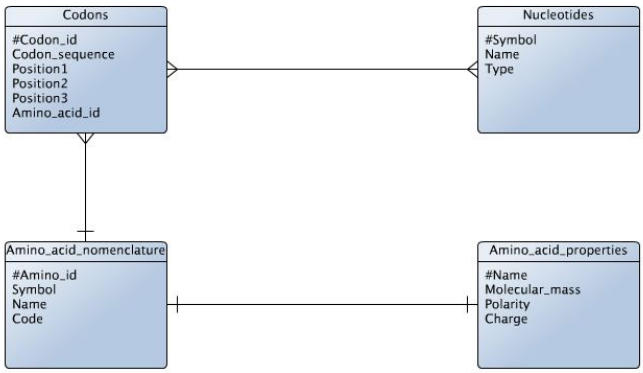
1.

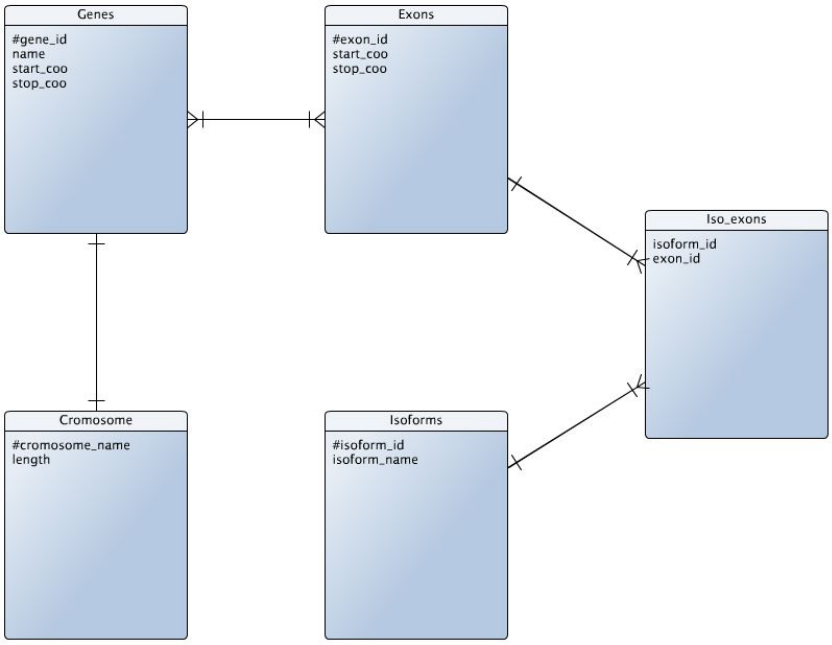


2 i)

Entities:

- Genes
- Exons
- Isoforms
- Chromosome

ii)



iii)

Genes(#gene_id, gene_name, chromosome_id*, start_pos, end_pos)

Exons(#exon_id, gene_id*, start_pos, stop_pos)

Isoforms(#Isoform_id, Isoform_name)

Exo_Iso_Connection(Iso_id*, Exo_id*)

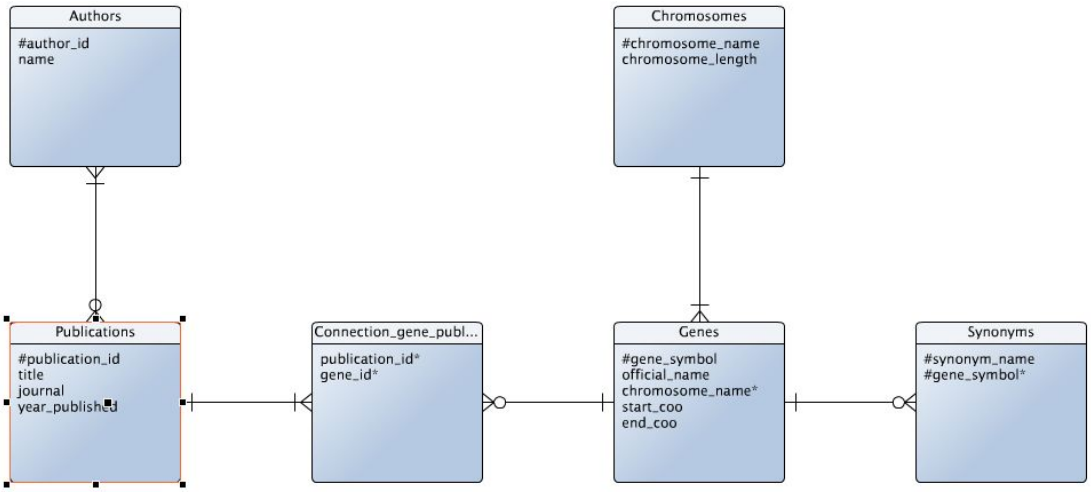
Chromosomes(#chromosome_id, Chromosome_name, Chromosome_length)

3 i)

Entities:

- Genes
- Chromosomes
- Synonyms
- Publications

ii)



iii)

#Gene_symbol	off_name	#chr_name	chr_length	start_coo	stop_coo	synonyms	#references_id	authors	title	journal	year_published
SHH	Sonic hedgehog	Chr5	153573022	28456815	28467256	HHG1					
SHH	Sonic hedgehog	Chr5	153573022	28456815	28467256	MCOPCB5					
SHH	Sonic hedgehog	Chr5	153573022	28456815	28467256	SMMCi					
SHH	Sonic hedgehog	Chr5	153573022	153573022	28467256	TPT					
SHH	Sonic hedgehog	Chr5	153573022	153573022	28467256	TPTPS					
SHH	Sonic hedgehog	Chr5	153573022	153573022	28467256		J:227320	Holtz AM, et al.,	Secreted HHIP1 interacts with heparan sulfate and regulates Hedgehog ligand localization and function.	J Cell Biol.	2015
SHH	Sonic hedgehog	Chr5	153573022	153573022	28467256		J:13476	Dickie MM,	Hemimelic extra toes, Hx.	Mouse News Lett.	1968

iv)

Gene

#Gene_symbol	Off_name	Chr_name*	Start_coo	End_coo
SHH	Sonic hedgehog	Chr5	28456815	28467256

Synonym

#Synonym	Gene_symbol*
HHG1	SHH
MCOPCB5	SHH
SMMCi	SHH
TPT	SHH
TPTPS	SHH

Chromosone

#Chr_name	Chr_length
Chr5	153573022

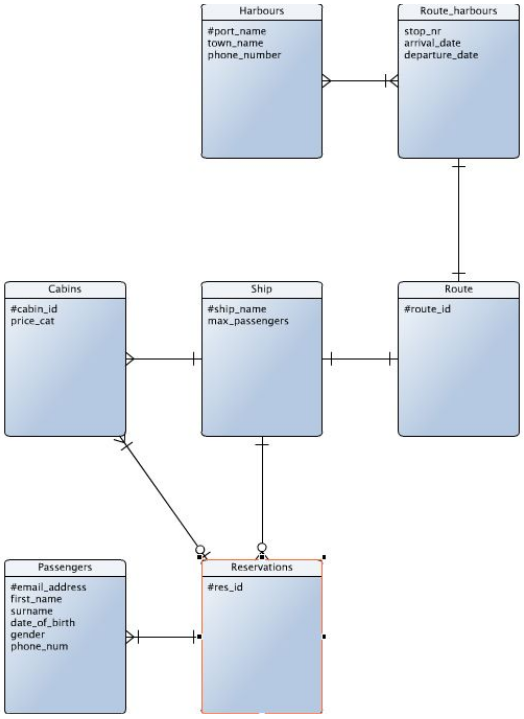
Reference

#reference_id	author	title	journal	year_published
J:227320	Holtz AM, et al.,	Secreted HHIP1 interacts with heparan sulfate and regulates Hedgehog ligand localization and function.	J Cell Biol.	2015
J:13476	Dickie MM,	Hemimelic extra toes, Hx.	Mouse News Lett.	1968

Gene_pub_connection

reference_id*	gene_symbol*
J:227320	SHH
J_13476	SHH

4)



5 i)

The Registration_number should be primary key. Maximum weight is known, but the weight of the vehicle is not known, so that this is formation is too vague.

ii)

Registration_year, model and maximum_weight has a functional dependency on Registration_Number.

iii)

Registration_number is the only candidate key in the table, thus the primary key.

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)
Truck (Registration_number, Registration_year, Model, Maximum_weight, Assignment_number*)