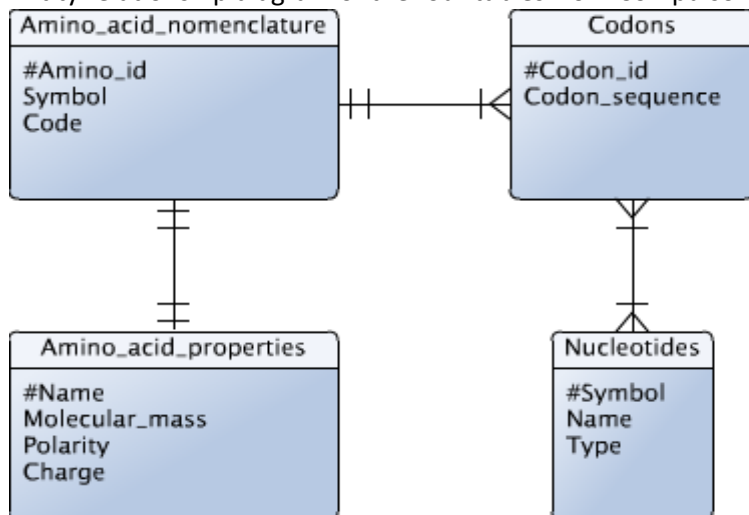


Compulsory Exercise 2

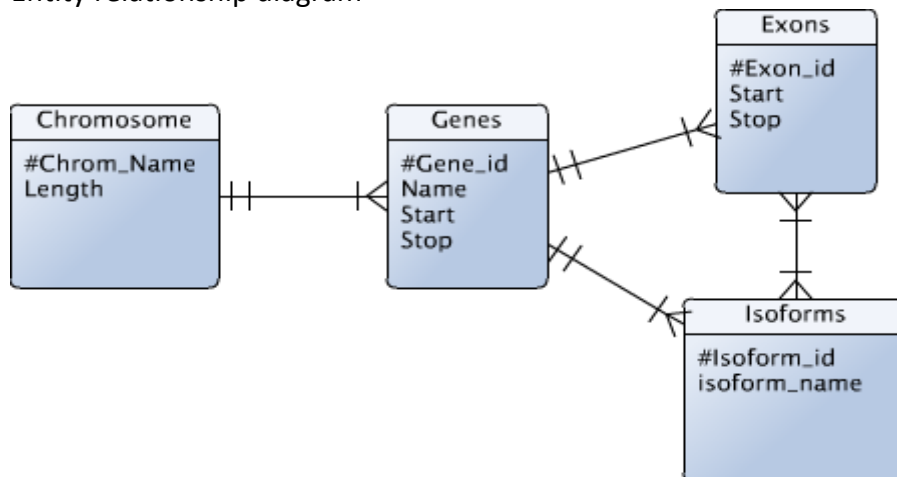
Task 1:

Entity relationship diagram of the four tables from Compulsory exercise one.



Task 2:

- I. Entities: Chromosome, Gene, Exon and Isoform
- II. Entity relationship diagram

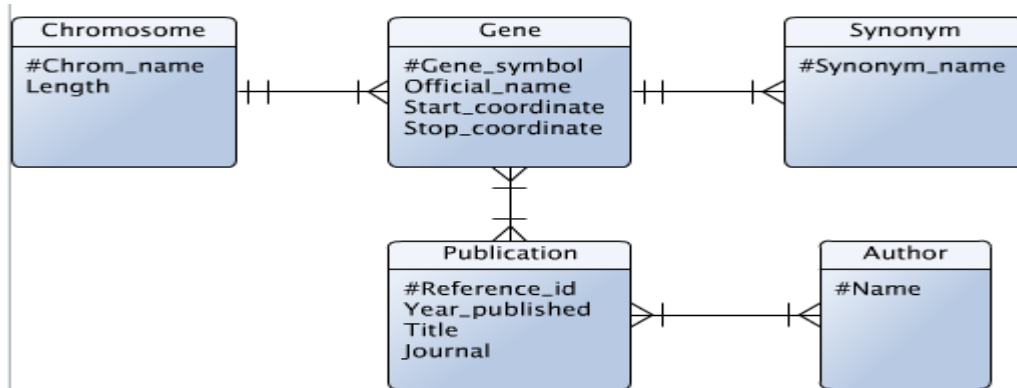


- III. The tables in 3NF

Chromosome(#Chrom_Name, Length)
Gene(#Gene_id, Name, Start, Stop, Chrom_Name*)
Exons(#Exon_id, Start, Stop, Gene_id*)
Isoform(#Isoform_id, Isoform_Name, Gene_id*)
Isoform_Exons(#Isoform_id*, #Exon_id*)

Task 3:

- I. **Entities:** Chromosome, Gene, Synonym, Publication and Author
- II. **Entity relationship diagram:** interpretation: A publication can have multiple authors, and an author can write multiple different publications.



III. The table in 1NF:

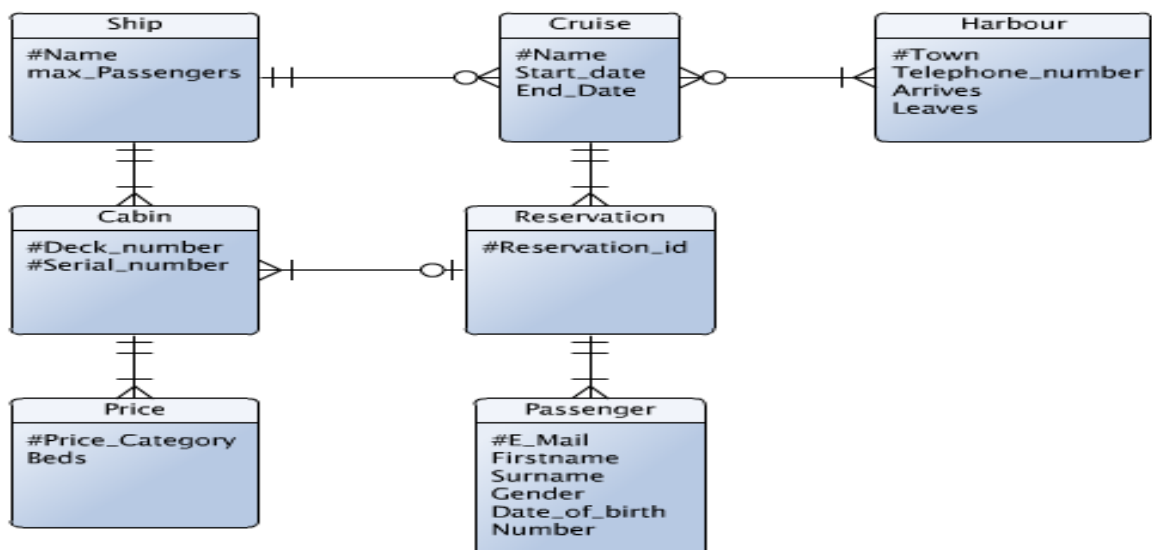
Gene_Nomenclature(#Chrom_name , #Gene_Symbol, #Synonym_Name, #Reference_id, #Author_name, Chrom_length, Official_name, start_coordinate, stop_coordinate, Year_published, title, journal)

IV. The tables in Boyce-Codd Normal form (BCNF)

Chromosome(#Chrom_name, Length)
 Gene(#Gene_Symbol, Official_Name, Start_Coordinate, Stop_Coordinate, Chrom_Name*)
 Synonym(#Synonym_Name, Gene_Symbol*)
 Gene_Reference(#Reference_id*, #Gene_Symbol*)
 Publication(#Reference_id, Year_Published, Title, Journal)
 Publication_Authors(#Reference_id*, #Author_name*)
 Author(#Name)

Task 4:

- I. The Entity relationship diagram for Global_Cruises. Interpretation: Every town can only have one harbour



Task 5:

- I. **Error:** No primary key! This is problematic because there is no way to identify rows without the primary key, this also opens the door for other problems like duplicates
- II. **Functional Dependencies:**
Registration_number --> Registration_Year, Model, Assignment_number*
Model --> Maximum_weight
- III. **Candidate key**
Registration_Number, Model
- IV. **The tables in Boyce-Codd Normal form (BCNF)**
Interpretation: Every truck can only have one assignment
Truck (#Registration_number, Registration_year, Model*, Assignment_number*)
Model(#Model, Maximum_weight)
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)