

Comsats University Islamabad



ASSIGNMENT – 1

Entity Relationship Modeling

Database Systems

Submitted to
Engr. Modassir Ishfaq

Submitted by
Muhammad Ahmad (FA23-BCE-113)

Computer Engineering

Statement:

A Country Bus Company owns a number of busses. Each bus is allocated to a particular route, although some routes may have several buses. Each route passes through several towns. One or more drivers are allocated to each stage of a route, which corresponds to a journey through some or all of the towns on a route. Some of the towns have a garage where buses are kept and each of the busses are identified by the registration number and can carry different numbers of passengers, since the vehicles vary in size and can be single or double-decked. Each route is identified by a route number and information is available on the average number of passengers carried per day for each route. Drivers have an employee number, name, address, and sometimes a telephone number

Identifying Key Information:

Relationship

1. Each bus is allocated to a particular route, although some routes may have several buses.
2. Each route passes through several towns.
3. One or more drivers are allocated to each stage.
4. Some of the towns have a garage.
5. Garage where buses are kept.
6. Each stage of a route corresponds to a journey through some or all of the towns on a route.

Attributes

1. Each of the busses are identified by the registration number and can carry different numbers of passengers, since the vehicles vary in size and can be single or double-decked.
2. Drivers have an employee number, name, address, and sometimes a telephone number.
3. Each route is identified by a route number and information is available on the average number of passengers carried per day for each route.

Note: Above are the information given, assumptions will also be done when I need it. Also on the next page I am going to write relationship and attributes in the same sequence as given above.

Country Bus Company:

1. Entities:

- Busses
- Routes
- towns
- drivers
- stages
- garages

2. Relationship (degree, Cardinality, optionality), Verbs:

1. Bus $\xrightarrow{\text{is assign to}}$ Route

degree: Binary

cardinality: 1-m

optionality: every bus must have route but a route exist without bus.

2. Route $\xrightarrow{\text{passes through}}$ Town

degree: Binary

cardinality: m-n

optionality: route must pass through town but town can exist without passing a single bus.

3. Driver $\xrightarrow{\text{is assign to}}$ Stage

degree: Binary

cardinality: 1-m

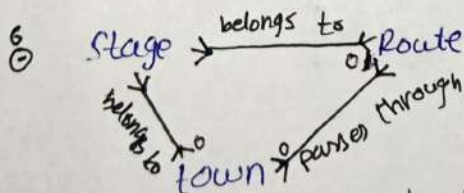
optionality: A driver may not have stage but each stage must have drivers.

4. Town $\xrightarrow{\text{have}}$ Garage

degree: Binary

cardinality: 1-1

optionality: every town may not have garage but garage must be located in any town



degree: Ternary

cardinality: m-m₁-m₂

optionality: stage must belong to route and pass through town, but route may exist without stage. and, also town may not be part of stage and route

5. Bus $\xrightarrow{\text{have}}$ Garage

degree: Binary

cardinality: 1-m

optionality: bus must have garage to park but garage can exist without busses

3: Attributes:

BUS
 # bus-id
 * bus-regNo
 * bus-capacity
 * bus-size (single/double)
 * route-id (fk)
 * garage-id (fk)

Driver
 * emp-id
 * emp-name
 * emp-address
 o emp-telNo
 o stage-id (fk)

ROUTE
 * route-id
 * route-number
 o no-of-passenger/-day

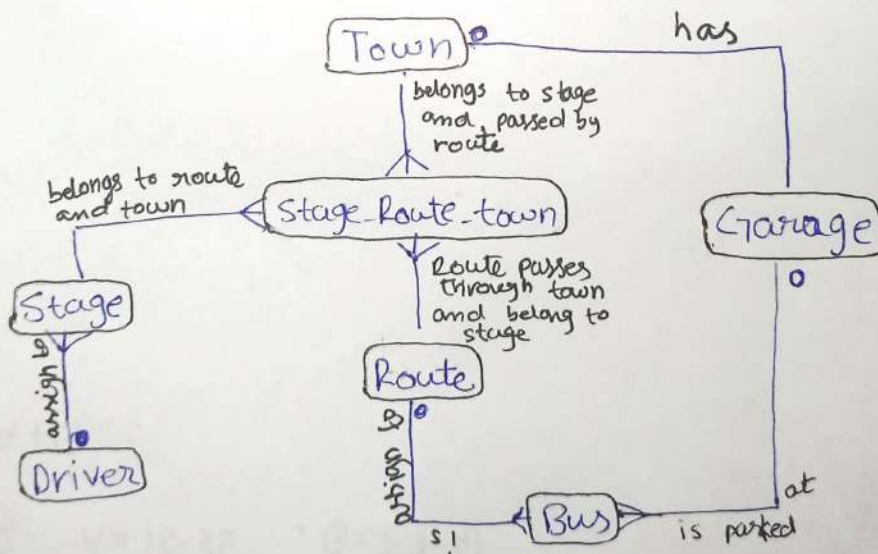
TOWN
 # town-id
 * town-name
 o town-garage (has/hasn't)

STAGE
 # stage-id
 * route-id (fk)
 o town-id (fk)

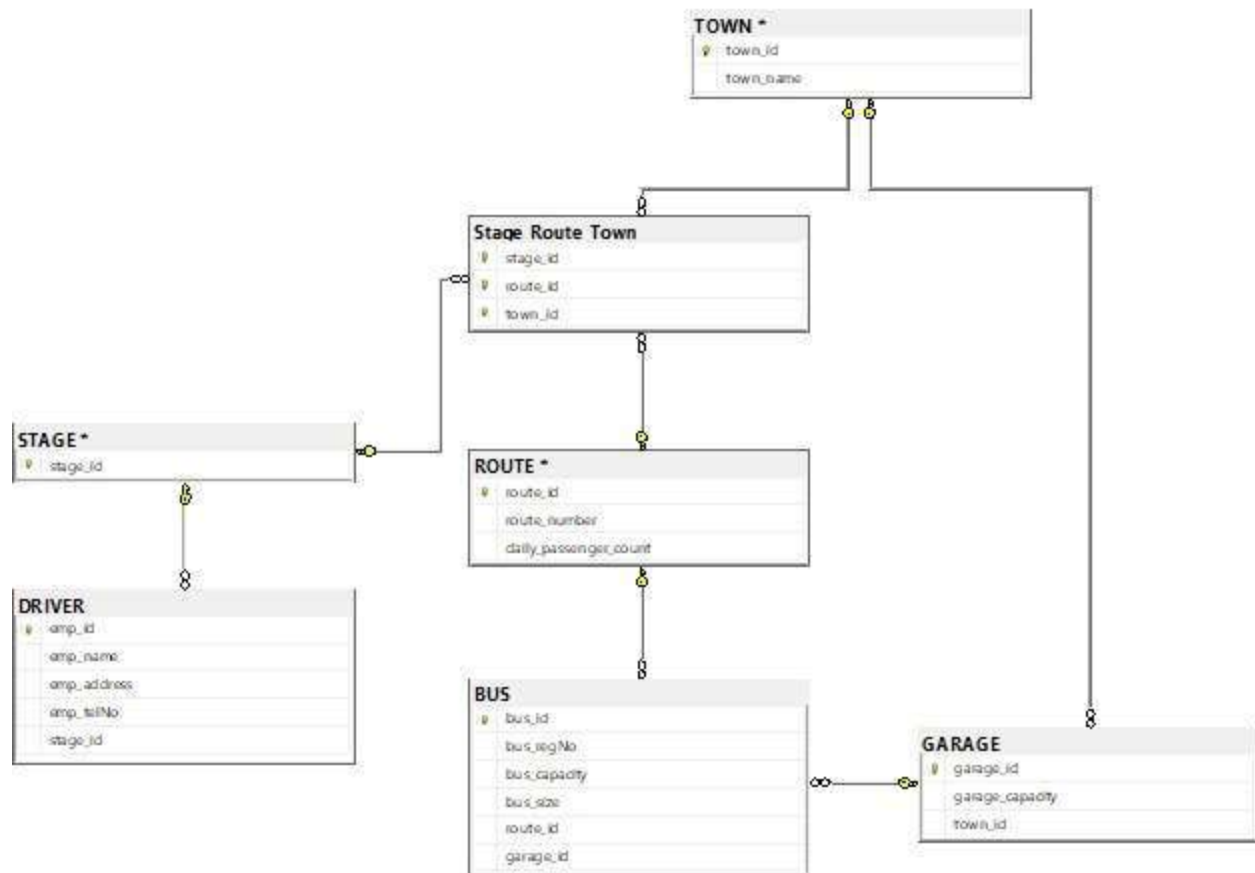
GARAGE
 * garage-id
 * garage-capacity
 * town-id (fk)

4: ER-Diagram

Since I have already mentioned attributes above
 so I am just taking Entity only without attribute.



ER Model of Bus Management System



ER Diagram 1: ER Model for Country Bus Company

Note: This shows the full attributes of entities cardinality, optionality and relation verb is mentioned in previous diagram.