COURIER SERVICE MANAGEMENT SYSTEM

Team Data Dissectors

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TABLE OF CONTENTS

1. BUSINESS APPLICATION DESCRIPTION

1.1 Introduction

   Courier Management System involves timely delivery of packages from the source to destination as per the needs of the customer.Though the world has come closer due to ease of transport and development of technology, the needs and demands of the population have also increased. People need better services in terms of reliability and timely delivery of packages, thus optimizing the routes and the transit time for which the package travels through. In order to ensure accuracy in transport of packages and maintaining business finances, we need to maintain consistency in data.

    Thus, the Courier Management System database will maintain end-to-end details pertaining to Packages, Payment Details, Routes, Sub routes, Senders, Receivers and the Franchise staff. The database will be updated continuously by the company staff based on the real time location of packages.

    In this system, a customer drops the package to the nearest franchise along with the destination details. The price of the package delivery is calculated based on the size, weight and destination of the package. The staff then allocates the route and sub route through which the package will be sent based on the source and destination specified by the customer. The analyst manages the finances of the company by analysing the reports generated for each package of a particular franchise. The customer will be able to track package location as and when required.

1.2 Objective
The objectives of the project are:
1. Customer and package Details : Providing the company with accurate package details to ensure efficient package delivery.
2. Optimizing delivery route : Ensure that routes and sub routes are allocated in such a way that the package would be delivered at the earliest and the package details are maintained at every subroute
3. Providing tracking facility: Provide customers and staff with facility to track packages when they are in transition to know at which check-point they have reached.
4. Managing Finances: Gain accurate results on Statistical Analysis of data to maintain company finances.

1.2 Scope
For the scope of this project, we have taken into consideration Local(within the United States) as well as international package deliveries. We have assumed our franchises to be the subroute checkpoints. The customer drops off and picks up their packages from the nearest franchise outlet

2. USERS AND ENTITIES

1. Customer

● Sender: They will send packages and will be able to track them during transition

● Receiver: Their address will be the destination of the package delivery and they will be able to track the packages during transition using package tracking id.

2. Employee

● Franchise Manager: Every franchise will have a dedicated manager who will look over the entire package delivery management system pertaining to that franchise.

● Franchise staff: They will accept packages and access the database to update customer and package details. They will decide the routes and sub routes based on the source and destination of the package. The staff will also manage the enquiries or complaints of the customers related to the packages.

● Analyst: A cumulative report of revenue and expenses for packages in every franchise is analysed by the analyst and is provided to the Franchise Manager.

3.LIST OF RELATIONS

1. Employee

2. Franchise Manager (Parent table: Employee)

3. Franchise Staff (Parent table: Employee)

4. Analyst (Parent table: Employee)

5. Franchise

6. Package

7. Tracking details

8. Tracking_Assignment(Linking table between Tracking details and Subroute)

9. Enquiry_Complaint

10. Report

11. Route

12. Subroute

13. Customer

14. Sender (Parent table: Customer)

15. Receiver (Parent table: Customer)

4. LOGICAL SCHEMA
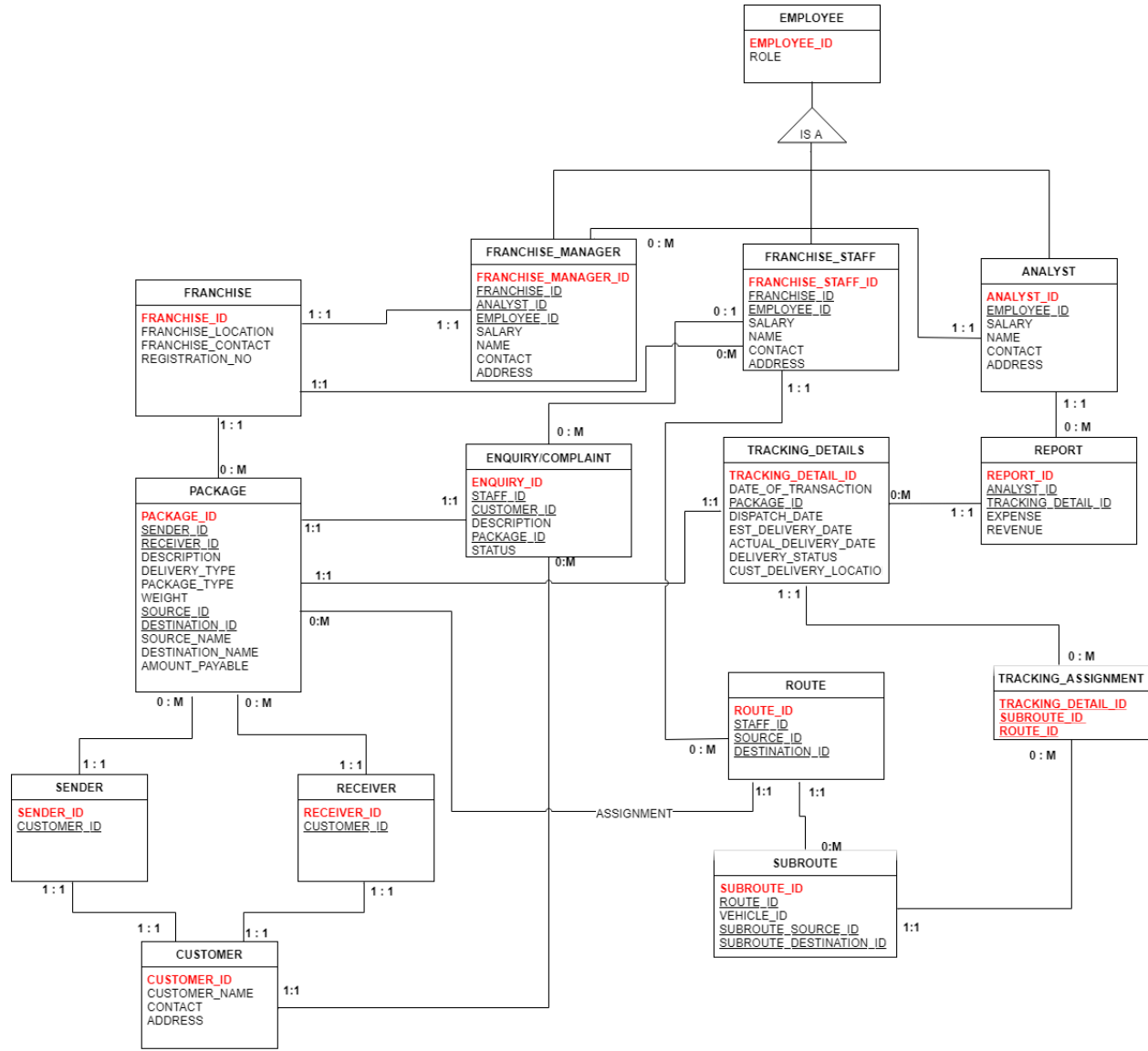
5.USE CASES

I. Users

1.Customer: Sender/Receiver

- Drops package to the nearby franchise
- Track the route of the package
- Update the contact details of the receiver
- Recording complaints and Enquiries related to the packages and deliveries

2. Franchise Manager

- Keeps record of staff working under him
- Updates salaries of staff
- Add details of newly hired employees
- Track employee performance based on number of complaints resolved
- Keep a track of pending orders
- List all package details and customer details for the franchise
- Notify senders of the delivery of their package

3. Franchise staff

- Adds a new package order
- Updates the details of existing package orders
- Keeps a track of frequent customers
- Gives promotional discount to specific customers based on their package orders
- Lists the count of packages based on type of packages and delivery destination
- Searches for enquiries and complaints assigned to particular staff
- Searches number and details of packages dispatched on a particular date
- Lists the packages with minimum sub routes
- Keep track of routes managed by every staff
- Search for packages to be delivered between a certain source and destination
- Search for oversize package orders (with weight greater than 20 kgs) in the past 6 months
- Update the descriptions of packages
- Segregate packages based on delivery description

4. Analyst

- Calculate profits earned in dispatched packages
- Calculate total amount expected for a particular package dispatched to a particular location
- Calculate sum of expenses incurred for packages at a particular franchise
- Provides a cumulative report of expenses and revenue to the Franchise Manager

6. PHYSICAL SCHEMA-DATA DICTIONARY

1. Employee

EMPLOYEE			
Name	**Type**	**Constraint**	**Description**
EMPLOYEE_ID	VARCHAR (20)	PRIMARY KEY	Stores the employee id
ROLE	VARCHAR (30)	NOT NULL	Stores whether the employee is franchise manager/franchise staff/analyst

2. Franchise Manager

FRANCHISE_MANAGER			
Name	**Type**	**Constraint**	**Description**
FRANCHISE_MANAGER_ID	VARCHAR (20)	PRIMARY KEY	Stores the manager id
FRANCHISE_ID	VARCHAR (20)	FOREIGN KEY NOT NULL	Stores the franchise id
ANALYST_ID	VARCHAR (20)	FOREIGN KEY NOT NULL	Stores the id of analyst who provides the report
EMPLOYEE_ID	VARCHAR (20)	FOREIGN KEY NOT NULL	stores the employee id of the manager
NAME	VARCHAR (30)	NOT NULL	Stores the Manager's name
CONTACT	BIGINT (15)	NOT NULL	Stores Manager's contact
ADDRESS	VARCHAR (50)	NOT NULL	Stores Manager's address
SALARY	BIGINT(10)	NOT NULL	Stores Manager's Salary

3. Franchise Staff

FRANCHISE_STAFF			
Name	**Type**	**Constraint**	**Description**
FRANCHISE_STAFF_ID	VARCHAR(20)	PRIMARY KEY	Stores the id of the staff
FRANCHISE_ID	VARCHAR (20)	FOREIGN KEY NOT NULL	Stores the franchise id of the staff
EMPLOYEE_ID	VARCHAR(20)	FOREIGN KEY NOT NULL	Stores the employee of the staff
NAME	VARCHAR (30)	NOT NULL	Stores the Staff's name
CONTACT	BIGINT (15)	NOT NULL	Stores Staff's contact
ADDRESS	VARCHAR (50)	NOT NULL	Stores Staff's address
SALARY	BIGINT(10)	NOT NULL	Stores staff's Salary

4. Analyst

ANALYST			
Name	**Type**	**Constraint**	**Description**
ANALYST_ID	VARCHAR(20)	PRIMARY KEY	Stores the id of analyst
EMPLOYEE_ID	VARCHAR(20)	FOREIGN KEY NOT NULL	Stores the employee of the analyst
NAME	VARCHAR (30)	NOT NULL	Stores the Analyst's name
CONTACT	BIGINT (15)	NOT NULL	Stores Analyst's contact
ADDRESS	VARCHAR (50)	NOT NULL	Stores Analyst's address
SALARY	BIGINT(10)	NOT NULL	Stores Analyst's Salary

5. Franchise

	FRANCHISE		
Name	**Type**	**Constraint**	**Description**
FRANCHISE_ID	VARCHAR (20)	PRIMARY KEY	Stores the id of franchise
FRANCHISE_LOCATION	VARCHAR(30)	NOT NULL	Stores the location of the franchise
FRANCHISE_CONTACT	INT(15)	NOT NULL	stores the contact no. of the franchise
REGISTRATION_NO	INT(20)	NOT NULL	Stores the registration no. of the franchise

6. Package

	PACKAGE		
Name	**Type**	**Constraint**	**Description**
PACKAGE_ID	VARCHAR(20)	PRIMARY KEY	Stores the id of package
SENDER_ID	VARCHAR(20)	FOREIGN KEY NOT NULL	Stores the id of the sender
RECEIVER_ID	VARCHAR(20)	FOREIGN KEY NOT NULL	Stores the id of the receiver
DESCRIPTION	VARCHAR (30)	NOT NULL	Stores the description of the package
DELIVERY_TYPE	VARCHAR (20)	NOT NULL	Stores if the package is to be delivered locally / internationally
SOURCE_ID	VARCHAR (20)	FOREIGN KEY NOT NULL	Stores the franchise id of the location from where the package is dispatched.
DESTINATION_ID	VARCHAR (20)	FOREIGN KEY NOT NULL	Stores the franchise id of the location to which package is to be delivered.
WEIGHT	FLOAT (15)	NOT NULL	Stores the weight of package in kgs
SOURCE_NAME	VARCHAR (20)	NOT NULL	Stores name of the source location

DESTINATION_NAME	VARCHAR (20)	NOT NULL	Stores name of the Destination location
AMT_PAYABLE	FLOAT (15)	NOT NULL	Stores the prices of the packages
PACKAGE_TYPE	VARCHAR(30)	NOT NULL	Stores the type of the package from the drop down list.

7. Tracking details

TRACKING_DETAILS			
Name	**Type**	**Constraint**	**Description**
TRACKING_DETAIL_ID	VARCHAR(20)	PRIMARY KEY	Stores Id to track the package delivery
DATE_OF_TRANSACTION	DATE	NOT NULL	Stores the date on which the package was dropped in the franchise
PACKAGE_ID	VARCHAR(20)	FOREIGN KEY NOT NULL	Stores the Id of the package which is to be tracked
EST_DELIVERY_DATE	DATE	NOT NULL	Stores the Estimated delivery Date of the package
DELIVERY_STATUS	VARCHAR (20)	NOT NULL	Stores the status of the package as delivered or pending
ACTUAL_DELIVERY_DATE	DATE	NULL	Stores the Date on which the package was delivered
CURRENT_DELIVERY_LOCATION	VARCHAR(30)	NULL	Stores the intermediate/current location of the package

8.Tracking Assignment

	TRACKING		
Name	**Type**	**Constraint**	**Description**
TRACKING_DETAIL_ID	VARCHAR(20)	PRIMARY KEY	Stores the Tracking detail id of the package travelling through that particular route
SUBROUTE_ID	VARCHAR(20)	PRIMARY KEY	Stores the subroute id from which the package travels
ROUTE_ID	VARCHAR(20)	PRIMARY KEY	Stores the route id of the route for that particular package

9. Enquiry/Complaint

	ENQUIRY_COMPLAINT		
Name	**Type**	**Constraint**	**Description**
ENQUIRY_COMPLAINT_ID	VARCHAR(20)	PRIMARY KEY	Stores Enquiry/complaint ID of the logged enquiry and complaint by the customer
STAFF_ID	VARCHAR(20)	FOREIGN KEY NOT NULL	Stores the staff id who is responsible for the enquiry
CUSTOMER_ID	VARCHAR(20)	FOREIGN KEY NOT NULL	Stores the customer id lodging the complaint/enquiry
DESCRIPTION	VARCHAR (30)	NOT NULL	Stores Description of the enquiry
STATUS	VARCHAR(30)	NOT NULL	Stores the status: pending/resolved
PACKAGE_ID	VARCHAR(20)	NULL	Stores the package id of the package for which the complaint or enquiry is logged

10. Report

Name	Type	Constraint	Description
REPORT_ID	VARCHAR(20)	PRIMARY KEY	Stores the report id for the report of every package
TRACKING_DETAIL_ID	VARCHAR(20)	NOT NULL	Stores the tracking detail id for tracking every package
EXPENSE	INT(20)	NOT NULL	Stores the expense recorded in report for every package
REVENUE	INT(20)	NOT NULL	Stores the revenue recorded in report for every package
ANALYST_ID	VARCHAR(20)	NOT NULL	Stores the Analyst's ID to which the report is provided

(Table title: **REPORT**)

11. Route

Name	Type	Constraint	Description
ROUTE_ID	VARCHAR(20)	PRIMARY KEY	Stores the route id for the route through which the package is transported
STAFF_ID	VARCHAR(20)	FOREIGN KEY NOT NULL	Stores the Staff_id assigning route to that particular package
SOURCE_ID	VARCHAR (20)	FOREIGN KEY NOT NULL	Stores the source of the route
DESTINATION_ID	VARCHAR (20)	FOREIGN KEY NOT NULL	Stores the destination of routes

(Table title: **ROUTE**)

12. Sub route

Name	Type	Constraint	Description
SUBROUTE_ID	VARCHAR(20)	PRIMARY KEY	Stores the id of the particular subroute
ROUTE_ID	VARCHAR(20)	PRIMARY KEY	Stores the id of the route for which the subroute is defined
VEHICLE_ID	VARCHAR(20)	NOT NULL	Stores the truck no./ flight id
SUBROUTE_SOURCE _ID	VARCHAR(20)	NOT NULL	Stores the name of the franchise through which the package passes
SUBROUTE_DESTINATI ON_ID	VARCHAR(20)	NOT NULL	Stores name of the franchise through which the package passes

SUBROUTE (table title)

13. Customer

Name	Type	Constraint	Description
CUSTOMER_ID	VARCHAR(20)	PRIMARY KEY	Stores id of the customer: sender/receiver
CUSTOMER_NAME	VARCHAR (30)	NOT NULL	Stores name of the customer
CONTACT	INT (15)	NOT NULL	Stores the contact number of the customer
ADDRESS	VARCHAR (30)	NOT NULL	Stores the address of the customer

CUSTOMER (table title)

14. Sender

Name	Type	Constraint	Description
SENDER_ID	VARCHAR(20)	PRIMARY KEY	Stores the id of the sender
CUSTOMER_ID	VARCHAR(20)	FOREIGN KEY	Store the customer id

SENDER (table title)

		NOT NULL	

15. Receiver

RECEIVER			
Name	**Type**	**Constraint**	**Description**
RECEIVER_ID	VARCHAR(20)	PRIMARY KEY	Stores id of the receiver
CUSTOMER_ID	VARCHAR(20)	FOREIGN KEY NOT NULL	Stores the customer id of the receiver

7.QUERIES

Customer:

1.Track the route of the package

```
10      # 8.RETREIVE SOURCE AND DESTINATION OF EACH CHECKPOINT FOR PACKAGE F301 and F305
11
12  •   SELECT td.PACKAGE_ID, F.FRANCHISE_LOCATION AS 'SUBROUTE SOURCE', F1.FRANCHISE_LOCATION AS 'SUBROUTE DESTINATION'
13      FROM FRANCHISE F, FRANCHISE F1, SUBROUTE SR, tracking_assignment ta, tracking_details td
14      WHERE
15      SR.SUBROUTE_ID = ta.SUBROUTE_ID AND
16      ta.TRACKING_DETAIL_ID = td.TRACKING_DETAIL_ID AND
17      F.FRANCHISE_ID=SR.SUBROUTE_SOURCE_ID AND
18      F1.FRANCHISE_ID=SR.SUBROUTE_DESTINATION_ID AND
19      td.PACKAGE_ID in(SELECT td.PACKAGE_ID from tracking_details WHERE td.PACKAGE_ID = "F301" OR td.PACKAGE_ID = "F305");
20
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

PACKAGE_ID	SUBROUTE SOURCE	SUBROUTE DESTINATION
F301	Denver	Austin
F301	Austin	Little Rock
F301	Little Rock	Miami
F305	Austin	Little Rock
F305	Little Rock	New York

2. Update the contact details of the receiver

Before Update:

```
102
103  •   SELECT * FROM CUSTOMER WHERE CUSTOMER_ID="C10"
104
105
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

CUSTOMER_ID	CUSTOMER_NAME	CONTACT	ADDRESS
C10	Chandler Bing	2123134141	2348 Wilson Street New York 1006
NULL	NULL	NULL	NULL

After Update:

```
93
94  •   UPDATE CUSTOMER C SET  C.CONTACT="2156543219"
95      WHERE CUSTOMER_ID="C10" LIMIT 1;
96
97
98
99  •   SELECT * FROM CUSTOMER WHERE CUSTOMER_ID="C10"
100
101
```

Result Grid | Filter Rows: | Edit: | Export/Import:

CUSTOMER_ID	CUSTOMER_NAME	CONTACT	ADDRESS
C10	Chandler Bing	2156543219	2348 Wilson Street New York 1006
NULL	NULL	NULL	NULL

3. Recording complaints and Enquiries related to the packages and deliveries

```
111
112 •   INSERT INTO enquiry_complaint values ("E17","2004","C23","Damaged Goods","F312","Delivered");
113 •   select *from enquiry_complaint;
114
```

ENQUIRY_ID	STAFF_ID	CUSTOMER_ID	DESCRIPTION	PACKAGE_ID	ENQUIRY_COMPLAINT_STATUS
E1	2001	CO1	Late Delivery	F301	Resolved
E10	2007	C12	Payment Issue	F306	Pending
E11	2004	C13	Payment Issue	F307	Pending
E12	2008	C31	Late Delivery	F316	Pending
E13	2010	C28	Damaged Goods	F314	Pending
E14	2008	C23	Delayed Delivery	F312	Pending
E15	2010	C36	Damaged Goods	F318	Pending
E16	2010	C37	Delayed Delivery	F319	Pending
E17	2004	C23	Damaged Goods	F312	Delivered
E2	2002	CO2	Tracking Lost Package	F302	Pending
E3	2001	CO3	Delayed Delivery	F303	Resolved

Franchise Manager:

1. Keeps record of staff working under a particular Manager

```
1    #1 NAME AND CONTACT OF STAFF WORKING FOR MANAGER JASON MAYO-
2    SELECT FS.STAFF_NAME, FS.CONTACT, GROUP_CONCAT(FM.MANAGER_NAME) AS 'MANAGER NAME'
3    FROM FRANCHISE_STAFF FS, franchise_manager FM, franchise F
4    WHERE FS.FRANCHISE_ID = F.FRANCHISE_ID AND
5    F.FRANCHISE_ID = FM.FRANCHISE_ID AND
6    FM.MANAGER_NAME = "Jason Mayo"
7    GROUP BY FS.STAFF_NAME;
8
9
10
11
12
13
14
15
16
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: ⫶A

STAFF_NAME	CONTACT	MANAGER NAME
Bob Gravs	3334289123	Jason Mayo
Ronak Gune	3216213334	Jason Mayo
Ross Geller	4446217210	Jason Mayo
Steve Jobs	3214268293	Jason Mayo

2. Updates salaries of staff

Before:

```
114
115 •          *        franchise_staff;
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content: ⫶A

FRANCHISE_STAFF_ID	FRANCHISE_ID	EMPLOYEE_ID	STAFF_NAME	CONTACT	ADDRESS	SALARY
2001	A1	8	Alex Miller	2143262137	3622 LittleRock 72202	4000
2002	B1	7	James Lennon	9664664638	1286 Denver 80204	3500
2003	C1	6	Ethan Smith	1283884278	3328 Miami 33124	3000
2004	D1	15	Ronak Gune	3216213334	1378 Chicago 60602	4000
2005	E1	16	Peter Parker	4213213321	1233 Austin 78701	3500
2006	F1	17	Chris Louis	3321273321	1011 Paris 75004	3000
2007	G1	18	David Tim	1476232147	7822 New York 10005	3200
2008	D1	19	Steve Jobs	3214268293	3124 Chicago 32001	3600
2009	D1	20	Bob Gravs	3334289123	3302 Chicago 32002	4500
2010	D1	21	Ross Geller	4446217210	3103 Chicago 32002	3500
2011	E1	22	Rachel Green	1268296231	2204 Austin 78702	4000
NULL	NULL	NULL	NULL	NULL	NULL	NULL

After:

```
114
115 •   update franchise_staff set SALARY = SALARY*1.1 where SALARY <= 3500;
116 •   select*from franchise_staff;
117
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

FRANCHISE_STAFF_ID	FRANCHISE_ID	EMPLOYEE_ID	STAFF_NAME	CONTACT	ADDRESS	SALARY
2001	A1	8	Alex Miller	2143262137	3622 LittleRock 72202	4000
2002	B1	7	James Lennon	9664664638	1286 Denver 80204	3850
2003	C1	6	Ethan Smith	1283884278	3328 Miami 33124	3300
2004	D1	15	Ronak Gune	3216213334	1378 Chicago 60602	4000
2005	E1	16	Peter Parker	4213213321	1233 Austin 78701	3850
2006	F1	17	Chris Louis	3321273321	1011 Paris 75004	3300
2007	G1	18	David Tim	1476232147	7822 New York 10005	3520
2008	D1	19	Steve Jobs	3214268293	3124 Chicago 32001	3600
2009	D1	20	Bob Gravs	3334289123	3302 Chicago 32002	4500
2010	D1	21	Ross Geller	4446217210	3103 Chicago 32002	3850
2011	E1	22	Rachel Green	1268296231	2204 Austin 78702	4000
NULL	NULL	NULL	NULL	NULL	NULL	NULL

3. Add details of newly hired employees

```
128
129 •   INSERT INTO franchise_staff values("2012","A1","23","Rosie Singh","4652165325","3147 Park Avenue Denver 80203","2800");
130 •   select *from franchise_staff;
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

FRANCHISE_STAFF_ID	FRANCHISE_ID	EMPLOYEE_ID	STAFF_NAME	CONTACT	ADDRESS	SALARY
2001	A1	8	Alex Miller	2143262137	3622 LittleRock 72202	4000
2002	B1	7	James Lennon	9664664638	1286 Denver 80204	3850
2003	C1	6	Ethan Smith	1283884278	3328 Miami 33124	3300
2004	D1	15	Ronak Gune	3216213334	1378 Chicago 60602	4000
2005	E1	16	Peter Parker	4213213321	1233 Austin 78701	3850
2006	F1	17	Chris Louis	3321273321	1011 Paris 75004	3300
2007	G1	18	David Tim	1476232147	7822 New York 10005	3520
2008	D1	19	Steve Jobs	3214268293	3124 Chicago 32001	3600
2009	D1	20	Bob Gravs	3334289123	3302 Chicago 32002	4500
2010	D1	21	Ross Geller	4446217210	3103 Chicago 32002	3850
2011	E1	22	Rachel Green	1268296231	2204 Austin 78702	4000
2012	A1	23	Rosie Singh	4652165325	3147 Park Avenue D...	2800
NULL	NULL	NULL	NULL	NULL	NULL	NULL

4. Track employee performance based on number of complaints resolved

```
24      # 7.Retrieve the Name of the employee and the franchise ID to which he belongs, who has Outperformed by resolving most number of complaints!
25
26 •    SELECT FS.FRANCHISE_ID, FS.STAFF_NAME
27      FROM FRANCHISE_STAFF FS
28      WHERE FS.FRANCHISE_STAFF_ID IN (SELECT EC.STAFF_ID FROM ENQUIRY_COMPLAINT EC
29      WHERE ENQUIRY_COMPLAINT_STATUS="Resolved"
30      GROUP BY EC.STAFF_ID
31      HAVING COUNT(EC.STAFF_ID) >= ALL (SELECT COUNT(EC1.STAFF_ID)
32      FROM ENQUIRY_COMPLAINT EC1
33      GROUP BY EC1.STAFF_ID));
34
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

FRANCHISE_ID	STAFF_NAME
A1	Alex Miller

5. Keep a track of pending orders

```
34
35     # 9.Retrieve count of packages with status = "Pending"
36
37 •   SELECT COUNT(PACKAGE_ID) AS 'TOTAL PACKAGES PENDING', GROUP_CONCAT(PACKAGE_ID) AS 'PACKAGE IDS PENDING'
38     FROM TRACKING_DETAILS
39     WHERE DELIVERY_STATUS="Pending";
40
41
42
43
44
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: IA

TOTAL PACKAGES PENDING	PACKAGE IDS PENDING
4	F304.F305.F306.F307

6. List all package details and customer details for the franchise

```
119    # LIST ALL PACKAGE DETAILS AND CUSTOMER DETAILS DEPARTING FROM NEW YORK
120 •  SELECT P.PACKAGE_ID,P.DESCRIPTION,P.DELIVERY_TYPE,P.PACKAGE_TYPE,P.WEIGHT,P.SOURCE_NAME,P.DESTINATION_NAME,
121    C.CUSTOMER_NAME,C.CONTACT,C.ADDRESS
122    FROM PACKAGE P, SENDER S, CUSTOMER C
123    WHERE P.SENDER_ID=S.SENDER_ID AND P.SOURCE_NAME="New York" AND S.CUSTOMER_ID=C.CUSTOMER_ID;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: IA

PACKAGE_ID	DESCRIPTION	DELIVERY_TYPE	PACKAGE_TYPE	WEIGHT	SOURCE_NAME	DESTINATION_NAME	CUSTOMER_NAME	CONTACT	ADDRESS
F302	Official Docs	International	documents	3	New York	Paris	Codv Lione	6672161734	1286 Eden Road New York 10005
F306	Liquid	International	Food	5	New York	Paris	Chandler Bina	2123134141	2348 Wilson Street New York 10006
F308	Solid vacuumed food	Local	Food	25	New York	Austin	Codv Lione	6672161734	1286 Eden Road New York 10005
F309	Dehvdrated food	Local	Food	30	New York	Austin	Codv Lione	6672161734	1286 Eden Road New York 10005
F314	fragile	Local	baggage	40	New York	Austin	Codv Lione	6672161734	1286 Eden Road New York 10005
F315	liquid	Local	food	5	New York	Austin	Kevin Walson	2223134141	2348 Lawrence New York 10006
F316	documents	Local	applications	3	New York	Austin	Kie Harrington	3123134141	1320 Benson Street New York 10006
F317	vacuum food	International	food	20	New York	Paris	Hudson Jerrv	3336669999	431 Greens Road New York 10006
F318	dehvdrated food	International	food	25	New York	Paris	Chandler Bina	2123134141	2348 Wilson Street New York 10006

7. Notify senders of the delivery of their package

```
21     #10 List name, contact and package ids of the senders whose packages are delivered.
22 •   SELECT distinct C.CUSTOMER_NAME, C.CONTACT, GROUP_CONCAT(p.package_id) as 'PACKAGE IDs WHICH ARE DELIVERED'
23     FROM CUSTOMER C, SENDER S, PACKAGE P, TRACKING_DETAILS TD
24     WHERE C.CUSTOMER_ID = S.CUSTOMER_ID AND
25     S.SENDER_ID = P.SENDER_ID AND
26     P.PACKAGE_ID = TD.PACKAGE_ID AND
27     TD.DELIVERY_STATUS = "Delivered"
28     group by c.customer_name;
29
30
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: IA

CUSTOMER_NAME	CONTACT	PACKAGE IDs WHICH ARE DELIVERED
Abhiieet Paul	2129994141	F313
Chandler Bina	2123134141	F318
Codv Lione	6672161734	F309.F308.F302.F314
George Bose	9123194140	F312
Hudson Jerrv	3336669999	F317
Kevin Walson	2223134141	F315
Kie Harrington	3123134141	F316
Marv Terrual	2123134141	F319
Niki Pawar	6662131324	F303.F320
Peter Russel	4063512214	F310
Rahul Sharma	6692141754	F301.F311

Franchise Staff:

1. Lists the count of packages based on type of packages.

```
17   #4
18 ● SELECT F.FRANCHISE_LOCATION AS 'FRANCHISE CITY', P.PACKAGE_TYPE AS 'TYPES OF PACKAGES SENT' , COUNT(P.PACKAGE_ID) AS 'NUMBER OF PACKAGES'
19   FROM FRANCHISE F , PACKAGE P
20   WHERE F.FRANCHISE_ID=P.DESTINATION_ID
21   GROUP BY F.FRANCHISE_LOCATION, P.PACKAGE_TYPE;
22
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

FRANCHISE CITY	TYPES OF PACKAGES SENT	NUMBER OF PACKAGES
Austin	applications	1
Austin	baggage	1
Austin	Food	3
Denver	applications	2
Denver	Documents	1
Denver	food	1
Miami	applications	1
Miami	Baggage	2
Miami	food	2
New York	documents	1
New York	university application	1
Paris	documents	1
Paris	Food	3

2. Searches for enquiries and complaints assigned to particular staff

```
81
82   #18. Display all the enquiries and commplaints received by Alex Miller.
83 ● SELECT EC.ENQUIRY_ID, EC.DESCRIPTION, EC.ENQUIRY_COMPLAINT_STATUS
84   FROM ENQUIRY_COMPLAINT EC, FRANCHISE_STAFF FS
85   WHERE EC.STAFF_ID=FS.FRANCHISE_STAFF_ID AND FS.STAFF_NAME="Alex Miller";
86
87   |
88
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

ENQUIRY_ID	DESCRIPTION	ENQUIRY_COMPLAINT_STATUS
E1	Late Delivery	Resolved
E3	Delaved Deliverv	Resolved
E8	Delaved Deliverv	Resolved
E9	Damaged Goods	Resolved

3. Searches number and details of packages dispatched on a particular date

```
43
44    #11. Details of packages dispatched on same date. (2018-02-20)
45 •  SELECT P.PACKAGE_ID, TD.DISPATCH_DATE, P.DELIVERY_TYPE, P.PACKAGE_TYPE, TD.EST_DELIVERY_DATE, TD.DELIVERY_STATUS
46    FROM PACKAGE P, TRACKING_DETAILS TD
47    WHERE P.PACKAGE_ID=TD.PACKAGE_ID AND TD.DISPATCH_DATE='2018-02-20';
48
49    |
50
51
52
53
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: IA

PACKAGE_ID	DISPATCH_DATE	DELIVERY_TYPE	PACKAGE_TYPE	EST_DELIVERY_DATE	DELIVERY_STATUS
F310	2018-02-20	Local	Baggage	2018-02-23	Delivered
F314	2018-02-20	Local	baggage	2018-02-22	Delivered
F315	2018-02-20	Local	food	2018-02-22	Delivered
F316	2018-02-20	Local	applications	2018-02-22	Delivered
F308	2018-02-20	Local	Food	2018-02-22	Delivered
F309	2018-02-20	Local	Food	2018-02-25	Delivered

4. Lists the packages with minimum sub routes

```
54    #12 RETREIVE ROUTES WITH MINIMUM SUBROUTES
55 •  SELECT SR2.ROUTE_ID AS 'ROUTES WITH MIN SUBROUTES',COUNT(SR2.ROUTE_ID) AS 'NUMBER OF SUBROUTES' FROM subroute SR2
56    GROUP BY SR2.ROUTE_ID HAVING COUNT(*) <=
57    (SELECT COUNT(*) AS 'ROUTECOUNT' FROM subroute SR1 GROUP BY SR1.ROUTE_ID order by ROUTECOUNT LIMIT 1);
58
59
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: IA

ROUTES WITH MIN SUBROUTES	NUMBER OF SUBROUTES
R4	2
R5	2

5. Keep track of routes managed by every staff

```
60    #14. Retrieve count of route ids defined by a staff member of a particular franchise
61 •  SELECT FS.FRANCHISE_ID, FS.STAFF_NAME AS 'STAFF MEMBER', COUNT(ROUTE_ID) AS 'TOTAL ROUTES DEFINED'
62    FROM ROUTE R, FRANCHISE_STAFF FS
63    WHERE R.STAFF_ID=FS.FRANCHISE_STAFF_ID
64    GROUP BY FS.STAFF_NAME;
65
66
67
68
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: IA

FRANCHISE_ID	STAFF MEMBER	TOTAL ROUTES DEFINED
G1	David Tim	2
C1	Ethan Smith	1
B1	James Lennon	1
E1	Peter Parker	1
D1	Ronak Gune	1

6. Search for packages to be delivered between a certain source and destination

```
36 •  SELECT *
37    FROM PACKAGE P
38    WHERE P.SOURCE_NAME="NEW YORK"
39    AND P.DESTINATION_NAME="AUSTIN";
40    |
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content: |

PACKAGE_ID	SENDER_ID	RECEIVER_ID	DESCRIPTION	DELIVERY_TYPE	PACKAGE_TYPE	WEIGHT	SOURCE_NAME	DESTINATION_NAME	SOURCE_ID	DESTINATION_ID	A
F308	SC8	RC8	Solid vacuumed food	Local	Food	25	New York	Austin	G1	E1	30
F309	SC9	RC9	Dehydrated food	Local	Food	30	New York	Austin	G1	E1	35
F314	SC14	RC14	fragile	Local	baggage	40	New York	Austin	G1	E1	30
F315	SC15	RC15	liquid	Local	food	5	New York	Austin	G1	E1	70
F316	SC16	RC16	documents	Local	applications	3	New York	Austin	G1	E1	50
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NU

7. Search for oversize package orders (with weight greater than 20 kgs) in the past 6 months

```
48
49    #7 SEARCH FOR PVERSIZED PACKAGE ORDERS WITH WEIGHT > 20 KGS IN 6 MONTHS
50 •  SELECT DISTINCT P.PACKAGE_ID AS 'OVERSIZED PACKAGES IN PAST 6 MONTHS', P.WEIGHT AS 'WEIGHT (IN KGS)'
51    FROM PACKAGE P, TRACKING_DETAILS TD
52    WHERE TD.ACTUAL_DELIVERY_DATE BETWEEN DATE_SUB(now(), INTERVAL 6 MONTH) AND now() AND P.WEIGHT>"20"
53
54
55
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: |

OVERSIZED PACKAGES IN PAST 6 MONTHS	WEIGHT(IN KGS)
F301	46
F303	23
F308	25
F309	30
F310	56
F312	23
F314	40
F318	25

8. Update the descriptions of packages

```
133
134 •  UPDATE PACKAGE SET WEIGHT="11", PACKAGE_TYPE = "Food", DESCRIPTION =  "Whole Foods", AMT_PAYABLE = 100 WHERE PACKAGE_ID = 'F301';
135 •  SELECT *FROM package WHERE PACKAGE_ID = "F301";
136
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content: |

PACKAGE_ID	SENDER_ID	RECEIVER_ID	DESCRIPTION	DELIVERY_TYPE	PACKAGE_TYPE	WEIGHT	SOURCE_NAME	DESTINATION_NAME	SOURCE_ID	DESTINATION_ID	AMT_PAYABLE
F301	SC1	RC1	Whole Foods	Local	Food	11	Denver	Miami	B1	C1	100
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

9. Segregate packages based on delivery Type

```
5      #9 SEGEREGATE PACKAGES BASED ON DELIVERY TYPE(LOCAL/INTERNATIONAL)
6  •   SELECT P.DELIVERY_TYPE AS 'TOTAL PACKAGES PENDING', GROUP_CONCAT(P.PACKAGE_ID) AS 'PACKAGE IDs'
7      FROM PACKAGE P
8      GROUP BY P.DELIVERY_TYPE;
9
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: IA

TOTAL PACKAGES PENDING	PACKAGE IDs
International	F302.F306.F317.F318
Local	F301.F303.F304.F305.F307.F308.F309.F310.F311.F312.F313.F314.F315.F316.F319.F320

Analyst:

1. Calculate profits earned in dispatched packages

```
26
27     #5.1 CALCULATE PROFIT EARNED BY DELIVERY OF PACKAGES DISPATCHED IN FEB 2018
28     SELECT CONCAT(MONTHNAME(TD.DISPATCH_DATE), YEAR(TD.DISPATCH_DATE)) AS 'MONTH AND YEAR',SUM(R.REVENUE-R.EXPENSE) AS 'PROFIT EARNED'
29     FROM REPORT R, TRACKING_DETAILS TD
30     WHERE MONTHNAME(TD.DISPATCH_DATE)="FEBRUARY" AND YEAR(TD.DISPATCH_DATE)="2018"
31     AND TD.TRACKING_DETAIL_ID=R.TRACKING_DETAIL_ID;
32     |
33
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: IA

MONTH AND YEAR	PROFIT EARNED
Februarv2018	1070

2. Calculate total amount expected for a particular package dispatched to a particular location

```
2      #2 FIND TOTAL AMOUNT EXPECTED FROM PACKAGES FROM EVERY FRANCHISE WHERE DESTINATION IS NEW YORK
3  •   SELECT  P.SOURCE_ID AS 'SOURCE FRANCHISE',(P.AMT_PAYABLE) AS 'AMOUNT EXPECTED'
4      FROM PACKAGE P, FRANCHISE F
5      WHERE F.FRANCHISE_ID=P.DESTINATION_ID AND F.FRANCHISE_LOCATION="New York";
6
7
8
9
10
11
12
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: IA

SOURCE FRANCHISE	AMOUNT EXPECTED
E1	50
C1	80

3. Calculate total revenue incurred from packages for a particular year

```
1 ●  select distinct f.franchise_location as 'Franchise', sum(r.revenue) as 'Total Revenue'
2    from franchise f, package p, tracking_details t, report r
3    where year(t.EST_DELIVERY_DATE) = '2018' and
4    r.tracking_detail_id= t.tracking_detail_id and t.package_id = p.package_id
5    and p.SOURCE_ID= f.franchise_id
6    group by f.franchise_location;
```

Result Grid | 🔢 | ↔ Filter Rows: | Export: 🗔 | Wrap Cell Content: 🅰

Franchise	Total Revenue
Austin	20
Chicago	90
Denver	510
Miami	35
New York	1165

8 and 9.INDEXES AND TRIGGERS:

Indexes: All the primary keys in a table can be indexed

Triggers:

We need trigger to update the delivery status to DELIVERED when the current location in the tracking details is set to the address of the receiver.

To track the delivery of packages, we implemented trigger to set delivery status as Delivered by updating current location as receiver's address on completion of the package delivery.

DELIMITER

$$

USE `test`

$$

CREATE

DEFINER=`root`@`127.0.0.1`

TRIGGER `test`.`student_mast_AUPD`

AFTER UPDATE

ON `test`.`tracking_details`FOR EACH ROW

-- Edit trigger body code below this line. Do not edit lines above this one

BEGIN

if (tracking_details.current_delivery_location=customer.address)

set tracking_details.delivery_status="delivered");

END

$$

10.VIEWS

1. Analyst provides a cumulative report of packages to the Manager of a particular franchise:

```
138
139 •   CREATE VIEW DATA_REPORTS AS
140     SELECT F.FRANCHISE_ID, P.PACKAGE_ID, TD.TRACKING_DETAIL_ID, R.REPORT_ID
141     FROM FRANCHISE F, PACKAGE P, tracking_details TD, REPORT R
142     WHERE F.FRANCHISE_LOCATION = "New York" AND
143     F.FRANCHISE_ID = P.SOURCE_ID AND
144     P.PACKAGE_ID = TD.PACKAGE_ID AND
145     TD.TRACKING_DETAIL_ID = R.TRACKING_DETAIL_ID;
146
147 •   SELECT *FROM DATA_REPORTS;
148
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: IA

FRANCHISE_ID	PACKAGE_ID	TRACKING_DETAIL_ID	REPORT_ID
G1	F302	TD2	Report 2
G1	F306	TD6	Report 6
G1	F308	TD8	Report 8
G1	F309	TD9	Report 9
G1	F314	TD14	Report 14
G1	F315	TD15	Report 15
G1	F316	TD16	Report 16
G1	F317	TD17	Report 17
G1	F318	TD18	Report 18

2.Querying the View: View report for a particular package at the given franchise

```
165     select *from(
166     SELECT F.FRANCHISE_ID, P.PACKAGE_ID, TD.TRACKING_DETAIL_ID, R.REPORT_ID
167     FROM FRANCHISE F, PACKAGE P, tracking_details TD, REPORT R
168     WHERE F.FRANCHISE_LOCATION = "New York" AND
169     F.FRANCHISE_ID = P.SOURCE_ID AND
170     P.PACKAGE_ID = TD.PACKAGE_ID AND
171     TD.TRACKING_DETAIL_ID = R.TRACKING_DETAIL_ID) Z
172     where Z.PACKAGE_ID = "F308";
173
174
```
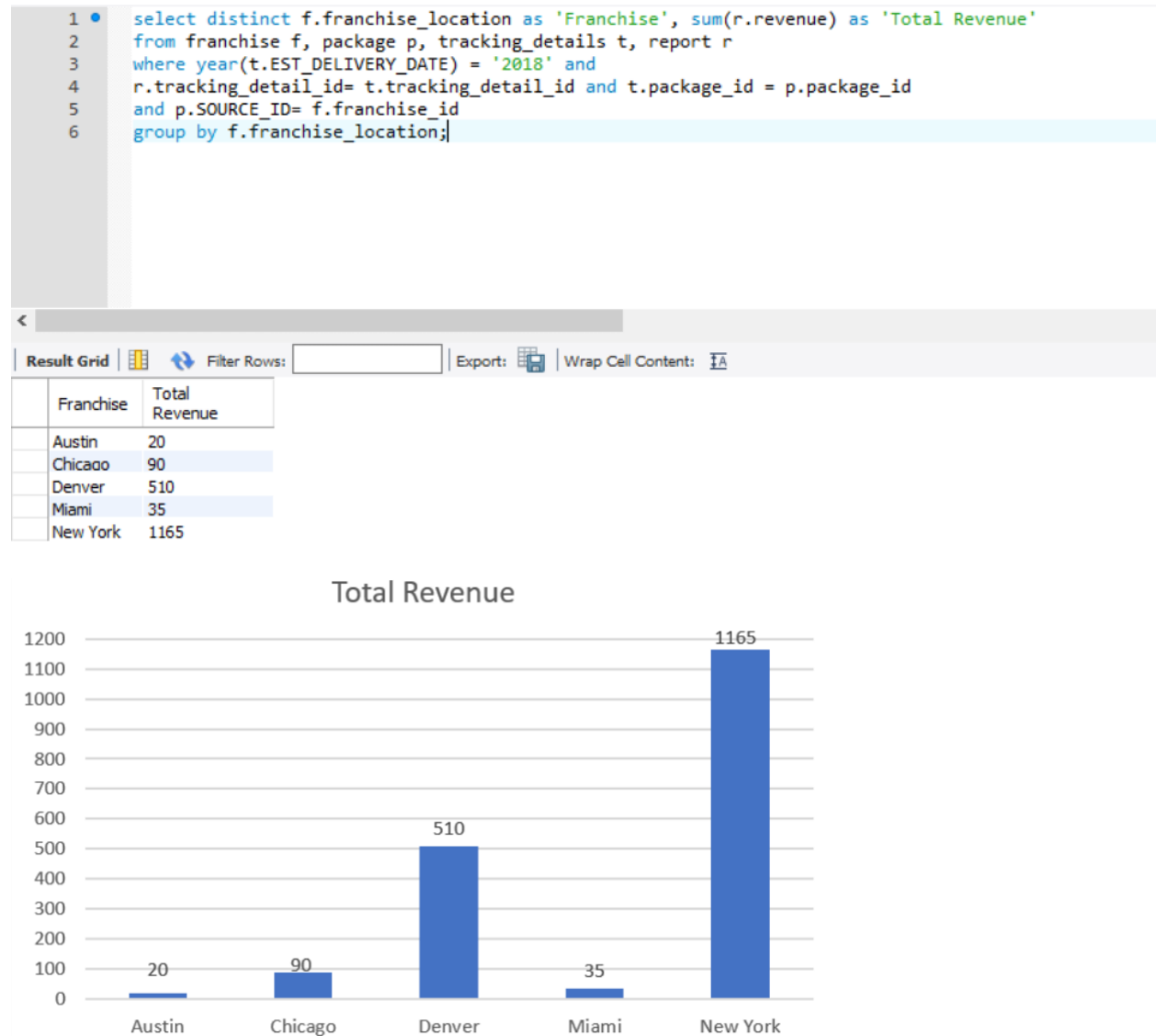
Result Grid | Filter Rows: | Export: | Wrap Cell Content: IA

FRANCHISE_ID	PACKAGE_ID	TRACKING_DETAIL_ID	REPORT_ID
G1	F308	TD8	Report 8

11. BUSINESS METRICS

Business metric is a quantifiable measure that organizations use to track their performance over a given period. This metric is often useful to assess the current state of the business in terms of success or failure of a specific aspect related to sales, finances or performance of the business. Following are some of the metrics defined for the Courier Management Company –

1. **Performance of franchise depending on their revenue for the year**

```
1 •  select distinct f.franchise_location as 'Franchise', sum(r.revenue) as 'Total Revenue'
2    from franchise f, package p, tracking_details t, report r
3    where year(t.EST_DELIVERY_DATE) = '2018' and
4    r.tracking_detail_id= t.tracking_detail_id and t.package_id = p.package_id
5    and p.SOURCE_ID= f.franchise_id
6    group by f.franchise_location;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: $\bar{A}$

Franchise	Total Revenue
Austin	20
Chicago	90
Denver	510
Miami	35
New York	1165

Total Revenue

2. Volume of packages being delivered on the same route

```sql
1   select a.ROUTE_ID,count(distinct t.tracking_detail_id) as 'NUMBER OF PACKAGES', group_concat(distinct t.PACKAGE_ID) AS 'PACKAGE IDS'
2   from tracking_details t, tracking_assignment a, tracking_assignment a1
3   where t.tracking_detail_id= a.tracking_detail_id and a.route_id=a1.route_id
4   group by route_id;
5
6
7
8
9
10
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: IA

ROUTE_ID	NUMBER OF PACKAGES	PACKAGE IDS
R1	5	F301.F310.F311.F312.F313
R2	4	F302.F306.F317.F318
R3	4	F303.F307.F319.F320
R4	1	F305
R5	1	F304
R8	5	F308.F309.F314.F315.F316

NUMBER OF PACKAGES/ROUTE
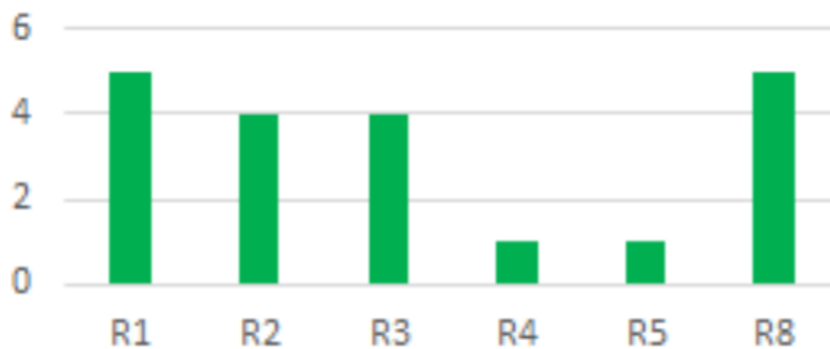
3. Frequency of complaints by type

```sql
10   select    e.description as 'Complaint Type',count(e.enquiry_id) as 'Number of Complaints'
11   from enquiry_complaint e
12   group by e.description;
13
14
15
16
17
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: IA

Complaint Type	Number of Complaints
Damaged Goods	2
Delayed Delivery	3
Late Delivery	1
Payment Issue	4
Tracking Lost Package	1

No. of Complaints

- ■ Damaged Goods
- ■ Delayed Delivery
- ■ Late Delivery
- ■ Payment Issue
- ■ Tracking Lost Package

4. Increase in sales (no. of packages) of the company over the years

```
34 ● SELECT  YEAR(TD.DATE_OF_TRANSACTION) AS 'YEAR1',COUNT(P.PACKAGE_ID) AS 'NUMBER OF PACKAGES'
35   FROM PACKAGE P, tracking_details TD
36   WHERE P.PACKAGE_ID=TD.PACKAGE_ID
37   GROUP BY YEAR1;
38
39
40
41
```

Result Grid | ▦ | ↻ | Filter Rows: | | Export: 🖫 | Wrap Cell Content: ᵼА

YEAR1	NUMBER OF PACKAGES
2016	5
2017	4
2018	11
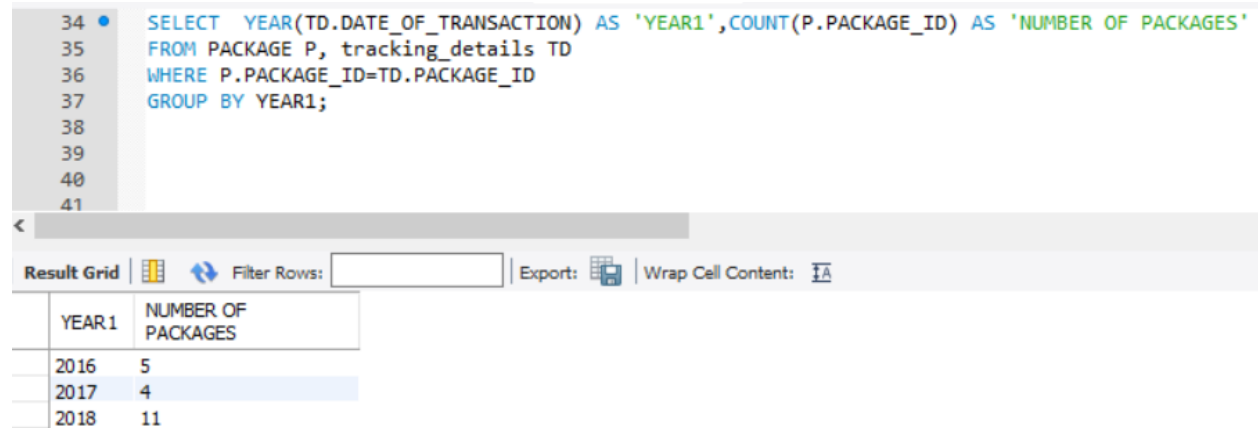
Number of Packages/Year
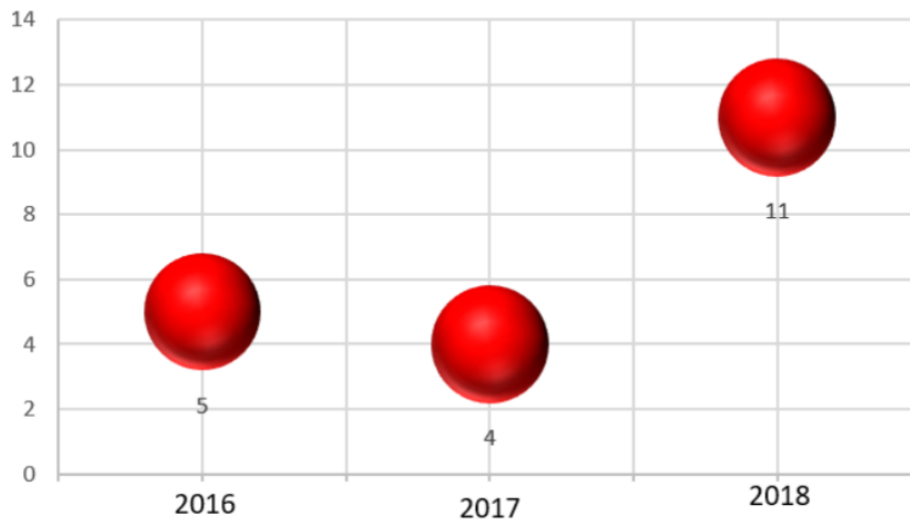
5. Change in revenue over the years

```
43 ● SELECT YEAR(TD.ACTUAL_DELIVERY_DATE) AS 'YEAR', SUM(R.REVENUE)
44   FROM REPORT R, TRACKING_DETAILS TD
45   WHERE R.TRACKING_DETAIL_ID=TD.TRACKING_DETAIL_ID AND TD.DELIVERY_STATUS='DELIVERED'
46   GROUP BY year(TD.ACTUAL_DELIVERY_DATE)
47
48
49   |
```

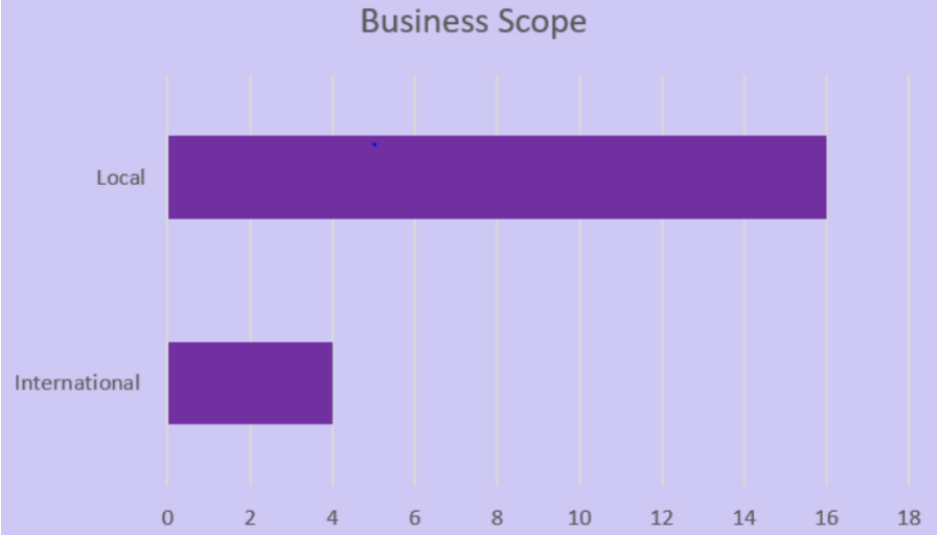Result Grid | Filter Rows: | Export: | Wrap Cell Content:

YEAR	SUM(R.REVENUE)
2016	740
2017	330
2018	1765

Revenue/year
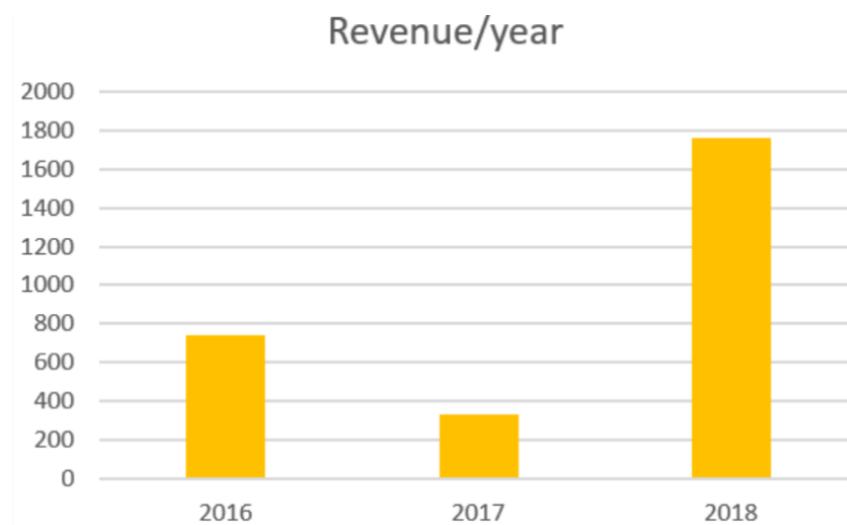
6. Local Vs International delivery

```
1 ● SELECT P.DELIVERY_TYPE,COUNT(P.PACKAGE_ID)
2   FROM PACKAGE P
3   GROUP BY P.DELIVERY_TYPE;
```

Result Grid | Filter Rows: | Export: | Wra

DELIVERY_TYPE	COUNT(P.PACKAGE_ID)
International	4
Local	16

Business Scope

7. Efficiency of service based on estimated and actual delivery date

```
12 •  SELECT (COUNT(TD.TRACKING_DETAIL_ID)/16)*100 AS 'DELIVERY ACCURACY' , "%" AS 'MEASURE'
13     FROM tracking_details TD
14     WHERE TD.EST_DELIVERY_DATE=TD.ACTUAL_DELIVERY_DATE AND DELIVERY_STATUS = 'DELIVERED'
15
16
17
18
19
20
21
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: IA

DELIVERY ACCURACY	MEASURE
75.0000	%

Same Day Delivery Measure

75%
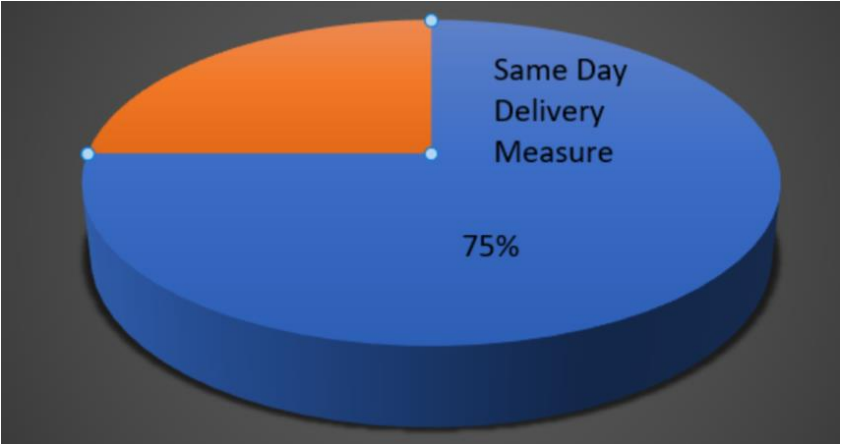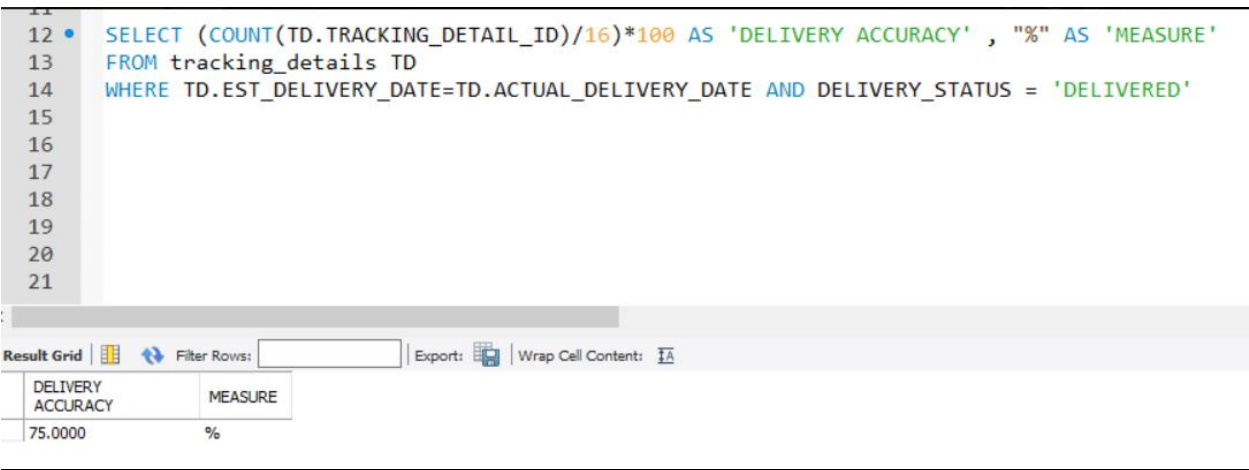
8. Yearly Average Revenue

```
41
42    #8 YEARLY AVERAGE REVENUE
43 ●  SELECT YEAR(TD.DISPATCH_DATE) AS 'YEARS', (SUM(R.REVENUE)/COUNT(TD.PACKAGE_ID)) AS 'AVERAGE REVENUE PER PACKET'
44    FROM REPORT R, TRACKING_DETAILS TD
45    WHERE TD.TRACKING_DETAIL_ID=R.TRACKING_DETAIL_ID
46    GROUP BY YEARS
47    ORDER BY YEARS DESC;
48
49
50
51
52
53    |
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: A

YEARS	AVERAGE REVENUE PER PACKET
2018	165.4545
2017	96.2500
2016	148.0000

Average Revenue per packet
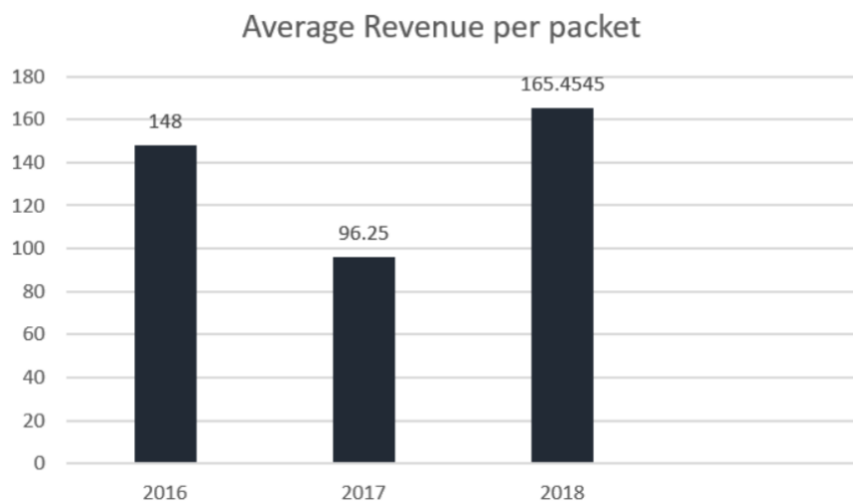
12. PROJECT SUMMARY

12.1 Summarize your experience with this exercise

Our aim for this project was to design and implement a database with high accuracy and low redundancy for a courier service management system. Though such databases already exist, we got an opportunity to have hands-on experience of developing such a system from scratch. Courier service management is a very complicated system as it needs to be real time, accurate and implemented with precision.

While designing the physical model of the database, we tried to implement all the concepts of schema design, normalization and joins taught to us in class. This project taught us how to maintain consistency throughout the conceptual, logical and physical model of the database to gain accurate results on querying the database. Implementing a fully functional database enhanced our understanding of the theoretical concepts of database systems. Also working as a team helped us greatly to understand various ways of writing queries and sub-queries for the same problem. Thus, developing this project was a very enriching experience for us.

12.2 What was the hardest part of this project?

1. The hardest part of the project was to convert the logical model into the physical model. Determining the primary and foreign keys was a tedious task as they had to be in sync with the cardinalities of each relation.

2. As we advanced through our project, we came across various attributes and relationships between different entities that needed to be updated. Missed or wrong attributes would return wrong results upon querying the database. Hence we had to refine our logical and physical model continuously throughout the project.

3. Formulating use cases for all the users was tricky. We had to make sure the use cases represented the functionality of every user appropriately.

4. Making sure that all the use cases are accurately covered while designing the tables was a tedious task. Thus finalizing the UML model was difficult due to continuous modifications needed in the tables.

5. Deciding on the business metrics and formulating the appropriate queries to represent them was a tough task.

12.3 What problems did you run against in this project?

1. The major problem that we faced was to define correct links between different entities of the system while creating the conceptual model. As courier management is a complex system with a lot of entities, it became very difficult to understand what entities should be connected to each other to get values of any attributes queried from the database.

2. There are a lot of relations linked along with their corresponding attributes which led to data inconsistency and inaccurate query results.

3. We had a difficulty in deciding intermediate checkpoints for the routes during package delivery.

4. We had difficulty in tracking real time location to ensure accurate and timely delivery of packages.

12.4 How did you solve these problems?

1. The logical and physical models were refined when various attributes and relationships between the different entities were updated.

2. We normalized the data to avoid redundancy in the data and used joins and subqueries to get the desired query result.

3. We mapped multiple checkpoints(layovers) for each different route for an efficient and smooth package delivery.

4. To track the delivery of packages, we implemented trigger to set delivery status as Delivered by updating current location as receiver's address on completion of the package delivery..

12.5 If you were to do this project again, what methodology would you follow?

1. We would like to implement more number of views, triggers and views in the project to make the querying of the data more employee specific.

2. We would try to introduce more number of entities and attributes in order to maintain detailed information about the consignments, staff, routes and subroutes

3. We would try using NoSQL to implement the same system to understand the working of different kind of database systems.

4. Generate more business metrics to analyze the data in more detail to incur more precise results on querying the database.

12.6 Suggestions for how to refine this project for the next class?

1. Increase the scope of the project by introducing more number routes and subroutes. Make sure the database can accommodate the necessary changes.

2. Auto update the status and location of the consignment at every checkpoint in the database by introducing appropriate triggers in the system.

3. Add other modes of transport like ships and railways along with flights and trucks. Also add necessary relations for businesses to carry out merchandise imports and exports consignments using this courier management service.

4. Introduce the service of picking up the courier from the customers location instead of offering only drop off at the company outlets. Make necessary changes in the database to add details for pick up vehicles, pick up staff and map them to the nearest franchise location.