NATIONAL INSTITUTE OF TECHNOLOGY WARANGAL

(AN INSTITUTE OF NATIONAL IMPORTANCE)

Shipping & Logistics Management Project

By:

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Introduction

In this project, we have designed a database management system to store the logistics and data about the packaged items that a shipment company will ship around the world. The data can be used by both the shipment company and the users seamlessly to gather required information.

This database will contain the senders and receivers details once he/she plans on sending an item to be shipped such as name, email, address, etc. This will be helpful in case of an item being returned back to the sender. We also store the dimensions of the package which will help us in determining the cost of the shipment considering other factors like mode of shipment.

This management system proves useful as we have assigned unique IDs to every relation such as OrderID, BillingID, etc. The sender can feel more connected to the package as he will have access to live tracking of the package. With the relationships present in this database management system, we can gather essential data required quickly and also update data wherever necessary. In the end, billing is taken care of as we care for every user who plans on using this database.

Table of Contents

Tables

1. Sender Table

Stores details about the person sending the package.

ATTRIBUTE	DATATYPE	CONSTRAINTS
UserID	NUMBER	PRIMARY KEY
Name	VARCHAR2(30)	NOT NULL
Email	VARCHAR2(30)	NOT NULL
Phone no	NUMBER	NOT NULL
Address	VARCHAR2(30)	NOT NULL
City	VARCHAR2(30)	NOT NULL
Country	VARCHAR2(30)	NOT NULL

2. Package Table

Stores details about the package itself.

ATTRIBUTE	DATATYPE	CONSTRAINTS
UserID	NUMBER	FOREIGN KEY
ReceiverID	NUMBER	FOREIGN KEY
TransportID	NUMBER	FOREIGN KEY
OrderID	NUMBER	PRIMARY KEY
DateReceived	DATE	NOT NULL
DeliveryDate	DATE	NOT NULL
Weight	NUMBER(5,2)	NOT NULL

3. Delivery Table

Stores details about the costs associated with different shipping options.

ATTRIBUTE	DATATYPE	CONSTRAINTS
TransportID	NUMBER	PRIMARY KEY
TransportMethod	VARCHAR2(20)	NOT NULL
CostPerUnit	NUMBER	NOT NULL

4. Billing Table

Stores details about the final cost.

ATTRIBUTE	DATATYPE	CONSTRAINTS
OrderID	NUMBER	FOREIGN KEY
TransactionID	NUMBER	PRIMARY KEY
Description	VARCHAR(40)	NOT NULL
Cost	NUMBER	NOT NULL

5. Tracking Table

Stores details about the tracking of the package.

ATTRIBUTE	DATATYPE	CONSTRAINTS
OrderID	NUMBER	FOREIGN KEY
TrackingID	NUMBER	PRIMARY KEY
Origin	VARCHAR2(30)	NOT NULL
Current Location	VARCHAR2(30)	NOT NULL
Destination	VARCHAR2(30)	NOT NULL
Date	DATE	NOT NULL

6. Receiver Table

Stores details about the person receiving the package.

ATTRIBUTE	DATATYPE	CONSTRAINTS
ReceiverID	NUMBER	PRIMARY KEY
Name	VARCHAR2(30)	NOT NULL
Phone	VARCHAR2(30)	NOT NULL
Address	VARCHAR2(30)	NOT NULL
City	VARCHAR2(30)	NOT NULL
Country	VARCHAR2(30)	NOT NULL

ER Model Assumptions

- A sender can send multiple packages to multiple receivers and is uniquely identified by his/her sender ID.
- Each package can be sent to only one receiver but a receiver can receive multiple packages and is identified by his/her receiver ID.
- Packages store information such as date of order, delivery date and weight which is uniquely identified by their Order ID.
- The sender can prefer his own method of delivery which associates each package to a Transport ID that can determine the cost per unit of the package and allows multiple senders to have the same Transport ID.
- Each package will finally have its own bill that stores its total cost of transportation along with a unique Transaction ID.
- After shipping the packages, they can also be tracked by the company's servers which are recognized by its Tracking ID that can identify its current location.

Functional Dependencies and Primary Keys

1. Sender

UserID -> {Name,Email,Phone,Address,City,Country}
Since all fields depend on UserID, (UserID)+ -> R
Hence, UserID is the Primary Key.

2. Package

OrderID -> {UserID, ReceiverID, TransportID, Weight, DateReceived, DeliveryDate}
Since all the fields depend on OrderID, (OrderID)+ -> R.
Hence, OrderID is the Primary Key.

3. Delivery

TransportID -> {TransportMethod, CostPerUnit}
TransportMethod -> {TransporID, CostPerUnit}
Since all the fields depend on TransportID
(TransportID)+ -> R
or
They depend on TransportMethod,
(TransportMethod)+ -> R,
Hence,TransportID is the Primary Key.

4. Billing

TransactionID->{Cost,Description,OrderID}
Since all fields depend on TransactionID,
(TransactionID)+ -> R
Hence, TransactionID is the Primary Key

5. Tracking

TrackingID->{Origin,CurrentLocation,Destination,Date,OrderID}

Since all fields depend on TrackingID, (TrackingID)+ -> R

Hence, TrackingID is the Primary Key

6. Receiver

ReceiverID -> {Name,Phone,Address,City,Country}

Since all fields depend on ReceiverID, (ReceiverID)+ -> R

Hence, ReceiverID is the Primary Key

Normalization

1. Sender

Primary Key: UserID
All attributes depend on the UserID, hence the table is 2NF.
All attributes depend directly on UserID, hence the table is in 3NF.
All determinants(UserID) are candidate keys, hence the table is in BCNF.

2. Package

Primary key: OrderID
All attributes depend on the OrderID, hence the table is 2NF.
All attributes depend directly on OrderID, hence the table is in 3NF.
All determinants(OrderID) are candidate keys, hence the table is in BCNF.

3. Delivery

Primary key: TransportID
All attributes depend on the TransportID or TrasnportMethod, hence the table is 2NF.
All attributes depend directly on TransportID or TransportMethod, hence the table is in 3NF.
All determinants(TransportID,TransportMethod) are candidate keys, hence the table is in BCNF.

4. Billing

Primary Key: TransactionID
All attributes depend on the TransactionID, hence the table is 2NF.
All attributes depend directly on TransactionID, hence the table is in 3NF.
All determinants(TransactionID) are candidate keys, hence the table is in BCNF.

5. Tracking

Primary Key: TrackingID
All attributes depend on the TrackingID, hence the table is 2NF.
All attributes depend directly on TrackingID, hence the table is in 3NF.
All determinants(TrackingID) are candidate keys, hence the table is in BCNF.

6. Receiver

Primary Key: ReceiverID
All attributes depend on the ReceiverID, hence the table is 2NF.
All attributes depend directly on ReceiverID, hence the table is in 3NF.
All determinants(ReceiverID) are candidate keys, hence the table is in BCNF.

Relationship Schema

- **Sends**
  Being a one to many relationship between sender and package, it is merged with the package table by having OrderID as its primary key.

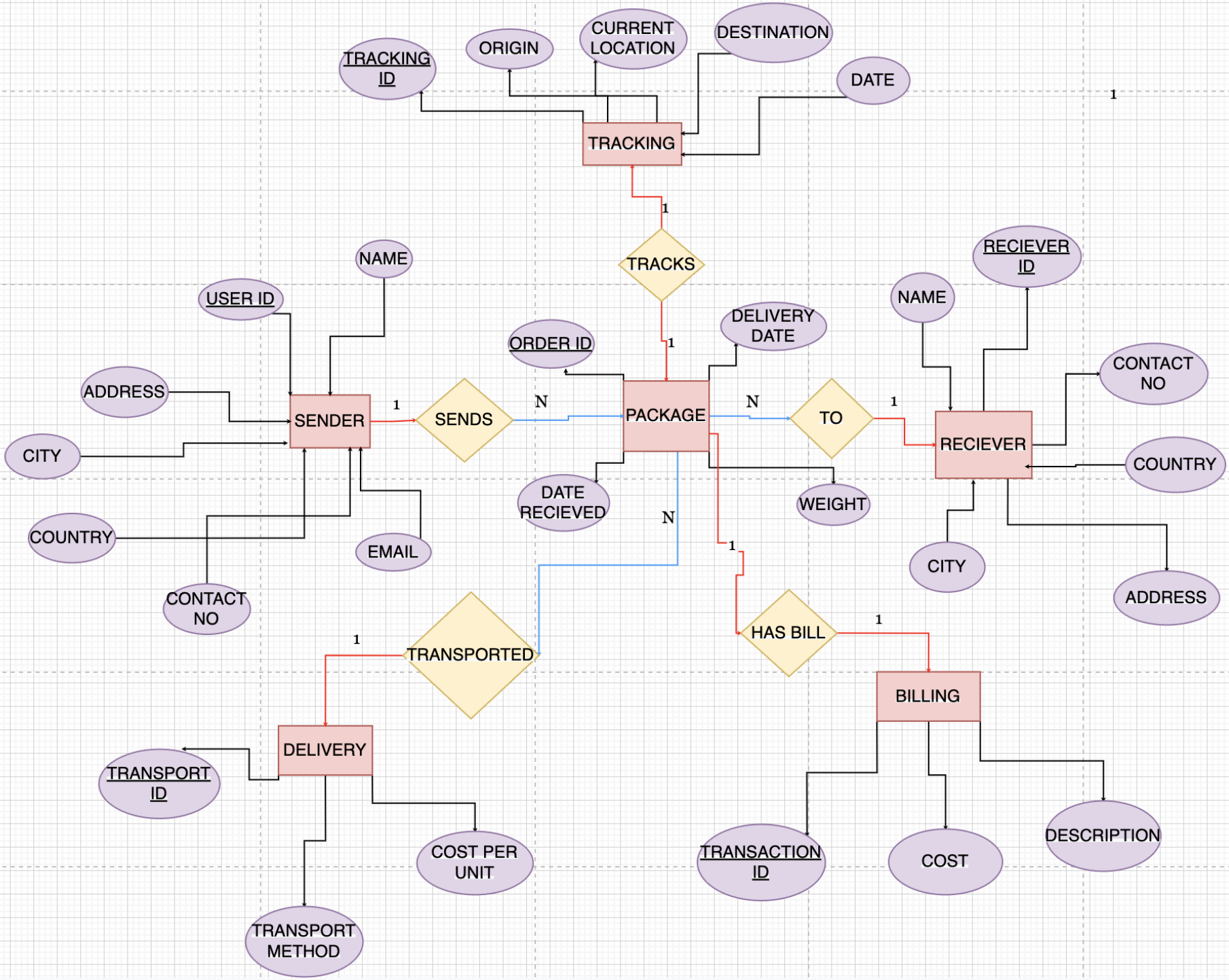
- **Transported**
  Being a one to many relationship between delivery and package, it is merged with the package table by having OrderID as its primary key.

- **To**
  Being a one to many relationship between receiver and package, it is merged with the package table by having OrderID as its primary key.

- **Tracks**
  Being a one to one relationship between package and tracking, it is merged with the tracking table by having TrackingID as its primary key.

- **Has Bill**
  Being a one to one relationship between package and billing, it is merged with the billing table by having TransactionID as its primary key.

ER DIAGRAM


TRACKING ID
ORIGIN
CURRENT LOCATION
DESTINATION
DATE
TRACKING
1
TRACKS
1
NAME
USER ID
ADDRESS
CITY
COUNTRY
CONTACT NO
EMAIL
SENDER
1
SENDS
N
ORDER ID
DELIVERY DATE
PACKAGE
DATE RECIEVED
WEIGHT
N
N
TO
1
RECIEVER ID
NAME
CONTACT NO
COUNTRY
CITY
ADDRESS
RECIEVER
1
HAS BILL
1
1
TRANSPORTED
DELIVERY
TRANSPORT ID
COST PER UNIT
TRANSPORT METHOD
BILLING
TRANSACTION ID
COST
DESCRIPTION

SQL Code:

```
CREATE TABLE Sender (
      userID                NUMBER PRIMARY KEY,
      name                  VARCHAR2(30) NOT NULL,
      email                 VARCHAR2(30) NOT NULL,
      phone                 NUMBER NOT NULL,
      address               VARCHAR2(30) NOT NULL,
      city                  VARCHAR2(30) NOT NULL,
      country               VARCHAR2(30) NOT NULL
);

CREATE TABLE Receiver (
      receiverID            NUMBER PRIMARY KEY,
      name                  VARCHAR2(30) NOT NULL,
      phone                 NUMBER NOT NULL,
      address               VARCHAR2(30) NOT NULL,
      city                  VARCHAR2(30) NOT NULL,
      country               VARCHAR2(30) NOT NULL
);

CREATE TABLE Delivery (
      transportID           NUMBER PRIMARY KEY,
      transportMethod       VARCHAR2(20) NOT NULL,
      costPerUnit           NUMBER(7,2) NOT NULL
);


CREATE TABLE Package (
      userID                NUMBER NOT NULL,
      receiverID            NUMBER NOT NULL,
      transportID           NUMBER NOT NULL,
      orderID               NUMBER PRIMARY KEY,
      dateReceived          DATE NOT NULL,
      deliveryDate          DATE NOT NULL
      weight                NUMBER(7,2) NOT NULL,
      FOREIGN KEY (userID)       REFERENCES Sender (userID),
      FOREIGN KEY (receiverID)   REFERENCES Receiver (receiverID),
      FOREIGN KEY (transportID)  REFERENCES Delivery (transportID),

);


CREATE TABLE Billing (
      transactionID         NUMBER PRIMARY KEY,
      cost                  NUMBER NOT NULL,
      description           VARCHAR(40) NOT NULL,
      orderID               NUMBER,
      FOREIGN KEY (orderID) REFERENCES Package (orderID)
);
```

```
CREATE TABLE Tracking (
      trackingID             NUMBER PRIMARY KEY,
      origin                 VARCHAR2(30) NOT NULL,
      currentLocation        VARCHAR2(30) NOT NULL,
      destination            VARCHAR2(30) NOT NULL,
      date                   DATE NOT NULL,
      orderID                NUMBER,
      FOREIGN KEY (orderID) REFERENCES Package (orderID)
);
-------------------------------------------------------------------
-----

Insert into SENDER (USERID,NAME,EMAIL,PHONE,ADDRESS,CITY,COUNTRY)
values (201,'Walter scott' , 'walterscott@gmail.com'
,202555130,'Orchard Avenue','Denver','United States');

Insert into SENDER (USERID,NAME,EMAIL,PHONE,ADDRESS,CITY,COUNTRY)
values (202,'Walker adams' ,'walkeradams@gmail.com'
,202555169,'Crescent Street','Miami','United States');

Insert into SENDER (USERID,NAME,EMAIL,PHONE,ADDRESS,CITY,COUNTRY)
values (203,'Larry nelson','larrynelson@gmail.com',202555172,'Laurel
Drive','San Francisco','United States');

Insert into SENDER (USERID,NAME,EMAIL,PHONE,ADDRESS,CITY,COUNTRY)
values (204,'Thanishekaran adith', 'santoshadith@gmail.com'
,44567389,'Dubai Downtown','Dubai','United Arab Emirates');

Insert into SENDER (USERID,NAME,EMAIL,PHONE,ADDRESS,CITY,COUNTRY)
values (205,'Soumyajit das', 'soumyajit1998@gmail.com'
,8756873435,'Park Street', 'Kolkata','India');

Insert into SENDER (USERID,NAME,EMAIL,PHONE,ADDRESS,CITY,COUNTRY)
values (206,'Aditya santosh', 'adityasan45@yahoo.com',
8789743214,'White Street','Mumbai','India');

Insert into SENDER (USERID,NAME,EMAIL,PHONE,ADDRESS,CITY,COUNTRY)
values (207,'Emily cabler','emilycabler@gmail.com',33590886,'Route
30','London','United Kingdom');

Insert into SENDER (USERID,NAME,EMAIL,PHONE,ADDRESS,CITY,COUNTRY)
values (208,'Samar garg', 'gargsamar2001@gmail.com',
8997664545,'Crescent Street','Delhi','India');

Insert into SENDER (USERID,NAME,EMAIL,PHONE,ADDRESS,CITY,COUNTRY)
values (209,' Abdul azeem', 'azeemshaik123@gmail.com',
34345050,'Lusail Main','Doha','Qatar');
```

```
Insert into SENDER (USERID,NAME,EMAIL,PHONE,ADDRESS,CITY,COUNTRY)
values (210,'Kenneth brown','kennethbrown@yahoo.com'
,234443115,'Route 30','Manchester','United Kingdom');
```

```
Insert into TRACKING
(TRACKING_ID,ORIGIN,CURRENT_LOCATION,DESTINATION,DATE,ORDERID)
values (501,'United States','United Kingdom','India',to_date('04-
MAY-21','DD-MON-RR'),101);
Insert into TRACKING
(TRACKING_ID,ORIGIN,CURRENT_LOCATION,DESTINATION,DATE,ORDERID)
values (502,'United States','United Kingdom','India',to_date('26-
APR-21','DD-MON-RR'),102);
Insert into TRACKING
(TRACKING_ID,ORIGIN,CURRENT_LOCATION,DESTINATION,DATE,ORDERID)
values (503,'United States','United Kingdom','India',to_date('14-
JUN-21','DD-MON-RR'),103);
Insert into TRACKING
(TRACKING_ID,ORIGIN,CURRENT_LOCATION,DESTINATION,DATE,ORDERID)
values (504,'United Arab Emirates','Italy','United
States',to_date('03-JUN-21','DD-MON-RR'),104);
Insert into TRACKING
(TRACKING_ID,ORIGIN,CURRENT_LOCATION,DESTINATION,DATE,ORDERID)
values (505,'United States','Iceland','United Kingdom',to_date('02-
MAY-21','DD-MON-RR'),105);
Insert into TRACKING
(TRACKING_ID,ORIGIN,CURRENT_LOCATION,DESTINATION,DATE,ORDERID)
values (506,'India','New Zealand','Japan',to_date('02-MAY-21','DD-
MON-RR'),106);
Insert into TRACKING
(TRACKING_ID,ORIGIN,CURRENT_LOCATION,DESTINATION,DATE,ORDERID)
values (507,'India','Bhutan','Nepal',to_date('28-APR-21','DD-MON-
RR'),107);
Insert into TRACKING
(TRACKING_ID,ORIGIN,CURRENT_LOCATION,DESTINATION,DATE,ORDERID)
values (508,'India','Bhutan','Nepal',to_date('08-MAY-21','DD-MON-
RR'),108);
Insert into TRACKING
(TRACKING_ID,ORIGIN,CURRENT_LOCATION,DESTINATION,DATE,ORDERID)
values (509,'United Kingdom','Saudi Arabia','India',to_date('03-MAY-
21','DD-MON-RR'),109);
Insert into TRACKING
(TRACKING_ID,ORIGIN,CURRENT_LOCATION,DESTINATION,DATE,ORDERID)
values (510,'India','United Arab Emirates','Saudi
Arabia',to_date('07-MAY-21','DD-MON-RR'),110);
```

```
Insert into TRACKING
(TRACKING_ID,ORIGIN,CURRENT_LOCATION,DESTINATION,DATE,ORDERID)
values (511,'Qatar','Oman','Bahrain',to_date('02-MAY-21','DD-MON-
RR'),111);
Insert into TRACKING
(TRACKING_ID,ORIGIN,CURRENT_LOCATION,DESTINATION,DATE,ORDERID)
values (512,'United Kingdom','Azerbaijan','India',to_date('04-MAY-
21','DD-MON-RR'),112);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Insert into RECEIVER (RECEIVERID,NAME,PHONE,ADDRESS,CITY,COUNTRY)
values (301,'Venkatesh Thota',7995708966,'Venkat Nagar
Park','Kakinada','India');
Insert into RECEIVER (RECEIVERID,NAME,PHONE,ADDRESS,CITY,COUNTRY)
values (302,'Karthik Rekhapalli',8179409631,'Navabharat
nagar','Rajahmundry','India');
Insert into RECEIVER (RECEIVERID,NAME,PHONE,ADDRESS,CITY,COUNTRY)
values (303,'Hamid Ahmed',8765554345,'Main
road','Warangal','India');
Insert into RECEIVER (RECEIVERID,NAME,PHONE,ADDRESS,CITY,COUNTRY)
values (304,'Jimmy Carter',707578432,'Malibu drive','Malibu','United
States');
Insert into RECEIVER (RECEIVERID,NAME,PHONE,ADDRESS,CITY,COUNTRY)
values (305,'Dio Brando',320840284,'Northern suburb
road','London','United Kingdom');
Insert into RECEIVER (RECEIVERID,NAME,PHONE,ADDRESS,CITY,COUNTRY)
values (306,'Jotaro Kujo',283082483,'Tokyo circle','Tokyo','Japan');
Insert into RECEIVER (RECEIVERID,NAME,PHONE,ADDRESS,CITY,COUNTRY)
values (307,'Rajesh
Kumar',4342940910,'Kritipur','Kathmandu','Nepal');
Insert into RECEIVER (RECEIVERID,NAME,PHONE,ADDRESS,CITY,COUNTRY)
values (308,'RD Sharma',8448948993,'Marine Drive','Mumbai','India');
Insert into RECEIVER (RECEIVERID,NAME,PHONE,ADDRESS,CITY,COUNTRY)
values (309,'Jauwaad Shams',9573590856,'Deira','Riyadh','Saudi
Arabia');
Insert into RECEIVER (RECEIVERID,NAME,PHONE,ADDRESS,CITY,COUNTRY)
values (310,'Keshav Ganesh',50456778,'Village
Road','Manama','Bahrain');


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Insert into PACKAGE
(USERID,RECEIVERID,TRANSPORTID,ORDERID,DATERECEIVED,DELIVERYDATE,WEI
GHT) values (201,301,2,101,to_date('10-MAR-21','DD-MON-
RR'),to_date('10-MAY-21','DD-MON-RR'),150);
Insert into PACKAGE
(USERID,RECEIVERID,TRANSPORTID,ORDERID,DATERECEIVED,DELIVERYDATE,WEI
```

```
GHT) values (202,302,3,102,to_date('05-APR-21','DD-MON-
RR'),to_date('28-APR-21','DD-MON-RR'),10);
Insert into PACKAGE
(USERID,RECEIVERID,TRANSPORTID,ORDERID,DATERECEIVED,DELIVERYDATE,WEI
GHT) values (203,303,2,103,to_date('15-APR-21','DD-MON-
RR'),to_date('16-JUN-21','DD-MON-RR'),120);
Insert into PACKAGE
(USERID,RECEIVERID,TRANSPORTID,ORDERID,DATERECEIVED,DELIVERYDATE,WEI
GHT) values (204,304,5,104,to_date('20-APR-21','DD-MON-
RR'),to_date('05-JUN-21','DD-MON-RR'),200);
Insert into PACKAGE
(USERID,RECEIVERID,TRANSPORTID,ORDERID,DATERECEIVED,DELIVERYDATE,WEI
GHT) values (202,305,1,105,to_date('24-APR-21','DD-MON-
RR'),to_date('04-MAY-21','DD-MON-RR'),18);
Insert into PACKAGE
(USERID,RECEIVERID,TRANSPORTID,ORDERID,DATERECEIVED,DELIVERYDATE,WEI
GHT) values (205,306,4,106,to_date('29-APR-21','DD-MON-
RR'),to_date('03-MAY-21','DD-MON-RR'),9);
Insert into PACKAGE
(USERID,RECEIVERID,TRANSPORTID,ORDERID,DATERECEIVED,DELIVERYDATE,WEI
GHT) values (206,307,6,107,to_date('07-APR-21','DD-MON-
RR'),to_date('30-APR-21','DD-MON-RR'),30);
Insert into PACKAGE
(USERID,RECEIVERID,TRANSPORTID,ORDERID,DATERECEIVED,DELIVERYDATE,WEI
GHT) values (206,307,3,108,to_date('02-APR-21','DD-MON-
RR'),to_date('10-MAY-21','DD-MON-RR'),0.5);
Insert into PACKAGE
(USERID,RECEIVERID,TRANSPORTID,ORDERID,DATERECEIVED,DELIVERYDATE,WEI
GHT) values (207,308,4,109,to_date('30-APR-21','DD-MON-
RR'),to_date('05-MAY-21','DD-MON-RR'),20);
Insert into PACKAGE
(USERID,RECEIVERID,TRANSPORTID,ORDERID,DATERECEIVED,DELIVERYDATE,WEI
GHT) values (208,309,1,110,to_date('22-APR-21','DD-MON-
RR'),to_date('09-MAY-21','DD-MON-RR'),6);
Insert into PACKAGE
(USERID,RECEIVERID,TRANSPORTID,ORDERID,DATERECEIVED,DELIVERYDATE,WEI
GHT) values (209,310,1,111,to_date('19-APR-21','DD-MON-
RR'),to_date('04-MAY-21','DD-MON-RR'),10);
Insert into PACKAGE
(USERID,RECEIVERID,TRANSPORTID,ORDERID,DATERECEIVED,DELIVERYDATE,WEI
GHT) values (210,309,4,112,to_date('29-APR-21','DD-MON-
RR'),to_date('06-MAY-21','DD-MON-RR'),11);


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Insert into DELIVERY (TRANSPORTID,TRANSPORTMETHOD,COSTPERUNIT)
values (1,'AIR',300);
Insert into DELIVERY (TRANSPORTID,TRANSPORTMETHOD,COSTPERUNIT)
values (2,'SEA',50);
```

```
Insert into DELIVERY (TRANSPORTID,TRANSPORTMETHOD,COSTPERUNIT)
values (3,'LAND',150);
Insert into DELIVERY (TRANSPORTID,TRANSPORTMETHOD,COSTPERUNIT)
values (4,'EXPRESS AIR',450);
Insert into DELIVERY (TRANSPORTID,TRANSPORTMETHOD,COSTPERUNIT)
values (5,'EXPRESS SEA',90);
Insert into DELIVERY (TRANSPORTID,TRANSPORTMETHOD,COSTPERUNIT)
values (6,'EXPRESS LAND',250);
```

```
Insert into BILLING (TRANSACTIONID,COST,DESCRIPTION,ORDERID) values
(401,7500,'SCOOTER',101);
Insert into BILLING (TRANSACTIONID,COST,DESCRIPTION,ORDERID) values
(402,1500,'BOOKS',102);
Insert into BILLING (TRANSACTIONID,COST,DESCRIPTION,ORDERID) values
(403,6000,'TREADMILL',103);
Insert into BILLING (TRANSACTIONID,COST,DESCRIPTION,ORDERID) values
(404,18000,'MOTOR BIKE',104);
Insert into BILLING (TRANSACTIONID,COST,DESCRIPTION,ORDERID) values
(405,5400,'FRIDGE',105);
Insert into BILLING (TRANSACTIONID,COST,DESCRIPTION,ORDERID) values
(406,4050,'AC',106);
Insert into BILLING (TRANSACTIONID,COST,DESCRIPTION,ORDERID) values
(407,7500,'WASHING MACHINE',107);
Insert into BILLING (TRANSACTIONID,COST,DESCRIPTION,ORDERID) values
(408,75,'DOCUMENTS',108);
Insert into BILLING (TRANSACTIONID,COST,DESCRIPTION,ORDERID) values
(409,9000,'BED',109);
Insert into BILLING (TRANSACTIONID,COST,DESCRIPTION,ORDERID) values
(410,1800,'SPEAKER',110);
Insert into BILLING (TRANSACTIONID,COST,DESCRIPTION,ORDERID) values
(411,3000,'COMPUTER',111);
Insert into BILLING (TRANSACTIONID,COST,DESCRIPTION,ORDERID) values
(412,4950,'SOFA',112);
```