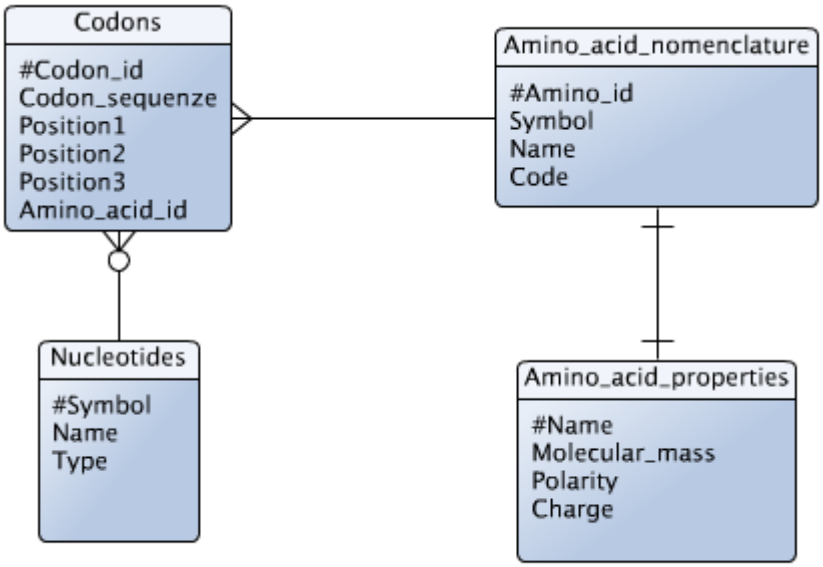
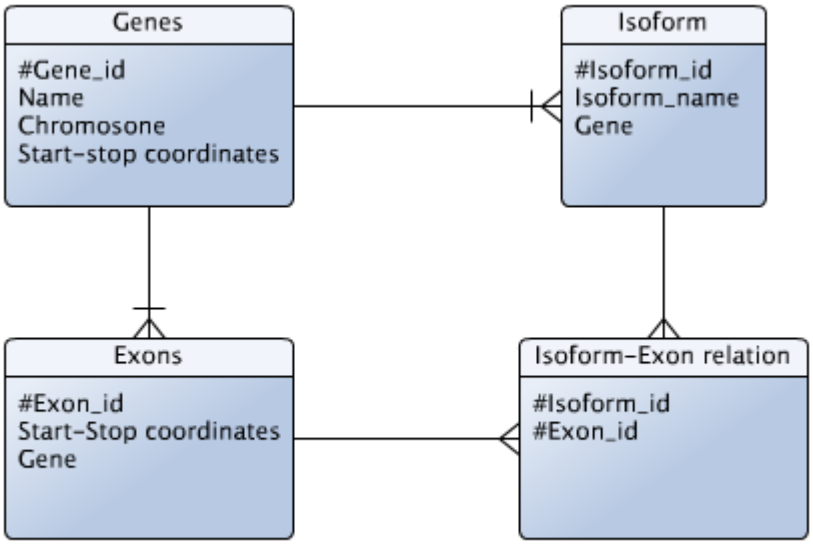
1)



2i) The entities of the for the relations between Genes, Exons, and Isoforms must be a unique table for each of them, as well as an extra table for the many-to-many relation between exons and Isoforms.

2ii)



2iii) Chromosomes(#Chromosome_id)

Genes(#Gene_id, Name, Chromosome*)

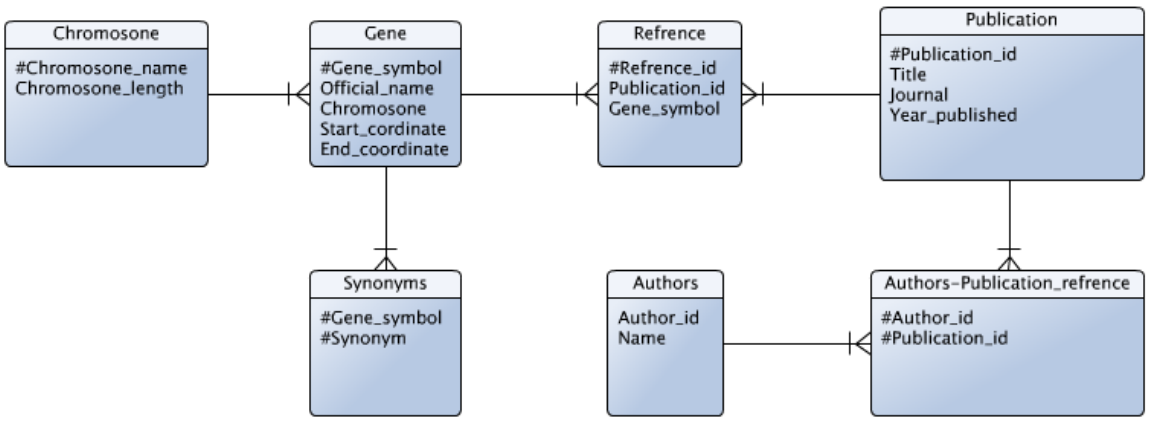
Exons(#Exon_id, Start_coordinate, End_coordinate, Gene_id*)

Isoform(#Isoform_id, Isoform_name, Gene_id*)

Isoform-Exon_relation(#Isoform_id*, #Exon_id*)

3i) We will need entities for Genes, Synonyms, Publications, References, Authors and for Chromosones.

3ii)



3iii) Gene(#Gene_symbol, Official_name, Chromosone, Chromosone_length, Start_coordinate, End_coordinate)

Synonyms(#Gene_Symbol, #Synonym)

Refrence(#Refrence_id, Publication_id, Gene_symbol)

Publication(#Publication_id, Title, Journal, Year_published)

Authors(#Author_id, Name)

Authors-Publication_refrence(#Author_id, #Publication_id)

This is not on 2nd normal form because the Chromosone and Chromosone_length in Gene is not dependent the other candidate keys.

3iv) Gene(#Gene_symbol, Official_name, Chromosome, Start_cpprdinate, End_coordinate)

Chromosome (Chromosome_name, Chromosome_length)

Synonyms(#Gene_symbol, #Synonym)

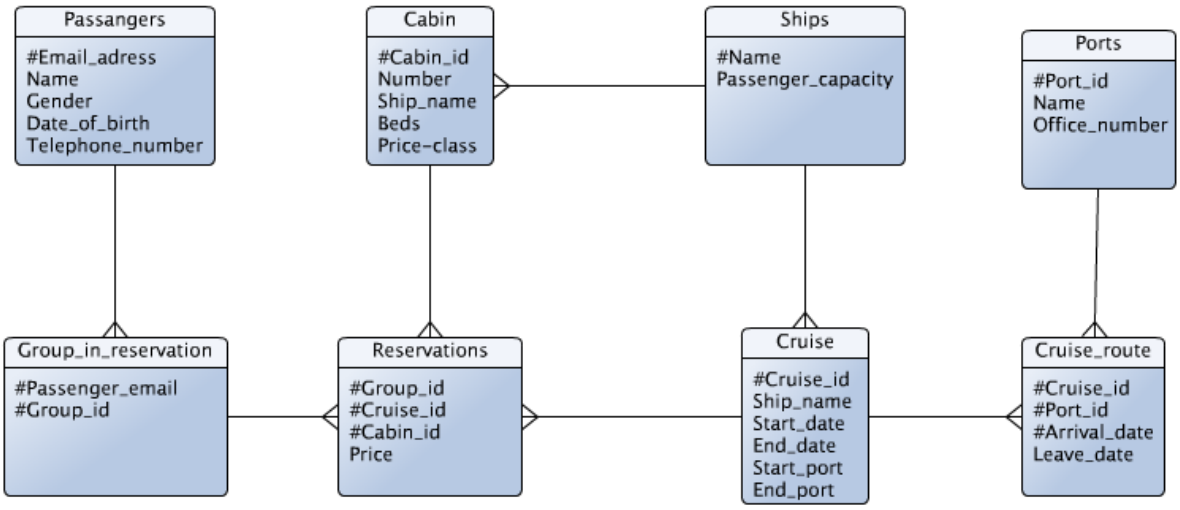
Refrence(#Refrence_id, Publication_id, Gene_symbol)

Publication(#Publication_id, Title, Journal, Year_published)

Authors(#Author_id, Name)

Authors-Publication_refrence(#Author_id, #Publication_id)

4)



5i) The truck table is problematic because none of the values is assigned primary key, and there are several functional dependencies.

5ii) The functional dependencies:

Registration_number -> Registration_ year

Model -> max weight

5iii) The registration number and the model fields are candidate keys because they are not dependent on the other fields of the table.

5iv) Registration_numbers (#registration_number, registration_year, model)

Trucks (#model, maximum_weight)

Truck_assignment (#registration_number, #Assignment_number)