STEP-WISE ANALYSIS OF CASE STUDY

#### ONLINE BUS BOOKING SYSTEM

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# 1.Identification of Entity Sets:

* Operators
* Buses
* Passengers
* Payment
* Routes
* Coupons
* Feedback
* Boarding\_points

2.Modeling Attributes, Keys:

1. **Operators:**

* O\_id
* O\_name
* O\_email
* O\_contact

**Primary key:** (O\_id);

Operators are service providers in this system.Each operator is given a unique identity O\_id .

* O\_id : Operators id.
* O\_name : Operators name
* O\_email : Operators email
* O\_contact : Operator head office contact

1. **Buses: (Weak Entity Set)**

* B\_id
* Seats\_type
* Bus\_type

Buses is weak entity set as it shows existence dependency on Operators.Each operator provide different types of buses for different routes.

* B\_id : describes id of the bus.
* Seats\_type : descibes the type of seats in that particular bus like Sleeper,Semi-Sleeper etc,.
* Bus\_type : descibes whether the bus is A/C or Non A/C.

**Discriminator:** B\_id.

**Primary key:** (B\_id,O\_id).

1. **Passengers:**

* P\_name
* P\_id
* gender
* age
* P\_contact
* P\_email\_id
* journey\_date

**Primary key:** P\_id.

Passengers entity has the attributes which descibes details of persons who purchase ticket of a particular bus.Each passenger is given unique id P\_id.

* P\_id : Unique id given to each passenger
* P\_name : Name of the passenger
* gender : Gender of passenger
* age : Age of the passenger
* Contact : Phone number of passenger
* Email\_id : Email id of the passenger
* Journey\_date : Journey date of passenger

1. **Payment:**

* Txn\_id
* Mthd\_payment
* final\_amnt
* Card\_number.

**Primary key:** Txn\_id.

Payment entity has the attributes which describes details of payments made by passengers for their journey.

* Txn\_id : Transaction id of payment made.
* Mthd\_payment : Payment Method
* final\_amnt : Final amount of ticket after applying service tax and coupon if any.
* Card\_number : ATM card number if debit or credit card is used for payment.

1. **Routes:**

* R\_id
* dept\_city
* arr\_city
* jr\_time --->(dept\_time, arr\_time)

**Primary key:** R\_id.

Routes entity set implies the source and destination cities through which buses travel.Each route is given a unique identity R\_id.

jr\_time is composite attribute.

* R\_id : Unique id given to route.
* dept\_city : Depature or Source city.
* arr\_city : Destination or Arrival city .
* dept\_time : time at which bus starts from dep\_city.
* arr\_time : time at which bus arrives the destination.

1. **Coupon:**

* Cpn\_code
* Discount\_ %
* Max\_discount
* valid\_date

**Primary key:**  Cpn\_code.

Coupons entity set implies the offers or discounts given to passengers to attract them and improve number of bookings.

* Cpn\_code : Code of coupon applied while making payment.
* Discount\_% : Percentage of fare given as discount.
* Max\_discount : Max value waved off for the fare.
* valid\_ date : date upto which coupon is valid.

1. **Feedback**:

* F\_id
* rating
* comments

**Primary key:** F\_id

Feedback entity set implies the experience shared by passengers regarding their journey.They can given rating(out of 5) and comments (remarks).Each feedback is given a unique id F\_id.This feedback given will be shown to the corresponding operator and necessary improvements are suggested.The rating given for that particular bus is averaged which is one of the filters in searching of buses.

* F\_id : unique id given for feedback
* rating : number(out of 5 ) given for bus.
* comments : any special remarks.

1. **Boarding\_points: (Weak Entity Set)**

* Bp\_name
* Bp\_id
* Bp\_time

**Discriminator:** Bp\_id

**Primary key:** (Bp\_id, (B\_id,O\_id) , (R\_id) )

Boarding\_points is weak entity set as it shows existence dependancy on (Buses+Routes).Different buses in different routes have different boarding points.This facility is provided to passengers as it is difficult for them who are far away from the starting point of the bus.

* Bp\_name : name of the boarding point.
* Bp\_id : id of boarding point.
* Bp\_time : time at the bus will reach that boarding point.

3. Identification of Relationships:

|  |  |  |  |
| --- | --- | --- | --- |
| S.NO | Entity Set | Relationship | Entity Set |
| 1 | Operators | PROVIDE | Buses |
| 2 | Buses+Operators | FROM – TO | Routes |
| 3 | Buses + Routes+Operators | RESERVE | Passengers |
| 4 | Passengers | RESERVE | Payment |
| 5 | Coupon | APPLIED- TO | Payment |
| 6 | Passengers | GAVE | Feedback |
| 7 | Operators+Buses+Routes | HAVE | Boarding\_points |

4. Descriptive attributes of Relationships:

|  |  |
| --- | --- |
| RELATIONSHIP | DESCRIPTIVE ATTRIBUTE |
| RESERVE | Ticket \_no , booking\_date |
| FROM-TO | Days , Fare |

##### ***5. Description Of Relations:***

1. **PROVIDE** : [Operators,Buses]

Mapping cardinality : (1 : M)

Operators : Total participation

Buses : Total participation

1. **FROM-TO** : [(Operators+Buses),Routes]

Mapping cardinality : (M : M)

Buses : Total participation

Routes : Total participation

Days is a multi-valued descriptive attribute in FROM-TO relationship which shows which bus is available on particular day.

Fare is descriptive attribute which describes for a particular bus and route combination.

1. **HAVE**  : [(Operators+Buses+Routes) ,Boarding\_points]

Mapping cardinality : (M : M)

Operatos+Buses+Routes : Total participation

Boarding\_points : Total participation

1. **RESERVES** : [(Operators+Buses+Routes), Passengers,Payment]

Mapping cardinality : (M : N : P)

Payment : Total participation

Operators+Buses+Routes : Partial participation

Passengers : Total participation

Ticket\_no and booking\_date are descriptive attributes of RESERVES relation.Ticket\_no is given fo each passenger for particular booking. booking\_date is date on which booking is made.

1. **APPLIED-TO** : [Coupons ,Paymet]

Mapping cardinality : (1 : M)

Coupons : Partial participation

Payment : Partial participation

1. **GAVE** : [Passengers, Feedback]

Mapping cardinality : (1 : M)

Passengers : Partial participation

Feedback : Total participation

TRANSFORMING ER-DIAGRAM INTO TABLES :

#### **1.Entity sets into tables:**

1. **Operator :**

* O\_id int;
* O\_name varchar(15) not null;
* O\_email varchar(25) not null;
* O\_contact varchar(10) not null;
* Primary key(O\_id);

1. **Buses :**

* B\_id int;
* Seats\_type varchar(20) not null;
* Bus\_type varchar(10) not null;
* O\_id int;
* Foreign key(O\_id) references Operator(O\_id);

1. **Routes :**

* R\_id int;
* dept\_city varchar(15) not null;
* arr\_city varchar(15) not null;
* dept\_time varchar(10) not null;
* arr\_time varchar(10) not null;
* Primary key(R\_id);

1. **Boarding\_points :**

* Bp\_id int;
* Bp\_name varchar(40) not null;
* Bp\_time varchar(10) not null;
* Foreign keys O\_id,R\_id,B\_id.

1. **Payment :**

* Txn\_id int;
* Mthd\_payment varchar(15) not null;
* final\_amnt int not null;
* card\_no varchar(20) not null;
* Primary key(Txn\_id);

1. **Coupons :**

* Cpn\_code varchar(10);
* Discount\_% int not null;
* Max\_discount int not null;
* valid\_date date not null;
* Primary key(Cpn\_code);

1. **Feedback :**

* F\_id int;
* rating int;
* comments text;
* Primary key(F\_id);

1. **Passengers :**

* P\_id int;
* P\_name varchar(20) not null;
* P\_email varchar(40) not null;
* P\_contact varchar(10) not null;
* gender character(1) not null;
* journey\_date date;
* age int;
* Primary key(P\_id);

#### **2.Relationships into tables :**

1. **From-To :**

* Foreign key (O\_id,R\_id,B\_id);
* Fare int;

1. **Days (multi-valued attribute of From-To relation) :**

* Foreign key(O\_id,R\_id,B\_id);
* Days varchar(10);

1. **Reserves :**

* Foreign key(O\_id,R\_id,B\_id,Txn\_id,P\_id);
* Ticket\_no varchar(10);
* booking\_date date;

1. **Applied –To :**

* Foreign key(Txn\_id);
* Foreign key(Cpn\_code);

#### **ER-DIAGRAM OF ONLINE BUS BOOKING SYSTEM :**

