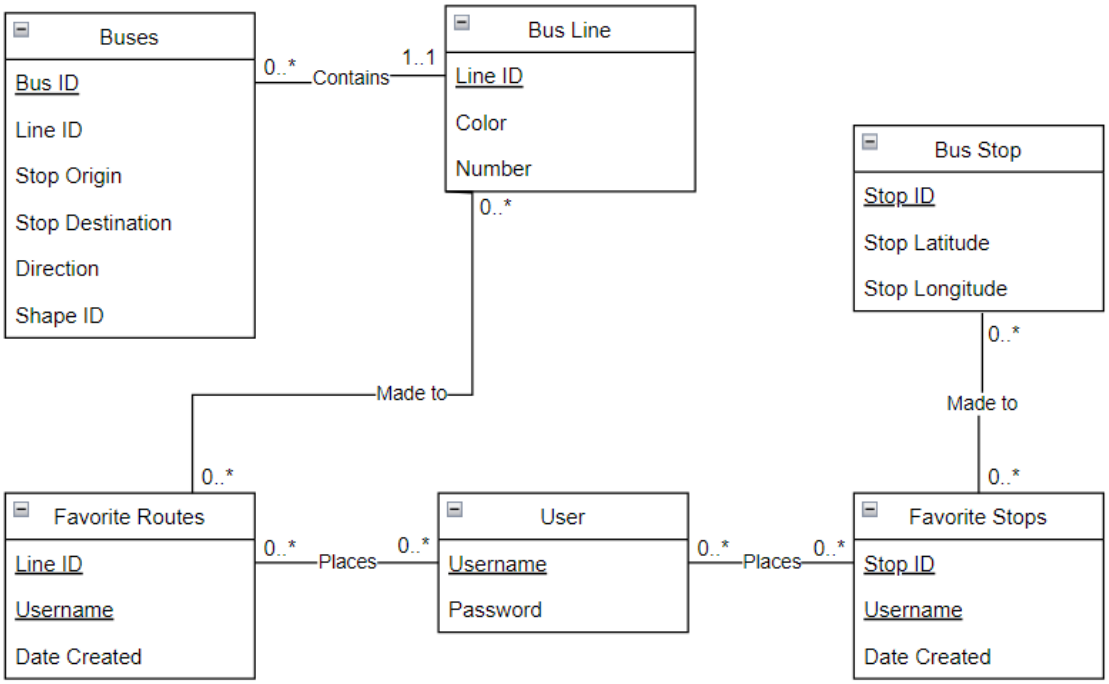

Entities:

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.

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 LineID or StopID. 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. We have also created a stop origin and stop destination attribute, where it depicts where each bus starts the route, and ends their route. We have given the direction the bus travels, as well as the shape, which is the route the bus follows that is shown on the map.

This bus line table has primary key line ID, which is the ID of the line/route that the bus will be following. Each route has a color that they primary follow, usually also included in the Line ID, as well as the number, which varies from each specific route that the bus will be following, even though their colors might be the same. 120E is the Teal's evening route, and 12E is the Teal's day route.

We created a bus stop entity, where each bus stop is distinguished by a StopID as their primary key. This Stop ID is generally formatted in a way where it tells what location it is at, such as the intersection between two roads. The table also provides the latitude and longitude coordinates, which will be helpful in displaying the stops on a map.

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.

Relational Schema:

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

FavoriteRoutes(LineID:VARCHAR(40) [PK] [FK to BusLine.LineID], Username:VARCHAR(20) [PK] [FK to Users.Username], DateCreated:VARCHAR(10))

FavoriteStops(StopID:VARCHAR(35) [PK] [FK to BusStop.StopID], Username:VARCHAR(20) [PK] [FK to Users.Username], DateCreated:VARCHAR(10))

Buses(BusID:VARCHAR(5) [PK], LineID:VARCHAR(40) [FK to BusLine.LineID], StopOrigin:VARCHAR(35), StopDestination:VARCHAR(35), Direction:VARCHAR(10), ShapeID:VARCHAR(40))

BusStop(StopID:VARCHAR(35) [PK], StopLatitude:REAL, StopLongitude:REAL)

BusLine(LineID:VARCHAR(40) [PK], Color:VARCHAR(10), Number:INT)