DATA MODELLING AND DATABASES
**Project Specification**

Project Part 2: Your Own Database

In the first part of the project, you designed and implemented an online crowdfunding platform. In the back end, your web application connects to a MySQL database. The web application is able to insert and update data as well as query data using SQL.

The goal of the second part of this project 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. As with part 1, java is highly recommended. 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 side of your web application.

These are the requirements of the second project part:

- Your database should provide methods to query data, as well as insert new record and update existing records.

- Your database should at least implement the following query operators: scan, project, select, sort, join, group by, and insert.

- In particular, your database should at least answer queries that join two tables (e.g., projects with funding amounts).

- Use the iterator model to implement query operators. That is, operators should pull tuples from underlying operators using next() calls. For example, the query "`SELECT name FROM users`" can be answered using the two operators project and scan:

<div align="center">

Web Application
$\downarrow$ next()
Project("name")
$\downarrow$ next()
Scan("user.txt")

</div>
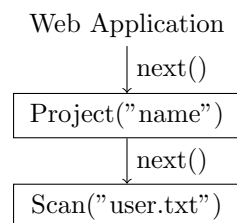
On the course's website, there is a project template that uses the iterator model. You may use the project template as a basis for your work. Have a look at `Part2Test.java` to see how the template works. Implement the missing parts of `Scan.java`, `Project.java`, `Select.java` and create more operators. (Note: In our template next() is implemented by a call to moveNext() and current(). Inserting data may be implemented differently and does not need to conform to the iterator model.)

Please note:

- The implementation of this project is optional for all participants of the lecture. There will be no grade and no "testat". Nonetheless, it is highly recommended to realize the project in order to understand the fundamental concepts and techniques of databases.

- The project's source code must be delivered by May 26th 2013. Each group will be requested to give a 15-minute presentation of the project.

- Any high-level programming language is allowed (Java, C#, PHP). However, we strongly recommend to use Java and to use our example project as basis for your work.