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Functional Programming – ST 2024
Reading Guide 05: Databases

Timeline: This unit should be completed by 20.05.2024. Note this is a public holiday in Germany. We will discuss the prior week how to proceed with the in-person sessions.

Note: As of June 2023, Datomic itself offers a licence under which we are happy to include it in the material. The code for the exercise below still makes use of Datahike though.

1 Material

- Rick Hickey: Datomic `https://www.youtube.com/watch?v=9TYfcyvSpEQ` (until 21:50: how can a data base be embedded into the epochal time model?)

- Rich Hickey: Writing Datomic in Clojure `https://www.youtube.com/watch?v=7Fi-UvrRpyI` (architecture of Datomic, in particular compared to other database systems)

- Datomic Datalog: `https://www.youtube.com/watch?v=bAilFQdaiHk` (brief introduction to the query language)

Useful resources:

- Interactive Datomic Tutorial: `https://max-datom.com/`

- Datahike (open-source alternative to Datomic for smaller projects): `https://github.com/replikativ/datahike`

2 Learning Outcomes

After completing this unit you should be able to

- compare the architecture of Datomic to „traditional“ data bases.

- describe unique features of a data base that conforms to the epochal time model.

- retrieve data using Datalog-style queries.

3 Exercises

Exercise 5.1 (myMDB)
For this task, you may use the `05-skeleton.clj` you will find in ILIAS. Additionally, we use two data sets IMDb provides at `https://datasets.imdbws.com/`. We'll need to download and extract `title.basics.tsv.gz` as well as `title.ratings.tsv.gz`.

A Feed the data into a Datehike data base. `05-skeleton.clj` already contains code that parses the .tsv-file, sets up a data base and provides a schema. Your task here is to transform the data into a transaction.

B Query the data base and retrieve the following information:

- In what year was „Beverly Hills Cop" released?
- What is the IMDb score for „The Matrix"?
- Which movies from the 80s has a score of at least 9.0?
- What is the average score of all movies released in 1914?