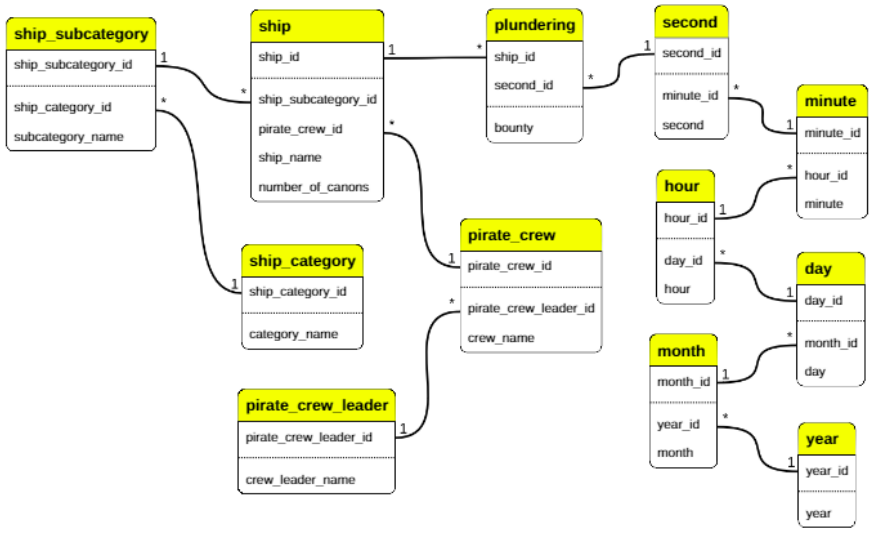
Exercise 1 *Multi-dimensional data model* (1 + 1 + 2 + 2 + 1 + 1 Points)

A cutting-edge pirate crew wants to leverage relational databases to track their performance metrics in order to facilitate growth of their operational efficiency. They came up with the following schema.



(a) fact table: plundering

dimension table: all the ~~other~~ tables

The fact table stores business metrics (facts) which can be used to access the company's performance.

Here the bounty is the "key performance indicator"

(b) I argue that it is not a standard schema

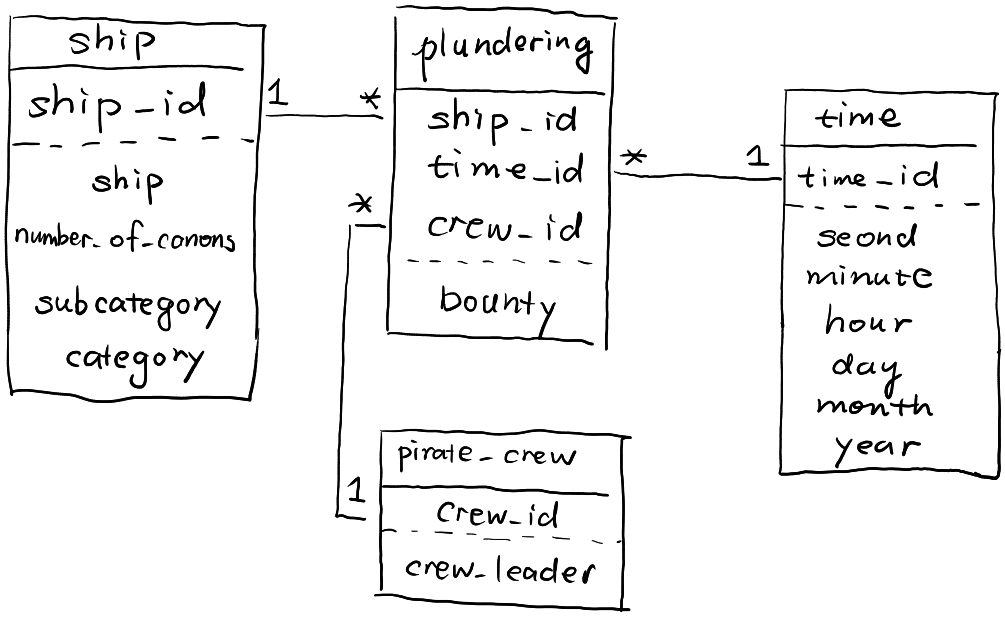
- There is only one fact table. We may exclude galaxy schema and fact constellation schema
- The fact table has only the foreign keys of the lowest level of each dimension ✓

Each dimension table contains its primary key and only foreign keys of the next upper classification level. ✗

The ship table contains foreign keys of tables of other dimension (crew). So it shall not be a snowflake schema

- Each dimension has multiple tables: not a star schema

(c)



(d) Star > Snowflake :

- avoid storing multiple tables for one dimension
- fast execution :

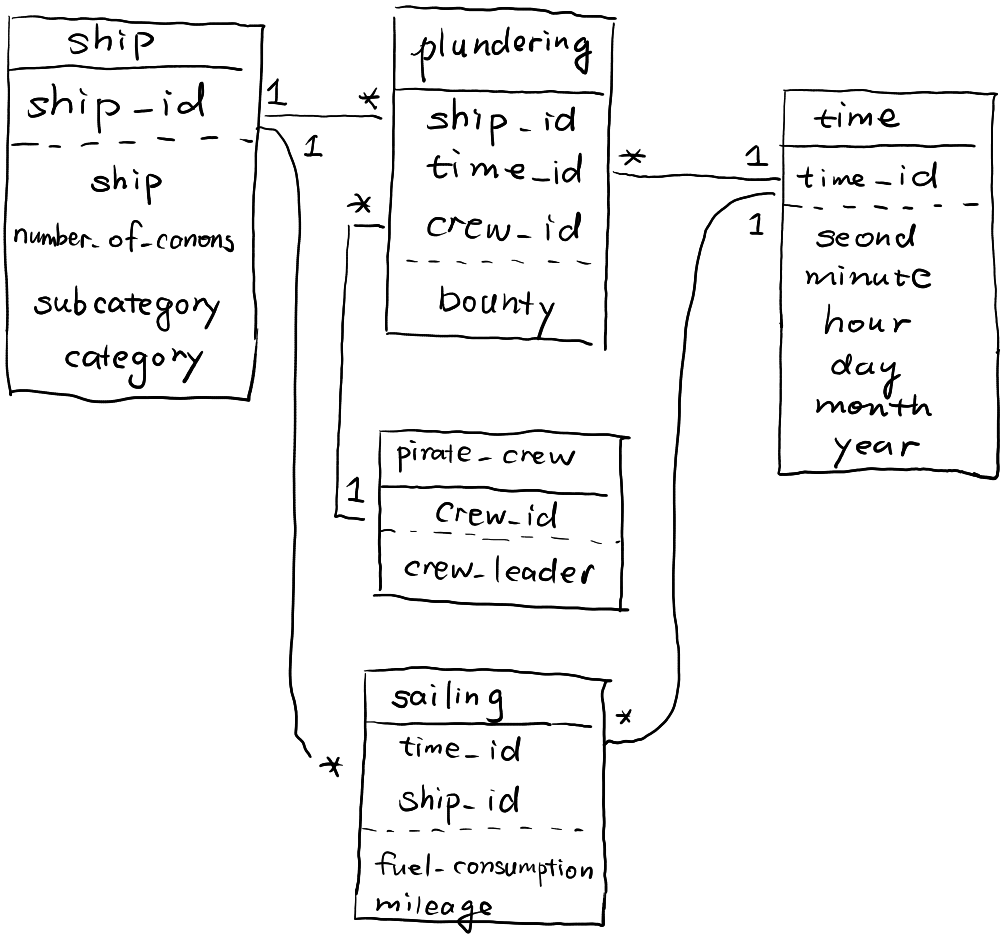
  avoid joining over lots of tables when querying

Snowflake > star

no redundancies.

- This might help to avoid abormalies during updating.
- Snowflake requires less data storage comparing to star schema

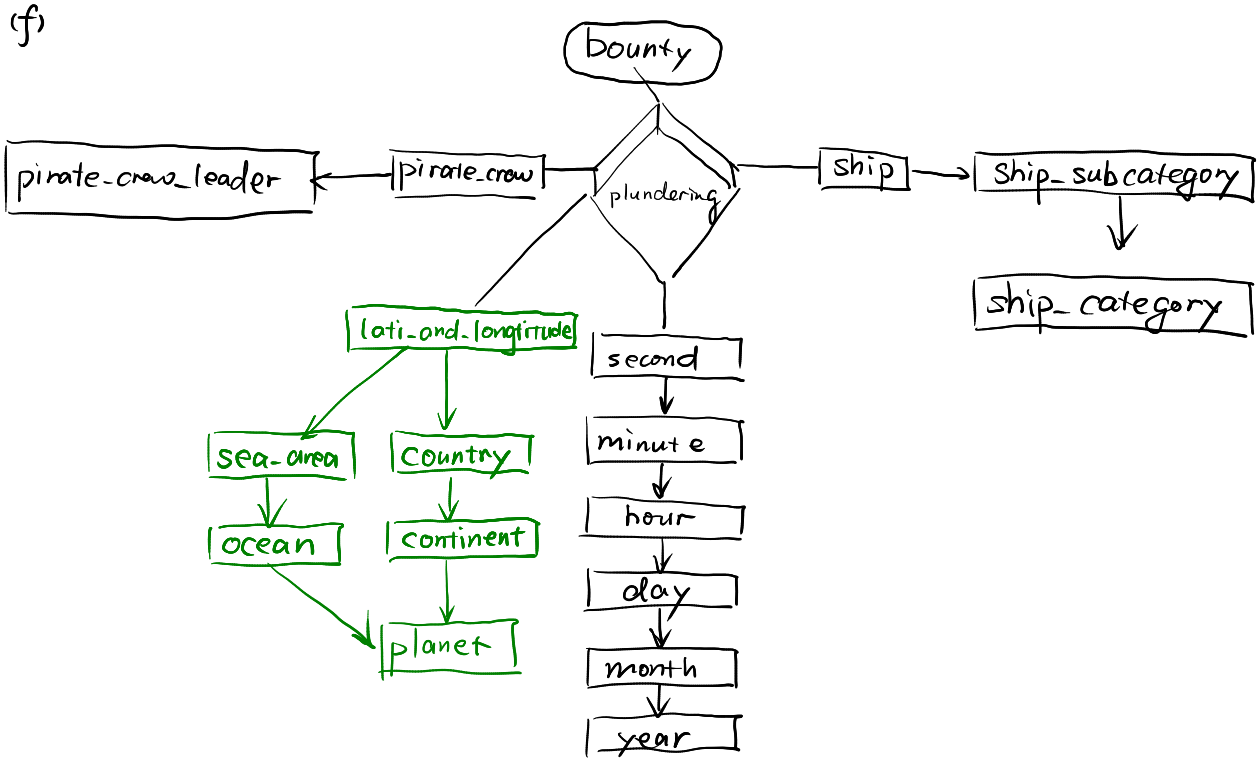
(e)



Important aspects to make it a galaxy schema

- One dimension table for each dimension
- Multiple fact tables which (partially) connects to several mutual dimension tables

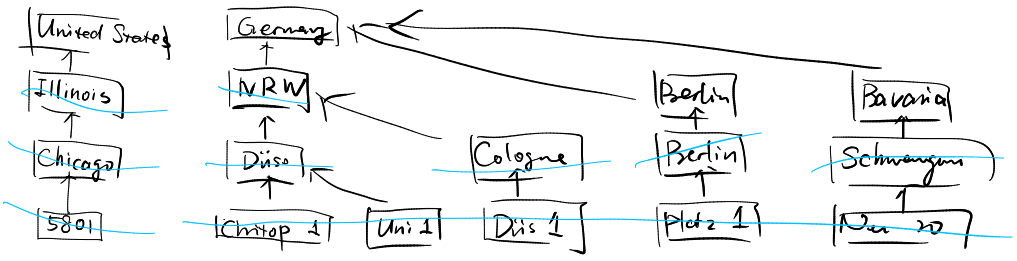
(f)



Convert the following vertical classification hierarchy into a hybrid classification hierarchy like the one seen in the lecture.

Dimension_ID	Parent_ID
5801 S Ellis Ave	Chicago
Bavaria	Germany
Berlin	Berlin
Berlin	Germany
Chicago	Illinois
Christophstr. 1	Düsseldorf
Cologne	North Rhine-Westphalia
Düsseldorfer Str. 1	Cologne
Düsseldorf	North Rhine-Westphalia
Illinois	United States
Neuschwansteinstr. 20	Schwangau
North Rhine-Westphalia	Germany
Platz der Republik 1	Berlin
Schwangau	Bavaria
Universitätsstr. 1	Düsseldorf

Drafts:



Answer:

Dimension_ID	Level1_ID	Level2_ID	Level3_ID	Level
5801 S Ellis Ave	Chicago	Illinois	United States	0
Christophstr. 1	Düsseldorf	North Rhine-Westphalia	Germany	0
Universitätsstr. 1	Düsseldorf	North Rhine-Westphalia	Germany	0
Düsseldorfer Str. 1	Cologne	North Rhine-Westphalia	Germany	0
Platz der Republik 1	Berlin	Berlin	Germany	0
Neuschwansteinstr. 20	Schwangau	Bavaria	Germany	0
Chicago	Illinois	United States	NULL	1
Düsseldorf	North Rhine-Westphalia	Germany	NULL	1
Cologne	North Rhine-Westphalia	Germany	NULL	1
Berlin	Berlin	Germany	NULL	1
Schwangau	Bavaria	Germany	NULL	1
Illinois	United States	NULL	NULL	2
North Rhine-Westphalia	Germany	NULL	NULL	2
Berlin	Germany	NULL	NULL	2
Bavaria	Germany	NULL	NULL	2
United States	NULL	NULL	NULL	3
Germany	NULL	NULL	NULL	3