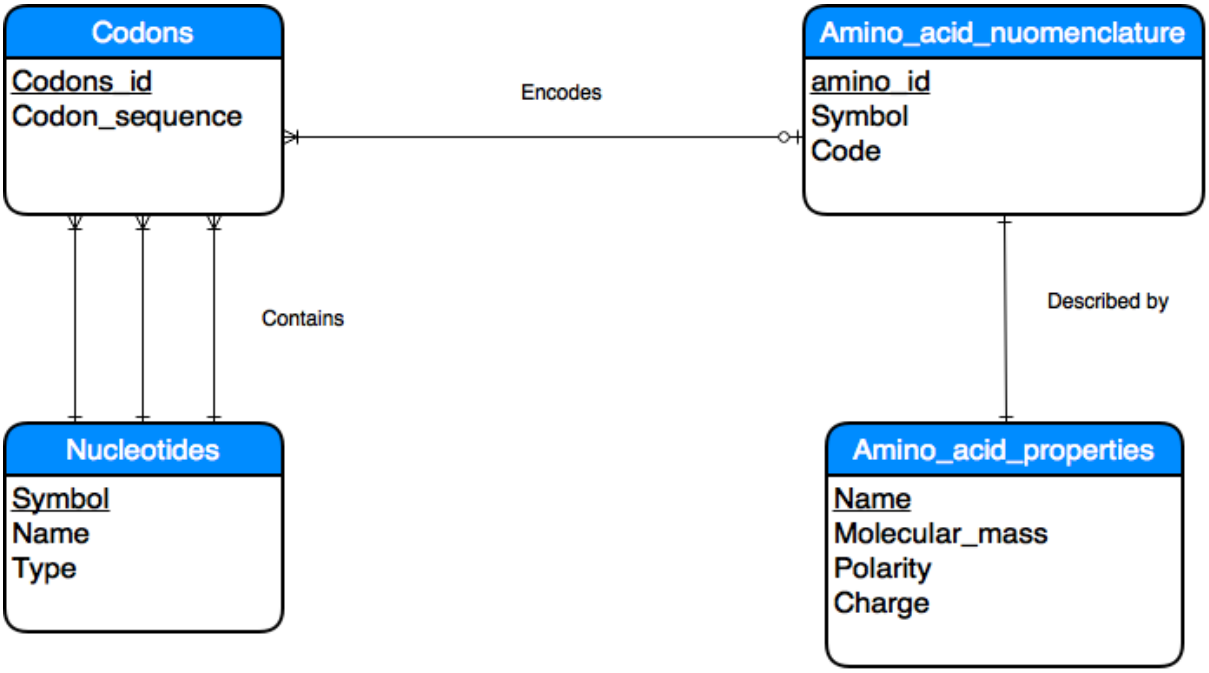
DKV001

INF115 Compulsory assignment 2

Task 1



Task 2

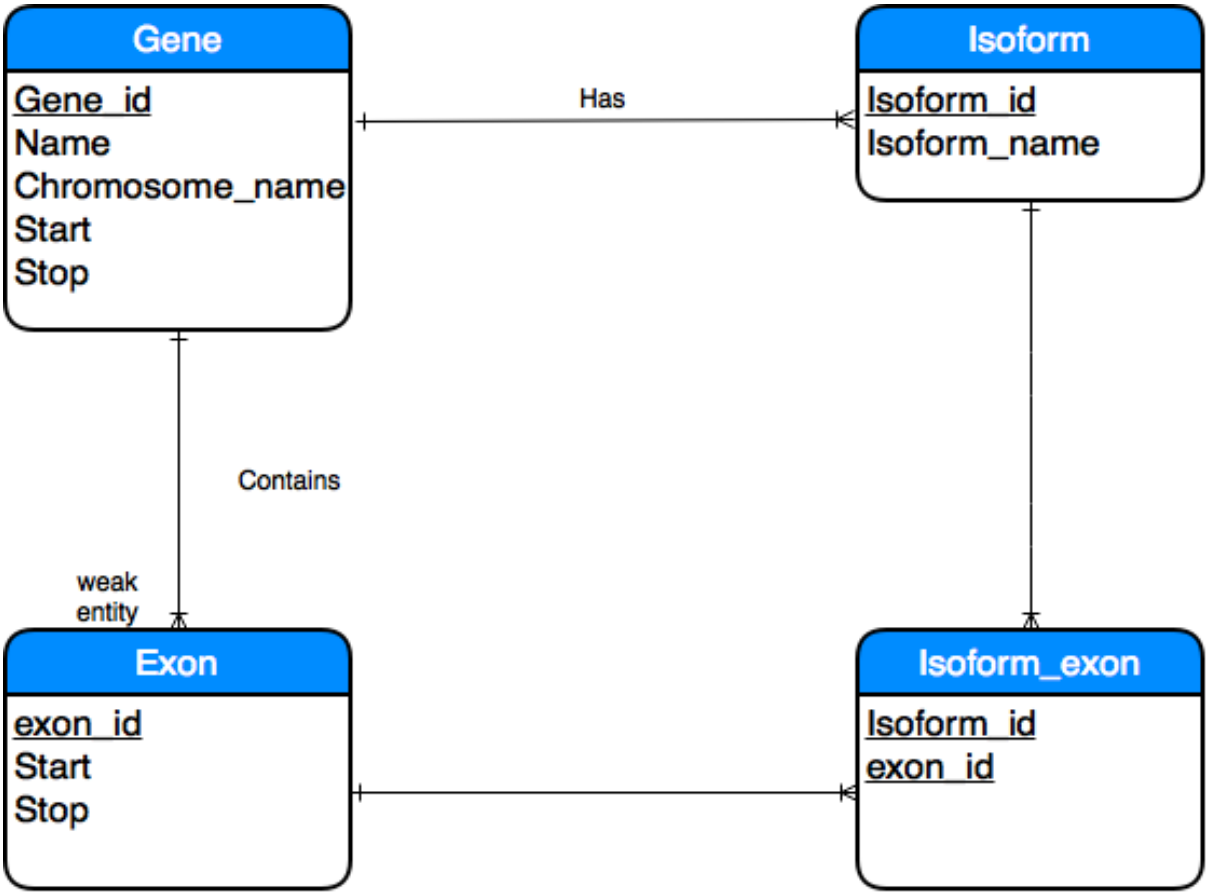
Task i)

Identify the entities:

- Gene
- Isoform
- Exon

Task ii)

E/R diagram showing the relations between these entities with highlighted primary keys:



Task iii)

E/R diagram converted to a set of tables to the third normal form with included highlighted primary keys and foreign keys:

Gene(#Gene_id, Name, Chromosome_name, Start, Stop)
Exon(#Exon_id, Gene_id*, Start, Stop)
Isoform(#Isoform_id, Gene_id*, Isoform_name)
Exon_Isoform(#Exon_id*, #Isoform_id*)

DKV001

Task 3

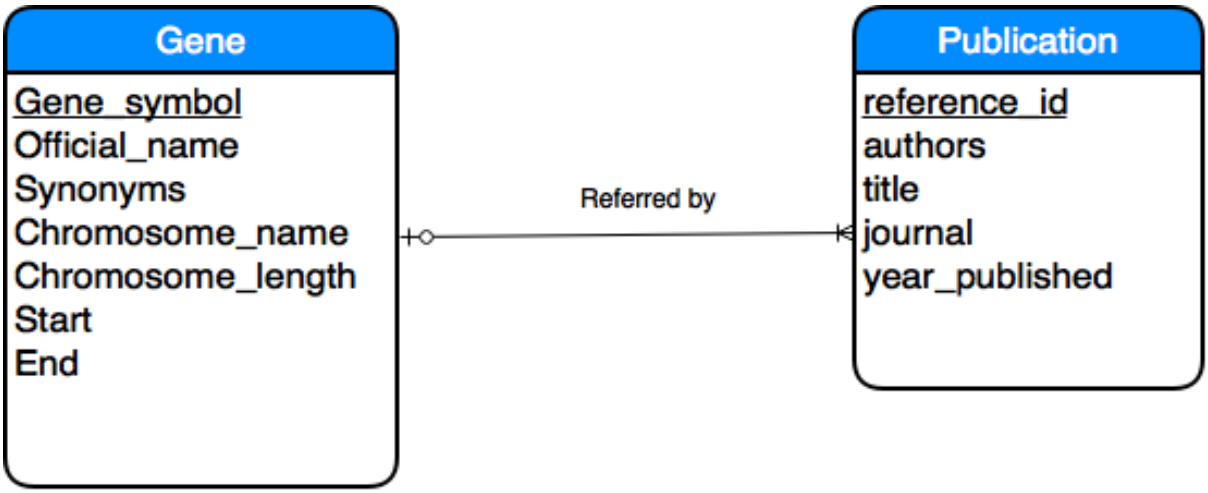
Task i)

Identify the entities:

- Gene
- Publication

Task ii)

E/R diagram showing the relations between these entities with highlighted primary keys:



Task iii)

E/R diagram converted to a set of tables to the first normal form, but not the second normal form with included highlighted primary keys and foreign keys:

Gene(#Gene_Symbol, #Synonym, Official_name, Chromosome_name, Chromosome_length, Start, End)
Publication(#Reference_id, #authors, Gene_symbol*, title, journal, year_published)

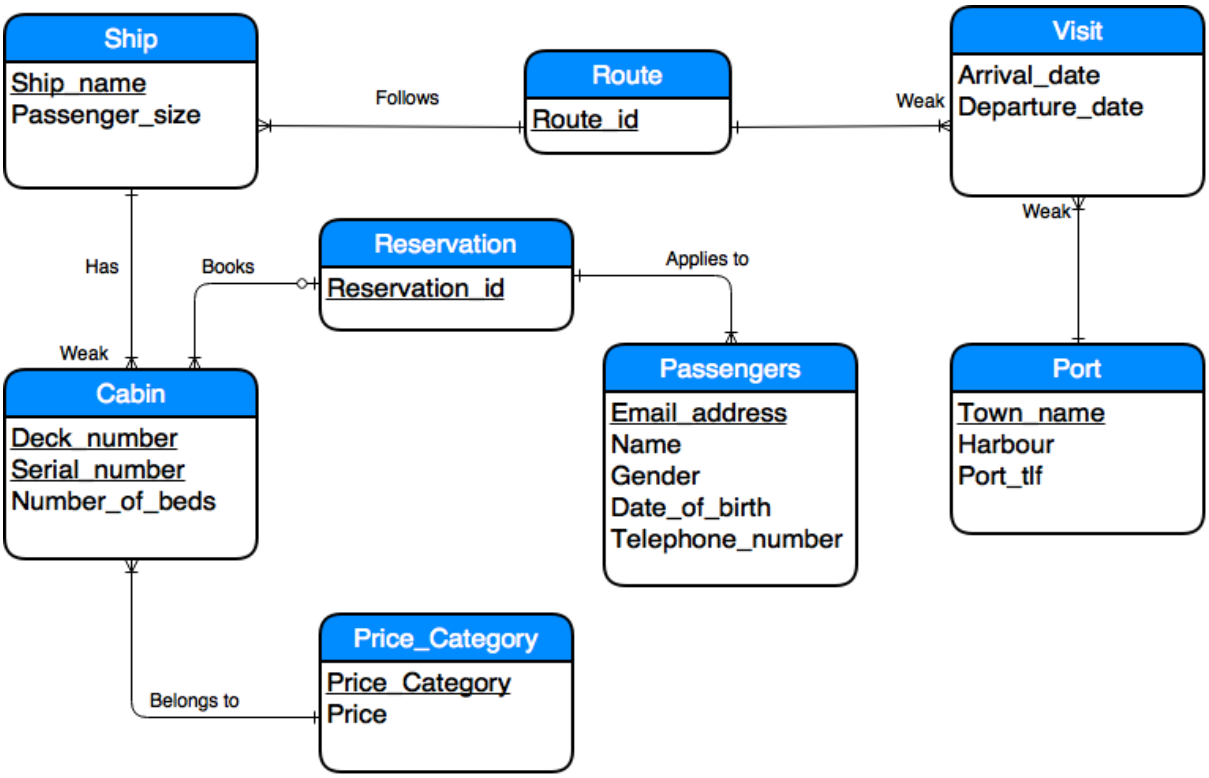
Task iv)

Developed the table structure from iii) so that it conforms to Boyce Codd Normal Form (BCNF) with highlighted primary keys and foreign keys:

Gene(#Gene_Symbol, Chromosome_name*, Symbol_id*, Official_name, Start, End)
Symbol(#Symbol_id, Symbol_name)
Chromosome(#Chromosome_name, Chromosome_length)
Publication(#Reference_id, Gene_symbol*, author_id*, title, journal, year_published)
Author(#Author_id, Author_name)

Task 4

E/R diagram for Global cruises specifying primary keys and depicting the relationship between the entities.



Task 5

Task I) Explained why the proposed solution is problematic

The proposed solution is problematic for a number of reasons. Firstly the Truck table does not contain a primary key. Secondly the table will at some point have trucks with a NULL foreign key as they will not be assigned to a specific Assignment.

Task ii) Functional dependencies found in the Truck table

- Model → Max_weight
- Registration_number → Model, Max_weight, Registration_year, Assignment_number

Task iii) Candidate keys for the Truck table

- Registration_number

Task iv)

BCNF normalization performed on the whole table incorporated with a correct solution of the truck table problem with highlighted primary keys and foreign keys:

Container_type(#Type_id, Type_name, Max_weight, Cubic_quantity, Nightly_rate)
Container(#Container_number, Type_id*)
Assignment(#Assignment_number, Telephone_number*, Container_number*, Start_date, End_date)
Costumer(#Telephone_number, Address)
Truck(#Registration_number, Assignment_number*, Model*, Registration_year)
Model(#Model, Maximum_weight)

P.S: The program I used to draw the diagram did not allow weak entity so where there is written “Weak” it is to show it’s a weak entity.