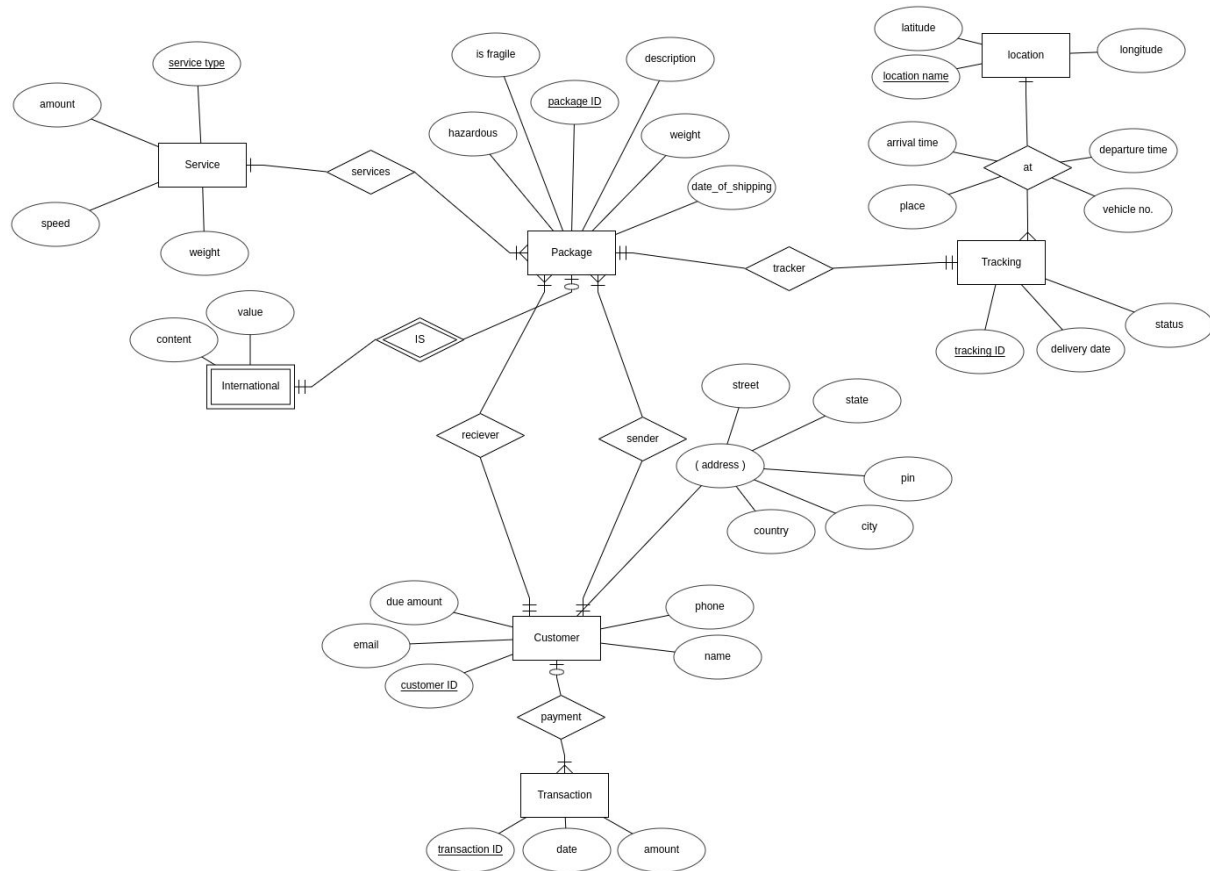Name: Souhardya Das Chowdhury
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Date:30/11/2020

In this project,I have implemented a relational database of a package delivery system.

Here,goes the E-R Model(Entity-Relation Model) for my database---

The Entity Sets along with their respective Tables along with their respective attributes are explained below:

1)**_Package-_** the heart of our entire database. Its attributes are

Package_ID- Type is int. This is the primary key used to uniquely identify a package.

Sender_customer_ID: Customer_ID of sender foreign key of customer entity

Receiver_customer_ID: Customer_ID of receiver foreign key of customer entity

Track_ID: Foreign key of Tracking entity

Service_Type: Foreign Key of Service entity

Other Attributes: Description, weight, is_fragile, hazardous

2)**_Service-_**Strong entity set.Its attributes are-

   Primary key-service_type(**(flat envelope, small box, larger boxes, etc.),**

Other attributes are amount(Billing of that particular service),weight(foreign key,taking reference from Package table), and speed(Expected duration of delivery).

3)**_Customer-_**

   Primary key-Customer_ID.(Unique value to identify each customer).

  Other attributes-Name,Phone,Email,Due_Amount.All these are simple attribute,and a composite attribute address(street,city,state,pin,country).

4)**_Transaction-_**

Primary key-Trans_ID.

Other attributes-Amount(It is the transaction amount of float type) and Date (Date of transaction of datatype date).

5)**_Tracking-_**

Primary key-tracking_id.

Other attributes-Delivery date(status of each delivery day,where it is,shipment or which city), and Status(Delivered or on the way).

6)**_Location-_**

Primary key-location_name.

Other attributes-latitude and longitude.

Relations-

1)services
Many to one Relation from entity package to service.
Primary key-Package_ID

2)sender-
Many to One Relation from entity package to Customer.
Primary key-Package_ID

3) receiver-
Many to one Relation from entity package to Customer.
Primary key-Package_ID

4)Payment-
Many to one Relation from entity transaction to Customer.
Primary key-Transaction_ID

5)Tracker-
One to one Relation from entity package to Tracking.
Primary key-Package_ID,

6)at-
Many to many Relations- Relation between Tracking and location.
Primary key-Tracking_ID and Location_name
Other attributes- place, vehicle_no, arrival time and departure time

Codes to create table,populate with datas and answer query results-

//create tables;

1.create table customer(customer_id int primary key,name varchar(30),phone varchar(15),email varchar(30),Due_Amount float,street varchar(30),city varchar(30),state varchar(30),pin varchar(30),country varchar(30));

2.create table tracking(tracking_id int primary key,Delivery_Date date,status varchar(30));

3.create table transaction(trans_id int primary key, customer_id int, amount int, Date_of_transaction date, constraint fk2 foreign key(customer_id) references customer(customer_id));

4.create table service(service_type varchar(30) primary key,weight float,amount float,speed varchar(30));

5.create table package(package_id int primary key, sender_customer_id int, date_of_shipping date,reciever_customer_id int, service_type varchar(20), Description varchar(20), weight float, is_fragile char(1), hazardous varchar(20), tracking_id int, constraint fk1 foreign key(service_type) references service(service_type), constraint fk9 foreign key(sender_customer_id) references customer(customer_id),constraint fk10 foreign key(reciever_customer_id) references customer(customer_id));

6.create table location(location_name varchar(30) primary key,latitude float,longitude float);

7.create table at(tracking_id int, location_name varchar(20), vehicle_no int, place varchar(20), arrival_time timestamp, departure_time timestamp, primary key(tracking_id, location_name,vehicle_no),constraint fk7 foreign key(tracking_id) references

tracking(tracking_id), constraint fk8 foreign key(location_name) references location(location_name));

8.create table international(package_id int,value float,content varchar(30),constraint fk20 foreign key(package_id) references package(package_id));

Do Select count(*) for each table and write the answer.

Queries-

#Find the customer who has shipped the most packages in the past year.

Ans; select sender_customer_ID, count(sender_customer_ID) from package group by sender_customer_ID having count(sender_customer_ID) = (select max(maxcount) from (select sender_customer_ID, count(sender_customer_ID) maxcount from package where date_of_shipping >= "2019-11-30" group by sender_customer_ID) as T);

#Find the customer who has spent the most money on shipping in the past year

Ans- Find the customer who has spent the most money on shipping in the past year
mysql> select sender_customer_ID, sum(amount) from package inner join service on service.service_type=package.service_type group by sender_customer_ID having sum(amount) = (select max(amt) from (select sender_customer_ID, sum(amount) amt from package inner join service where service.service_type=package.service_type and date_of_shipping >= "2019-11-30" group by sender_customer_ID) as T);

#Find the street with the most customers.
Ans: select street, max(countstreet) from (select street, count(street) as countstreet from customer group by street) as T;

#Find those packages that were not delivered within the promised time

Ans: select package_ID from package inner join service inner join tracking where service.service_type=package.service_type and tracking.tracking_ID=package.tracking_ID and delivery_date-date_of_shipping>speed;

#Take Customer ID and provide the details such as customer name, address, and amount owed.

Ans: select Name, concat_ws(' ', street, city, pin, state, country) as Address, Due_Amount from customer where Customer_ID=2;

#A bill listing charges by type of service.

Ans : select service.service_type, sum(amount) as amt from package inner join service where service.service_type=package.service_type group by service.service_type;

THANK YOU