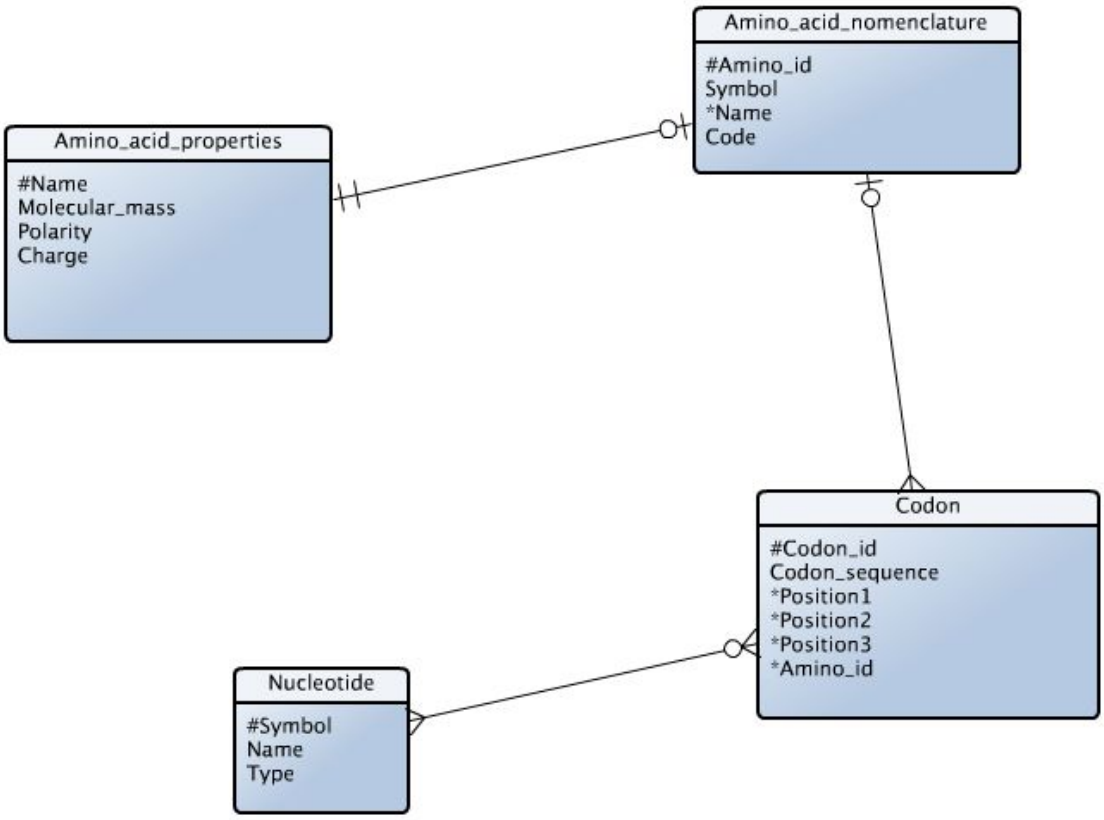
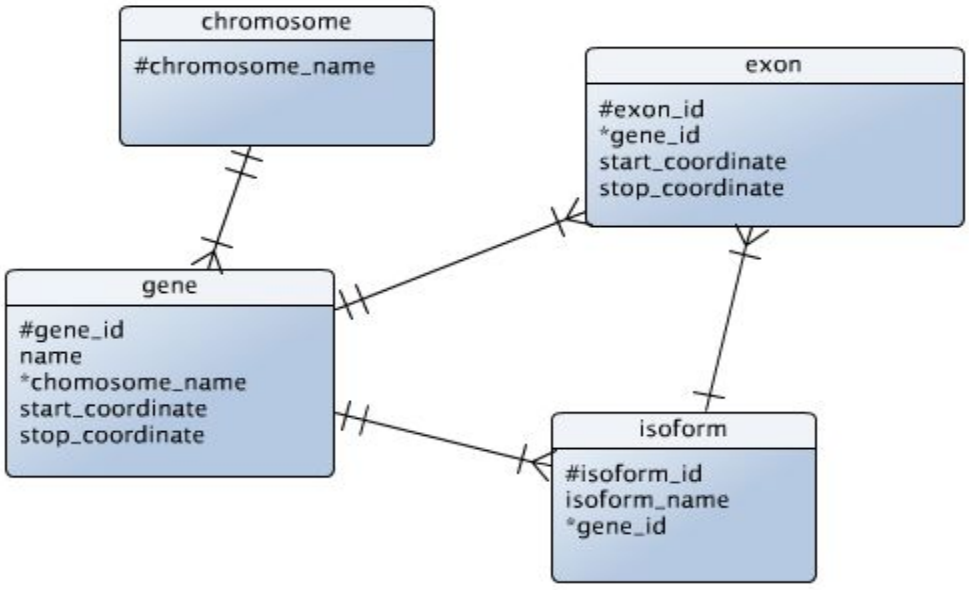
1)



2)

i) The entities are: chromosome, gene, exon and isoform.

ii)



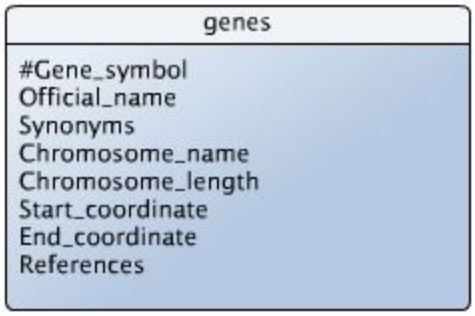
iii) The diagram in 2ii modified to conform to the third normal form:

chromosome(#chromosome_name)
*gene(#gene_id,gene_name,*chromosome_name,start_coordinate,stop_coordinate)*
*exon(#exon_id,*gene_id,start_coordinate,stop_coordinate)*
*isoform(#isoform_id,isoform_name,*gene_id)*

3)

i) The entities are: gene.

ii)

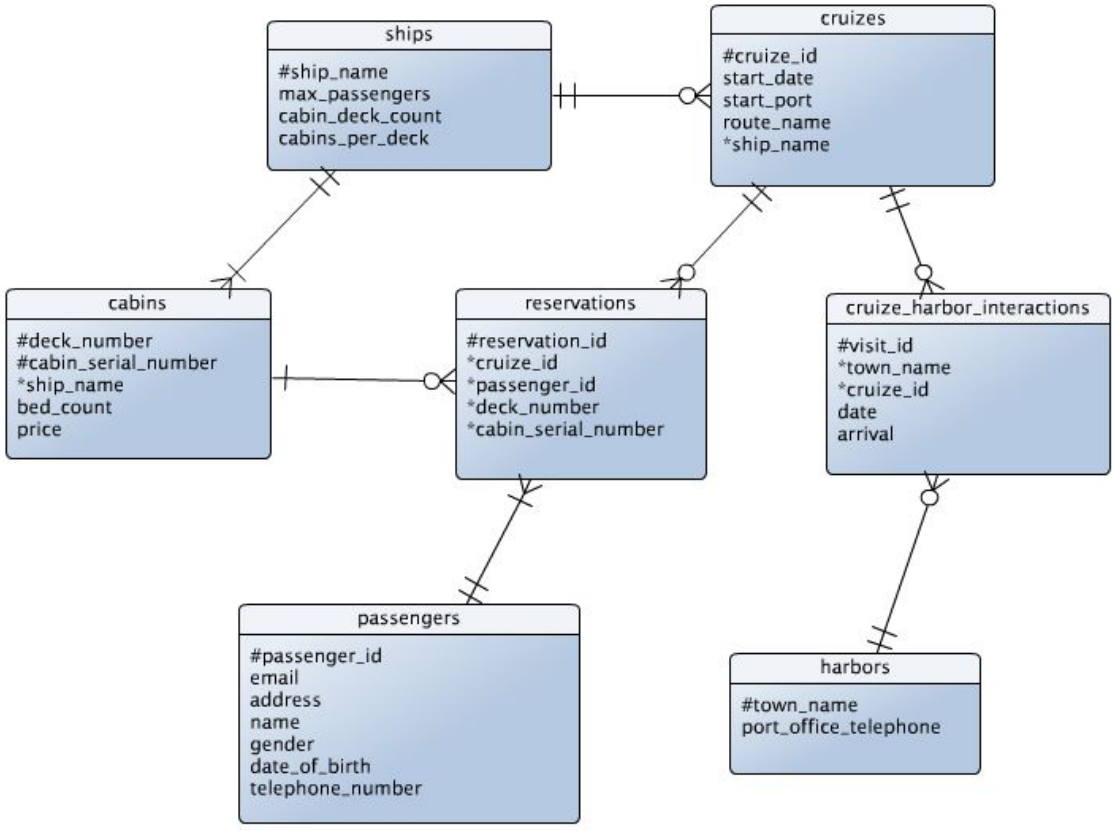


iii) The diagram in 3ii modified to conform to the first normal form, but not the second normal form:
genes(#Gene_symbol,Official_name,#Synonym,Chromosome_name,Chromosome_length,Start_coordinate,End_coordinate,#Reference_id,Reference_author,Reference_title,Reference_journal,Reference_year_published)

iv)

genes(#Gene_symbol,Official_name,Chromosome_name,Chromosome_length,Start_coordinate,End_coordinate)
*synonyms(#Synonym,*Gene_symbol)*
references(#Reference_id,Title,Journal,Year_published)
*reference_authors(#Reference_author_id, *Author_id, *Reference_id)*
authors(#Author_id,Author_name)

4)



5)

i) The solution is problematic because after a truck has carried out its first assignment, it has to either be registered again or altered so it can be given a new assignment.

The first option defeats the purpose of having a trucks-table, which is to keep a list of all the trucks the company owns. In addition to this, the truck table does not have a primary key, so there would be duplicate information.

The second option also has negative implications - there will be no real log of which trucks carried out which assignments.

ii) *Registration_year* is functionally dependent on *Model* because truck cannot be registered before the model is released. Similarly, *Maximum_weight* is specified by the truck model, and is therefore also functionally dependent on *Model*.

iii) Possible candidate keys for the truck table are: {*Registration_number*}

iv) The database with its tables modified to conform to the Boyce-Codd normal form:

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

*Container(#Container_number,*Type_id)*

Customer(#Customer_id,Telephone_number,Address)

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

*Truck(#Registration_number,Registration_year,*Model_name)*

Truck_model(#Model_name,Maximum_weight)

*Truck_assignments(#Truck_assignment_id,*Assignment_number,*Registration_number)*