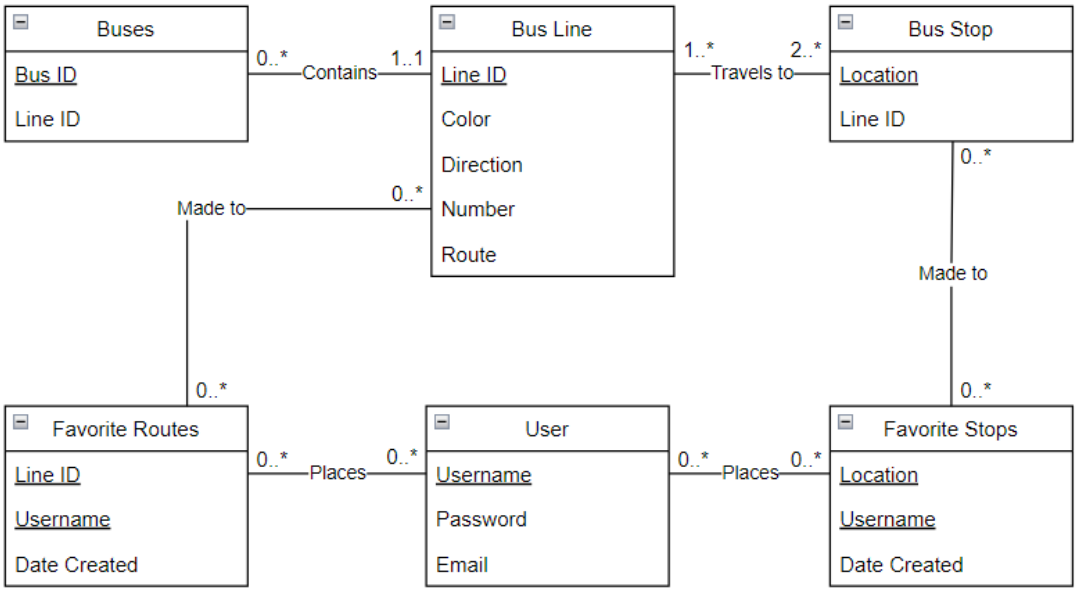

Entities:

We created a table for users, whose schema contains the username, which should be the primary key distinguisher between different users. The table also contains information on their password, as well as their email.

We also created two similar tables, a favorite routes, and a favorite stops table. Both tables have a primary key combining the username, and either infoID or location. They also have an attribute showing when the favorite was created.

We created a buses entity, where the primary key is the bus ID, corresponding to each different bus that is used. Buses may share the same line/information, for example, there may be 4 different buses all following the 12E Teal route, which allows for the buses to arrive at quicker intervals. As such, we have created the information ID attribute which is a foreign key to the bus line table.

This bus line table forms each set of attributes/descriptions, such as a bus's color, direction, number, and route into a single Line ID primary key.

We created a bus stop entity, where each bus stop is distinguished by their location as the primary key. The table will also show the routes/bus lines that utilize the bus stop, with bus stops being used by multiple different bus lines on occasion.

Description:

A user should be able to place favorites on multiple stops as well as multiple routes, and both routes and bus stops should be able to be the favorite of many students, thus the many-many relationship between users and favorite buses/bus stops. A user may make no favorites, or as many as they want, and the favorite may be the favorite of zero, or as many as possible different users, and as such the cardinality of both relationships is (0..*).

Favorites should be able to be made to many different routes or bus stops, and a single bus should be able to be many different favorites, indicating a many-many relationship for both favorite buses/stops and buses/stops. A bus stop may be the favorites of up to as many as possible, including zero, this indicates the (0..*) cardinality.

A bus should only be a part of one bus line at a time. In other words, it should only be taking exactly one route while the bus is operating. The bus line, however, can have multiple different buses utilizing that line/route, indicating a one-many relationship between bus lines and buses themselves. A bus line may not be operating at a specific time (i.e. at night, some lines close), and as such a bus line can have (0..*) routes going at once.

The relationship between a bus line and a bus stop is a many-many relationship. This is because a bus route will contain multiple different bus stops, and a bus stop should have multiple different buses or bus lines that arrive at the stop. We believe that a bus stop should have at least one bus line that goes to that destination, otherwise it should not exist, and that a bus line should go to at least two different stops, otherwise it seems pointless.

Relational Schema:

User(Username:VARCHAR(20) [PK], Password:VARCHAR(20), Email:VARCHAR(20))

Favorite-Routes(LineID:VARCHAR(5) [PK] [FK to Bus-Line.LineID], Username:VARCHAR(20) [PK] [FK to Users.Username], Date-Created:VARCHAR(10))

Favorite-Stops(Location:VARCHAR(30) [PK] [FK to Bus-Stop.Location], Username:VARCHAR(20) [PK] [FK to Users.Username], Date-Created:VARCHAR(10))

Buses(BusID:VARCHAR(5) [PK], LineID:VARCHAR(5) [FK to Bus-Line.LineID])

Bus-Stop(Location:VARCHAR(30) [PK], LineID:VARCHAR(5) [FK to Bus-Line.LineID])

Bus-Line(LineID:VARCHAR(5) [PK], Color:VARCHAR(10), Direction:VARCHAR(2), Number:INT, Route:VARCHAR(20))