Project Name/ Railway Station

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Explanation

Entities:

-In railway station we have **Employees** each employee has a **Id** and **SSN** and these attributes are unique and not null (but we choose the primary key **Id** because its size is smaller), **Name** is composite of **First-Name** and **Last-Name**, **Job-Type**, **Salary**, **Date-Of-Birth, Age** is derived attribute because we can get it from **Date-Of-Birth** (Age=SYSDATE - Date-Of-Birth), **Email** and phone number which is multivalued attribute.

-Also we have **Trains** each train has a **Number** and its unique and not null (primary key), **Model**, **Capacity**, when train is leaving the station it has an attribute **Leaving-Time** and when train is arriving the station it has an attribute **Arrival-Time**.

-We have **Leaving-Station** each leaving station has a **Name** and **Id** there are unique and not null (primary key).

-We have **Arrival-Station** each arrival station has a **Name** and **Id** there are unique and not null (primary key).

-We have **Tickets** each ticket has a **Ticket-Number** and it's unique and not null (primary key), **trip-num**, price, class and **trip-duration**.
We have **Passengers** each passenger has **SSN** and its unique and not null (primary key), **name** is composite of **first name** and **last name**, **phone number**.

-We have **FEE** and its weak entity because it hasn't a unique or not null key (hasn't primary key) and it has a **violation** (partial key) and **fee-price** and it dependence to passenger.

Assumptions& Relations

1- Drive (between employee & train):

A part of employees (where **job-type** is driver) not all employees will drive train so the relation will be (**partial participation**) & every train is being driven by an employee (driver) so the relation will be (**total participation**).
Cardinality ratio **(1:1)** because:
The driver can drive one train& the train is being driven by 1 driver.

2- Sells (between employee& ticket):

A part of employees (where **job-type** is ticket seller) not all employees will sell tickets so the relation will (**partial participation**) & every ticket will be sold by an employee (ticket seller) so the relation will be (**total participation**).
Cardinality ratio **(1: M)** because:
The seller can sell many tickets & each ticket is being sold by 1 seller.

3- Leaves (between Trains& station):
Every train must leave from station so the relation will be (**total participation**) & each station is being leaved by a train so the relation will be (**total participation**).
Cardinality ratio **(1: M)** because:
Each train can leave 1 station at time & each station is being leaved by many trains.

4- Reaches (between Trains& station):
Every train must arrive to station so the relation will be (**total participation**) & each station is being arrived by a train so the relation will be (**total participation**).
Cardinality ratio **(1: M)** because:
Each train can arrive 1 station at time & each station is being arrived by many trains.

5- Has (between tickets& station):
Every ticket has a leaving or arrival station printed on it so the relation will be (**total participation**) & each station (leaving or arrival) has a ticket so the relation will be (**total participation**).

6- Buy (between Passenger& ticket):
Every passenger must buy a ticket so the relation will be (**total participation**) & each ticket is being bought by a passenger so the relation will be (**total participation**).
Cardinality ratio **(1: M)** because:
Each passenger can buy many tickets & each ticket is being bought by 1 passenger.

7- Made a violation (between passenger & fee):
A part of passengers may make a violations (fees) so the relation will be (**partial participation**) & every fee is being made by passengers so the relation will be (**total participation**).
Cardinality ratio **(M: N)** because:
Each passenger can made many violations > M.
Example: if passenger smoke or throw a rubbish in the train or station.
Each violation may be made by many passenger > M