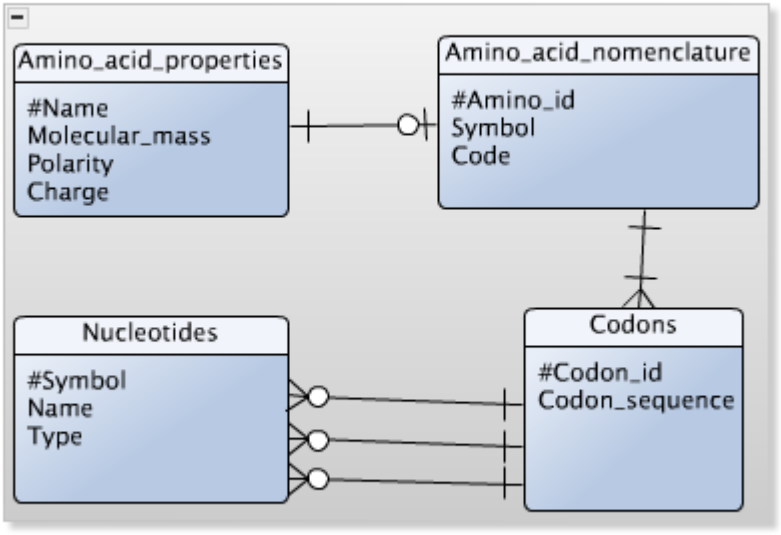
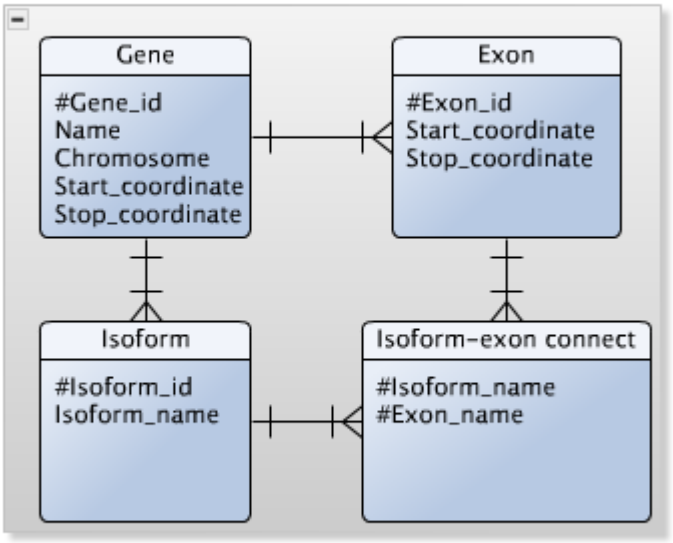
1.



2. i) Gene, Exon, Isoform, Chromosome

ii)



iii)

Gene(#Gene_id, Name, Chromosome*, Start_coordinate, stop_coordinate)

Chromosome(#Name)

Exon(#Exon_id, Gene*, Start_coordinate, Stop_coordinate)

Isoform(#Isoform_id, Isoform_name, Gene*)

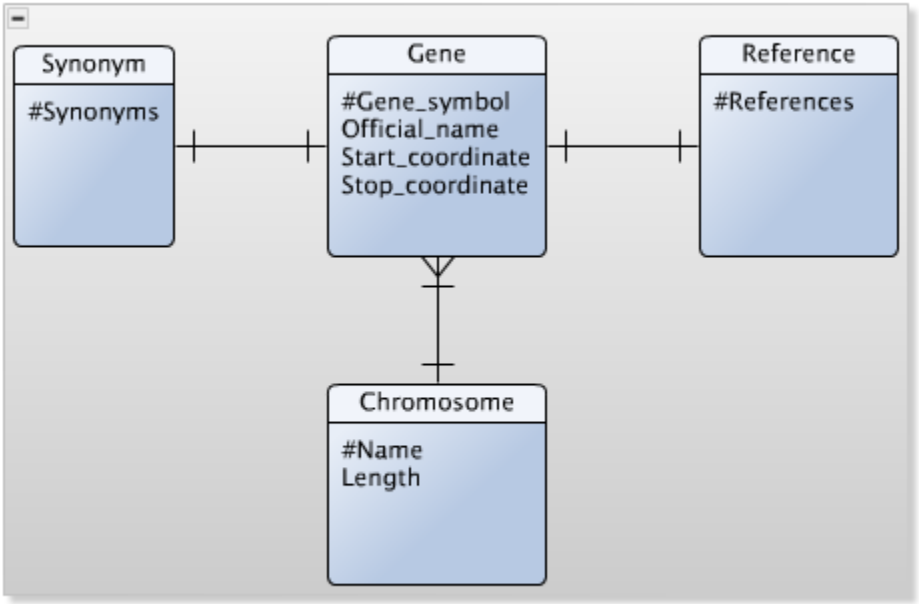
Isoform-exon_connection(#Exon*, #Isoform*)

3. i)

Gene, Chromosome, Synonym, Reference

ii) Note: I am showing Gene + Synonym and Gene + Reference as one to one relationships, because synonyms and references are lists of all synonyms and references, and thus only one 'item'.

This is obviously a horrible database, but that's the point of the next task I suppose.



iii)

Gene(#Gene_symbol, Official_name, Start_coordinate, Stop_coordinate, Chromosome, Chromosome_length)

Synonym(#Name, Official_name*)

Reference(#Reference_id, Title, Journal, Year_published)

Publication(#Author_id*, #Reference_id*)

Author(#Author_id, First_name_initials, Last_name)

iv)

Gene(#Gene_symbol, Official_name, Start_coordinate, Stop_coordinate, Chromosome*)

Coordinates(#Gene*, Start_coordinate, Stop_coordinate)

Synonym(#Name, Official_name*)

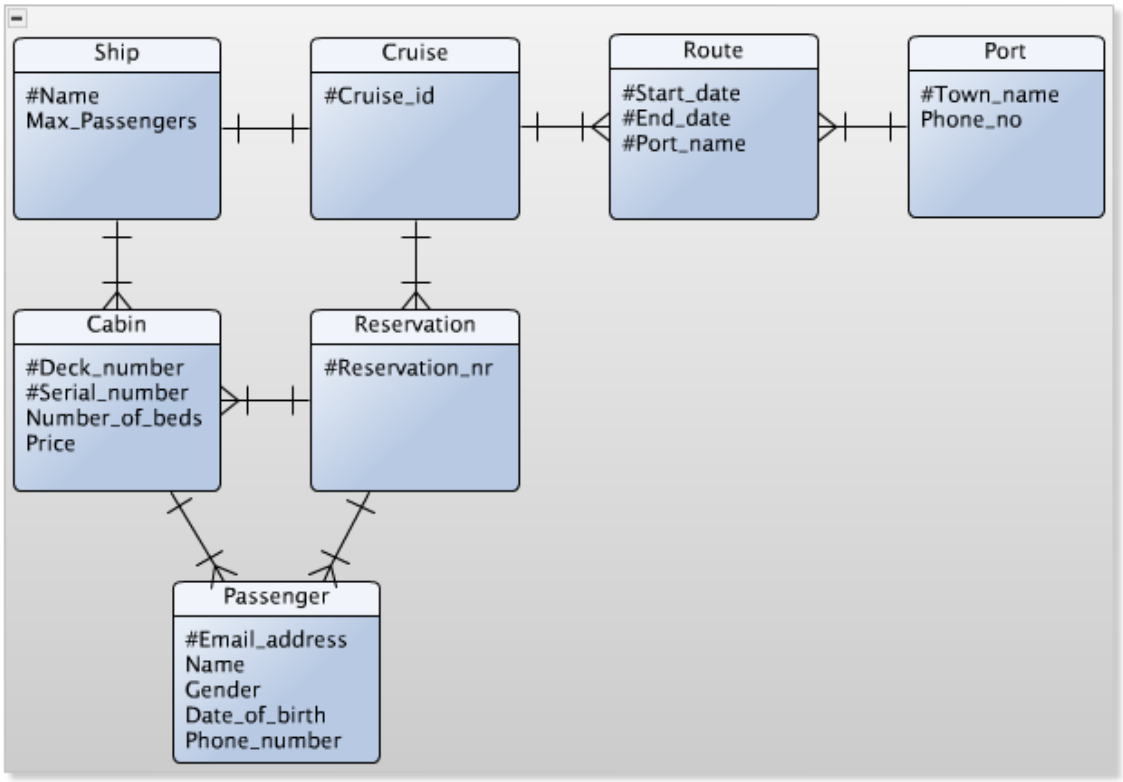
Chromosome(#Name, Length)

Reference(#Reference_id, Title, Journal, Year_published)

Publication(#Author_id*, #Reference_id*)

Author(#Author_id, First_name_initials, Last_name)

4.



5.

i) Because multiple trucks can be used in an assignment, it is problematic to have an assigment foreign key in the Truck table,

because this means a truck can only ever do one assignment.

These should be many to many relationship, thus a new table should be made to connect Assignment and Truck.

Truck table also is missing a primary key, this should be Registration_number.

ii) Maximum_weight is functionally dependent on Model.

Registration_year and Model are all functionally dependent on Registration_number.

There is a transitive functional dependency here because Registration_number --> Model and

Model --> Maximum_weight.

iii) Registration_number.

Assignment_number is a unique identifier, so it could also be a candidate key, but as stated previously, it shouldn't actually be in the table at all.

iv) Container_type (#Type_id, Type_name, Max_weight, Cubic_quantity, Nightly_rate)

Container (#Container_number, Type_id*)

Customer (#Telephone_number, Address)

Assignment (#Assignment_number, Telephone_number*, Container_number*, Start_date, End_date)

Task(#Registration_number*, #Assignment_number*)

Truck(#Registration_number, registration_year, Model*)

Truck_type(#Model, Maximum_weight, Reg_number*)

Note: I have not changed nightly rate at all, but one could assume it is either functionally dependent on either Max_weight, Cubic_quantity, or both. As this is not specifically stated and has several logical possibilities I kept it there. At least if you order a container for removing trash you pay for the container size, ie. cubic quantity, but I can imagine in a B2B transport the weight might be more logical to base price on for certain customers (e.g. transport of heavy metals).