1. Explain the relationships between the tables listing the primary keys and foreign keys, and the cardinality between two tables.

The EER model shows the relationships between tables very clearly, as there is a key icon for each primary key and a red diamond indicating that field is a foreign key. Addresses table's primary key is address_id and foreign key of customer_id links it to the customers' table. The primary key of the customers' table is customer_id, and there is no foreign key. The order_id of the orders' table is the primary key and the customer_id foreign key links it to the customers' table. In order_items, item_id is primary key and the order_id foreign key links it to the orders table and the product_id foreign key links it to the products table. Products table has a product_id primary key and the category_id foreign key links it to the categories table. Finally, the categories' table has a primary category_id key but no foreign key. The administrators table does not connect to any of the other tables but has its own admin_id primary key.

You can use the lines connecting the table to understand the relationships between each table. For example, the customers' table has a one-to-many relationship with both addresses and orders tables, meaning there are (potentially) many addresses and orders for each customer. The customer has many orders but each order has one customer.

2. Explain how you achieved each normal form.

For a table to be in first normal form, its columns must not contain repeating values and each column must contain single, scalar values. In order to achieve first normal form, each class would be its own row. For example, there would be three rows for both Joe Green and Sue Smith, with each of their classes in its own row.

For a table to be in second normal form, every non-key column must depend on the entire primary key. So the Students table will have student_id, student_name, email, and major. All of these non-key columns depend on the student_id. Since address does not depend on the student_id, I moved it to its own table, and the student's classes to its own table as well.

Finally, for a table to be in third normal form, every non-key column must depend *only* on the primary key. If it does not, it is likely assigned to the wrong table. Each of the three tables only have columns that depend on the primary key.