Project #1

Riyadh train database system (RTDS)

1. Introduction:

For me it was always hard to get to a place to another because I can't drive, but this doesn't apply on me only, there are a lot of other people that can't drive, or don't have cars or just can't handle with the increasing price of petrol, especially for a student or a working class citizen this can be hard on them.

So comes the perfect alternative, trains. Trains exists for so long, and with trains ability to travel fast across town it can be the perfect alternative for cars ,also this comes as another solution for the increasing number of car traffic in Riyadh.

So we preset our project to organize and manage a database for Riyadh train, which the following:

1. Organizing and managing Train information.
2. Maintaining customers data.
3. Speed of obtaining and processing data will reduce manual errors.
4. Web enabled to give the clients the ease of use to check and book (passenger), and adjust database information (administrator).

2. Data requirement:

Our project will enable our clients to organize, maintain, submit and manage the information about stations, trains, employees and passengers.

It will give the administrator the following:

1. Add, update and remove employee.
2. Access and adjust information of trains, stations, and routes.

And for passengers the following:

1. Buying pass card.
2. Checking for train, station and route information.

3. Entitles and attributes:

Passenger will have: Social security number (SSN), Name.
pass card will have: Passenger serial number (PSN), Balance and date of expire.
Station will have: Station number (S_ Name), Train times and Location.
Facilities will have: Facility number (Fac_Num), Facility name (Fac_name).
Train will have: Train_ ID, Type and Number of seats (Num_ Seats).
Route will have: Route Number.

4. Relationships

Passenger goes to station to buy ticket, which are provided at station. Stations have facilities passengers can use in their waiting time (e.g., shops, bathrooms ...etc.), stations as connects routes as well and trains arrive at them at a certain time.
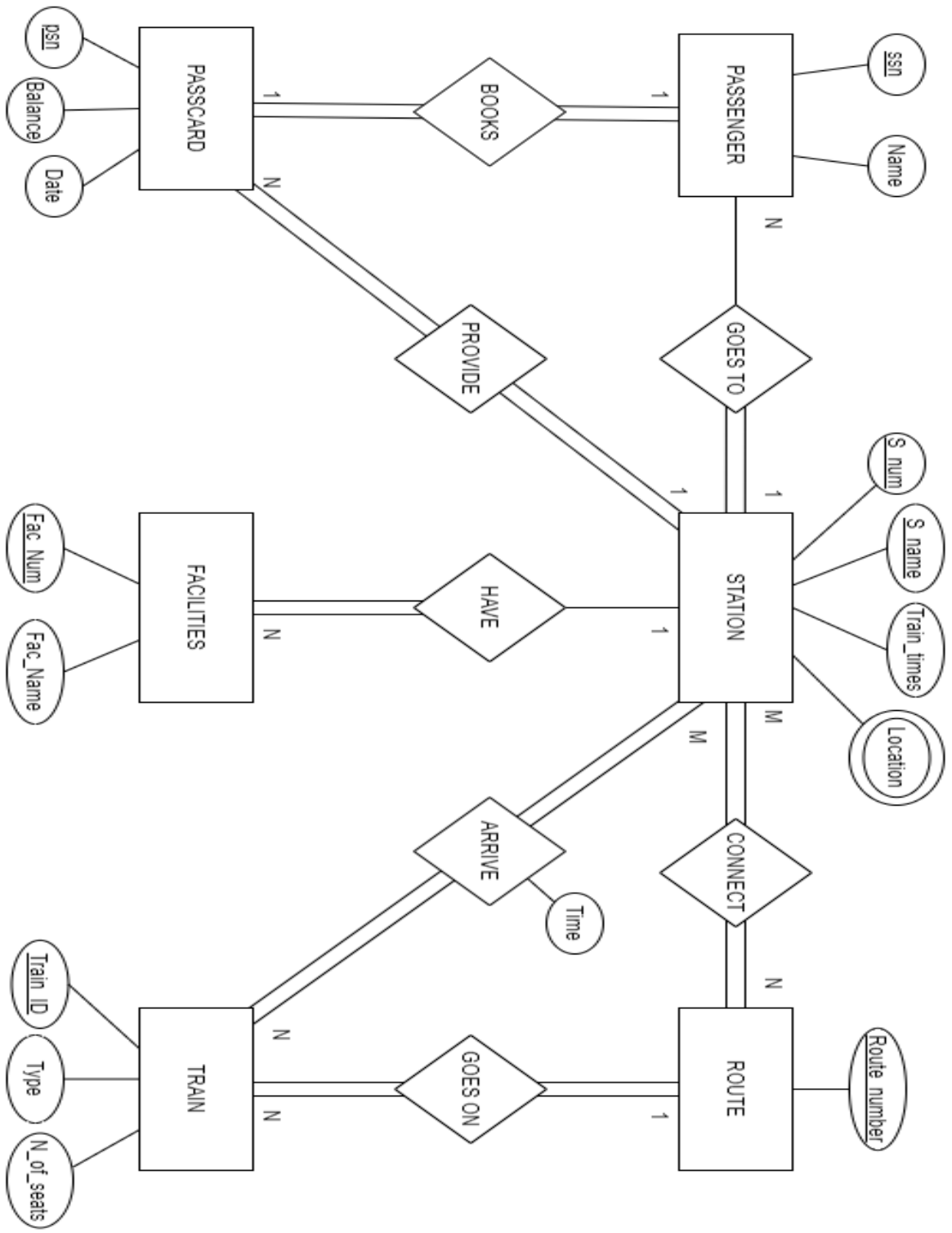
5. Business rules:

passengers will go to stations, and each passenger can buy one pass card which is provided at all station. Trains arrive at several stations along the route it goes on. Each station has facilities.
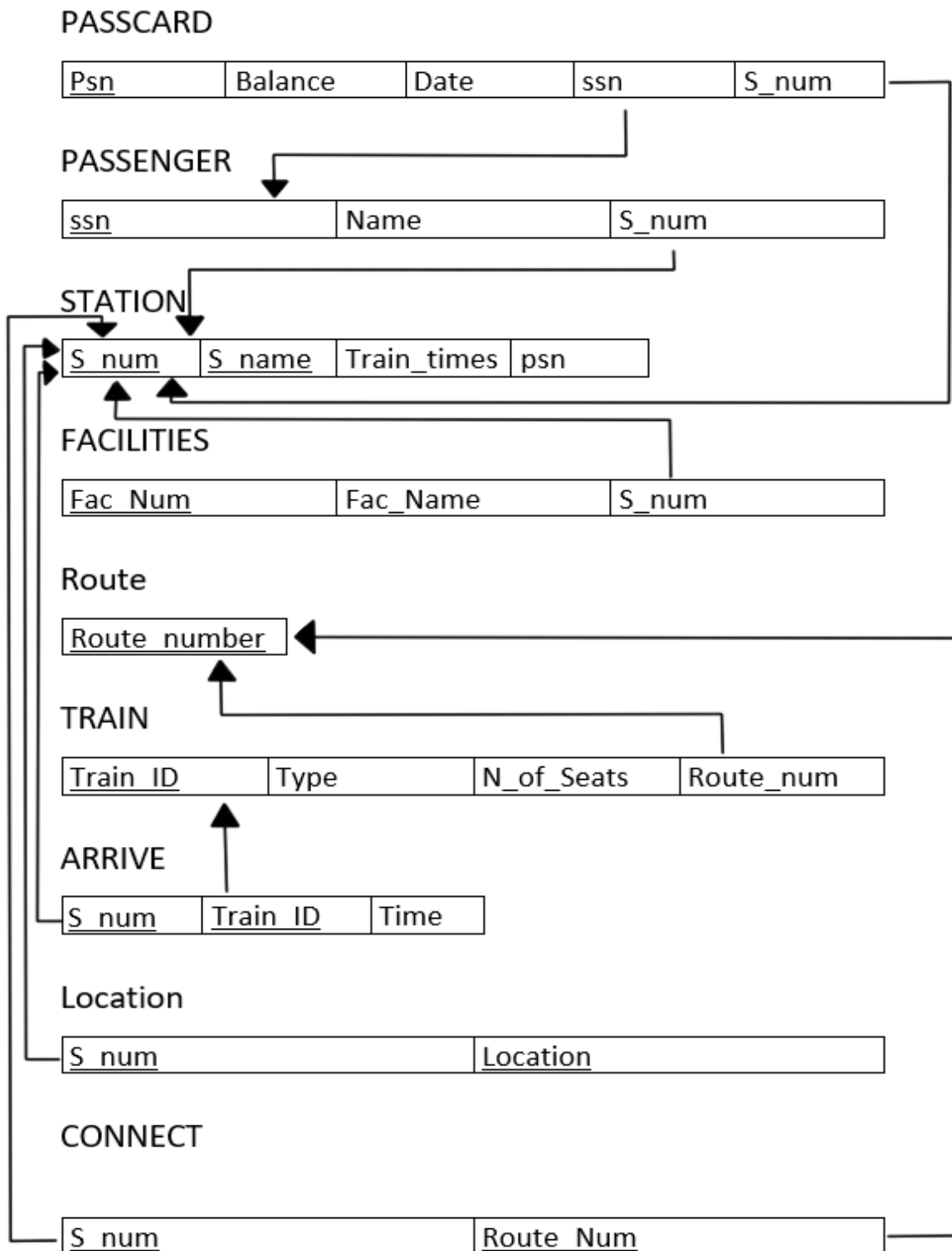
6. Queries:
1. The number of facilities at the station 111.
2. Name of station with station number 208.
3. The number of all stations in the Riyadh.
4. The location of all stations.
5. Train times arrival.
6. names of facilities.
7. The connects with station number 103.
8. All Routes.
9. Tickets with balance over 100SAR.
10.   Trains with 100 seat or more.

7. ER diagram:

8. Mapping:

PASSCARD

Psn	Balance	Date	ssn	S_num

PASSENGER

ssn	Name	S_num

STATION

S_num	S_name	Train_times	psn

FACILITIES

Fac_Num	Fac_Name	S_num

Route

Route_number

TRAIN

Train_ID	Type	N_of_Seats	Route_num

ARRIVE

S_num	Train_ID	Time

Location

S_num	Location

CONNECT

S_num	Route_Num

SQL WORK (Using MySQL):

1.   The Code & Tables:

create database `Riyadh_Train`;

use `Riyadh_Train`;

create table `train_station`(

`s_num` int not null,

`s_name` varchar(50) not null,

`train_time` time not null,

`location` varchar(50),

primary key (`s_num`)

);

insert into `train_station` values (601,'king abdullah',133000,'Al Oad');

insert into `train_station` values (907,'king fahad',153000,'Al Dreiah');

insert into `train_station` values (208,'king khaled',183000,'Al Olia');

insert into `train_station` values (502,'king faisal',203000,'king saud university');

insert into `train_station` values (103,'king Abdulaziz',223000,'Al Malaz');

s_num	s_name	train_time	location
103	king khaled	22:30:00	Al Malaz
208	king khaled	18:30:00	Al Olia
502	king khaled	20:30:00	king saud university
601	king khaled	13:30:00	Al Oad
907	king khaled	15:30:00	Al Dreiah
NULL	NULL	NULL	NULL

```sql
create table `passenger`(

`ssn` int(11) not null,

`name` varchar(50) not null,

`s_num_fk1` int not null,

primary key(`ssn`),

FOREIGN KEY (`s_num_fk1`) REFERENCES `train_station` (`s_num`)

);

insert into `passenger` values (101023,'elisa ',103);

insert into `passenger` values (202034,'jeniffer ',601);

insert into `passenger` values (303045,'alex ',907);

insert into `passenger` values (404056,'jenna ',208);

insert into `passenger` values (505067,'alison ',502);
```

ssn	name	s_num_fk1
101023	elisa	103
202034	jeniffer	601
303045	alex	907
404056	jenna	208
505067	alison	502
NULL	NULL	NULL

```sql
create table `passcard`(

`psn` int(6) not null,

`balance` int(5) not null,

`date` varchar(20) not null,

`ssn_fk` int(7) not null,

`s_num_fk2` int not null,

primary key(`psn`),

FOREIGN KEY (`s_num_fk2`) REFERENCES `train_station` (`s_num`),

FOREIGN KEY (`ssn_fk`) REFERENCES `passenger` (`ssn`)

);

insert into `passcard` values (12345,100,'2020-12-23',101023,103);

insert into `passcard` values (23456,45,'2020-10-10',202034,601);

insert into `passcard` values (34567,310,'2019-11-15',303045,907);

insert into `passcard` values (45678,50,'2021-04-25',404056,208);

insert into `passcard` values (56789,220,'2024-06-14',505067,502);
```

psn	balance	date	ssn_fk	s_num_fk2
12345	100	2020-12-23	101023	103
23456	45	2020-10-10	202034	601
34567	310	2019-11-15	303045	907
45678	50	2021-04-25	404056	208
56789	220	2024-06-14	505067	502
NULL	NULL	NULL	NULL	NULL

create table `facilities`(

`fac_num` int(5) not null,

`fac_name` varchar(30) not null,

`s_num_fk3` int not null,

primary key(`fac_num`),

FOREIGN KEY (`s_num_fk3`) REFERENCES `train_station` (`s_num`)

);

insert into `facilities` values (1102,'bathroom',601);

insert into `facilities` values (2015,'makeup store',103);

insert into `facilities` values (1211,'minimart',208);

insert into `facilities` values (7845,'phone accesory',907);

insert into `facilities` values (3120,'waiting benches',907);

	fac_num	fac_name	s_num_fk3
▶	1102	bathroom	601
	1211	minimart	208
	2015	makeup store	103
	3120	waiting benches	907
	7845	phone accesory	907
✱	NULL	NULL	NULL

```sql
create table `route`(

`route_num` int(4) not null,


primary key(`route_num`)

);
insert into `route` values (101);

insert into `route` values (202);

insert into `route` values (303);

insert into `route` values (404);

insert into `route` values (505);
```

route_num
101
202
303
404
505
NULL

```sql
create table `train`(

`train_id` int(5) not null,

`type` varchar(30) not null,

`nb_seats` int(4) not null,

`route_num_fk` int not null,


primary key(`train_id`),

FOREIGN KEY (`route_num_fk`) REFERENCES `route` (`route_num`)

);

insert into `train` values (1100,'bathroom',110,101);

insert into `train` values (2200,'magnatic',120,202);

insert into `train` values (3300,'rail',150,303);

insert into `train` values (4400,'rail',120,404);

insert into `train` values (5500,'waiting benches',150,505);
```

train_id	type	nb_seats	route_num_fk
1100	bathroom	110	101
2200	magnatic	120	202
3300	rail	150	303
4400	rail	120	404
5500	waiting benches	150	505
NULL	NULL	NULL	NULL

create table `arrival`(

`s_num_fk4` int not null,

`train_id_fk` int(5) not null,

`arrival_time` time not null,

primary key (`s_num_fk4`,`train_id_fk`),

FOREIGN KEY (`s_num_fk4`) REFERENCES `train_station` (`s_num`),

FOREIGN KEY (`train_id_fk`) REFERENCES `train` (`train_id`)

);

insert into `arrival` values (502,1100,133120);

insert into `arrival` values (103,4400,152954);

insert into `arrival` values (601,3300,181521);

insert into `arrival` values (907,5500,221054);

insert into `arrival` values (208,2200,192812);

s_num_fk4	train_id_fk	arrival_time
103	4400	15:29:54
208	2200	19:28:12
502	1100	13:31:20
601	3300	18:15:21
907	5500	22:10:54
NULL	NULL	NULL

create table `location`(

`location` varchar(30) not null,

`s_num_fk5` int not null,

primary key (`location`,`s_num_fk5`),

FOREIGN KEY (`s_num_fk5`) REFERENCES `train_station` (`s_num`)

);

insert into `location` values ('Mala St',103);

insert into `location` values ('Oad St',601);

insert into `location` values ('Olia St',208);

insert into `location` values ('Deriah St',907);

insert into `location` values ('king saud university',502);

location	s_num_fk5
Mala St	103
Olia St	208
king saud university	502
Oad St	601
Deriah St	907
NULL	NULL

```
create table `connects`(

`route_num_fk2` int(5) not null,

`s_num_fk6` int not null,


primary key (`route_num_fk2`,`s_num_fk6`),

FOREIGN KEY (`s_num_fk6`) REFERENCES `train_station` (`s_num`),

FOREIGN KEY (`route_num_fk2`) REFERENCES `route` (`route_num`)

);
insert into `connects` values (101,103);

insert into `connects` values (505,601);

insert into `connects` values (303,208);

insert into `connects` values (202,907);

insert into `connects` values (404,502);
```

route_num_fk2	s_num_fk6
101	103
303	208
404	502
505	601
202	907
NULL	NULL

2.   Queries:

1.

```sql
SELECT fac_num

FROM facilities

WHERE s_num_fk3 = 103;
```

fac_num
2015
NULL

2.

```sql
SELECT s_name

FROM train_station

WHERE s_num = 208;
```

s_name
king khaled

3.

```sql
SELECT COUNT(*)

FROM train_station;
```

COUNT(*)
5

4.

```sql
SELECT LOCATION
FROM train_station;
```

	LOCATION
▶	Al Malaz
	Al Olia
	king saud university
	Al Oad
	Al Dreiah

5.

```sql
SELECT arrival_time
FROM arrival;
```

	arrival_time
▶	15:29:54
	19:28:12
	13:31:20
	18:15:21
	22:10:54

6.

```sql
SELECT fac_name
FROM facilities;
```

	fac_name
▶	bathroom
	minimart
	makeup store
	waiting benches
	phone accesory

7.

```sql
SELECT *
FROM connects
WHERE s_num_fk6 = 103;
```

	route_num_fk2	s_num_fk6
▶	101	103
	NULL	NULL

8.

```sql
SELECT *
FROM route
```

	route_num
▶	101
	202
	303
	404
	505
	NULL

9.

```sql
SELECT *
FROM passcard
WHERE balance >= 100
```

	psn	balance	date	ssn_fk	s_num_fk2
▶	12345	100	2020-12-23	101023	103
	34567	310	2019-11-15	303045	907
	56789	220	2024-06-14	505067	502

10.

```sql
SELECT *
FROM train
WHERE nb_seats >= 100;
```

	train_id	type	nb_seats	route_num_fk
▶	1100	bathroom	110	101
	2200	magnatic	120	202
	3300	rail	150	303
	4400	rail	120	404
	5500	waiting benches	150	505

3.   Insert and Delete and Update:

1) Insert A new station

```sql
USE riyadh_train;


insert into `train_station` (s_num,s_name,train_time,location)

values (124,'king saud',184000,'Al Masif');


SELECT *

FROM train_station;
```

s_num	s_name	train_time	location
103	king salman	22:30:00	Al Malaz
124	king saud	18:40:00	Al Masif
208	king khaled	18:30:00	Al Olia
502	king faisal	20:30:00	king saud university
601	king abdullah	13:30:00	Al Oad
907	king fahad	15:30:00	Al Dreiah

2) Update the name of station with number 103 (king abdulaziz)

```sql
USE riyadh_train;


UPDATE train_station

SET s_name = 'king salman'

WHERE s_num = 103;


SELECT *

FROM train_station;
```

s_num	s_name	train_time	location
▶ 103	king salman	22:30:00	Al Malaz
208	king khaled	18:30:00	Al Olia
502	king faisal	20:30:00	king saud university
601	king abdullah	13:30:00	Al Oad
907	king fahad	15:30:00	Al Dreiah
NULL	NULL	NULL	NULL

3) Delete the Facility with number 7845 (phone accessory)

```sql
USE riyadh_train;


DELETE FROM facilities WHERE fac_num = 7845;


SELECT *

FROM facilities;
```

fac_num	fac_name	s_num_fk3
1102	bathroom	601
1211	minimart	208
2015	makeup store	103
3120	waiting benches	907
NULL	NULL	NULL