ECE 9014A – GROUP PROJECT

RAILWAY SYSTEM DATABASE

PART 1: RELATION DATABASE SYSTEM (10%)

GROUP – 11

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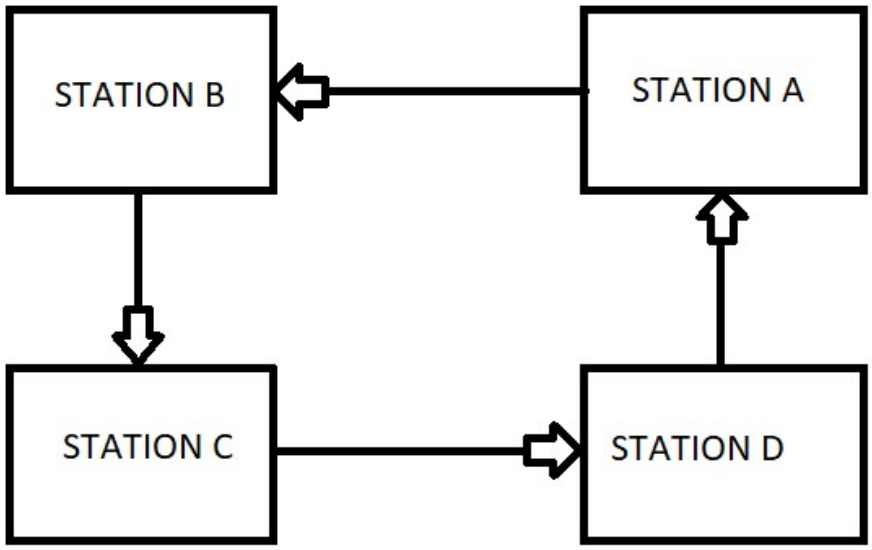
MODEL OF THE TRAIN SYSTEM



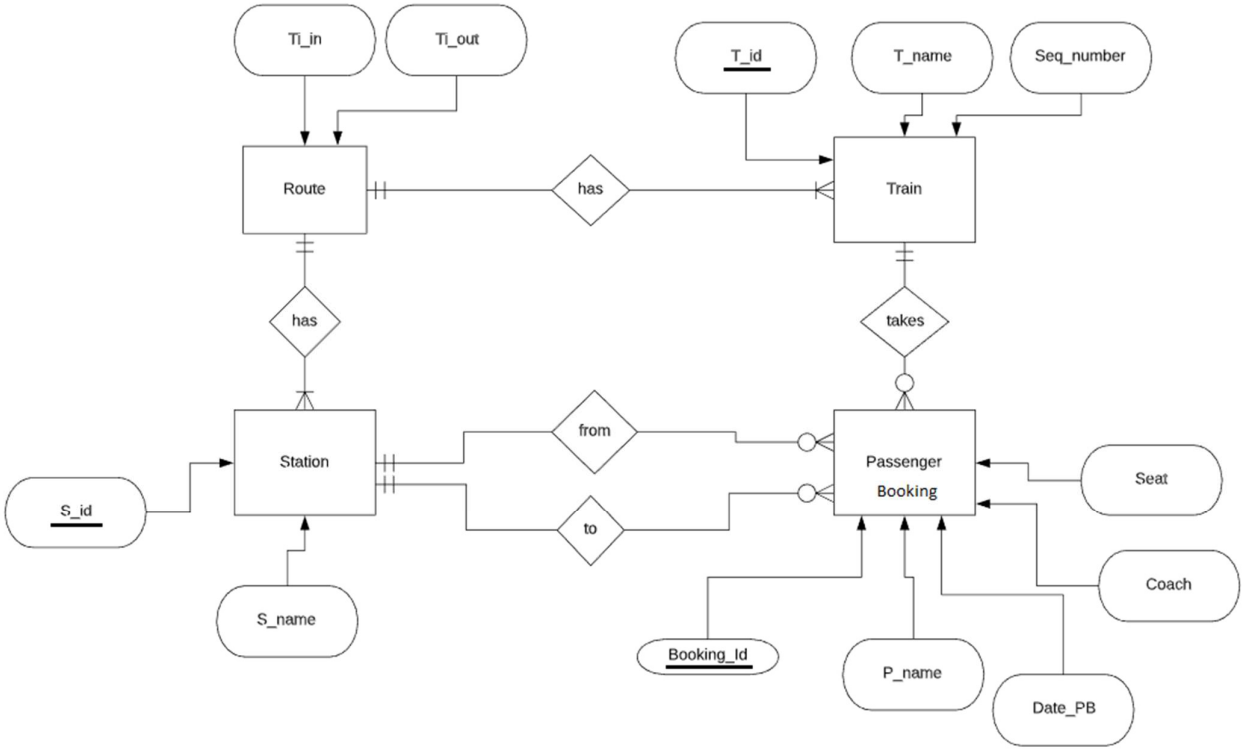
The following are the assumptions we have made:

- The 4 stations taken are connected in a single, unidirectional loop.
- 4 trains run along this loop.
- There is only 1 track between two consecutive stations.

Additional attributes taken include:

- Booking_Id: This attribute has been added because we have assumed that none of the columns can be uniquely defined in the passenger booking table. Thus, we assume that no two booking IDs are the same.

ENTITY RELATIONSHIP DIAGRAM



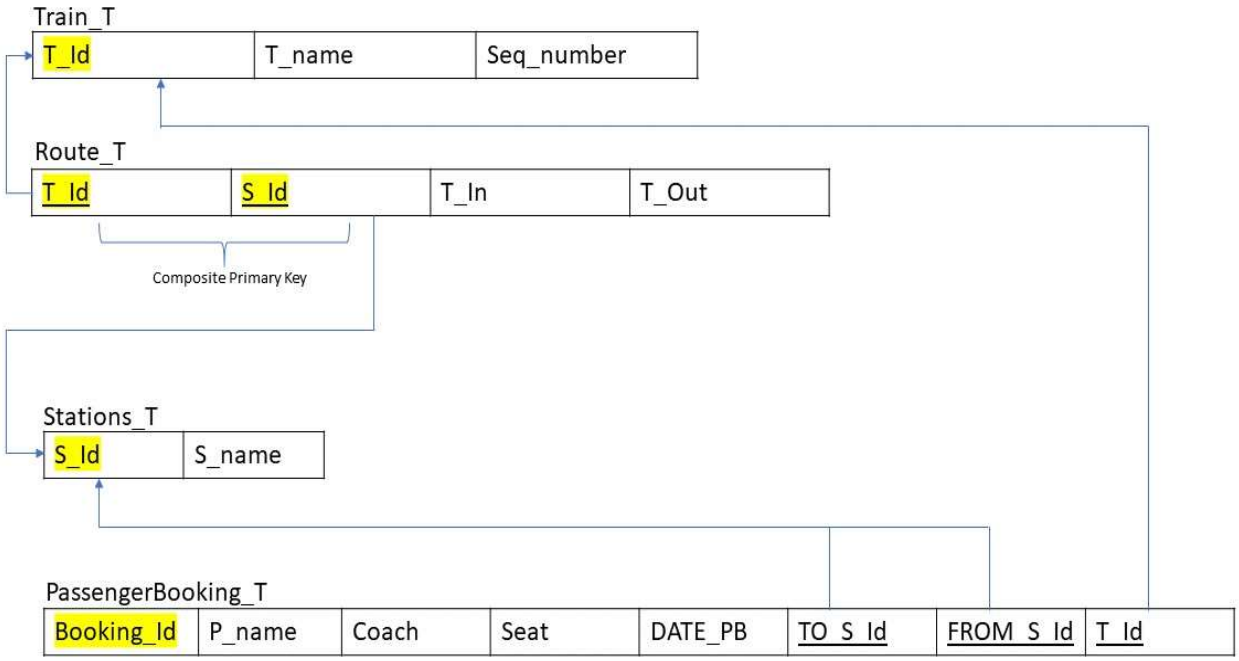
Representation Notes:

- We replaced the relationship between train and station that is train schedule, with an entity named route, since they have a many to many relationships.
- Hence route has the same attributes as the train schedule, that is, time in and time out.

Explanation:

- Every train has one and only one route while every route has at least one or many trains.
- Every station has one and only one route while every route has at least one or many stations.
- Every passenger departs from one and only one station and arrives at one and only one station
- Every station can have zero or many passengers.
- Every passenger booking is for one and only one train.
- Every train can be booked by zero or many passengers.

RELATIONAL MODEL



The relational model is already in third normal form.

Key for the relational model:

- Highlighted value is the primary key
- Underlined value is the foreign key.
- Highlighted and underlined value is both a primary and a foreign key with respect to its corresponding tables.

SQL SCHEMA

Table definitions scripts:

1. To create table Train_T :

```
create table Train_T
(T_id NUMBER(12,0) NOT NULL,
T_name VARCHAR(20),
Seq_number VARCHAR(20),
CONSTRAINT Train_PK PRIMARY KEY (T_id));
```

2. To create table Station_T :

```
create table Station_T
(S_id VARCHAR(12) NOT NULL,
S_name VARCHAR(20),
CONSTRAINT Station_PK PRIMARY KEY (S_id));
```

3. To create table Route_T :

```
create table Route_T
(T_id NUMBER(12,0) NOT NULL,
S_id NUMBER(12,0) NOT NULL,
T_in TIME,
T_out TIME,
CONSTRAINT Route_PK PRIMARY KEY (T_id,S_id),
CONSTRAINT Route_FK1 FOREIGN KEY (T_id) REFERENCES Train_T(T_id),
CONSTRAINT Route_FK2 FOREIGN KEY (S_id) REFERENCES Station_T(S_id) );
```

4. To create table PassengerBooking_T:

```
create table PassengerBooking_T
(Booking_Id VARCHAR(30) NOT NULL,
P_name VARCHAR(30) NOT NULL,
Coach VARCHAR(3),
Seat NUMBER(2,0),
DATE_PB DATE,
TO_S_Id NUMBER(12,0) NOT NULL,
FROM_S_Id NUMBER(12,0) NOT NULL,
PB_T_Id NUMBER(12,0) NOT NULL,
CONSTRAINT PassengerBooking_PK PRIMARY KEY (Booking_Id),
CONSTRAINT PassengerBooking_FK1 FOREIGN KEY (PB_T_Id) REFERENCES Train_T(T_id),
CONSTRAINT PassengerBooking_FK2 FOREIGN KEY (TO_S_Id) REFERENCES Station_T(S_id),
CONSTRAINT PassengerBooking_FK3 FOREIGN KEY (FROM_S_Id) REFERENCES Station_T(S_id));
```

5. Inserting values into the tables:

- insert into Train_T values ('T1','ALL_STOP','ABCD'),('T2','EXPRESS_12','ACD'),('T3','EXPRESS_14','AD'),('T4','EXPRESS_90','BA');

- insert into Station_T values ('S_A','TOWN1'),('S_B','TOWN2'),('S_C','TOWN3'),('S_D','TOWN4');

- insert into Route_T values('T1','S_A','06:30:00','06:45:00'),('T1','S_B','06:50:00','07:05:00'),('T1','S_C','07:10:00','07:25:00'),('T1','S_D','07:30:00','07:45:00'),('T2','S_A','07:05:00','07:20:00'),('T2','S_B','07:25:00','07:25:00'),('T2','S_C','07:30:00','07:45:00'),('T2','S_D','07:50:00','08:05:00'),('T3','S_A','08:00:00','08:15:00'),('T3','S_B','08:20:00','08:20:00'),('T3','S_C','08:25:00','08:25:00'),('T3','S_D','08:30:00','08:45:00'),('T4','S_B','09:00:00','09:15:00'),('T4','S_C','09:20:00','09:20:00'),('T4','S_D','09:25:00','09:25:00'),('T4','S_A','09:30:00','09:45:00');

- insert into PassengerBooking_T values ('B001','Arpit','AC1','32','2019-12-10','S_A',' S_D','T3'),('B002','Mashrukh','SC','01','2019-12-10','S_B',' S_A','T4'),('B003','Kushwant','AC1','44','2019-12-10','S_B',' S_D','T1'),('B004','Heena','SC','02','2019-12-10','S_B',' S_A','T4'),('B005','Sandra','AC6','24','2019-12-10','S_A',' S_D','T2');

- insert into PassengerBooking_T values ('B006','Luong','AC1','11','2019-12-10','S_C',' S_D','T1'),('B007','Tamara','AC2','29','2019-12-10','S_A',' S_D','T1'),('B008','Thomas','AC1','47','2019-12-10','S_A',' S_C','T1');

OUTPUT

1. Train Table:

Number of Records: 4

T_id	T_name	Seq_number
T1	NAME_1	ABCD
T2	Express_12	ACD
T3	Express_14	AD
T4	NAME_4	BA

2. Station Table:

Number of Records: 4

S_id	S_name
S_A	TOWN1
S_B	TOWN2
S_C	TOWN3
S_D	TOWN4

3. Route Table:

Number of Records: 16

T_id	S_id	T_in	T_out
T1	S_A	06:30:00	06:45:00
T1	S_B	06:50:00	07:05:00
T1	S_C	07:10:00	07:25:00
T1	S_D	07:30:00	07:45:00
T2	S_A	07:05:00	07:20:00
T2	S_B	07:25:00	07:25:00
T2	S_C	07:30:00	07:45:00
T2	S_D	07:50:00	08:05:00
T3	S_A	08:00:00	08:15:00
T3	S_B	08:20:00	08:20:00
T3	S_C	08:25:00	08:25:00
T3	S_D	08:30:00	08:45:00
T4	S_B	09:00:00	09:15:00
T4	S_C	09:20:00	09:20:00
T4	S_D	09:25:00	09:25:00
T4	S_A	09:30:00	09:45:00

4. Passenger Booking Table:

Number of Records: 8

Booking_Id	P_name	Coach	Seat	DATE_PB	TO_S_Id	FROM_S_Id	PB_T_Id
B001	Arpit	AC1	32	2019-12-10	S_A	S_D	T3
B002	Mashrukh	SC	1	2019-12-10	S_B	S_A	T4
B003	Kushwant	AC1	44	2019-12-10	S_B	S_D	T1
B004	Heena	SC	2	2019-12-10	S_B	S_A	T4
B005	Sandra	AC6	24	2019-12-10	S_A	S_D	T2
B006	Luong	AC1	11	2019-12-10	S_C	S_D	T1
B007	Tamara	AC2	29	2019-12-10	S_A	S_D	T1
B008	Thomas	AC1	47	2019-12-10	S_A	S_C	T1