

CmpE321 - Project 1

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Deadline: 22nd July 2019, Monday, 09:00

1 Project Description

In this project, you are expected to design a storage manager system. The design shall have a system catalogue for storing the metadata and data storage units (files, pages and records) for storing the actual data. The system design must support following operations:

DDL Operations

- Create a type
- Delete a type
- List all types

DML Operations

- Create a record
- Delete a record
- Search for a record (by primary key)
- Update a record (by primary key)
- List all records of a type

You need to make certain decisions and assumptions while designing your system. The decisions shall include, but are not limited to:

- Page size (Something between 1KB and 2KBs is optimal)
- File size
- What information to store in your page headers and record headers
- Max number of fields a type can have
- Max length of a type name
- Max length of a field name

Assumptions:

- User always enters valid input.
- All fields shall be integers. However, type and field names shall be alphanumeric.
- A disk manager already exists that is able to fetch the necessary pages when addressed.

You can make further assumptions, as long as they do not conflict with the base assumptions and they are explained in the report clearly.

Constraints:

- The data *must* be organized in pages and pages must contain records. So, you *must* clearly explain your page and record structure in your report.
- You *are not allowed to* store all pages in the same file and a file *must* contain multiple pages. This means that your system *must* be able to create new files as storage manager grows. Moreover, when a file becomes free due to deletions, that file *must* be deleted.
- Although a file contains multiple pages, it must read page by page when it is needed. Loading the whole file to RAM is not allowed.

2 Report & Grading

You are expected to submit a report *written in L^AT_EX* that contains the sections below. Corresponding points are specified in parentheses.

1. **Title Page:** Include course name, semester, assignment title, your name and student number. *(5 pts)*
2. **Introduction:** Briefly describe the project in your own words. *(10 pts)*
3. **Assumptions & Constraints:** Clearly specify your assumptions and constraints of the system in an itemized or tabular format. *(25 pts)*
4. **Storage Structures:** Explain your system catalogue, page design, page header, record header etc. with tables/diagrams/figures. *(25 pts)*
5. **Operations:** Write your DDL and DML operations and refer to corresponding storage structures when needed in pseudocode. *(25 pts)*
6. **Conclusions & Assessment:** Evaluate your design, considering its ups and downs. *(10 pts)*

3 Submission

The submissions will be through Moodle. Submit a single pdf file named with your student number (e.g. 2016400XXX.pdf). If your pdf size is over Moodle upload limit, submit a link (drive, dropbox etc.) for downloading your report. Note that your reports will be inspected for plagiarism with previous years' reports as well as this year's. Any sign of plagiarism will be penalized.