participate in this Summer Internship Program.

KARRE ANIL

CERTIFICATE

This is to certify that *Mr. Karre Anil*, pursuing **B.Tech in Computer Science & Engineering** at *Indian Institute of Technology Patna*, has undertaken a project as an intern at *IDRBT Hyderabad* from **13 May 2013** to **15 July 2013** as a part of his summer internship.

He worked on the project '*Mobile Application for Scheduling Appointments with Bank Personnel for Banking Services*' under my guidance and has done satisfactory work.

I wish him a bright career and success in his future endeavors.

(DR. V. N. SASTRY)

Professor,

IDRBT, Hyderabad.

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1. Introduction:

1.1 Need for scheduling an appointment for banking services:

To know about the need for scheduling an appointment for banking services, let us focus on our regular experiences with the banks.

How do we go to a bank? We usually take-off a lunch hour or a business hour to visit a bank. Then, wouldn't it be very disappointing if we couldn't find or if we have to wait for the bank personnel of our service, for simple reasons like the banker has left for small refreshment or the banker is on leave. Also, sometimes we have to wait for long time due to the busy schedule of the banker.

Banks are rated on basis of how well they can serve customers at all customer flow rate. But, due to uneven customer flow rate staff utilization has become a problem for the banks and thus impending high operating costs. Also, the bank employee doesn't know the purpose of customer in advance and has to make the customer wait, to collect the documents of the customer.

Also, when a customer receives poor assistance from the bank employee, he/she have limited means to file a complaint or to provide feedback to the bank. If there is a means to collect feedback from every customer about the service offered, then it would be of great benefit for the bank to improve its functionality and be customer friendly.

So, if we can schedule appointments for banking services, the above discussed inconveniences can be avoided. It would be convenient if we can book appointments through our mobile devices. Thereby, we propose to develop an internet-based mobile application, to enable registered customers schedule appointments with the bank for different services offered. We will discuss about the process involved in booking appointments in the coming sections.

After discussing the need for scheduling appointments for banking services, now let us briefly discuss what a customer can do with this application and what an employee can.

1.2 Services facilitated by the application:

1.2.1 for a customer of bank:

- Customer can book an appointment with the bank, by providing the appointment details.
- Customer can choose different branches, available over different cities, of the bank.
- Customer can provide feedback, after the successful completion of an appointment. Thus, they can communicate their inconveniences to the bank.

1.2.2 for bank personnel and the bank:

- The bank employee would know about customers' visit, in advance. So the banker would stay alert at his/her cabin to attend the customer and hence the customer doesn't need to wait.
- The bank employee would know the purpose of customer and he/she would stay prepared for the appointment. Thus, they can plan their day in a better way.
- The bank manager would know the customer flow rate for each service, in advance and so bank staff allocation can be optimized.
- The grievances of customers will come into the notice of the concerned bank personnel and then act in according to serve their customers better.

Thus by providing the above services, the mobile application solves the common problems faced by both the customers and personnel of a bank. Now, let us move on to discuss about how this mobile application can be of use in this real world.

1.3 Adoption of this application in real world:

1.3.1 Functioning of this appointment scheduling system:

- Customer registers him/herself for this service with the bank and gets a unique user-id and a one-time password. Customer must change the one-time password on first visit to the account.
- Customer can then access this service, by using the internet-based mobile application by signing-in to the account.
- Customer can book appointment by providing the details of city & branch of visit, purpose of visit, date & time of visit, etc... from the particulars made available on the application.
- Once the appointment is successfully booked, the details will be updated in the database maintained by bank.
- The bank branch providing this service shall have a technician to work with the allocation of staff for the appointments booked.
- The technician can allocate staff, by referring to the skill-matrix of the employees of the branch. Once the staffs are allocated, the appointment details will be mailed to the employee' email and then can be added to their email-calendar.
- Now, the bank employee will stay prepared for the appointments and the customers will get their work done as per their appointment.
- After successful completion of an appointment, the concerned bank employee would request for feedback from the customer and customer can express his experience through his/her' mobile application account.

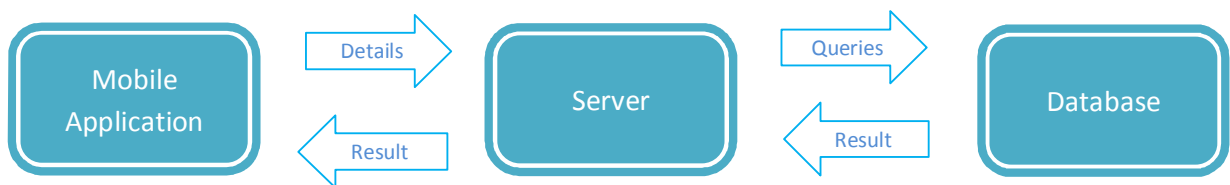


Fig 1.1 Data Flow during the functioning of the Application

1.3.2 Advantages of System:

- Waiting time of a customer gets reduced.
- Customers can express their complaints through their mobile.
- A bank employee would know the purpose of customer' visit and can serve them in a better way.
- A bank employee would know his/her schedule of the day and can plan their day better.
- Staff utilization can be optimized to lower the operating costs of the bank/branch, by utilizing staff according to the customer flow rate.

1.3.3 Challenges to be faced & possible solutions:

- Uneducated customers cannot get access to this system.
- There should be a means for the customers who couldn't get an appointment.
- To serve the above mentioned groups of customers, banks shall operate on both appointment & appointment-less system. They can serve customers through each mode during specific timings, like appointment system from 11:30AM to 2PM and appointment-less system during remaining business hours.
- The banks shall update the timings of each mode depending on the customer response for each mode.
- All the services offered by banks cannot be served through this system. This system needs further extension to make avail all the services offered by banks.

1.4 Objectives of the project:

- To Design, Develop & Implement a Mobile Application.
- To enable a customer of a branch, to schedule a time slot with the branch personnel for his/her purpose.
- To facilitate the Banker, to know about his/her detailed schedule for the day and help them plan their day in an efficient way.

2. Design of the Application:

2.1 Use Case Model:

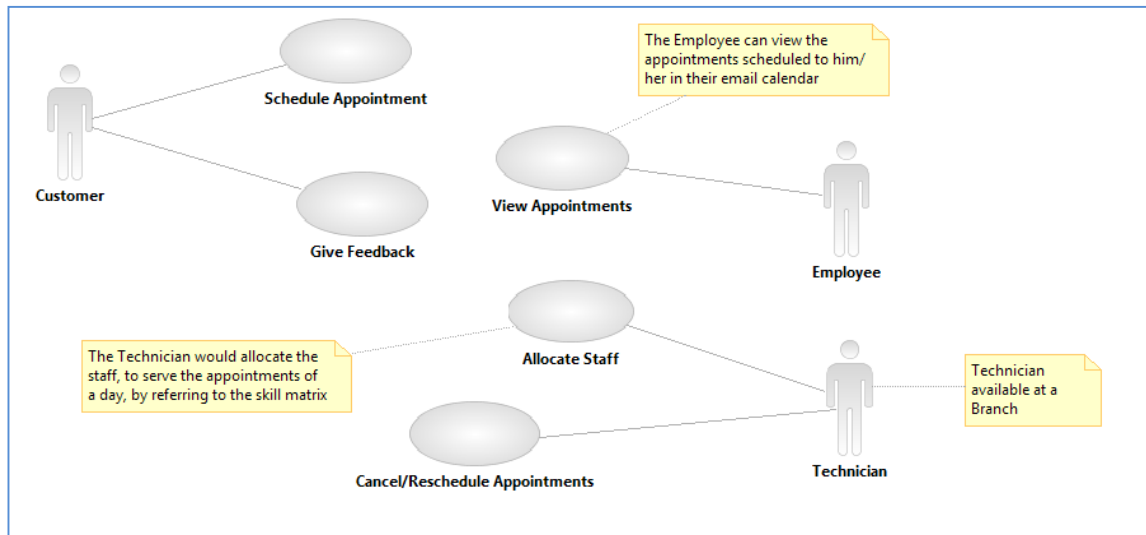


Fig 2.1 Use Case Diagram of the Application

Use Case Description:

Use Case	Description
Schedule Appointment	Customer will select the branch & city, purpose, date & time of visit and then requests to schedule an appointment for the particulars. The success or failure details of scheduling will be intimated to the customer.
Give Feedback	Customer can provide feedback about the service received at bank for his successfully completed appointment, on the request of bank.
Allocate Staff	Technician will allocate staff for a day according to the appointments booked for each service and skill of each employee in those services.
Cancel/Reschedule Appointments	Technician can cancel/re-schedule an appointment by accessing the database.
View Appointments	Bank employee can view the appointments allocated to them in their email calendar.

Table 2.2 Description of Use Cases of the Application

2.2 Sequence Diagram Model:

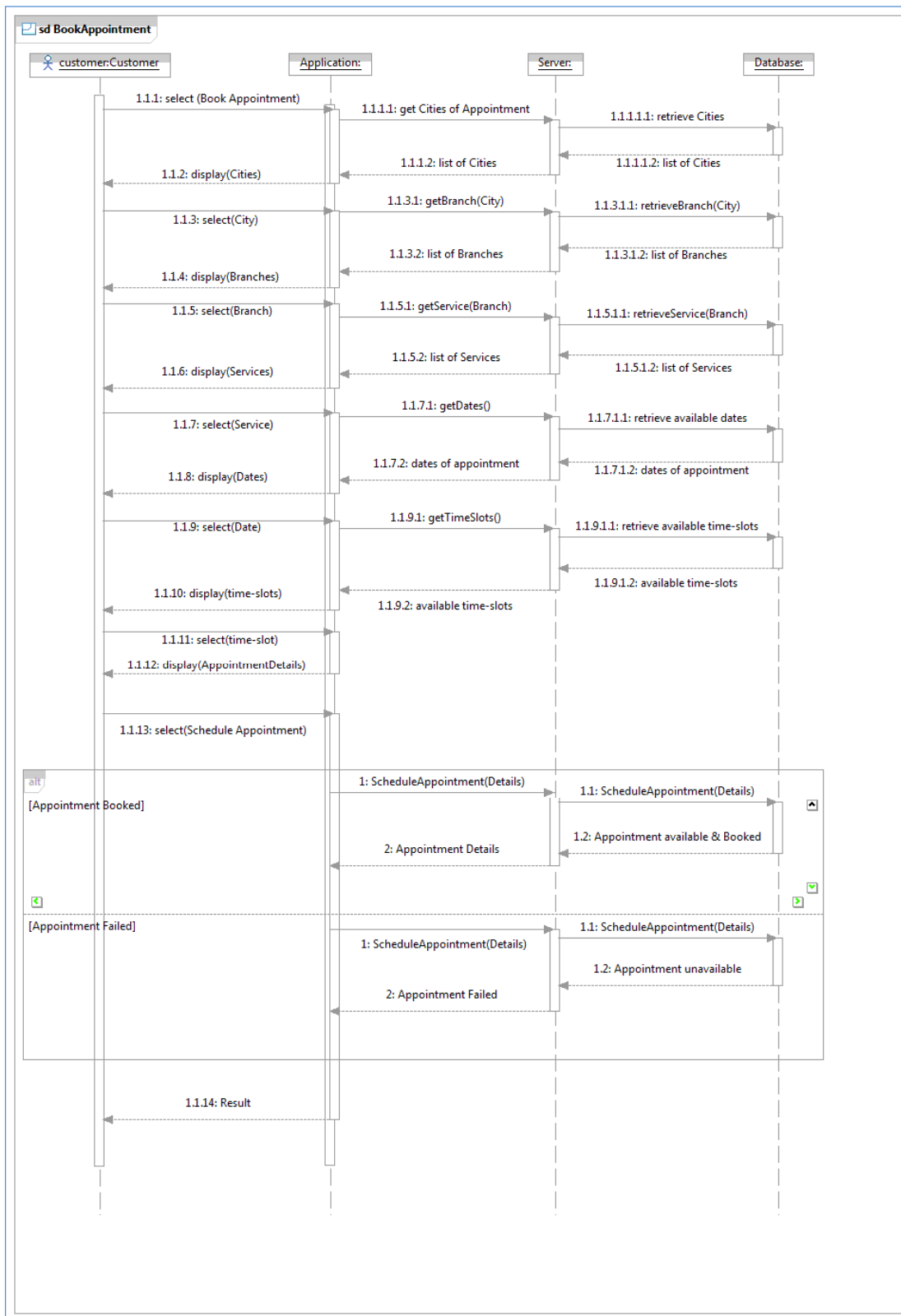


Fig 2.3 Sequence Diagram for scheduling appointment

2.3 Activity Diagram Model:

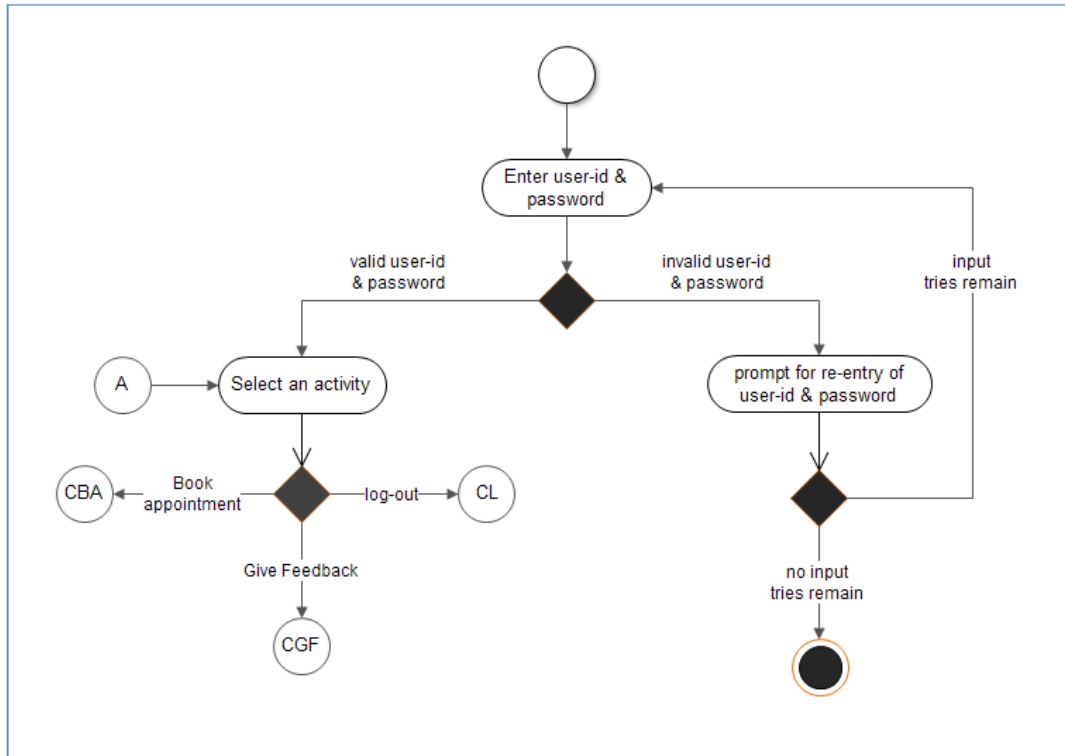


Fig 2.4 Activity Diagram - I

Activity Diagram - I:

- The customer shall sign-in to access the appointment scheduling system.
- After a failed sign-in appointment, the customer will be provided choice to retry.
- After three continuous failure attempts to sign-in, the application exits and the user account will be locked for the day.
- After successful sign-in, the customer can proceed with '*Book Appointment*' or '*Give Feedback*'.
- '*Book Appointment*' will take the customer to schedule an appointment.
- '*Give Feedback*' will enable the customer to provide feedback about the appointment he/she successfully attended.

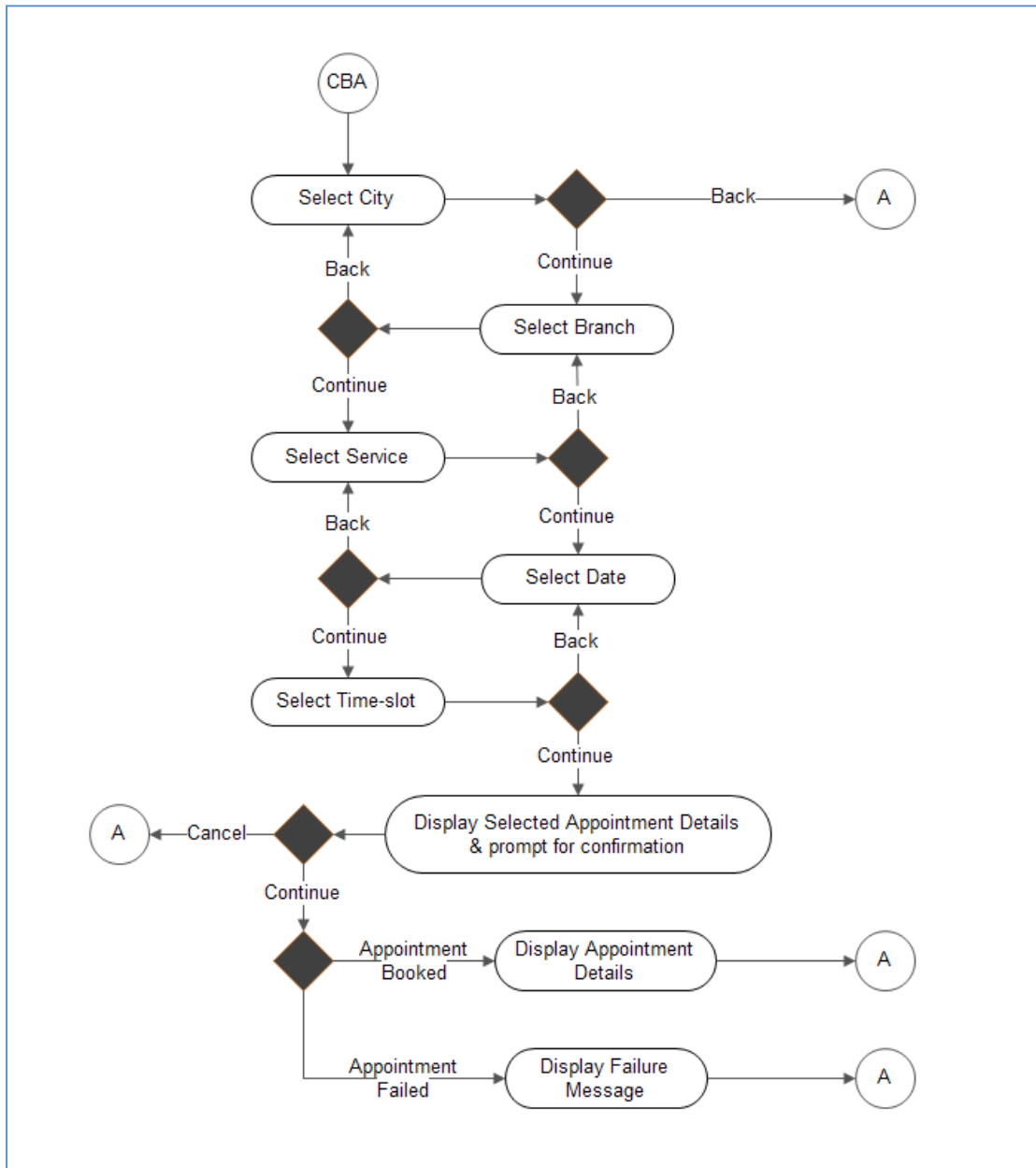


Fig 2.5 Activity Diagram - II

Activity Diagram - II:

- Customer reaches here, if he/she selected 'Book Appointment' in the previous section.
- Customer now selects *City, Branch, Service, Date, Time-slot* of the appointment from the available options.
- At each stage, customer can go 'Back' to alter his previous selections.
- After selecting the particulars, the selected details will be displayed and prompt the customer for confirmation to schedule appointment.

- If the customer agrees to book appointment for the displayed selection, scheduling will be started and the success or failure details will be displayed to the customer. If the customer disagrees, he/she will be directed to start page.

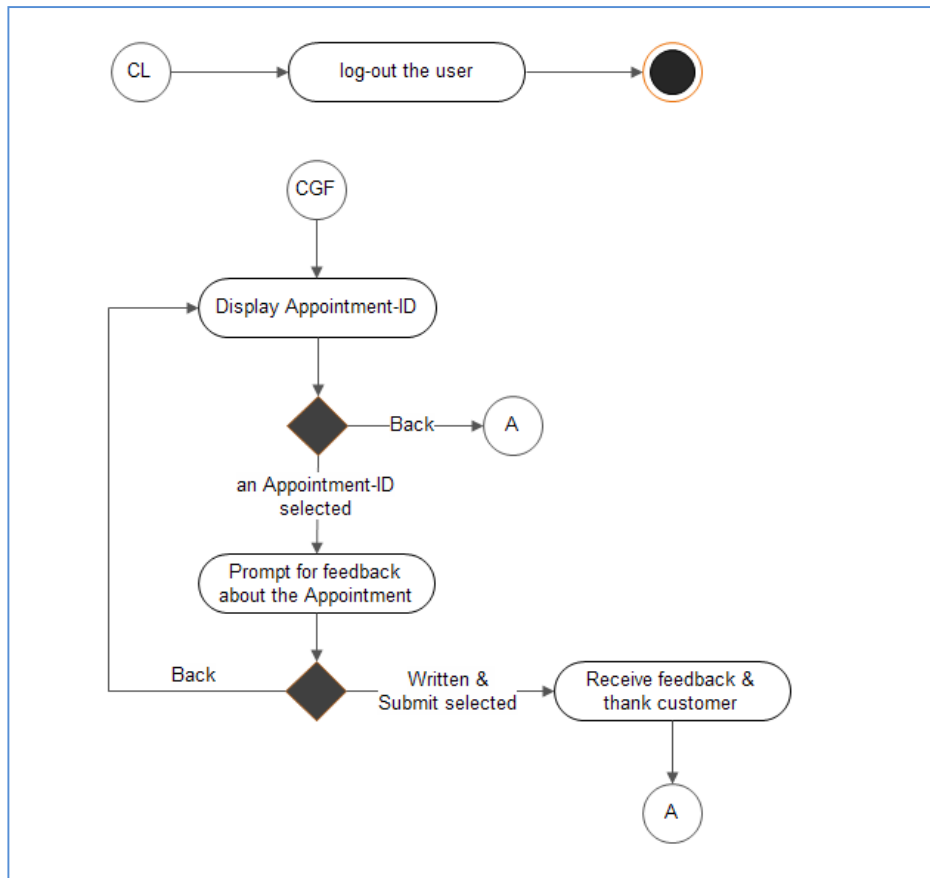


Fig 2.6 Activity Diagram - III

Activity Diagram - III:

- Customer reaches here, if he/she has selected 'Give Feedback' or 'log-out' at the start page.
- When 'Give Feedback' is selected, the Appointment-ID for which feedback is to be given, are displayed. Then customer can select the ID and give feedback in the next page.
- 'Back' command is provided to allow the customer to navigate through the procedure, making this application user-friendly.
- When 'log-out' is selected, the customer is logged-out of their account and the application exits.

2.4 Database Schema:

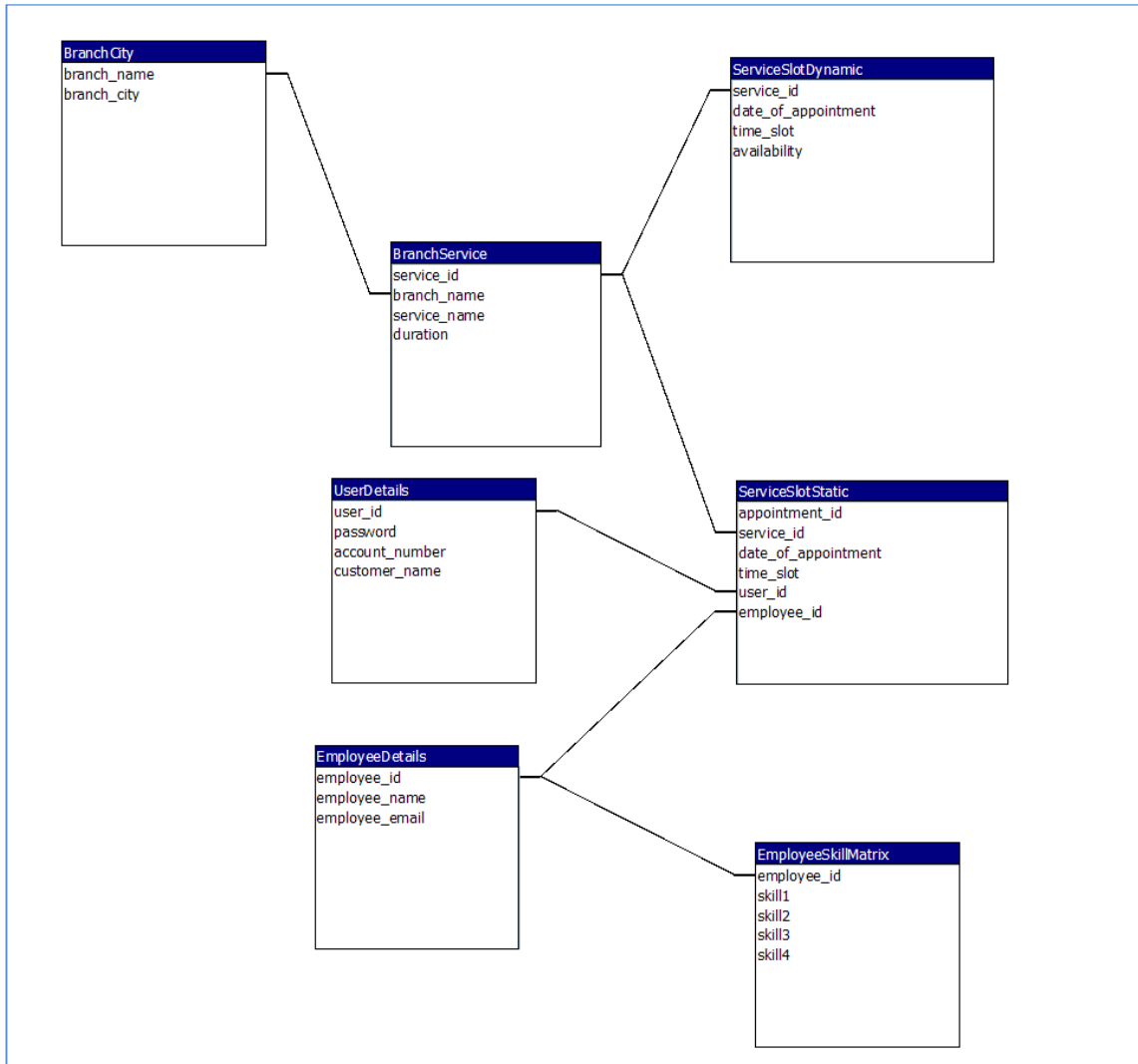


Fig 2.7 Relational Database Schema

Relational Database Schema:

- Seven data tables, namely 'BranchCity', 'BranchService', 'ServiceSlotDynamic', 'UserDetails', 'ServiceSlotStatic', 'EmployeeDetails' and 'EmployeeSkillMatrix' were defined for the functionality of this application.
- 'BranchCity' stores information about branch names & city of the branch.
- 'BranchService' stores data about the services offered by each branch and the duration of each service. Each service offered by each branch is assigned a unique service_id to access it easily.
- 'UserDetails' stores data about the user account details of customers.
- 'EmployeeDetails' stores information about each employee of the bank.

- *'EmployeeSkillMatrix'* is the skill-matrix that stores the skill level of each employee in each service. skill1 is the name of a service & the attribute stores integer from 0 to 5, rating the skill level of the employee in the service.
- *'ServiceSlotDynamic'* is defined to store the available appointments. Scheduling of appointments is made primarily by accessing this table. The date_of_appointment attribute stores date from present day to next 15 days, allowing appointment booking only for 15 days in advance. Once the appointment is booked, the appointment details along with user_id are stored into *'ServiceSlotStatic'*. This can be achieved by defining a *trigger* function on *'ServiceSlotDynamic'*.
- *'ServiceSlotStatic'* is defined to store all the information about booked appointments. The records of expired appointments are deleted after 30 days. The employee_id attribute can be null until staff allocation is done by *Technician*. This table is accessed to retrieve details of booked appointments.

2.5 Assumptions in design:

- The duration of a service is fixed by the bankers providing the service. Customer is not provided the chance to select duration of appointment because the banker knows about this better than the customers.
- There will be technician at each branch to manage database for staff allocation, cancel/re-schedule appointments.
- A customer can schedule an appointment only one at a time i.e., customer cannot book an appointment if he/she has an active appointment booked that is to be attended. Only after successful completion of existing appointment, the customer can book another appointment for any service.

3. Implementation:

3.1 Tools and Technologies used:

1. Java ME

This is Micro edition of Java designed for embedded systems including mobile phones. It is designed by Sun Microsystems and later acquired by Oracle Corporation. Although it is not used on some of the today's newest mobile platform like iPhone, Windows phone, Android; still it continue to be very popular in most of the Nokia series 40 phones.

The Connected Limited Device Configuration (CLDC) contains a strict subset of the Java class libraries, and is the minimum amount needed for the Java virtual machine to operate. CLDC is basically used for classifying myriad devices into a fixed configuration. We are using CLDC 1.1

Mobile Information Device Profile (MIDP) includes a GUI and a data storage API and MIDP 2.0 includes a basic 2D gaming API. Applications written for this profile are called MIDlets. We have used MIDP 2.0 with our application.

This programming language was designed because; we cannot use JavaSE on mobile phones. Mobile phones have low computability, low cache memory. So they cannot support JavaSE and hence Java ME is designed to operate on mobile phones.

I chose this as medium for developing the application because the application can be used on java enabled mobile phones.

2. NetBeans IDE 7.3

This is an Integrated Development Environment to develop desktop, embedded and web applications using Java by Oracle Corporation. It is compatible with Windows, OS X, Linux and Solaris. The latest version of NetBeans is 7.3 which provide support for other languages like PHP, C & C++ and HTML 5.

3. MySQL Database community Edition 5.1.49

This is an open source relational database management system by Oracle Corporation. It is used for database management using Structure Query Language. Many high profile web sites including Google, Wikipedia and Facebook use this system.

This system is easy to operate and reliable for data security. This led me to choose this system for developing database of the application.

4. Apache Tomcat 7.0.34.0

This is an open source web server which connects the database with the application installed on customer's mobile through internet. It is developed by Apache Software Foundation. It also includes many third party libraries for file systems.

5. IBM Rational Software Architecture 7.0

This is a designing tool for developing J2EE or web application and is built in Eclipse open source software framework. It uses Unified Modeling Language to design diagrams. This tool provides templates for all kind of diagrams as defined in the UML Specification 2.4.1

This software was used to design the '*Use Case Diagrams*', '*Sequence Diagrams*' presented earlier in this report.

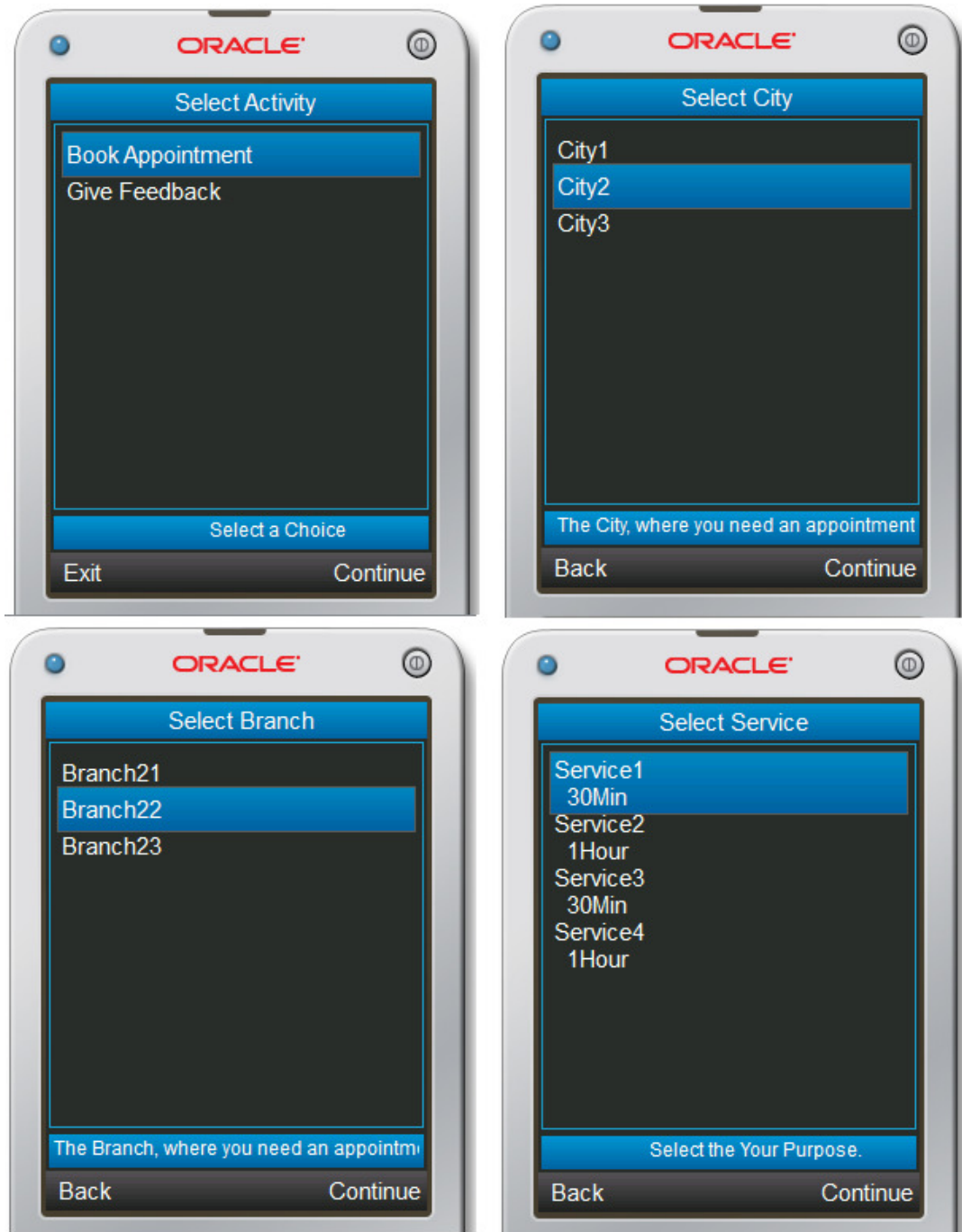
6. Edraw Max 7.0

Edraw UML Diagram is ideal for software engineers and software designers who need to draw detailed software design documentation, novel, small and exquisite, who work in the following fields: UML Diagrams, Software Diagrams, Data Flow Model Diagrams, Flowcharts and Network Diagrams.

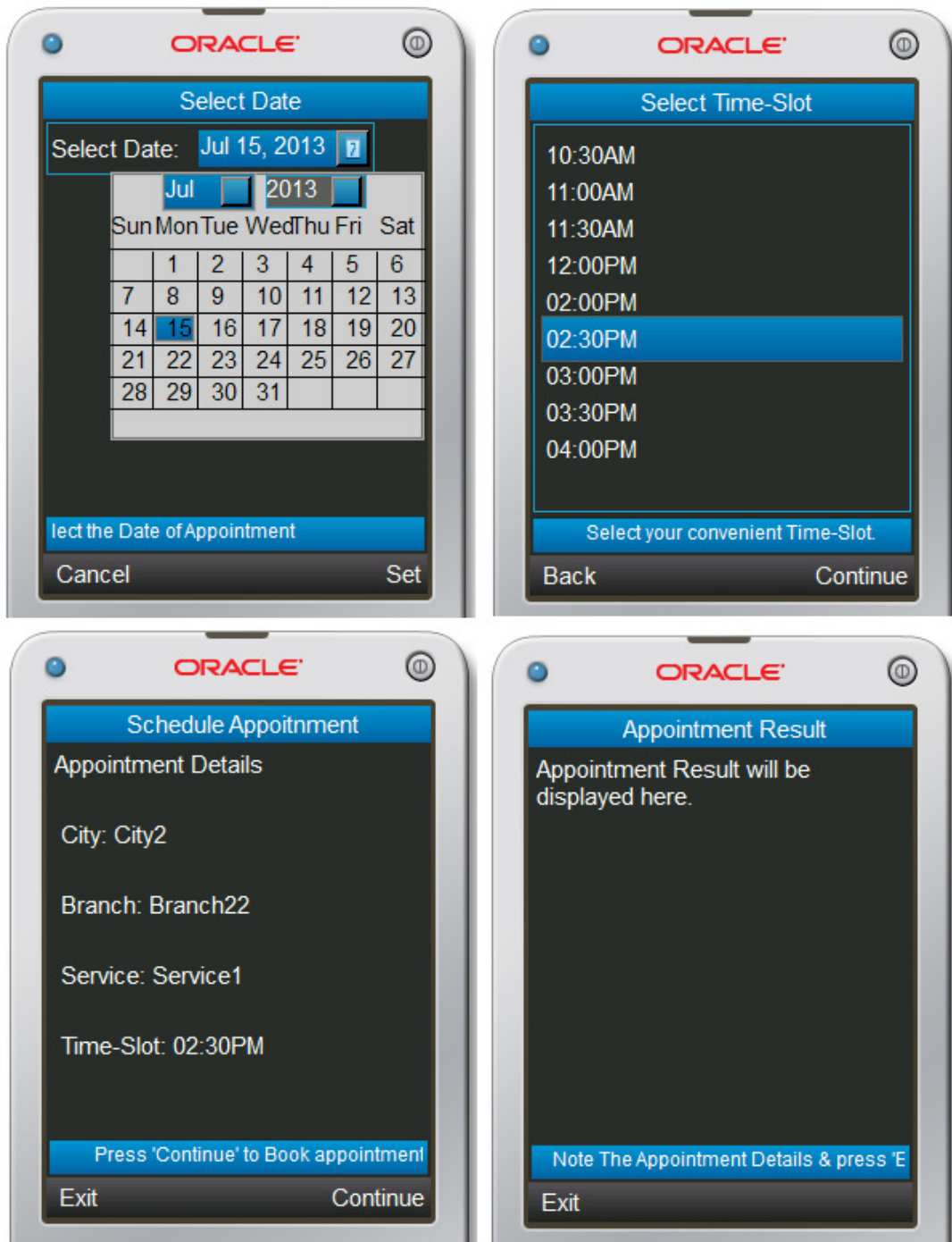
This software was used to design the '*Activity Diagrams*' presented earlier in the '*Activity Diagram Model*'.

3.2 Screenshots of the Application:

3.2.1 for Booking Appointment:

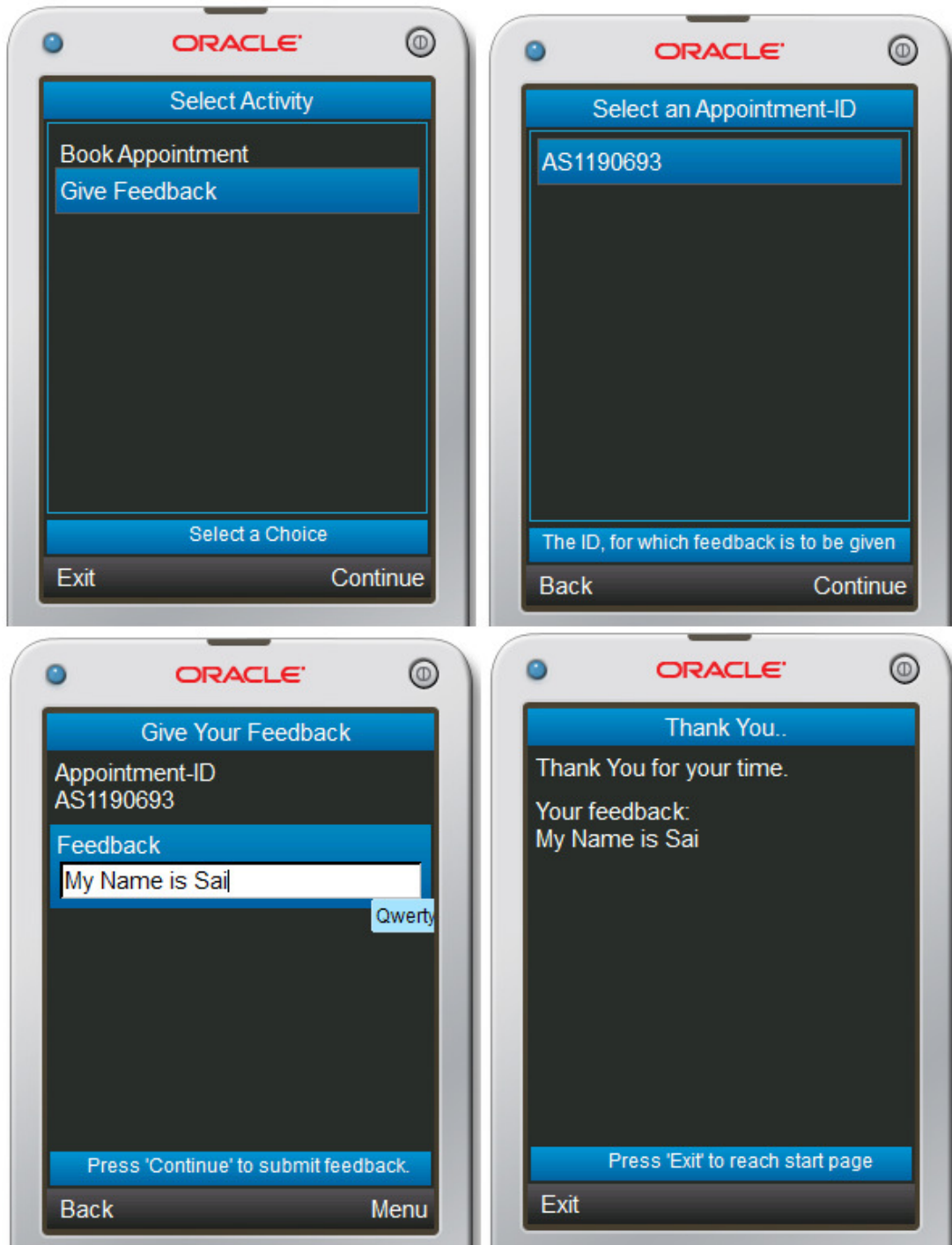


* Sequence flow: Top-left -> Top-right -> Bottom-left -> Bottom-right.



* Sequence flow: Top-left -> Top-right -> Bottom-left -> Bottom-right.

3.2.2 for giving Feedback:



* Sequence flow: Top-left -> Top-right -> Bottom-left -> Bottom-right.

Conclusion

The application '*Mobile Application for Scheduling Appointment with Bank Personnel for Banking Services*' has been successfully designed using the UML diagrams as per UML specification 2.4.1

The application is developed using Java Me and implemented as a standalone application. The backend database support is to be added to this system to make it fully functional. I ran out of time at the end and was unable to implement the backend database support. The future work to be implemented with this application is to create database as per the relational database schema presented in the section-2.4 and then modify the source-code of this application to connect this application to the database through a server.

This application when developed as fully functional will be of great benefit in the banking sector to improve their ability to serve customer at their comfort. This application will be a solution for the problems faced by both the customers and the bankers in banking operations.

Security features are to be added to make this application reliable and care must be taken to prevent misuse of this service. This application is just like present day '*Appointment Booking for Passport Services*' offered by Indian Government. This application will be very helpful in the banking sector just like afore mentioned service.

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