FORMAL DESCRIPTION:

Entities:

Train, Seat\_Status, Passenger, Route, Payment, Admin

Attributes of Entities:

**Train :** *Single Valued Attributes:* Train\_id, Train\_name, Train\_type

**Passenger :** *Single Valued Attributes:* SSN, Age, Gender, Phn\_num

*Composite Attributes:* ​ Fname, Minit, Lname

**Route :** *Single Value Attributes:* Source, Destination, Arr\_time, Dep\_time, Fair

**Admin :** *Single Value Attributes:* User\_id, Password

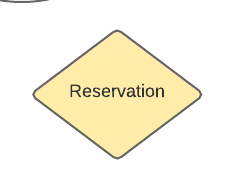
**Payment :** *Single Value Attributes:* Payment\_id, Mode, Status, Payment\_date

**Seat\_Status :** *Single Value Attributes:* Date, Status, Seat\_no

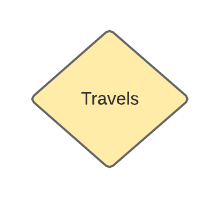
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Relationships :

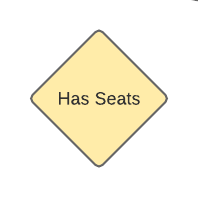
1. Reservation:



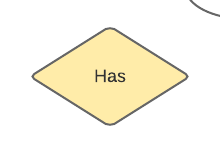
1. Travels:



1. Has Seats

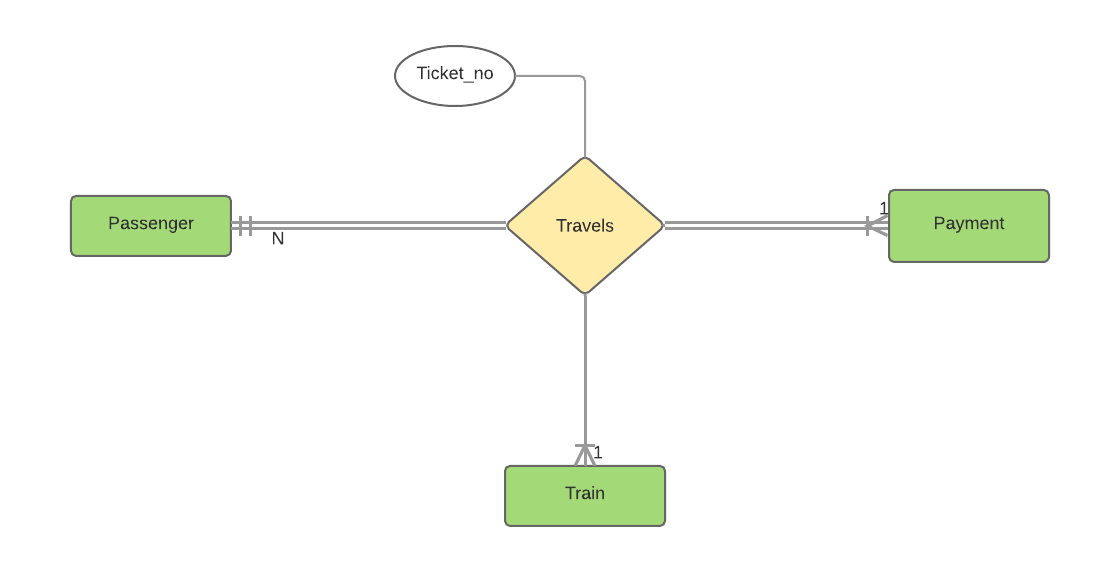


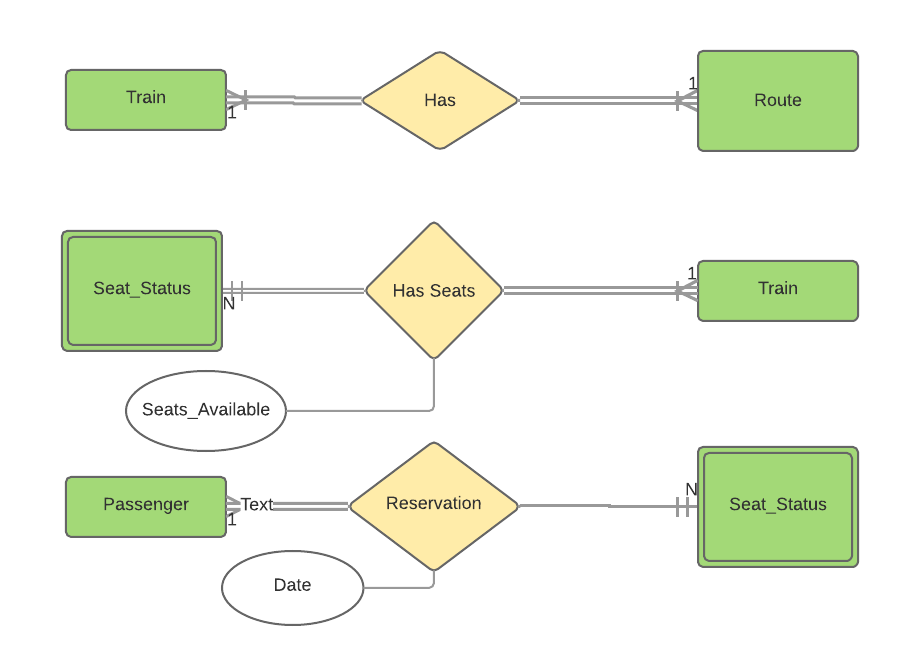
1. Has



**Total and Partial participation constraints, Mapping cardinalities:**

1. **Many to Many Relationship, One to One Relationsip and One to Many Relationships:**

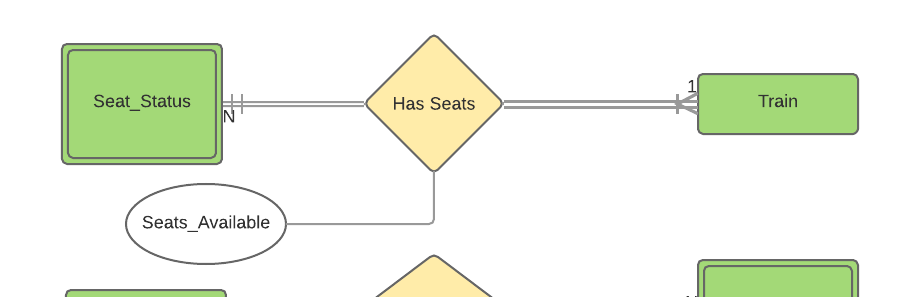




**Mapping ER diagram to Relational Database schema:**

**A. One to Many(1 to N) relationship mapping into tables:**

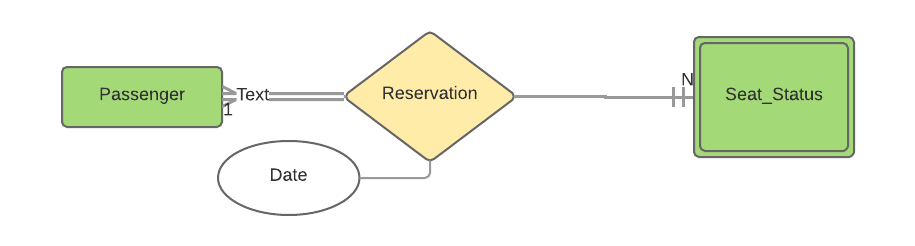
**1. As per 1 to N mapping we added ‘S\_Train\_id’ attribute to Seat\_Status as a Foreign Key that refers Primary key ‘​Train\_id’​ of Train and added attribute Seats\_Available of Relation to Seats\_Status.**



**Seat\_Status(Date, Status, Seat\_no, S\_Train\_id, Seats\_Available)**

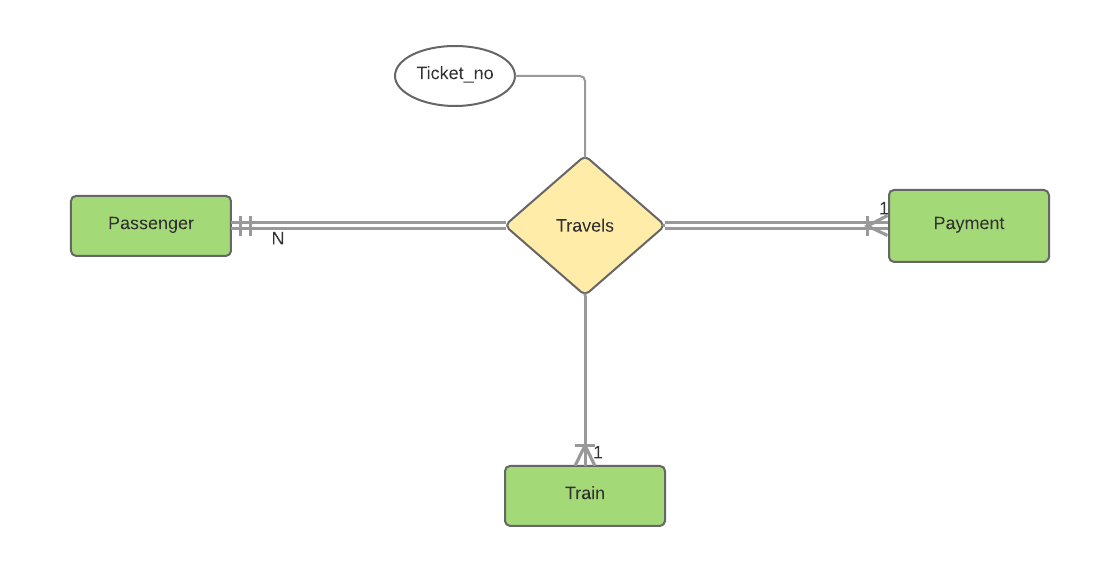
**Train(Train\_id, Train\_type, Train\_name)**

1. **As per 1 to N mapping we added ‘S\_SSN’ attribute to Seat\_Status as a Foreign Key that refers Primary key ‘​SSN​’ of Passenger.**



**Seat\_Status(Date, Status, Seat\_no, S\_Train\_id, S\_SSN, Seats\_Available)**

**Passenger(SSN, Fname, Minit, Lname, Gender, Age, Phn\_num)**



**Consider Passenger to Train**

1. **As per 1 to N mapping we added ‘P\_Train\_id’ attribute to Passenger as a Foreign Key that refers Primary key ‘Train\_id​’ of Train and added attribute Ticket\_no added to Passenger.**

**Passenger(SSN, Fname, Minit, Lname, Gender, Age, Phn\_num, P\_Train\_id, Ticket\_no)**

**Train(Train\_id, Train\_type, Train\_name)**

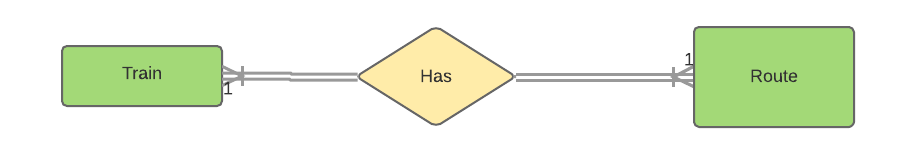
**Consider Passenger to Payment**

1. **As per 1 to N mapping we added ‘P\_payment\_id’ attribute to Passenger as a Foreign Key that refers Primary key ‘​Payment\_id’​ of Payment.**

**Passenger(SSN, Fname, Minit, Lname, Gender, Age, Phn\_num, P\_Train\_id, Ticket\_no, P\_payment\_id)**

**Payment(Payment\_id, Mode, Status, Payment\_date)**

**B. ​One TO One Relationship mapping:**



1. **As per 1 to 1 mapping we merged both the Train and Route as one entity and gave Train\_id as a primary key.**

**Train\_route(Train\_id, Train\_name, Train\_type, Source ,Destination, Arr\_time, Dep\_time, Fare)**