Technical Task

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autumn semestsr course project
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November 13, 2015

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1 Technical task for the Phase 1

The objective of this phase is to utilize the database knowledge for real life problems.

1. Design the relational model and transform them into relations (create ER diagram and translate it into Relations).
2. Design the relations in an existing database management system (DBMS) by creating physical tables and their relationships.

1.1 Creating Scheme

There are many repositories containing research articles with their information.

Figure 1: The same article may be stored in different repositories.

The research articles are usually categorized based on their venues, authors, types and years.

Figure 2: The same article may be written by different authors.

A publication record reference in research articles can have several attributes along with the article name.

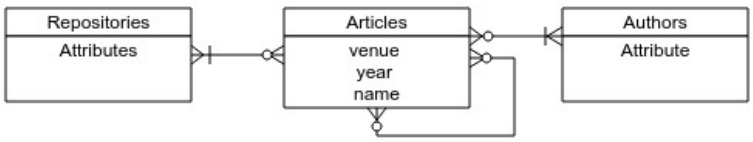

Figure 3: The same article may be referenced in different articles.

Functionality:

- Select, Insert, delete, and update publication records
- Import at least 1 million publications that are crawled from an existing publication repository, e.g. DBLP or Google Scholar, ACM digital library or etc. Realtime crawling is a +.
- Search the publication based on research area, author name, publication year, venue(conference/journal name), title, keyword, type of paper, institution or related articles and obtained ordered results.
- Ability to query related articles, based on your own defined methods, at least two methods.
- Ability to sort papers based on your own defined ranking methods, at least two methods

1.2 Implementing scheme

According to relations from 1.1, it is needed to implement a database on PostgreSQL

2 Technical task for the Phase 2

After creating the physical database, you need to develop a web-based graphical user interface (GUI) on top of it to interact with the database. It helps the users to carry out all the specified functionalities. It is more like Content Management System CMS. Only authorized/registered users are allowed to use this interface.

The web interface must neatly report the results with ranking. A nice visualization of the results, like showing graphs for related articles, is a +.

3 Technical task for the Phase 3

The goal of this phase is to replace the relational database with your own implementation of a database. You are asked to implement query operators (scan, select, project, join, group by, insert) using a standard programming language. You will replace all SQL code with calls to the query operators. Note that from the user's point of view, nothing will change on the front end insert) side of your web application. These are the requirements of the third phase of the project:

- Your database must provide methods to query data, as well as insert new record and update existing records.
- Your database should provide methods to query data, as well as insert new record and update existing records.
- In particular, your database should at least answer queries that join two tables.
- Use the iterator model to implement query operators. That is, operators should pull tuples from underlying operators using next() calls.
- Indexing on Primary keys with ability to add index on other attributes.