RIYADH METRO SYSTEM

1/4/2017

Phase II Document

Members:
ABDULLAH ALGARNI 201332450
YAZIED AL-LAHIM 201361610
ABDULLAH ALNAHDI 201358590
MANSOUR ALDANDOR 201370350

Contents

Riyadh Metro System

PHASE II DOCUMENT

1. PROBLEM STATEMENT

a) Software Project Introduction

I. Project Overview

The system to be developed will aim to facilitate the means of transportation via the Metro in Riyadh city by providing an easy and efficient way of booking tickets and monitoring the overall state of the metro traffic

II. Problem Statement & Proposed Solution

- The Metro transport system which is currently under construction will require a database that will hold the information of stations, Customers, employees working time schedule, network lines and maintenance of the trains.

- The Metro system will need an electronic way of booking tickets in order to facilitate the reservation process and save customers' time and effort.

- The culture and traditions entail the separation between families and singles. So, the proposed system will consider this requirement while development by allocating railcars for families only, and also the same for singles

- The project needs to include the data of a center for the control and operation of the metro traffic management and monitoring.

III. User / Stakeholders Description

The system will involve the following users:

1. Passenger
2. Manager
3. Maintenance stuff
4. Operators and monitors

b) Software Functions

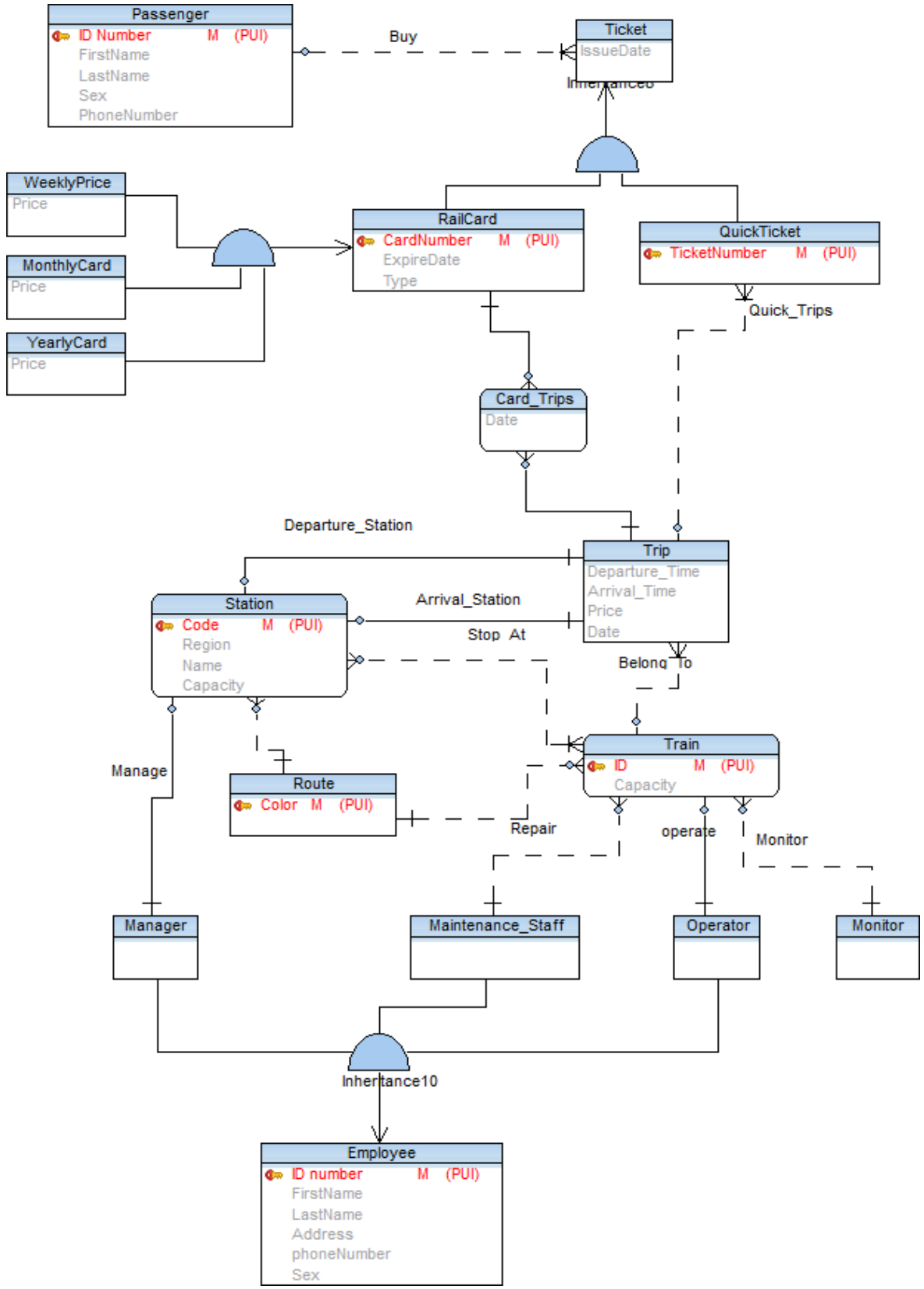
I. Product Functions

- Provide online booking interface which enables the users to check the schedule available and make a reservation
- The system provides machines for automatic scanning of tickets
- The Operators and monitors can monitor the metro's state
- The manager can easily receive reports about the reservations and metro's status
- The maintenance staff can view and modify the data regarding the functionality of the metro

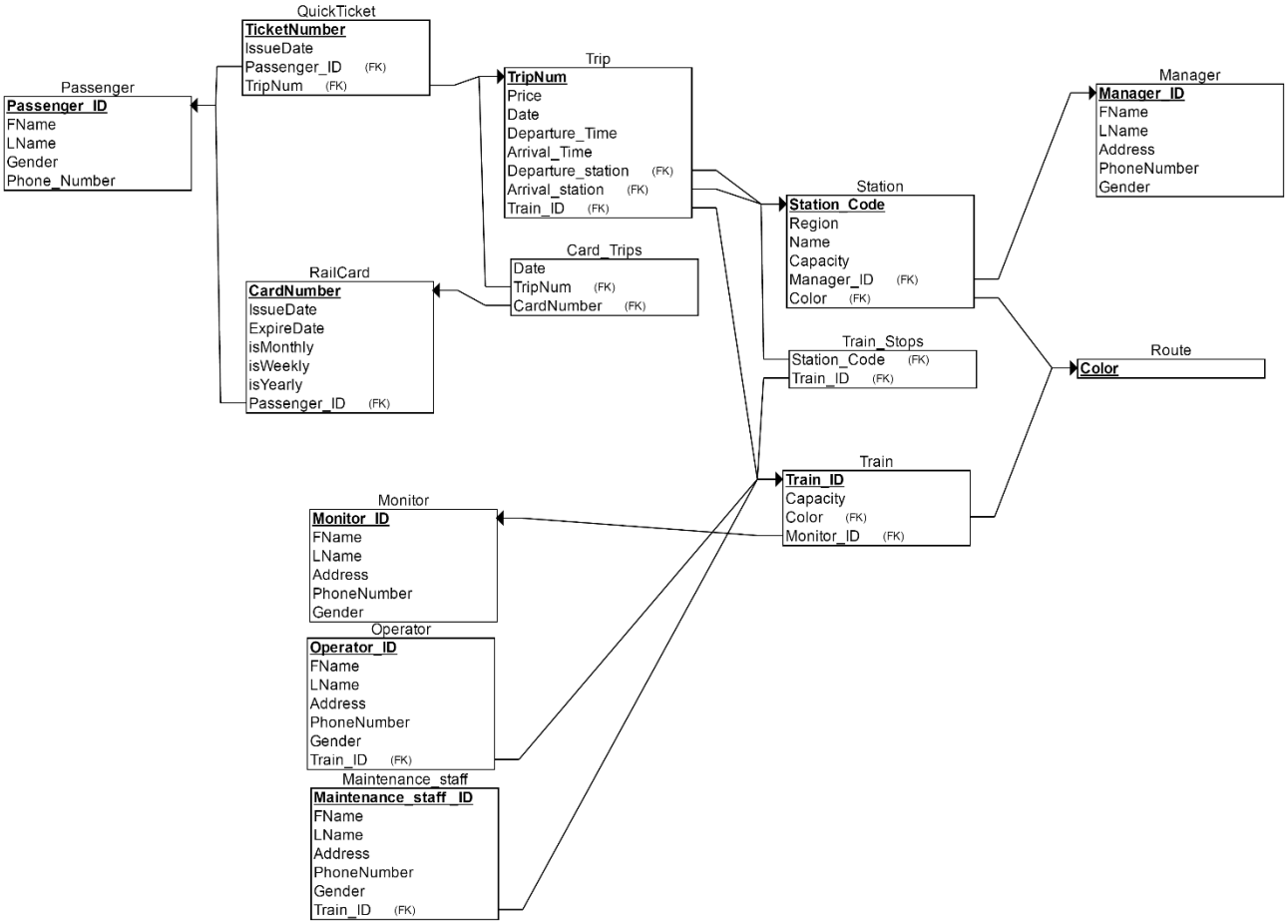
II. Assumptions and Dependencies

- Assume the passengers have intermediate knowledge about technology in general, and about computer use in particular

2. ER DIAGRAM


Passenger
ID Number M (PUI)
FirstName
LastName
Sex
PhoneNumber
Buy
Ticket
IssueDate
WeeklyPrice
Price
MonthlyCard
Price
YearlyCard
Price
RailCard
CardNumber M (PUI)
ExpireDate
Type
QuickTicket
TicketNumber M (PUI)
Quick_Trips
Card_Trips
Date
Departure_Station
Trip
Departure_Time
Arrival_Time
Price
Date
Station
Code M (PUI)
Region
Name
Capacity
Arrival_Station
Stop At
Belong To
Train
ID M (PUI)
Capacity
Manage
Route
Color M (PUI)
Repair
operate
Monitor
Manager
Maintenance_Staff
Operator
Monitor
Inheritance10
Employee
ID number M (PUI)
FirstName
LastName
Address
phoneNumber
Sex

3. RELATIONAL SCHEMA



4. PHYSICAL (OR INTERNAL) SCHEMA

I. Passenger

SR #	Attributes	Data Type	Size	PK	FK references to	Not Null	Don
1	ID_numbe	NUMBER	10	Y		Y	
2	firstName	varchar2	15				
3	lastName	varchar2	15				
4	Sex	varchar2	6				
5	phoneNumber	number	10				

II. Manager

SR #	Attributes	Data Type	Size	PK	FK references to	Not Null	Don
1	Manager_id	NUMBER	10	Y		Y	
2	firstName	varchar2	15				
3	lastName	varchar2	15				
4	Sex	varchar2	6				
5	phoneNumber	number	10				
6	Address	varchar2	30				

III. Monitor

SR #	Attributes	Data Type	Size	PK	FK references to	Not Null	Don
1	Monitor_id	NUMBER	10	Y		Y	
2	firstName	varchar2	15				
3	lastName	varchar2	15				
4	Sex	varchar2	6				
5	phoneNumber	number	10				
6	Address	varchar2	30				

IV. Operator

SR #	Attributes	Data Type	Size	PK	FK references to	Not Null	Dom
1	operator_id	NUMBER	10	Y		Y	
2	firstName	varchar2	15				
3	lastName	varchar2	15				
4	Sex	varchar2	6				
5	phoneNumber	number	10				
6	Address	varchar2	30				
7	Train_id	number	10	y	Train(train_id)	Y	

V. maintenance_staff

SR #	Attributes	Data Type	Size	PK	FK references to	Not Null	Dom
1	staff_id	NUMBER	10	Y		Y	
2	firstName	varchar2	15				
3	lastName	varchar2	15				
4	Sex	varchar2	6				
5	phoneNumber	number	10				
6	Address	varchar2	30				
7	Train_id	number	10	y	Train(train_id)	Y	

VI. Route

SR #	Attributes	Data Type	Size	PK	FK references to	Not Null	Domain/Constraint
1	color	varchar2	10	Y		y	

VII. Train

SR #	Attributes	Data Type	Size	PK	FK references to	Not Null	Domain/Constraint

1	Train_id	number	10	Y		Y	
2	capacityNum	number	4				
3	color	varchar2	10		Route(color)	Y	
4	Monitor_id	number	10		Monitor(monitor_id)	Y	

VIII. Station

SR #	Attributes	Data Type	Size	PK	FK references to	Not Null	Dom
1	Station_Code	Number	6	Y		Y	
2	Region	varchar2	45				
3	Name	varchar2	45				
4	capacityNum	Number	8				
5	Manager_ID	Number	10		Manager(Manager_ID)	Y	
6	Color	varchar2	10		Route(Color)	Y	

IX. train_stops

SR #	Attributes	Data Type	Size	PK	FK references to	Not Null	Domain/Constraint
1	station_code	Number	6		Station(station_code)	Y	
2	Train_id	Number	10		Train (train_id)	Y	

X. RailCard

SR #	Attributes	Data Type	Size	PK	FK references to	Not Null	Dom

1	CardNumber	NUMBER	10	Y		Y	
2	ExpireDate	DATE	--				
3	isMonthly	NUMBER	1				
4	isWeekly	NUMBER	1				
5	isYearly	NUMBER	1				
6	IssueDate	DATE	--				

XI. Trip

SR #	Attributes	Data Type	Size	PK	FK references to	Not Null	Dom
1	trip_number	NUMBER	10	Y		Y	
2	price	Nimber	4-2				
3	departure_station_code	Number	6	Y	Station(station_code)		
4	arrival_station_code	Number	6	Y	Station(station_code)		
5	Train_id	NUMBER	10	Y	Train (train_id)		

XII. QuickTicket

SR #	Attributes	Data Type	Size	PK	FK references to	Not Null	Domain/Constraint
1	ticketNumber	Number	10	y		Y	
2	IssueDate	Date	--				
3	pssngr_id	Number	10		Passenger(id_number)	Y	
4	trip_number	Number	10		Trip(trip_number)	Y	

XIII. card_trips

SR #	Attributes	Data Type	Size	PK	FK references to	Not Null	Domain/Constrain
1	card_trip_date	Date	--	y		Y	
2	cardnumber	Number	10		RailCard(cardnumber)	Y	
3	trip_number	Number	10		Trip(trip_number)	Y	

5. DDL SCRIPT /SQL STATEMENTS

```
CREATE TABLE passenger
  (
     id_number    NUMBER(10) CONSTRAINT pssngr_pk PRIMARY K
EY,
     firstname    VARCHAR2(15),
     lastname     VARCHAR2(15),
     sex          VARCHAR(6),
     phonenumber NUMBER(10)
  );

CREATE TABLE manager
  (
     manager_id  NUMBER(10) CONSTRAINT mngr_pk PRIMARY KEY
,
     firstname    VARCHAR2(15),
     lastname     VARCHAR2(15),
     sex          VARCHAR(6),
     phonenumber NUMBER(10),
     address      VARCHAR2(30)
  );

CREATE TABLE route
  (
     color VARCHAR2(10) CONSTRAINT color_pk PRIMARY KEY
```

```
  );

CREATE TABLE monitor
  (
     monitor_id  NUMBER(10) CONSTRAINT monitor_pk PRIMARY
KEY,
     firstname   VARCHAR2(15),
     lastname    VARCHAR2(15),
     sex         VARCHAR(6),
     phonenumber NUMBER(10),
     address     VARCHAR2(30)
  );

CREATE TABLE train
  (
     train_id    NUMBER(10) CONSTRAINT train_pk PRIMARY KE
Y,
     capacitynum NUMBER(4),
     color       VARCHAR2(10),
     monitor_id  NUMBER(10),
     CONSTRAINT train_monitor_fk_reference FOREIGN KEY (mo
nitor_id) REFERENCES
     monitor(monitor_id),
     CONSTRAINT train_color_fk_reference FOREIGN KEY (colo
r) REFERENCES route(
     color)
  );

CREATE TABLE operator
  (
     operator_id NUMBER(10) CONSTRAINT operator_pk PRIMARY
 KEY,
     firstname   VARCHAR2(15),
     lastname    VARCHAR2(15),
     sex         VARCHAR(6),
     phonenumber NUMBER(10),
     address     VARCHAR2(30),
     train_id    NUMBER(10),
     CONSTRAINT operator_train_fk_reference FOREIGN KEY (t
rain_id) REFERENCES
```

```
    train(train_id)
  );

CREATE TABLE maintenance_staff
  (
    staff_id    NUMBER(10) CONSTRAINT staff_pk PRIMARY KE
Y,
    firstname   VARCHAR2(15),
    lastname    VARCHAR2(15),
    sex         VARCHAR(6),
    phonenumber NUMBER(10),
    address     VARCHAR2(30),
    train_id    NUMBER(10),
    CONSTRAINT staff_train_fk_reference FOREIGN KEY (trai
n_id) REFERENCES train
    (train_id)
  );

CREATE TABLE station
  (
    station_code NUMBER(6) CONSTRAINT station_pk PRIMARY
KEY,
    region       VARCHAR2(45),
    NAME         VARCHAR2(45),
    capacitynum  NUMBER(8),
    manager_id   NUMBER(10),
    color        VARCHAR2(10),
    CONSTRAINT station_manager_fk_reference FOREIGN KEY (
manager_id) REFERENCES
    manager(manager_id),
    CONSTRAINT station_color_fk_reference FOREIGN KEY (co
lor) REFERENCES route(
    color)
  );

CREATE TABLE train_stops
  (
    station_code NUMBER(6),
    train_id     NUMBER(10),
    CONSTRAINT trstops_station_fk_ref FOREIGN KEY (statio
```

```
n_code) REFERENCES
     station(station_code),
     CONSTRAINT trstops_train_fk_ref FOREIGN KEY (train_id
) REFERENCES train(
     train_id),
     CONSTRAINT stationcode_trainid_pk PRIMARY KEY ( stati
on_code, train_id)
  );

CREATE TABLE railcard
  (
     cardnumber NUMBER(10) CONSTRAINT railcard_pk PRIMARY
KEY,
     issuedate  DATE,
     expiredate DATE,
     ismonthly  NUMBER(1),
     isweekly   NUMBER(1),
     isyearly   NUMBER(1),
     pssngr_id  NUMBER(10),
     CONSTRAINT raildcard_psngr_fk_ref FOREIGN KEY (pssngr
_id) REFERENCES
     passenger(id_number)
  );

CREATE TABLE trip
  (
     trip_number            NUMBER(10) CONSTRAINT trip_pk
PRIMARY KEY,
     price                  NUMBER(4, 2),
     departure_station_code NUMBER(6),
     arrival_station_code   NUMBER(6),
     train_id               NUMBER(10),
     CONSTRAINT tripdepart_station_fk_ref FOREIGN KEY (dep
arture_station_code)
     REFERENCES station(station_code),
     CONSTRAINT triparriv_station_fk_ref FOREIGN KEY (arri
val_station_code)
     REFERENCES station(station_code),
     CONSTRAINT trip_train_fk_ref FOREIGN KEY (train_id) R
EFERENCES train(
```

```
      train_id)
  );

CREATE TABLE quickticket
  (
      ticketnumber NUMBER(10) CONSTRAINT quickticket_pk PRI
MARY KEY,
      issuedate    DATE,
      pssngr_id    NUMBER(10),
      trip_number  NUMBER(10),
      CONSTRAINT quickticket_psngr_fk_ref FOREIGN KEY (pssn
gr_id) REFERENCES
      passenger(id_number),
      CONSTRAINT quickticket_trip_fk_ref FOREIGN KEY (trip_
number) REFERENCES
      trip(trip_number)
  );

CREATE TABLE card_trips
  (
      card_trip_date DATE,
      trip_number    NUMBER(10),
      cardnumber     NUMBER(10),
      CONSTRAINT cardtrips_trip_fk_ref FOREIGN KEY (trip_nu
mber) REFERENCES trip(
      trip_number),
      CONSTRAINT cardtrips_raildcard_fk_ref FOREIGN KEY (ca
rdnumber) REFERENCES
      railcard(cardnumber),
      CONSTRAINT cardtrips_pk PRIMARY KEY (trip_number, car
dnumber,
      card_trip_date)
  );
```

6. DML INSERT STATEMENTS

Maintenance :

Insert into MAINTENANCE_STAFF
(STAFF_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS,TRAIN_ID) values
(1,'Ahmad','Ali','M',591234567,'Saudi Arabia - Abha',4);

Insert into MAINTENANCE_STAFF
(STAFF_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS,TRAIN_ID) values
(2,'Ali','Ahmad','M',598759351,'Saudi Arabia - Jeddah',2);

Insert into MAINTENANCE_STAFF
(STAFF_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS,TRAIN_ID) values
(3,'Saeed','Qasim','M',598265256,'Saudi Arabia - Tendaha',3);

Insert into MAINTENANCE_STAFF
(STAFF_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS,TRAIN_ID) values
(4,'Mohammad','Almari','M',593332541,'Saudi Arabia - Dhahran',1);

Insert into MAINTENANCE_STAFF
(STAFF_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS,TRAIN_ID) values
(5,'Saleh','Altameme','M',596322254,'Saudi Arabia - Abha',5);

Insert into MAINTENANCE_STAFF
(STAFF_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS,TRAIN_ID) values
(6,'Raeed','Alharthy','M',598844714,'Saudi Arabia - Makka',2);

Insert into MAINTENANCE_STAFF
(STAFF_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS,TRAIN_ID) values
(7,'Majed','Alhadramy','M',595555555,'Saudi Arabia - Dammam',4);

Insert into MAINTENANCE_STAFF
(STAFF_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS,TRAIN_ID) values
(8,'osama','Alnayem','M',591140415,'Saudi Arabia - Khamis Mushat',3);

Insert into MAINTENANCE_STAFF
(STAFF_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS,TRAIN_ID) values
(9,'Naief','Alsahafy','M',564128351,'Saudi Arabia - Sharorah',5);

Manager :

Insert into MANAGER
(MANAGER_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS) values
(1,'Abdullah','Alzahrani','M',598787879,'Saudi Arabia - Tabok');

Insert into MANAGER
(MANAGER_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS) values
(2,'Sami','Alzamei','M',598863214,'Saudi Arabia - Riyadh');

Insert into MANAGER
(MANAGER_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS) values
(3,'Qayed','Alminaly','M',596648745,'Saudi Arabia - Najran');

Insert into MANAGER
(MANAGER_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS) values
(4,'Abdullah','Almolhem','M',598484744,'Saudi Arabia - Qaseem');

Insert into MANAGER
(MANAGER_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS) values
(5,'Salem','Alnahdi','M',599999999,'Saudi Arabia - Sharorah');

Insert into MANAGER
(MANAGER_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS) values
(6,'Mobarak','Alyami','M',598748475,'Saudi Arabia - Najran');

Monitor :

Insert into MONITOR
(MONITOR_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS) values
(1,'Aslam','Albakestani','M',596565141,'Saudi Arabia - Khobar');

Insert into MONITOR
(MONITOR_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS) values
(2,'Aseel','Haneef','M',598787963,'Saudi Arabia - Jeddah');

Insert into MONITOR
(MONITOR_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS) values
(3,'Basel','Almoshref','M',596325248,'Saudi Arabia - Riyadh');

Insert into MONITOR
(MONITOR_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS) values
(4,'Abdulrahmman','Almanee','M',598422222,'Saudi Arabia - Sharorah');

Insert into MONITOR
(MONITOR_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS) values
(5,'Yosef','Alnahdi','M',599999991,'Saudi Arabia - Sharorah');

Insert into MONITOR
(MONITOR_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS) values
(6,'Seef','Alyami','M',598411010,'Saudi Arabia - Abha');

Insert into MONITOR
(MONITOR_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS) values
(7,'Rame','Aldandor','M',596300001,'Saudi Arabia - Hafof');

Insert into MONITOR
(MONITOR_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS) values
(8,'Hazim','Alazem','M',598741256,'Saudi Arabia - Jeddah');

Insert into MONITOR
(MONITOR_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS) values
(9,'Moshary','Allate','M',592141512,'Saudi Arabia - Abha');

Operator :

Insert into OPERATOR
(OPERATOR_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS,TRAIN_ID) values
(1,'Khalid','Albakre','M',596322225,'Saudi Arabia - Jeddah',5);

Insert into OPERATOR
(OPERATOR_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS,TRAIN_ID) values
(2,'Salah','Alqahtani','M',598441452,'Saudi Arabia - Tanoma',1);

Insert into OPERATOR
(OPERATOR_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS,TRAIN_ID) values
(3,'Basel','Alshehre','M',596666323,'Saudi Arabia - Riyadh',2);

Insert into OPERATOR
(OPERATOR_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS,TRAIN_ID) values
(4,'Osama','Alkamel','M',594107410,'Saudi Arabia - qerayat',4);

Insert into OPERATOR (OPERATOR_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS,TRAIN_ID) values (5,'Sadeq','Alnahdi','M',596300250,'Saudi Arabia - Kharkher',5);

Insert into OPERATOR (OPERATOR_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS,TRAIN_ID) values (6,'Rame','Almasre','M',596497874,'Saudi Arabia - Wadi aldawaser',1);

Insert into OPERATOR (OPERATOR_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS,TRAIN_ID) values (7,'Ameer','Alseere','M',596666363,'Saudi Arabia - Sharorah',2);

Insert into OPERATOR (OPERATOR_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS,TRAIN_ID) values (8,'Moneer','Almaghe','M',598888747,'Saudi Arabia - Alwadeah',3);

Insert into OPERATOR (OPERATOR_ID,FIRSTNAME,LASTNAME,SEX,PHONENUMBER,ADDRESS,TRAIN_ID) values (9,'Shaker','Alnaser','M',596363630,'Saudi Arabia - Jeddah',3);

Route :

Insert into ROUTE (COLOR) values ('Blue');

Insert into ROUTE (COLOR) values ('Green');

Insert into ROUTE (COLOR) values ('Orange');

Insert into ROUTE (COLOR) values ('Purple');

Insert into ROUTE (COLOR) values ('Red');

Insert into ROUTE (COLOR) values ('Yellow');

Station :

```
Insert into STATION
(STATION_CODE,REGION,NAME,CAPACITYNUM,MANAGER_ID,COLOR) values
(1,'downtown','Qasr Al-Hukm district',20000,5,'Blue');

Insert into STATION
(STATION_CODE,REGION,NAME,CAPACITYNUM,MANAGER_ID,COLOR) values (2,'Al-
Olaya','Al-Olaya',15000,2,'Blue');

Insert into STATION
(STATION_CODE,REGION,NAME,CAPACITYNUM,MANAGER_ID,COLOR) values
(4,'Suwaidi Al-Gharbi','Western',12000,1,'Orange');

Insert into STATION
(STATION_CODE,REGION,NAME,CAPACITYNUM,MANAGER_ID,COLOR) values
(5,'Airport','Airport',6000,6,'Yellow');

Insert into STATION
(STATION_CODE,REGION,NAME,CAPACITYNUM,MANAGER_ID,COLOR) values
(6,'North','Princess Norh University',5000,4,'Yellow');

Insert into STATION
(STATION_CODE,REGION,NAME,CAPACITYNUM,MANAGER_ID,COLOR) values
(7,'Center','King Abdullah University',5000,3,'Red');

Insert into STATION
(STATION_CODE,REGION,NAME,CAPACITYNUM,MANAGER_ID,COLOR) values
(8,'Downtown','Railway Station',6000,1,'Orange');

Insert into STATION
(STATION_CODE,REGION,NAME,CAPACITYNUM,MANAGER_ID,COLOR) values
(9,'East','King Fahd Staduim',3000,5,'Red');

Insert into STATION
(STATION_CODE,REGION,NAME,CAPACITYNUM,MANAGER_ID,COLOR) values
(11,'Downtown','Salaheddin Al-Ayyubi',4000,2,'Green');

Insert into STATION
(STATION_CODE,REGION,NAME,CAPACITYNUM,MANAGER_ID,COLOR) values
(12,'Center','King Abdulaziz',4000,1,'Green');

Insert into STATION
(STATION_CODE,REGION,NAME,CAPACITYNUM,MANAGER_ID,COLOR) values (3,'King
Abdullah Financial','King Abdullah Financial District',10000,3,'Purple');

Insert into STATION
(STATION_CODE,REGION,NAME,CAPACITYNUM,MANAGER_ID,COLOR) values
(10,'North','Imam Mohammad Bin Sauod Islamic University',5000,2,'Purple');
```

Train :

Insert into TRAIN (TRAIN_ID,CAPACITYNUM,COLOR,MONITOR_ID) values (1,200,'Blue',9);

Insert into TRAIN (TRAIN_ID,CAPACITYNUM,COLOR,MONITOR_ID) values (2,200,'Red',7);

Insert into TRAIN (TRAIN_ID,CAPACITYNUM,COLOR,MONITOR_ID) values (3,200,'Orange',5);

Insert into TRAIN (TRAIN_ID,CAPACITYNUM,COLOR,MONITOR_ID) values (4,200,'Yellow',1);

Insert into TRAIN (TRAIN_ID,CAPACITYNUM,COLOR,MONITOR_ID) values (5,200,'Green',3);

Insert into TRAIN (TRAIN_ID,CAPACITYNUM,COLOR,MONITOR_ID) values (6,200,'Purple',4);

Trip :

Insert into TRIP (TRIP_NUMBER,PRICE,DEPARTURE_STATION_CODE,ARRIVAL_STATION_CODE,TRAIN_ID) values (1,5,5,6,4);

Insert into TRIP (TRIP_NUMBER,PRICE,DEPARTURE_STATION_CODE,ARRIVAL_STATION_CODE,TRAIN_ID) values (2,5,6,10,4);

Insert into TRIP (TRIP_NUMBER,PRICE,DEPARTURE_STATION_CODE,ARRIVAL_STATION_CODE,TRAIN_ID) values (3,7,10,3,6);

Insert into TRIP (TRIP_NUMBER,PRICE,DEPARTURE_STATION_CODE,ARRIVAL_STATION_CODE,TRAIN_ID) values (4,5,3,2,1);

```
Insert into TRIP
(TRIP_NUMBER,PRICE,DEPARTURE_STATION_CODE,ARRIVAL_STATION_CODE,TRAIN_ID
) values (5,6,2,1,1);

Insert into TRIP
(TRIP_NUMBER,PRICE,DEPARTURE_STATION_CODE,ARRIVAL_STATION_CODE,TRAIN_ID
) values (6,5,2,7,2);

Insert into TRIP
(TRIP_NUMBER,PRICE,DEPARTURE_STATION_CODE,ARRIVAL_STATION_CODE,TRAIN_ID
) values (7,5,2,9,2);

Insert into TRIP
(TRIP_NUMBER,PRICE,DEPARTURE_STATION_CODE,ARRIVAL_STATION_CODE,TRAIN_ID
) values (8,10,7,9,2);

Insert into TRIP
(TRIP_NUMBER,PRICE,DEPARTURE_STATION_CODE,ARRIVAL_STATION_CODE,TRAIN_ID
) values (9,5,1,11,5);

Insert into TRIP
(TRIP_NUMBER,PRICE,DEPARTURE_STATION_CODE,ARRIVAL_STATION_CODE,TRAIN_ID
) values (10,5,11,12,5);

Insert into TRIP
(TRIP_NUMBER,PRICE,DEPARTURE_STATION_CODE,ARRIVAL_STATION_CODE,TRAIN_ID
) values (11,8,1,4,3);

Insert into TRIP
(TRIP_NUMBER,PRICE,DEPARTURE_STATION_CODE,ARRIVAL_STATION_CODE,TRAIN_ID
) values (12,5,1,8,3);

Insert into TRIP
(TRIP_NUMBER,PRICE,DEPARTURE_STATION_CODE,ARRIVAL_STATION_CODE,TRAIN_ID
) values (13,10,4,8,3);
```

---

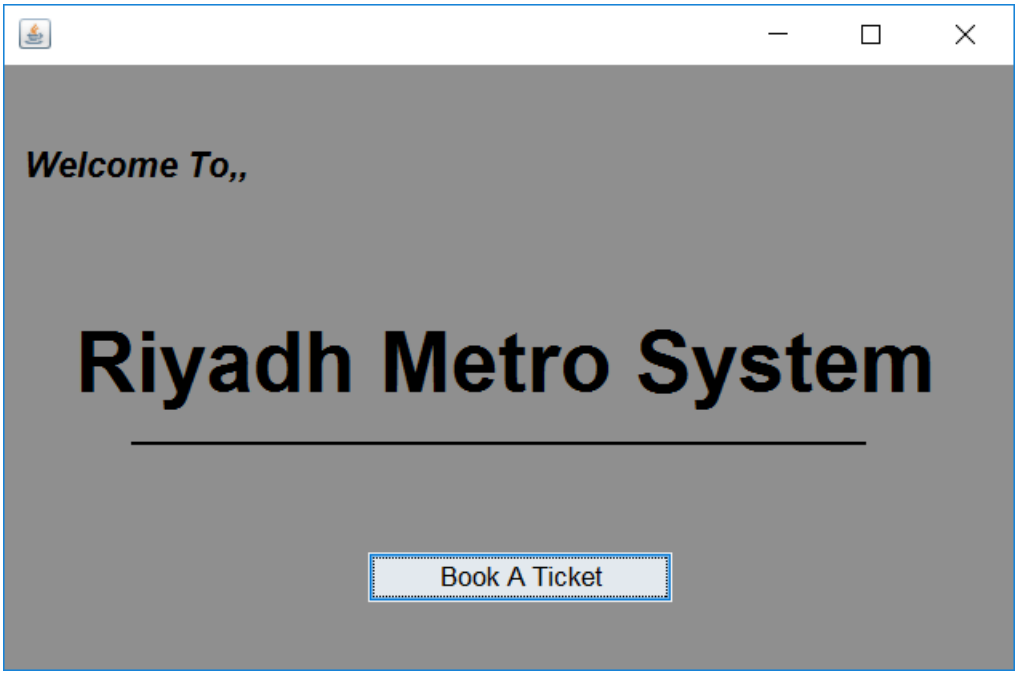
7. SELECT QUERIES

```
1       -SELECT *
FROM    train t ,
        train_stops p ,
        station s
WHERE   t.train_id = p.train_id
AND     p.station_code = s.station_code
AND     s.NAME = 'East-Ring-Road' ;

----2-SELECT p.firstname ,
        p.lastname
FROM    passenger p ,
        railcard r
WHERE   r.pssngr_id = p.id_number
AND     r.expiredate LIKE '2017-01-07%' ;

----3-SELECT Sum(t.price)
FROM    quickticket q ,
        trip t
WHERE   q.trip_number = t.trip_number
AND     q.issuedate LIKE '2016-12-12%' ;

--4-SELECT Count(DISTINCT t.trip_number)
FROM    trip t ,
        station s ,
        route r
WHERE   t.arrival_station_code = s.station_code
AND     s.color = 'Blue' ;

---5-SELECT t.trip_number AS "trip number " ,
        s.NAME          AS "departure Station" ,
        s2.NAME         AS "arrival station"
FROM    trip t ,
        station s ,
        station s2
WHERE   t.departure_station_code = s.station_code
AND     t.arrival_station_code =s2.station_code ;

----6       -SELECT *
FROM    passenger
WHERE   id_number = 1012466248 ;
```

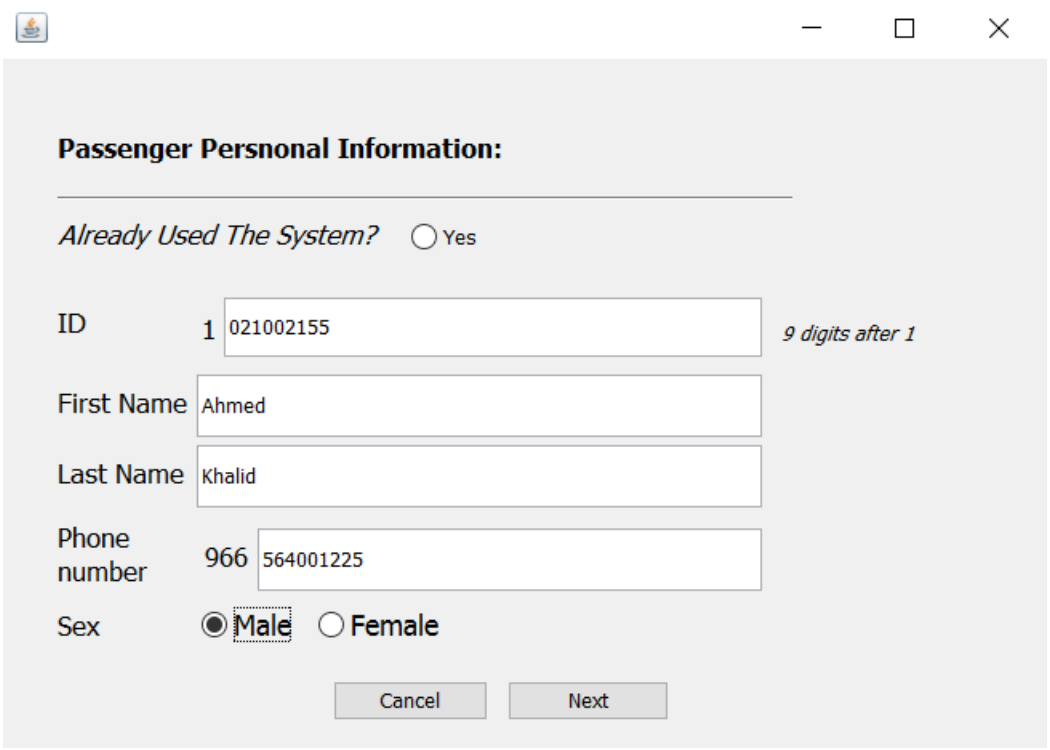
```
----7-SELECT p.id_number ,
       t.trip_number ,
       t.price ,
       t.departure_station_code ,
       t.arrival_station_code
FROM   trip t ,
       passenger p ,
       quickticket q ,
       card_trips s ,
       railcard r
WHERE  (
              q.pssngr_id = p.id_number
       AND    q.trip_number = t.trip_number)
OR     (
              s.cardnumber = r.cardnumber
       AND    s.trip_number = t.trip_number
       AND    r.pssngr_id = p.id_number);
```

8. THE USER MANUAL

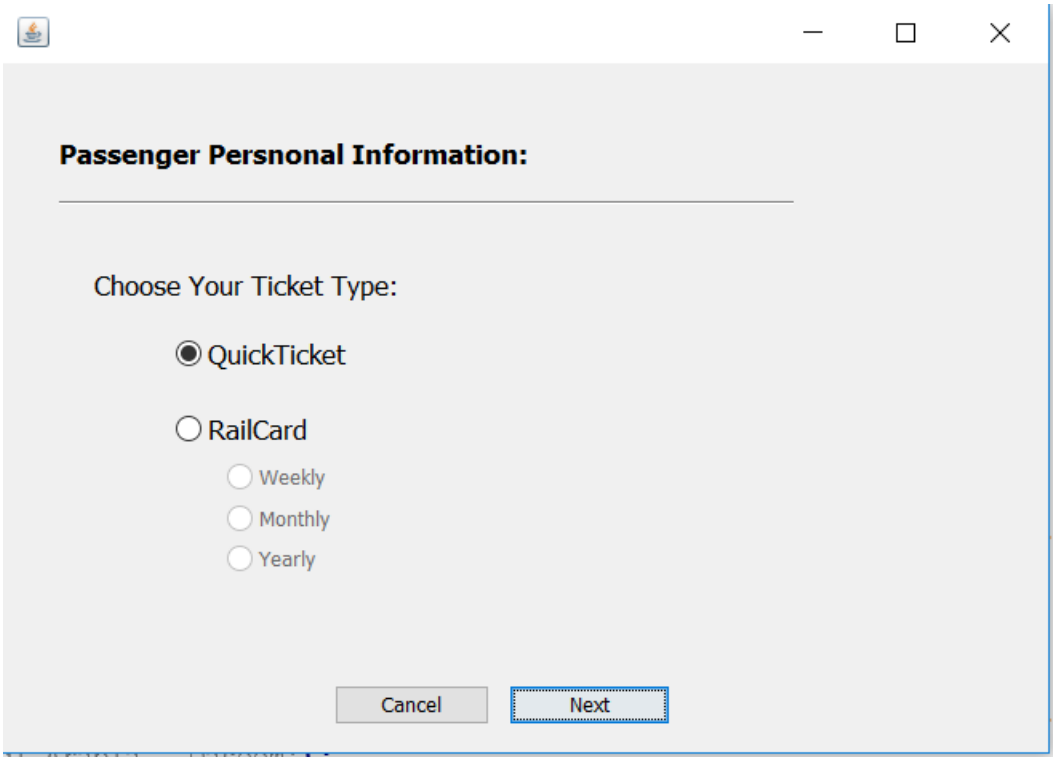
Welcoming page for passenger



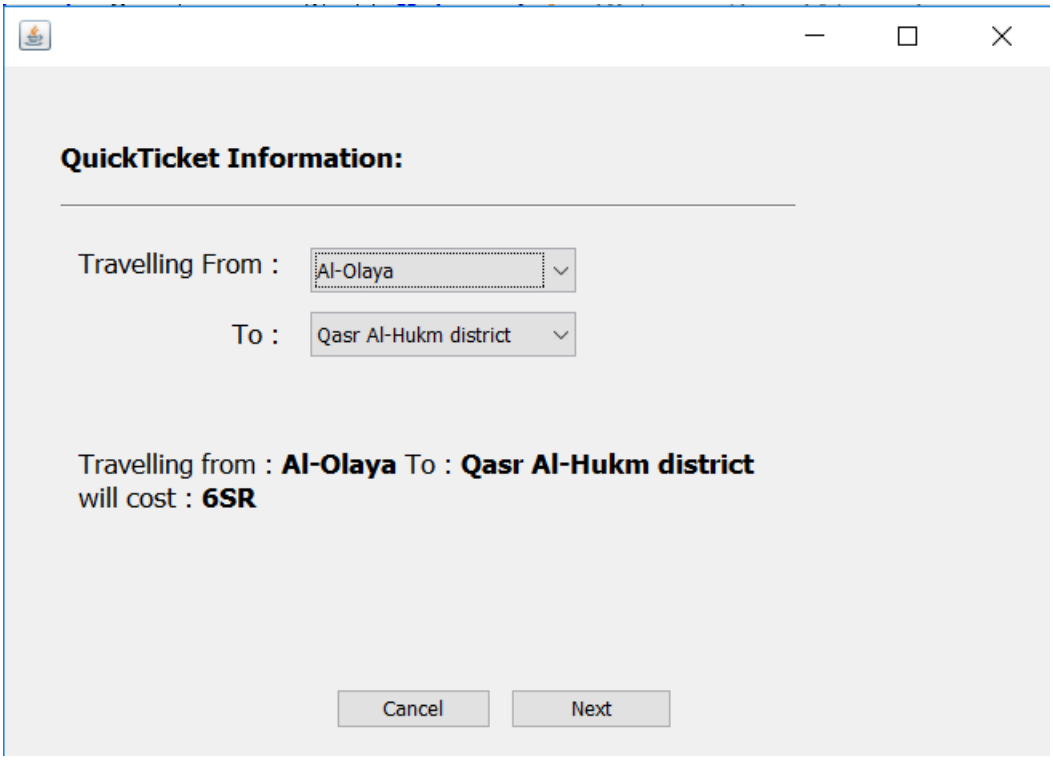
First step of booking tickets



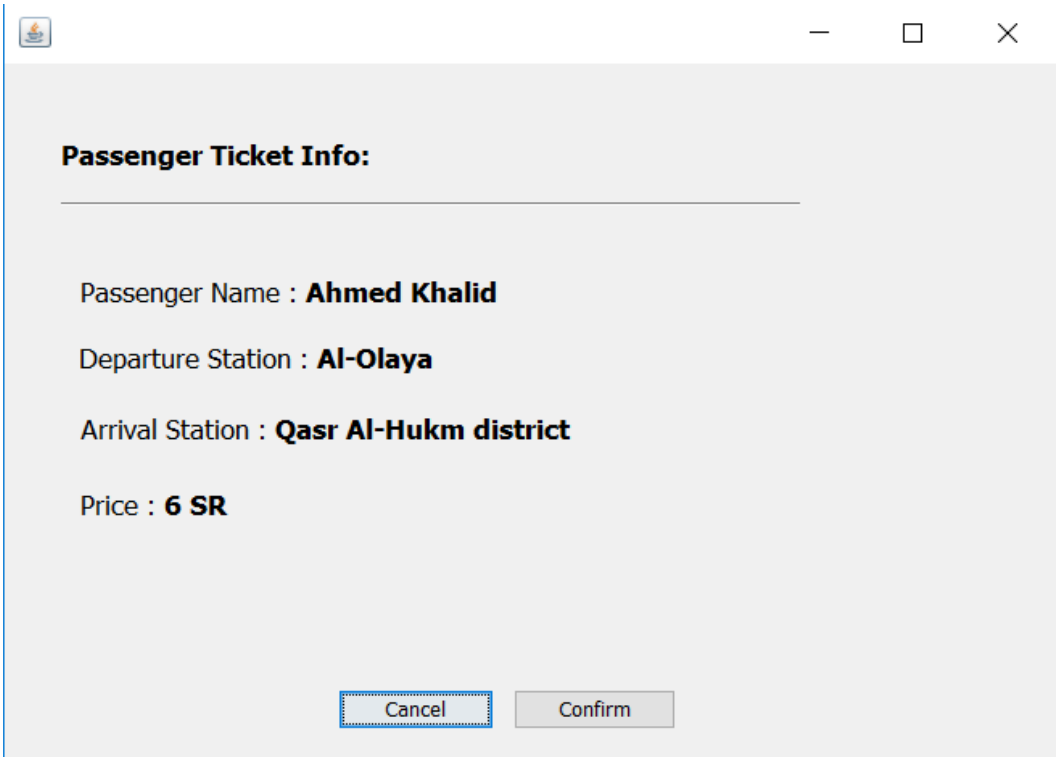
Second step of booking tickets



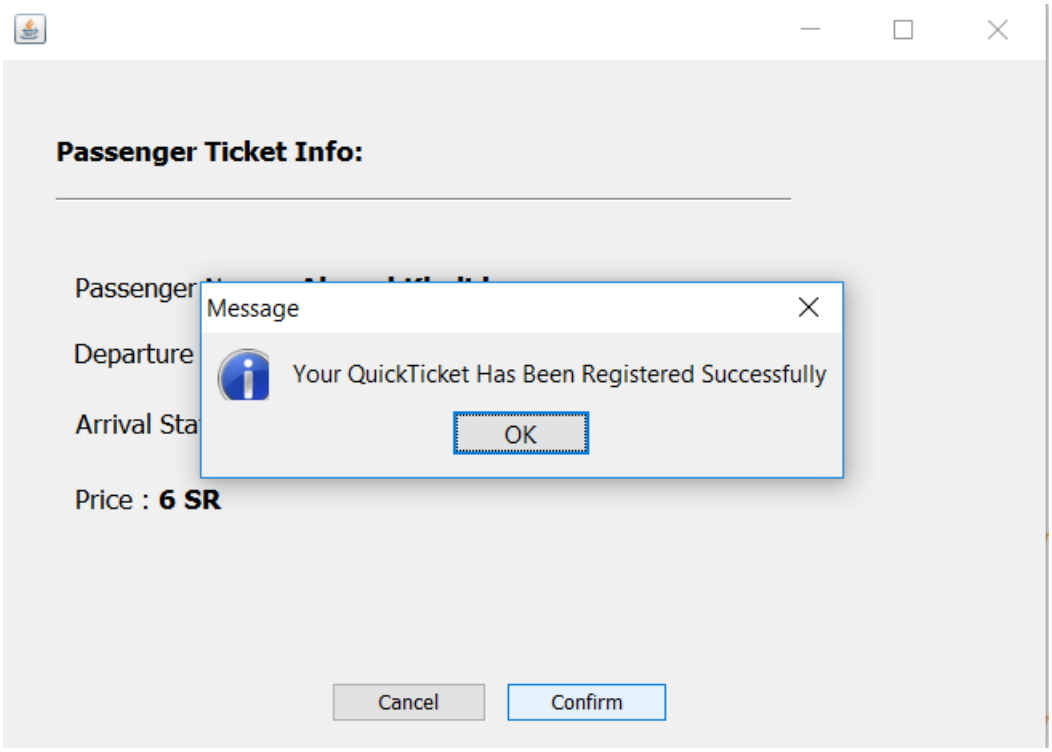
If the user selects quick tickets



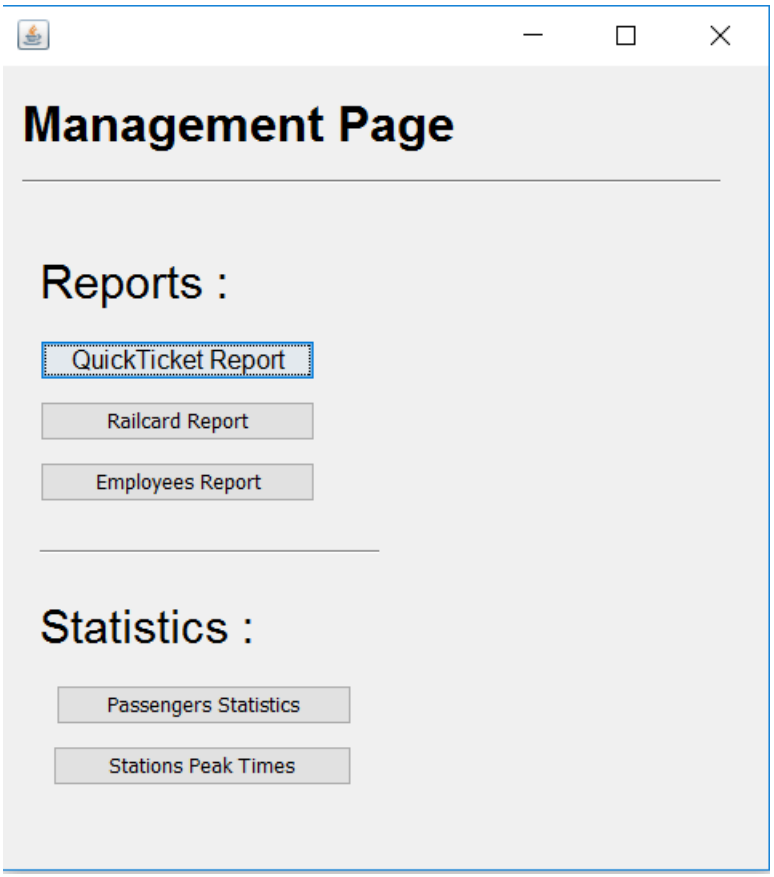
Confirmation of ticket details



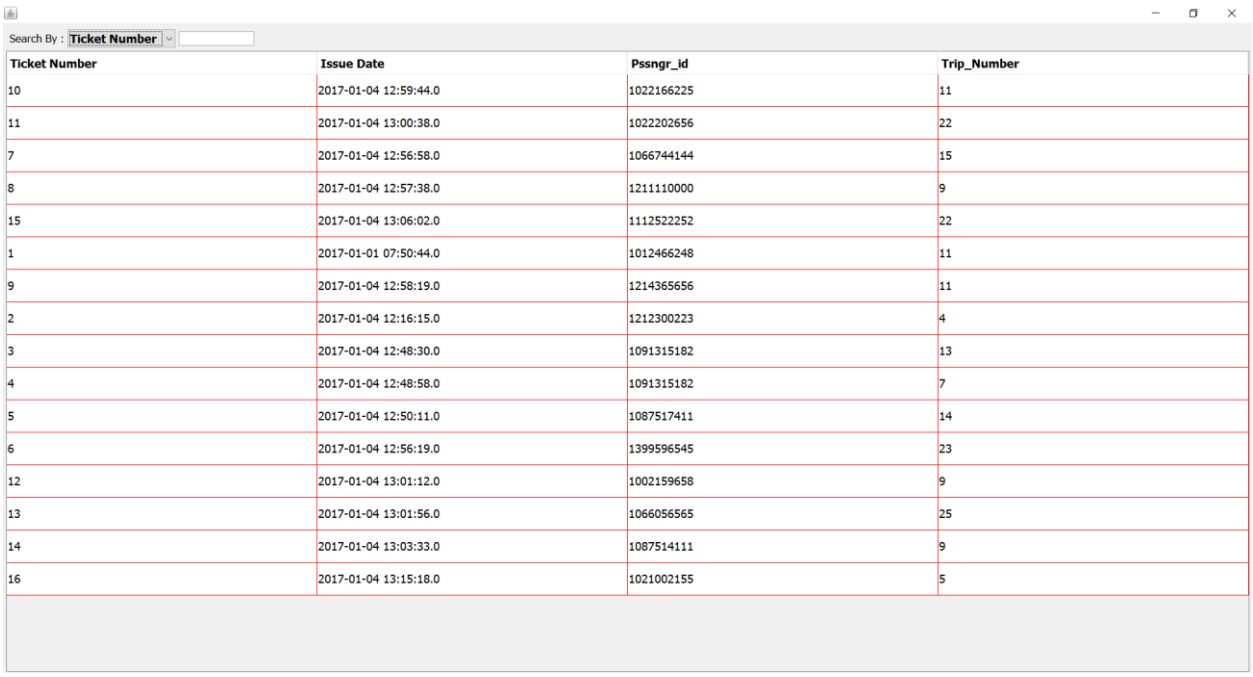
If the user selects confirm, the following dialog box will show up.



Manager Main Page



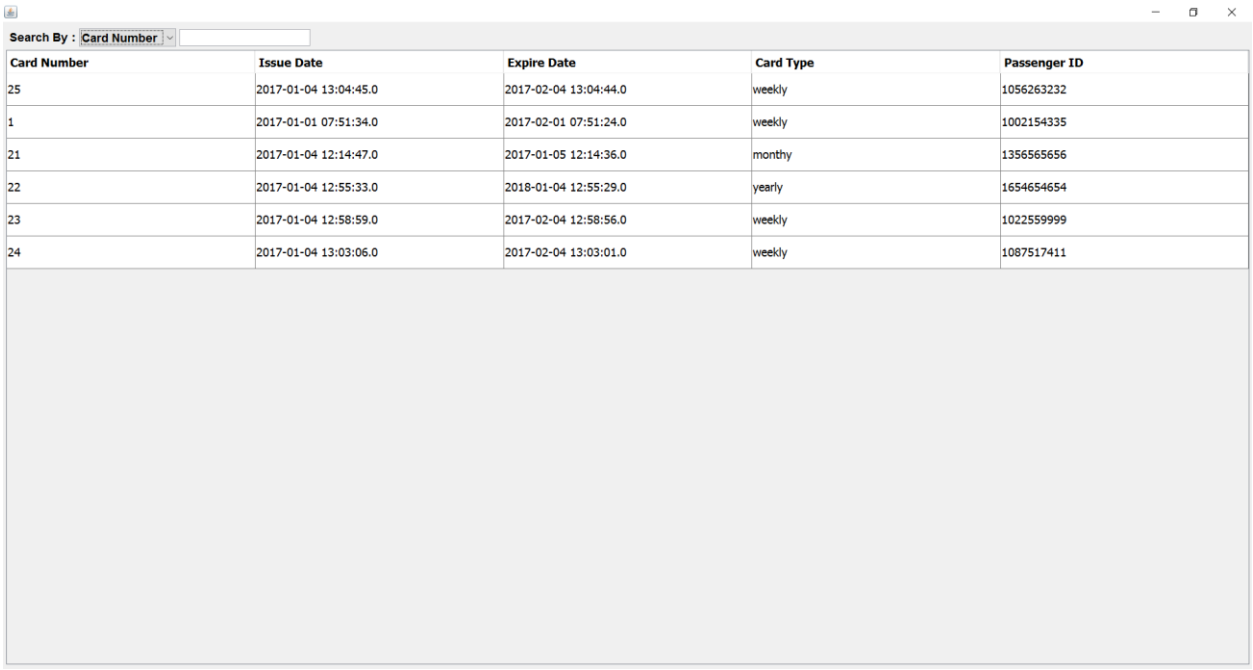
Quick tickets report



Search By : Ticket Number

Ticket Number	Issue Date	Pssngr_id	Trip_Number
10	2017-01-04 12:59:44.0	1022166225	11
11	2017-01-04 13:00:38.0	1022202656	22
7	2017-01-04 12:56:58.0	1066744144	15
8	2017-01-04 12:57:38.0	1211110000	9
15	2017-01-04 13:06:02.0	1112522252	22
1	2017-01-01 07:50:44.0	1012466248	11
9	2017-01-04 12:58:19.0	1214365656	11
2	2017-01-04 12:16:15.0	1212300223	4
3	2017-01-04 12:48:30.0	1091315182	13
4	2017-01-04 12:48:58.0	1091315182	7
5	2017-01-04 12:50:11.0	1087517411	14
6	2017-01-04 12:56:19.0	1399596545	23
12	2017-01-04 13:01:12.0	1002159658	9
13	2017-01-04 13:01:56.0	1066056565	25
14	2017-01-04 13:03:33.0	1087514111	9
16	2017-01-04 13:15:18.0	1021002155	5

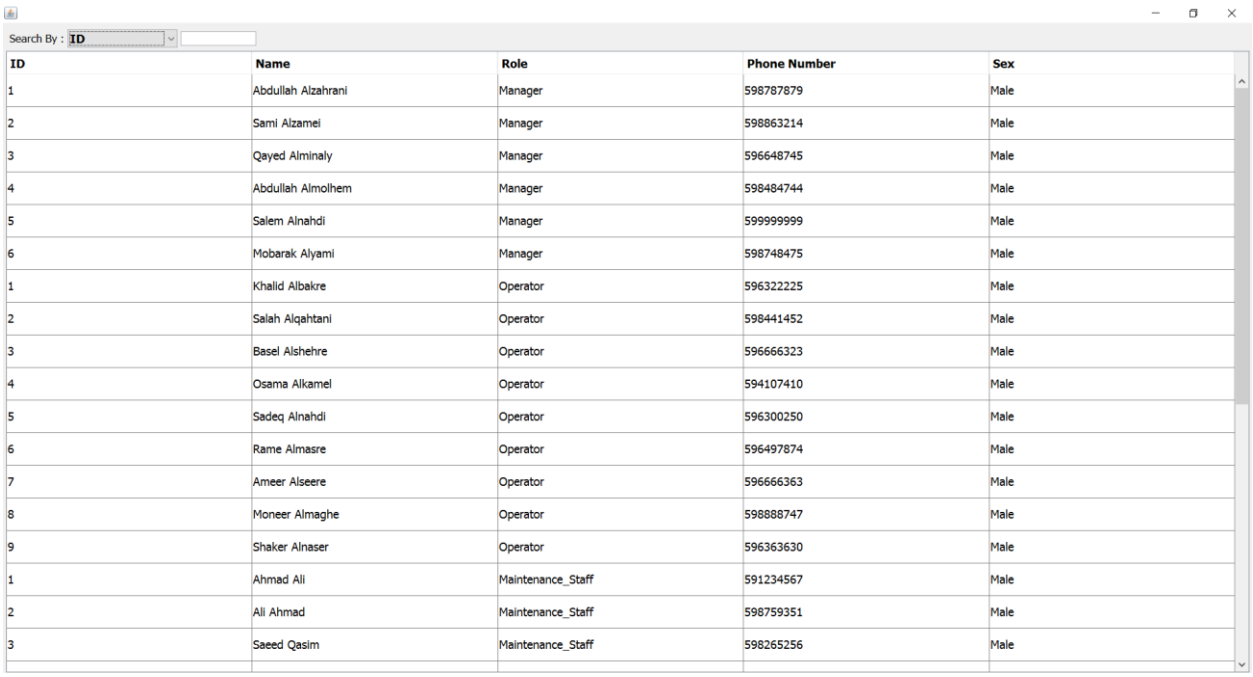
RailCards report



Search By : Card Number

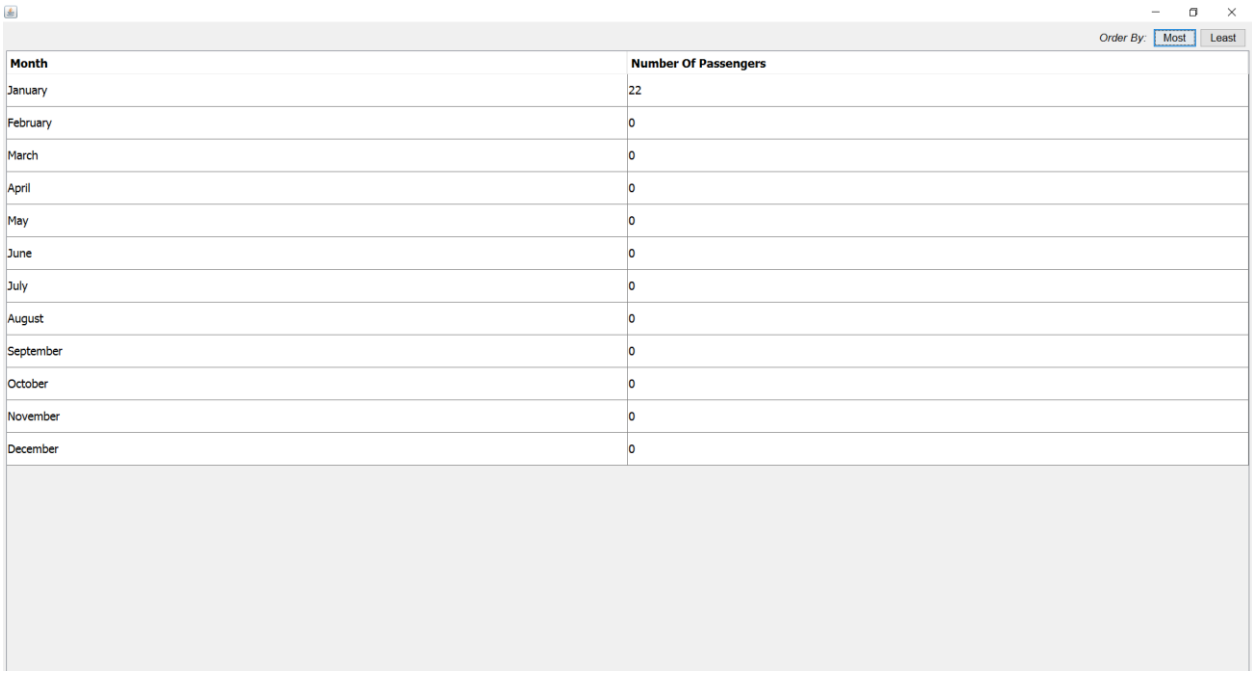
Card Number	Issue Date	Expire Date	Card Type	Passenger ID
25	2017-01-04 13:04:45.0	2017-02-04 13:04:44.0	weekly	1056263232
1	2017-01-01 07:51:34.0	2017-02-01 07:51:24.0	weekly	1002154335
21	2017-01-04 12:14:47.0	2017-01-05 12:14:36.0	monthy	1356565656
22	2017-01-04 12:55:33.0	2018-01-04 12:55:29.0	yearly	1654654654
23	2017-01-04 12:58:59.0	2017-02-04 12:58:56.0	weekly	1022559999
24	2017-01-04 13:03:06.0	2017-02-04 13:03:01.0	weekly	1087517411

Employees Report


Search By : ID

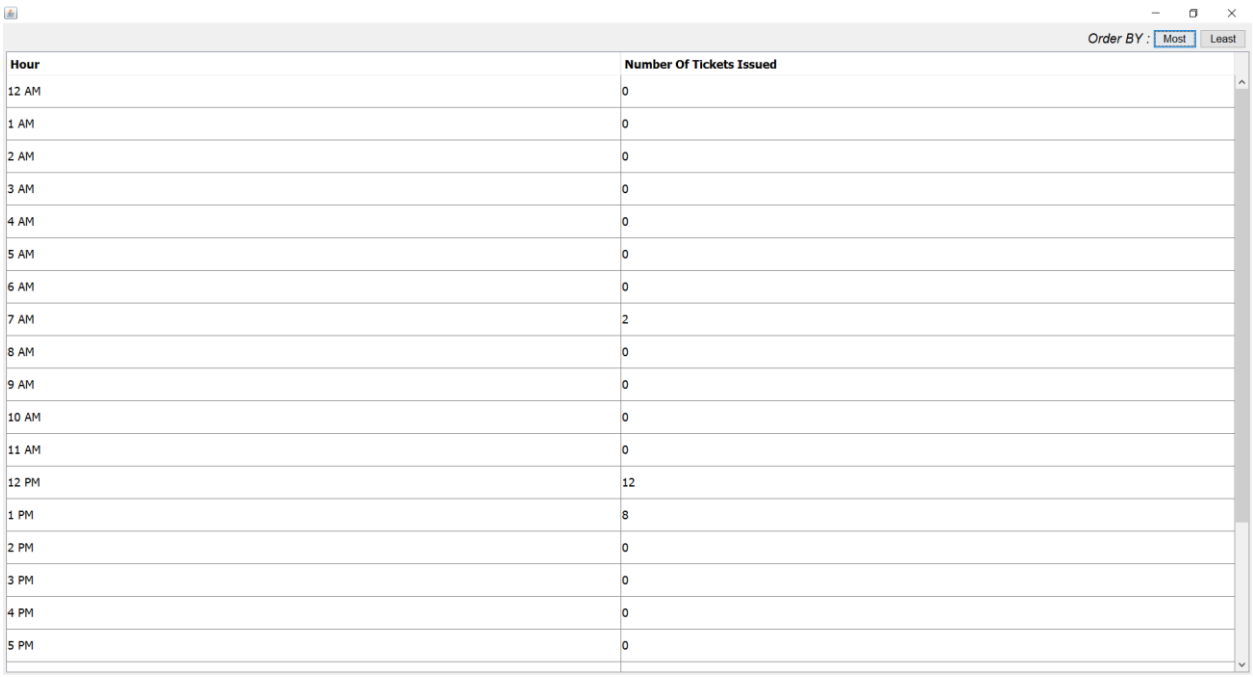
ID	Name	Role	Phone Number	Sex
1	Abdullah Alzahrani	Manager	598787879	Male
2	Sami Alzamei	Manager	598863214	Male
3	Qayed Alminaly	Manager	596648745	Male
4	Abdullah Almolhem	Manager	598484744	Male
5	Salem Alnahdi	Manager	599999999	Male
6	Mobarak Alyami	Manager	598748475	Male
1	Khalid Albakre	Operator	596322225	Male
2	Salah Alqahtani	Operator	598441452	Male
3	Basel Alshehre	Operator	596666323	Male
4	Osama Alkamel	Operator	594107410	Male
5	Sadeq Alnahdi	Operator	596300250	Male
6	Rame Almasre	Operator	596497874	Male
7	Ameer Alseere	Operator	596666363	Male
8	Moneer Almaghe	Operator	598888747	Male
9	Shaker Alnaser	Operator	596363630	Male
1	Ahmad Ali	Maintenance_Staff	591234567	Male
2	Ali Ahmad	Maintenance_Staff	598759351	Male
3	Saeed Qasim	Maintenance_Staff	598265256	Male

Passenger statistics


Order By: Most Least

Month	Number Of Passengers
January	22
February	0
March	0
April	0
May	0
June	0
July	0
August	0
September	0
October	0
November	0
December	0

Stations peak times



Order BY : Most Least

Hour	Number Of Tickets Issued
12 AM	0
1 AM	0
2 AM	0
3 AM	0
4 AM	0
5 AM	0
6 AM	0
7 AM	2
8 AM	0
9 AM	0
10 AM	0
11 AM	0
12 PM	12
1 PM	8
2 PM	0
3 PM	0
4 PM	0
5 PM	0

9. THE CONCLUSIONS

It was a nice experience even though we faced some difficulties. The main difficulty was how to choose a DBMS, and then how to connect it to Java.

After successfully connecting the database to Java, things got easier. Because we are already familiar with GUI related facilities.

We gained more information about the database and its structure while we were developing our system.

Besides the coding part, we learned more about how to write database requirements, especially when we converted it into real relations.

10. DISTRIBUTION OF PROJECT TASKS

Task	Student/s
Problem statement	Group Meeting
Database Requirement	Abdullah Alnahdi & Mansour Aldandor
EER model	Abdullah Algarni
Relational Schema	Yazied Allahim
Sample Quires & Required Reports	Mansour Aldandor & Yazied Allahim
Java GUI front-end implementation	Abdullah Algarni
Back-end implementation	Abdullah Algarni
Creation of tables	Abdullah Alnahdi
Insert initial Data into the tables	Mansour Aldandor
Organizing and Submission Report	Yazied Allahim
Presentation File	Abdullah Alnahdi