



M U L T I M E D I A   U N I V E R S I T Y

**TIS1101 Database Fundamentals**

## Assignment 2

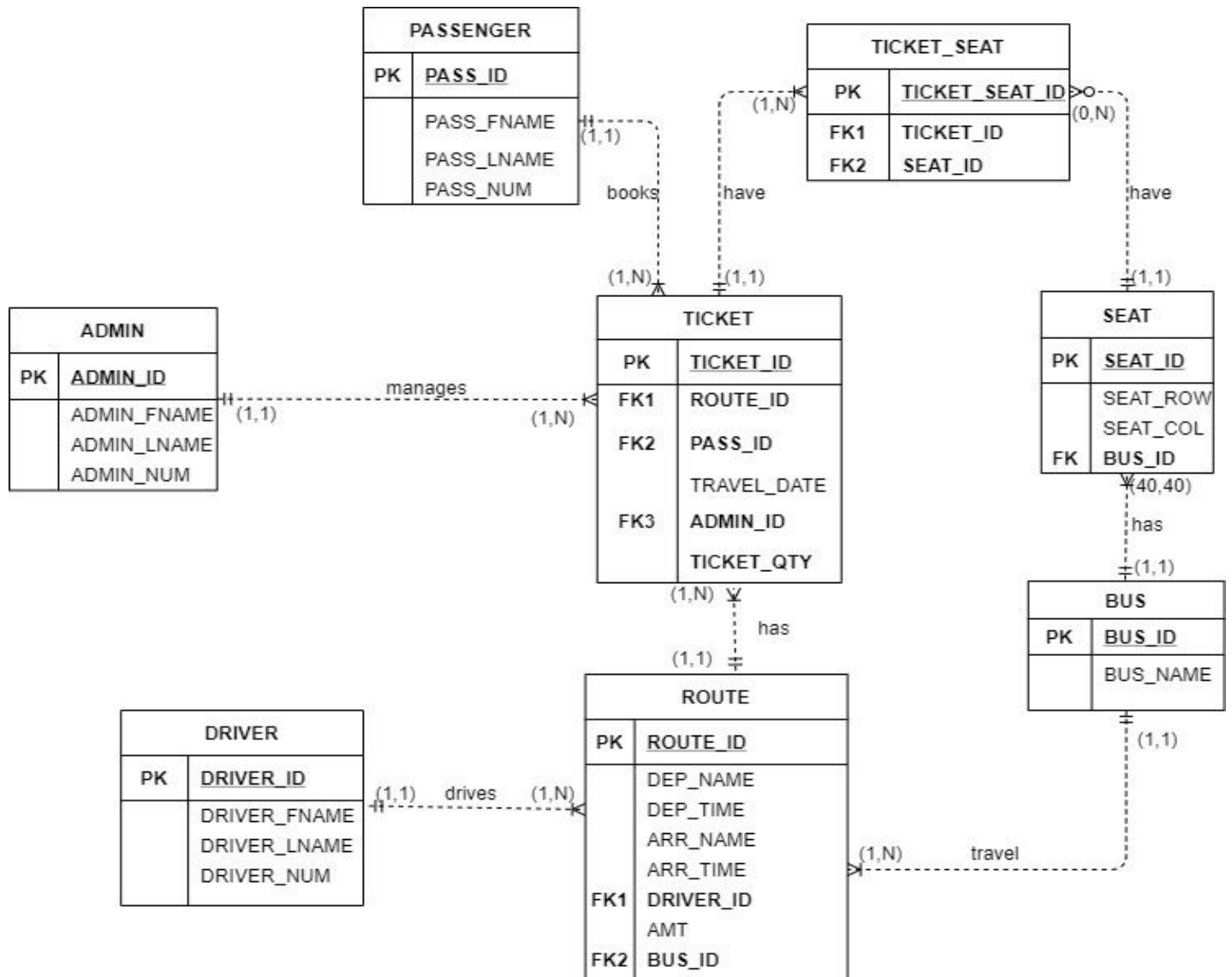
Lecturer: Linda Chua Sook Ling

<Bus Ticketing and Management System >

*Prepared by:*

|            |                        |                               |
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## Corrected ERD diagram



# Data Dictionary

| TABLE NAME  | ATTRIBUTES NAME  | CONTENTS   | TYPE  | FORMAT   | RANGE                             | REQUIRED                             | PK OR FK               | FK REFERENCED TABLE                     |
|-------------|--|--|---|--|-----------------------------------|--------------------------------------|------------------------|---|
| ADMIN       | ADMIN_ID<br>ADMIN_FNAME<br>ADMIN_LNAME<br>ADMIN_NUM                                    | Admin Code<br>Admin First Name<br>Admin Last Name<br>Admin Phone Number  | INT<br>VARCHAR(15)<br>VARCHAR(15)<br>VARCHAR(15)  | 9999<br>Xxxxxxxx<br>Xxxxxxxx<br>6013-6573150                               | 1000-9999                         | Y<br>Y<br>Y<br>Y                     | PK                     |   |
| PASSENGER   | PASS_ID<br>PASS_FNAME<br>PASS_LNAME<br>PASS_NUM  | Passenger Code<br>Passenger First Name<br>Passenger Last Name<br>Passenger Phone Number  | INT<br>VARCHAR(15)<br>VARCHAR(15)<br>VARCHAR(15)  | 999999<br>Xxxxxxxx<br>Xxxxxxxx<br>99999                                    | 100000-999999                     | Y<br>Y<br>Y                          | PK                     |   |
| DRIVER      | DRIVER_ID<br>DRIVER_FNAME<br>DRIVER_LNAME<br>DRIVER_NUM                                | Driver Code<br>Driver First Name<br>Driver Last Name<br>Driver Phone Number  | INT<br>VARCHAR(15)<br>VARCHAR(15)<br>VARCHAR(15)  | 999999<br>Xxxxxxxx<br>Xxxxxxxx<br>6013-6573150                             | 40500-40599                       | Y<br>Y<br>Y<br>Y                     | PK                     |   |
| BUS         | BUS_ID<br>BUS_NAME   | Bus Code<br>Bus Name   | CHAR(2)<br>VARCHAR(20)  | A1<br>Xxxxxxxx   |                                   | Y<br>Y                               | PK                     |   |
| ROUTE       | ROUTE_ID<br>DEP_NAME<br>DEP_TIME<br>ARR_NAME<br>ARR_TIME<br>DRIVER_ID<br>AMT<br>BUS_ID | Route Code<br>Departure Address<br>Departure Time<br>Arrival Address<br>Arrival Time<br>Driver Code<br>Ticket Amount<br>Bus Code | CHAR(7)<br>VARCHAR(20)<br>CHAR(5)<br>VARCHAR(20)<br>CHAR(5)<br>INT<br>DECIMAL(5,2)<br>CHAR(2) | 0123456<br>Xxxxxxxx<br>06:30<br>Xxxxxxxx<br>23:30<br>99999<br>129.25<br>B1 | <br><br><br><br><br>0 - 999.99    | Y<br>Y<br>Y<br>Y<br>Y<br>Y<br>Y<br>Y | PK<br><br><br>FK<br>FK | <br><br><br><br>DRIVER_ID<br><br>BUS_ID |
| TICKET      | TICKET_ID<br>ROUTE_ID<br>PASS_ID<br>TRAVEL_DATE<br>ADMIN_ID<br>TICKET_QTY              | Ticket Code<br>Route Code<br>Passenger Code<br>Travel Date<br>Admin Code<br>Ticket Quantity                                      | INT<br>CHAR(7)<br>INT<br>DATE<br>INT<br>INT   | 99999<br>Xxxxx-X<br>99999<br>'1842-12-31'<br>99999<br>99                   | 101-999<br><br><br><br><br>1 - 40 | Y<br>Y<br>Y<br>Y                     | PK<br>FK<br>FK<br>FK   | <br>ROUTE_ID<br>PASS_ID<br><br>ADMIN_ID |
| TICKET_SEAT | TICKET_SEAT_ID<br>TICKET_ID<br>SEAT_ID   | Ticket and seat Code<br>Ticket Code<br>Seat Code   | CHAR(4)<br>INT<br>CHAR(4)   | Xxxx<br>99999<br>Xxxx  |                                   | Y<br>Y<br>Y                          | PK<br>FK<br>FK         | <br>TICKET_ID<br>SEAT_ID                |
| SEAT        | SEAT_ID<br>SEAT_ROW<br>SEAT_COL<br>BUS_ID  | Seat Code<br>Seat Row Number<br>Seat Column Number<br>Bus Code   | CHAR(4)<br>CHAR(1)<br>CHAR(1)<br>CHAR(2)  | Xxxx<br>X<br>X<br>Xx   |                                   | Y<br>Y<br>Y<br>Y                     | PK<br><br>FK           | <br><br><br>BUS_ID                      |

## Admin Table:

| <u>ADMIN_ID</u> | ADMIN_FNAME | ADMIN_LNAME | ADMIN_NUM     |
|-----------------|-------------|-------------|---------------|
| 1011            | Amir        | Rahman      | 6011-69750208 |
| 1012            | Shariff     | Muhammad    | 6017-53225643 |
| 1013            | Nurul       | Mahmud      | 6018-77239016 |
| 1014            | Nur         | Fatimah     | 6011-79532270 |
| 1015            | Abdullah    | Ahmed       | 6017-00022254 |
| 1016            | Alya        | Aisha       | 6018-42132411 |
| 1017            | Aminah      | Khan        | 6011-44552233 |
| 1018            | Sharifa     | Hossain     | 6018-66655321 |
| 1019            | Sulaiman    | Ali         | 6019-82736543 |
| 1010            | Khairul     | Hani        | 6017-60999436 |

## Passenger table:

| <u>PASS_ID</u> | PASS_FNAME | PASS_LNAME | PASS_NUM      |
|----------------|------------|------------|---------------|
| 101911         | Eric       | Jensen     | 6010-27228863 |
| 101922         | Avinash    | Natt       | 6016-11473532 |
| 101933         | Savitra    | Tella      | 6013-44400244 |
| 101944         | Meghan     | Reilly     | 6018-36505759 |
| 101955         | Emilia     | Hopkins    | 6011-13162886 |
| 101966         | Fuzail     | Illias     | 6011-62038127 |
| 101977         | Tan        | Shupe      | 6019-73630813 |
| 101988         | Xannvern   | Cheok      | 6016-47513562 |
| 101999         | Ashraf     | Ahmed      | 6019-39211661 |
| 101900         | Irfan      | Khan       | 6016-67457307 |

## Driver Table:

| <b>DRIVER_ID</b> | <b>DRIVER_FNAME</b> | <b>DRIVER_LNAME</b> | <b>DRIVER_NUM</b> |
|------------------|---------------------|---------------------|-------------------|
| 40512            | Malone              | Roy                 | 6011-12366186     |
| 40513            | Johnson             | Velvet              | 6013-73651333     |
| 40514            | Lucas               | Paula               | 6018-38956589     |
| 40515            | Merrill             | Angel               | 6017-11117160     |
| 40516            | Wagner              | Sarah               | 6018-79774847     |
| 40517            | Pearson             | Dawn                | 6017-18122706     |
| 40518            | Gore                | Kathy               | 6017-34134602     |

## Bus Table:

| <b>BUS_ID</b> | <b>BUS_NAME</b> |
|---------------|-----------------|
| B1            | Greyhound1      |
| B2            | Greyhound2      |
| B3            | MegaBus1        |
| B4            | MegaBus2        |
| B5            | RedCoach1       |
| B6            | RedCoach2       |

## Route Table:

| ROUTE_ID | DEP_NAME   | DEP_TIME | ARR_NAME   | ARR_TIME | DRIVER_ID | AMT   | BUS_ID |
|----------|------------|----------|------------|----------|-----------|-------|--------|
| Route-A  | Cyberjaya  | 06:35    | KL Sentral | 07:30    | 40512     | 15.00 | B1     |
| Route-B  | Cyberjaya  | 10:00    | KL Sentral | 10:55    | 40518     | 15.00 | B1     |
| Route-C  | KL Sentral | 08:00    | Cyberjaya  | 09:00    | 40512     | 15.00 | B1     |
| Route-D  | KL Sentral | 17:00    | Cyberjaya  | 19:00    | 40518     | 15.00 | B1     |
| Route-E  | Cyberjaya  | 05:00    | Kepong     | 06:45    | 40515     | 20.50 | B2     |
| Route-F  | Kepong     | 17:30    | Cyberjaya  | 19:15    | 40515     | 20.50 | B2     |
| Route-G  | Cyberjaya  | 04:30    | Melaka     | 08:00    | 40514     | 30.90 | B3     |
| Route-H  | Cyberjaya  | 16:00    | Melaka     | 19:30    | 40517     | 30.90 | B4     |
| Route-I  | Melaka     | 08:30    | Cyberjaya  | 12:00    | 40514     | 30.90 | B3     |
| Route-J  | Melaka     | 17:00    | Cyberjaya  | 20:30    | 40516     | 30.90 | B5     |
| Route-K  | Cyberjaya  | 05:15    | Seremban   | 07:00    | 40513     | 26.30 | B6     |
| Route-L  | Seremban   | 17:00    | Cyberjaya  | 18:45    | 40513     | 26.30 | B6     |

## Ticket Table:

| TICKET_ID | ROUTE_ID | PASS_ID | TRAVEL_DATE | ADMIN_ID | TICKET_QTY |
|-----------|----------|---------|-------------|----------|------------|
| 101       | Route-A  | 101911  | 2020-09-02  | 1011     | 2          |
| 102       | Route-B  | 101922  | 2020-09-02  | 1012     | 5          |
| 103       | Route-C  | 101933  | 2020-09-02  | 1013     | 3          |
| 104       | Route-D  | 101944  | 2020-09-02  | 1013     | 6          |
| 105       | Route-E  | 101955  | 2020-09-02  | 1013     | 4          |
| 106       | Route-F  | 101966  | 2020-09-02  | 1014     | 1          |
| 107       | Route-G  | 101977  | 2020-09-02  | 1015     | 2          |
| 108       | Route-H  | 101988  | 2020-09-02  | 1016     | 2          |

|     |         |        |            |      |   |
|-----|---------|--------|------------|------|---|
| 109 | Route-I | 101999 | 2020-09-02 | 1017 | 1 |
| 110 | Route-J | 101900 | 2020-09-02 | 1018 | 7 |
| 111 | Route-K | 101900 | 2020-09-03 | 1019 | 1 |
| 112 | Route-L | 101988 | 2020-09-03 | 1019 | 1 |
| 113 | Route-K | 101922 | 2020-09-03 | 1019 | 1 |
| 114 | Route-A | 101999 | 2020-09-03 | 1016 | 2 |
| 115 | Route-K | 101933 | 2020-09-03 | 1013 | 3 |
| 116 | Route-A | 101944 | 2020-09-03 | 1014 | 9 |
| 117 | Route-K | 101955 | 2020-09-03 | 1015 | 3 |
| 118 | Route-A | 101966 | 2020-09-03 | 1016 | 1 |
| 119 | Route-K | 101977 | 2020-09-03 | 1017 | 1 |
| 120 | Route-A | 101933 | 2020-09-04 | 1017 | 1 |

## **Ticket\_Seat Table:**

| <b>TICKET_SEAT_ID</b> | <b>TICKET_ID</b> | <b>SEAT_ID</b> |
|-----------------------|------------------|----------------|
| A001                  | 101              | B1A1           |
| A002                  | 102              | B1A2           |
| A003                  | 103              | B1B1           |
| A004                  | 104              | B1B2           |
| A005                  | 105              | B1C2           |
| A006                  | 106              | B2D2           |
| A007                  | 107              | B2D1           |
| A008                  | 108              | B2A1           |
| A009                  | 109              | B3B2           |
| B001                  | 110              | B3E1           |

|      |     |      |
|------|-----|------|
| B002 | 111 | B4F2 |
| B003 | 112 | B5G1 |
| B004 | 113 | B6G2 |
| B005 | 114 | B1A1 |
| B006 | 114 | B6G2 |
| B007 | 101 | B3B2 |

## Seat Table:

| SEAT_ID | SEAT_ROW | SEAT_COL | BUS_ID |
|---------|----------|----------|--------|
| B1A1    | A        | 1        | B1     |
| B1A2    | A        | 2        | B1     |
| B1B1    | B        | 1        | B1     |
| B1B2    | B        | 2        | B1     |
| B1C2    | C        | 2        | B1     |
| B2D2    | D        | 2        | B2     |
| B2D1    | D        | 1        | B2     |
| B2A1    | A        | 1        | B2     |
| B3B2    | B        | 2        | B3     |
| B3E1    | E        | 1        | B3     |
| B4F2    | F        | 2        | B4     |
| B5G1    | G        | 1        | B5     |
| B6G2    | G        | 2        | B6     |



# Data Manipulation with SQL:

## i) Aggregate function

**Count:** To calculate the number of tickets bought by a single passenger.

```
DB2 CLP - DB2COPY1 - C:\PROGRA~2\IBM\SQLLIB\BIN\db2setcp.bat DB2SETCP.BAT DB2.EXE
db2 => select * from ticket

TICKET_ID  ROUTE_ID  PASS_ID    TRAVEL_DATE  ADMIN_ID
-----
101 Route-A      101911  09/02/2020    1011
102 Route-B      101922  09/02/2020    1012
103 Route-C      101933  09/02/2020    1013
104 Route-D      101944  09/02/2020    1013
105 Route-E      101955  09/02/2020    1013
106 Route-F      101966  09/02/2020    1014
107 Route-G      101977  09/02/2020    1015
108 Route-H      101988  09/02/2020    1016
109 Route-I      101999  09/02/2020    1017
110 Route-K      101900  09/03/2020    1018
111 Route-K      101900  09/03/2020    1019
112 Route-L      101988  09/03/2020    1019
113 Route-K      101922  09/03/2020    1019
114 Route-A      101999  09/03/2020    1016
115 Route-K      101933  09/03/2020    1013
116 Route-A      101944  09/03/2020    1014
117 Route-K      101955  09/03/2020    1015
118 Route-A      101966  09/03/2020    1016
119 Route-K      101977  09/03/2020    1017
120 Route-A      101933  09/04/2020    1017

20 record(s) selected.

db2 => select count(Pass_ID) from Ticket where Pass_ID = 101933
1
-----
3

1 record(s) selected.

db2 => _
```

**Max:** To get the maximum price of a route where the price is less than 30.

```
db2 => select * from route

ROUTE_ID  DEP_NAME    DEP_TIME  ARR_NAME    ARR_TIME  DRIVER_ID  AMT    BUS_ID
-----
Route-A  Cyberjaya    06:35    KL Sentral    07:30    40512    15.00  B1
Route-B  Cyberjaya    10:00    KL Sentral    10:55    40518    15.00  B1
Route-C  KL Sentral    08:00    Cyberjaya    09:00    40512    15.00  B1
Route-D  KL Sentral    17:00    Cyberjaya    19:00    40518    15.00  B1
Route-E  Cyberjaya    05:00    Kepong       06:45    40515    20.50  B2
Route-F  Kepong       17:30    Cyberjaya    19:15    40515    20.50  B2
Route-G  Cyberjaya    04:30    Melaka       08:00    40514    30.90  B3
Route-H  Cyberjaya    16:00    elaka        19:30    40517    30.90  B4
Route-I  Melaka       08:30    Cyberjaya    12:00    40514    30.90  B3
Route-J  Melaka       17:00    Cyberjaya    20:30    40516    30.90  B5
Route-K  Cyberjaya    05:15    Seremban     07:00    40513    26.30  B6
Route-L  Seremban     17:00    Cyberjaya    18:45    40513    26.30  B6

12 record(s) selected.

db2 => select MAX(AMT) from route where amt<30
1
-----
26.30

1 record(s) selected.

db2 =>
```

**Average:** To get average price of the route

```
db2 => select * from route
```

| ROUTE_ID | DEP_NAME   | DEP_TIME | ARR_NAME   | ARR_TIME | DRIVER_ID | AMT   | BUS_ID |
|----------|------------|----------|------------|----------|-----------|-------|--------|
| Route-A  | Cyberjaya  | 06:35    | KL Sentral | 07:30    | 40512     | 15.00 | B1     |
| Route-B  | Cyberjaya  | 10:00    | KL Sentral | 10:55    | 40518     | 15.00 | B1     |
| Route-C  | KL Sentral | 08:00    | Cyberjaya  | 09:00    | 40512     | 15.00 | B1     |
| Route-D  | KL Sentral | 17:00    | Cyberjaya  | 19:00    | 40518     | 15.00 | B1     |
| Route-E  | Cyberjaya  | 05:00    | Kepong     | 06:45    | 40515     | 20.50 | B2     |
| Route-F  | Kepong     | 17:30    | Cyberjaya  | 19:15    | 40515     | 20.50 | B2     |
| Route-G  | Cyberjaya  | 04:30    | Melaka     | 08:00    | 40514     | 30.90 | B3     |
| Route-H  | Cyberjaya  | 16:00    | elaka      | 19:30    | 40517     | 30.90 | B4     |
| Route-I  | Melaka     | 08:30    | Cyberjaya  | 12:00    | 40514     | 30.90 | B3     |
| Route-J  | Melaka     | 17:00    | Cyberjaya  | 20:30    | 40516     | 30.90 | B5     |
| Route-K  | Cyberjaya  | 05:15    | Seremban   | 07:00    | 40513     | 26.30 | B6     |
| Route-L  | Seremban   | 17:00    | Cyberjaya  | 18:45    | 40513     | 26.30 | B6     |

12 record(s) selected.

```
db2 => Select Avg(Amt) from route
```

```
1
-----
23.100000000000000000000000000000
```

1 record(s) selected.

```
db2 =>
```

**Group by and having clause:** To get the grouping data of the column route\_id with a having clause so that we can find the average amount from the grouped data.

```
db2 => select * from route
```

| ROUTE_ID | DEP_NAME   | DEP_TIME | ARR_NAME   | ARR_TIME | DRIVER_ID | AMT   | BUS_ID |
|----------|------------|----------|------------|----------|-----------|-------|--------|
| Route-A  | Cyberjaya  | 06:35    | KL Sentral | 07:30    | 40512     | 15.00 | B1     |
| Route-B  | Cyberjaya  | 10:00    | KL Sentral | 10:55    | 40518     | 15.00 | B1     |
| Route-C  | KL Sentral | 08:00    | Cyberjaya  | 09:00    | 40512     | 15.00 | B1     |
| Route-D  | KL Sentral | 17:00    | Cyberjaya  | 19:00    | 40518     | 15.00 | B1     |
| Route-E  | Cyberjaya  | 05:00    | Kepong     | 06:45    | 40515     | 20.50 | B2     |
| Route-F  | Kepong     | 17:30    | Cyberjaya  | 19:15    | 40515     | 20.50 | B2     |
| Route-G  | Cyberjaya  | 04:30    | Melaka     | 08:00    | 40514     | 30.90 | B3     |
| Route-H  | Cyberjaya  | 16:00    | elaka      | 19:30    | 40517     | 30.90 | B4     |
| Route-I  | Melaka     | 08:30    | Cyberjaya  | 12:00    | 40514     | 30.90 | B3     |
| Route-J  | Melaka     | 17:00    | Cyberjaya  | 20:30    | 40516     | 30.90 | B5     |
| Route-K  | Cyberjaya  | 05:15    | Seremban   | 07:00    | 40513     | 26.30 | B6     |
| Route-L  | Seremban   | 17:00    | Cyberjaya  | 18:45    | 40513     | 26.30 | B6     |

12 record(s) selected.

```
db2 => select route_ID, MAX(AMT) from route group by route_ID having avg(AMT) < 30
```

| ROUTE_ID | 2     |
|----------|-------|
| Route-A  | 15.00 |
| Route-B  | 15.00 |
| Route-C  | 15.00 |
| Route-D  | 15.00 |
| Route-E  | 20.50 |
| Route-F  | 20.50 |
| Route-K  | 26.30 |
| Route-L  | 26.30 |

8 record(s) selected.

```
db2 =>
```

**View:** To view the stored table.

```
db2 => create view bus_view as select bus_id, bus_name from bus
DB20000I The SQL command completed successfully.
db2 => select * from bus_view

BUS_ID  BUS_NAME
-----  -
B1      Greyhound1
B2      Greyhound
B3      MegaBus1
B4      MegaBus2
B5      RedCoach1
B6      RedCoach2

      6 record(s) selected.

db2 =>
```

**Top n records:**To get the first 10 records of the ticket\_seat table.

```
db2 => select * from ticket_seat order by ticket_seat_id fetch first 10 rows only

TICKET_SEAT_ID  TICKET_ID  SEAT_ID
-----  -
A001            101  B1A1
A002            102  B1A2
A003            103  B1B1
A004            104  B1B2
A005            105  B1C2
A006            106  B2D2
A007            107  B2D1
A008            108  B2A1
A009            109  B3B2
B001            110  B3E1

      10 record(s) selected.

db2 =>
```



**Trigger:** when ticket quantity is 5 or greater than 5 trigger will update the discount column with 5% discount after insert or update ticket quantity.

```
db2 => alter table ticket add column Discount char(2) default '0%'
DB20000I The SQL command completed successfully.
db2 => select * from ticket
```

| TICKET_ID | ROUTE_ID | PASS_ID | TRAVEL_DATE | ADMIN_ID | TICKET_QTY | DISCOUNT |
|-----------|----------|---------|-------------|----------|------------|----------|
| 101       | Route-A  | 101911  | 09/02/2020  | 1011     | 9          | 0%       |
| 102       | Route-B  | 101922  | 09/02/2020  | 1012     | 5          | 0%       |
| 103       | Route-C  | 101933  | 09/02/2020  | 1013     | 3          | 0%       |
| 104       | Route-D  | 101944  | 09/02/2020  | 1013     | 6          | 0%       |
| 105       | Route-E  | 101955  | 09/02/2020  | 1013     | 4          | 0%       |
| 106       | Route-F  | 101966  | 09/02/2020  | 1014     | 1          | 0%       |
| 107       | Route-G  | 101977  | 09/02/2020  | 1015     | 2          | 0%       |
| 108       | Route-H  | 101988  | 09/02/2020  | 1016     | 2          | 0%       |
| 109       | Route-I  | 101999  | 09/02/2020  | 1017     | 1          | 0%       |
| 110       | Route-K  | 101900  | 09/03/2020  | 1018     | 7          | 0%       |
| 111       | Route-K  | 101900  | 09/03/2020  | 1019     | 1          | 0%       |
| 112       | Route-L  | 101988  | 09/03/2020  | 1019     | 1          | 0%       |
| 113       | Route-K  | 101922  | 09/03/2020  | 1019     | 1          | 0%       |
| 114       | Route-A  | 101999  | 09/03/2020  | 1016     | 2          | 0%       |
| 115       | Route-K  | 101933  | 09/03/2020  | 1013     | 3          | 0%       |
| 116       | Route-A  | 101944  | 09/03/2020  | 1014     | 9          | 0%       |
| 117       | Route-K  | 101955  | 09/03/2020  | 1015     | 3          | 0%       |
| 118       | Route-A  | 101966  | 09/03/2020  | 1016     | 1          | 0%       |
| 119       | Route-K  | 101977  | 09/03/2020  | 1017     | 1          | 0%       |
| 120       | Route-A  | 101933  | 09/04/2020  | 1017     | 1          | 0%       |

20 record(s) selected.

After update

```
db2 => create trigger t1 after update of ticket_qty on ticket for each row mode db2sql update ticket set
discount= '5%' where ticket_qty >= 5
DB20000I The SQL command completed successfully.
db2 => select * from ticket
```

| TICKET_ID | ROUTE_ID | PASS_ID | TRAVEL_DATE | ADMIN_ID | TICKET_QTY | DISCOUNT |
|-----------|----------|---------|-------------|----------|------------|----------|
| 101       | Route-A  | 101911  | 09/02/2020  | 1011     | 9          | 0%       |
| 102       | Route-B  | 101922  | 09/02/2020  | 1012     | 5          | 0%       |
| 103       | Route-C  | 101933  | 09/02/2020  | 1013     | 3          | 0%       |
| 104       | Route-D  | 101944  | 09/02/2020  | 1013     | 6          | 0%       |
| 105       | Route-E  | 101955  | 09/02/2020  | 1013     | 4          | 0%       |
| 106       | Route-F  | 101966  | 09/02/2020  | 1014     | 1          | 0%       |
| 107       | Route-G  | 101977  | 09/02/2020  | 1015     | 2          | 0%       |
| 108       | Route-H  | 101988  | 09/02/2020  | 1016     | 2          | 0%       |
| 109       | Route-I  | 101999  | 09/02/2020  | 1017     | 1          | 0%       |
| 110       | Route-K  | 101900  | 09/03/2020  | 1018     | 7          | 0%       |
| 111       | Route-K  | 101900  | 09/03/2020  | 1019     | 1          | 0%       |
| 112       | Route-L  | 101988  | 09/03/2020  | 1019     | 1          | 0%       |
| 113       | Route-K  | 101922  | 09/03/2020  | 1019     | 1          | 0%       |
| 114       | Route-A  | 101999  | 09/03/2020  | 1016     | 2          | 0%       |
| 115       | Route-K  | 101933  | 09/03/2020  | 1013     | 3          | 0%       |
| 116       | Route-A  | 101944  | 09/03/2020  | 1014     | 9          | 0%       |
| 117       | Route-K  | 101955  | 09/03/2020  | 1015     | 3          | 0%       |
| 118       | Route-A  | 101966  | 09/03/2020  | 1016     | 1          | 0%       |
| 119       | Route-K  | 101977  | 09/03/2020  | 1017     | 1          | 0%       |
| 120       | Route-A  | 101933  | 09/04/2020  | 1017     | 1          | 0%       |

20 record(s) selected.

```
C:\DB2 CLP - DB2COPY1 - C:\PROGRA~2\IBM\SQLLIB\BIN\db2setcp.bat DB2SETCP.BAT DB2.EXE
db2 => update ticket set ticket_qty = 5 where ticket_id = 101
DB20000I The SQL command completed successfully.
db2 => select * from ticket
```

| TICKET_ID | ROUTE_ID | PASS_ID | TRAVEL_DATE | ADMIN_ID | TICKET_QTY | DISCOUNT |
|-----------|----------|---------|-------------|----------|------------|----------|
| 101       | Route-A  | 101911  | 09/02/2020  | 1011     | 5          | 5%       |
| 102       | Route-B  | 101922  | 09/02/2020  | 1012     | 5          | 5%       |
| 103       | Route-C  | 101933  | 09/02/2020  | 1013     | 3          | 0%       |
| 104       | Route-D  | 101944  | 09/02/2020  | 1013     | 6          | 5%       |
| 105       | Route-E  | 101955  | 09/02/2020  | 1013     | 4          | 0%       |
| 106       | Route-F  | 101966  | 09/02/2020  | 1014     | 1          | 0%       |
| 107       | Route-G  | 101977  | 09/02/2020  | 1015     | 2          | 0%       |
| 108       | Route-H  | 101988  | 09/02/2020  | 1016     | 2          | 0%       |
| 109       | Route-I  | 101999  | 09/02/2020  | 1017     | 1          | 0%       |
| 110       | Route-K  | 101900  | 09/03/2020  | 1018     | 7          | 5%       |
| 111       | Route-K  | 101900  | 09/03/2020  | 1019     | 1          | 0%       |
| 112       | Route-L  | 101988  | 09/03/2020  | 1019     | 1          | 0%       |
| 113       | Route-K  | 101922  | 09/03/2020  | 1019     | 1          | 0%       |
| 114       | Route-A  | 101999  | 09/03/2020  | 1016     | 2          | 0%       |
| 115       | Route-K  | 101933  | 09/03/2020  | 1013     | 3          | 0%       |
| 116       | Route-A  | 101944  | 09/03/2020  | 1014     | 9          | 5%       |
| 117       | Route-K  | 101955  | 09/03/2020  | 1015     | 3          | 0%       |
| 118       | Route-A  | 101966  | 09/03/2020  | 1016     | 1          | 0%       |
| 119       | Route-K  | 101977  | 09/03/2020  | 1017     | 1          | 0%       |
| 120       | Route-A  | 101933  | 09/04/2020  | 1017     | 1          | 0%       |

```
20 record(s) selected.
```

```
20 record(s) selected.

db2 => create trigger t2 after insert on ticket for each row mode db2sql update ticket set discount= '5%' where ticket_qty >= 5
DB20000I The SQL command completed successfully.
```



After insert

```
db2 => Insert into TICKET values(121, 'Route-A', 101933, '2020-09-04', 1019, 8,'0%')
DB20000I The SQL command completed successfully.
db2 => select * from ticket
```

| TICKET_ID | ROUTE_ID | PASS_ID | TRAVEL_DATE | ADMIN_ID | TICKET_QTY | DISCOUNT |
|-----------|----------|---------|-------------|----------|------------|----------|
| 101       | Route-A  | 101911  | 09/02/2020  | 1011     | 5          | 5%       |
| 102       | Route-B  | 101922  | 09/02/2020  | 1012     | 5          | 5%       |
| 103       | Route-C  | 101933  | 09/02/2020  | 1013     | 3          | 0%       |
| 104       | Route-D  | 101944  | 09/02/2020  | 1013     | 6          | 5%       |
| 105       | Route-E  | 101955  | 09/02/2020  | 1013     | 4          | 0%       |
| 106       | Route-F  | 101966  | 09/02/2020  | 1014     | 1          | 0%       |
| 107       | Route-G  | 101977  | 09/02/2020  | 1015     | 2          | 0%       |
| 108       | Route-H  | 101988  | 09/02/2020  | 1016     | 2          | 0%       |
| 109       | Route-I  | 101999  | 09/02/2020  | 1017     | 1          | 0%       |
| 110       | Route-K  | 101900  | 09/03/2020  | 1018     | 7          | 5%       |
| 111       | Route-K  | 101900  | 09/03/2020  | 1019     | 1          | 0%       |
| 112       | Route-L  | 101988  | 09/03/2020  | 1019     | 1          | 0%       |
| 113       | Route-K  | 101922  | 09/03/2020  | 1019     | 1          | 0%       |
| 114       | Route-A  | 101999  | 09/03/2020  | 1016     | 2          | 0%       |
| 115       | Route-K  | 101933  | 09/03/2020  | 1013     | 3          | 0%       |
| 116       | Route-A  | 101944  | 09/03/2020  | 1014     | 9          | 5%       |
| 117       | Route-K  | 101955  | 09/03/2020  | 1015     | 3          | 0%       |
| 118       | Route-A  | 101966  | 09/03/2020  | 1016     | 1          | 0%       |
| 119       | Route-K  | 101977  | 09/03/2020  | 1017     | 1          | 0%       |
| 120       | Route-A  | 101933  | 09/04/2020  | 1017     | 1          | 0%       |
| 121       | Route-A  | 101933  | 09/04/2020  | 1019     | 8          | 5%       |

21 record(s) selected.

### Subqueries:

Views the ticket id passenger name , number and purchased quantity for selected passenger id

```
db2 => select ticket_id , pass_fname, pass_num, ticket_qty from ticket, passenger where passenger.pass_id in (select pass_id from passenger where pass_id = 101933) and passenger.pass_id = ticket.pass_id
```

| TICKET_ID | PASS_FNAME | PASS_NUM      | TICKET_QTY |
|-----------|------------|---------------|------------|
| 103       | Savitra    | 6013-44400244 | 3          |
| 115       | Savitra    | 6013-44400244 | 3          |
| 120       | Savitra    | 6013-44400244 | 1          |
| 121       | Savitra    | 6013-44400244 | 8          |

4 record(s) selected.

db2 =>

Sets the route amount to maximum amount for the routes which has route amount less than average

```
db2 => update route set amt = (select max(amt) from route) where amt < (select avg(amt) from route)
DB20000I The SQL command completed successfully.
db2 => select * from route
```

| ROUTE_ID | DEP_NAME   | DEP_TIME | ARR_NAME   | ARR_TIME | DRIVER_ID | AMT   | BUS_ID |
|----------|------------|----------|------------|----------|-----------|-------|--------|
| Route-A  | Cyberjaya  | 06:35    | KL Sentral | 07:30    | 40512     | 30.90 | B1     |
| Route-B  | Cyberjaya  | 10:00    | KL Sentral | 10:55    | 40518     | 30.90 | B1     |
| Route-C  | KL Sentral | 08:00    | Cyberjaya  | 09:00    | 40512     | 30.90 | B1     |
| Route-D  | KL Sentral | 17:00    | Cyberjaya  | 19:00    | 40518     | 30.90 | B1     |
| Route-E  | Cyberjaya  | 05:00    | Kepong     | 06:45    | 40515     | 30.90 | B2     |
| Route-F  | Kepong     | 17:30    | Cyberjaya  | 19:15    | 40515     | 30.90 | B2     |
| Route-G  | Cyberjaya  | 04:30    | Melaka     | 08:00    | 40514     | 30.90 | B3     |
| Route-H  | Cyberjaya  | 16:00    | elaka      | 19:30    | 40517     | 30.90 | B4     |
| Route-I  | Melaka     | 08:30    | Cyberjaya  | 12:00    | 40514     | 30.90 | B3     |
| Route-J  | Melaka     | 17:00    | Cyberjaya  | 20:30    | 40516     | 30.90 | B5     |
| Route-K  | Cyberjaya  | 05:15    | Seremban   | 07:00    | 40513     | 26.30 | B6     |
| Route-L  | Seremban   | 17:00    | Cyberjaya  | 18:45    | 40513     | 26.30 | B6     |

12 record(s) selected.

```
db2 => _
```



**Stored procedure:** to store query that will show discount amount offer by B1 bus company

```

C:\DB2 CLP - DB2COPY1 - C:\PROGRA~2\IBM\SQLLIB\BIN\db2setcp.bat DB2SETCP.BAT DB2.EXE
db2 => select * from route

ROUTE_ID  DEP_NAME      DEP_TIME  ARR_NAME      ARR_TIME  DRIVER_ID  AMT      BUS_ID
-----
Route-A   Cyberjaya     06:35    KL Sentral    07:30     40512     29.35    B1
Route-B   Cyberjaya     10:00    KL Sentral    10:55     40518     29.35    B1
Route-C   KL Sentral    08:00    Cyberjaya     09:00     40512     29.35    B1
Route-D   KL Sentral    17:00    Cyberjaya     19:00     40518     29.35    B1
Route-E   Cyberjaya     05:00    Kepong        06:45     40515     30.90    B2
Route-F   Kepong        17:30    Cyberjaya     19:15     40515     30.90    B2
Route-G   Cyberjaya     04:30    Melaka        08:00     40514     30.90    B3
Route-H   Cyberjaya     16:00    elaka         19:30     40517     30.90    B4
Route-I   Melaka        08:30    Cyberjaya     12:00     40514     30.90    B3
Route-J   Melaka        17:00    Cyberjaya     20:30     40516     30.90    B5
Route-K   Cyberjaya     05:15    Seremban      07:00     40513     26.30    B6
Route-L   Seremban      17:00    Cyberjaya     18:45     40513     26.30    B6

12 record(s) selected.

db2 => create procedure procR (in disc decimal(7,2)) begin update route set amt = amt *(1- disc) where
bus_id = 'B1'; end
DB20000I The SQL command completed successfully.
db2 => call procR (0.05)

Return Status = 0
db2 => select * from route

ROUTE_ID  DEP_NAME      DEP_TIME  ARR_NAME      ARR_TIME  DRIVER_ID  AMT      BUS_ID
-----
Route-A   Cyberjaya     06:35    KL Sentral    07:30     40512     27.88    B1
Route-B   Cyberjaya     10:00    KL Sentral    10:55     40518     27.88    B1
Route-C   KL Sentral    08:00    Cyberjaya     09:00     40512     27.88    B1
Route-D   KL Sentral    17:00    Cyberjaya     19:00     40518     27.88    B1
Route-E   Cyberjaya     05:00    Kepong        06:45     40515     30.90    B2
Route-F   Kepong        17:30    Cyberjaya     19:15     40515     30.90    B2
Route-G   Cyberjaya     04:30    Melaka        08:00     40514     30.90    B3
Route-H   Cyberjaya     16:00    elaka         19:30     40517     30.90    B4
Route-I   Melaka        08:30    Cyberjaya     12:00     40514     30.90    B3
Route-J   Melaka        17:00    Cyberjaya     20:30     40516     30.90    B5
Route-K   Cyberjaya     05:15    Seremban      07:00     40513     26.30    B6
Route-L   Seremban      17:00    Cyberjaya     18:45     40513     26.30    B6

12 record(s) selected.

db2 =>

```