CMPE 321 – Assignment 2

IMPLEMENTING STORAGE SYSTEM MANAGER

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Introduction

In this project I did the implementation of the database storage manager that I designed earlier. With this terminal program, user can do some DLL and DML operations which are *create a type, delete a type, list all types, create a record, delete a record, search for a record* and *list all records of a type.*

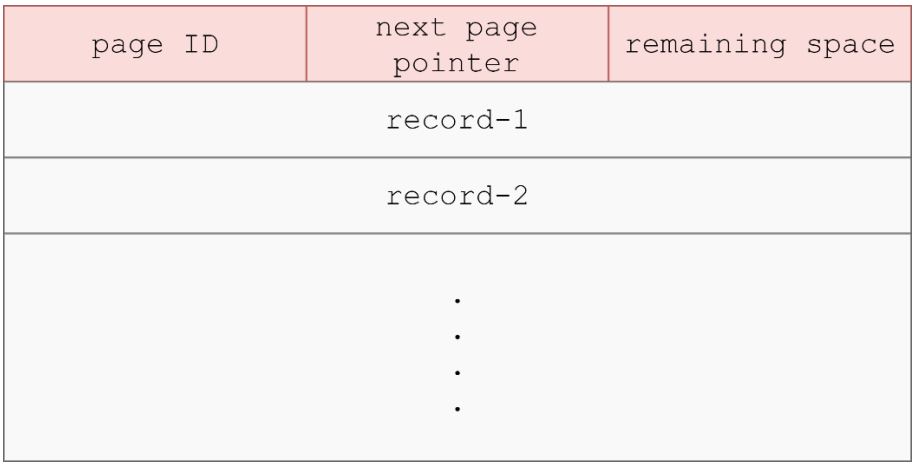
I made the implementation with java. Every structure except system catalogue has its own class for initialization. System catalogue is initialized in Main class and the DLL and DML operations are implemented in Main class as well. I used some side functions to make the code simpler, they are usually for type conversions such as from byte array to string or to integer.

During implementation I made some changes on assumptions and some minor changes on algorithm.

Changes From Initial Design

Changes Done:

- **Page size is 1025 KB.** This way it was easier to do page size and record placement.
- **There is no longer numOfFields info in the page header.** During implementation, reading this information from system catalogue seemed more convenient.



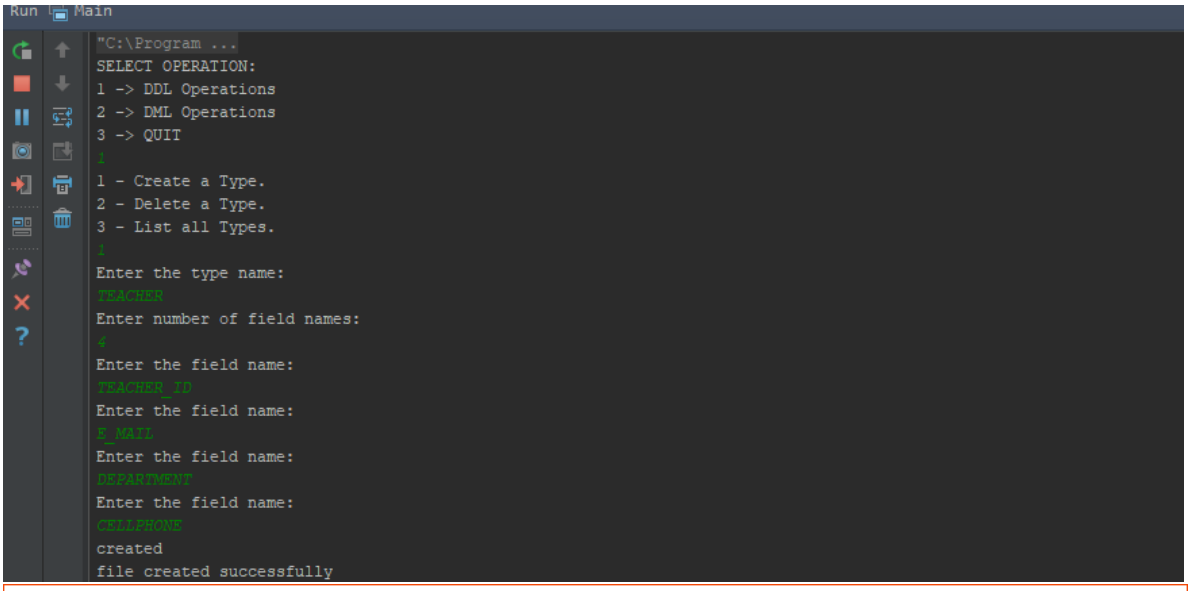
- **Type names or field names cannot contain spaces.** Since I am parsing the number of fields with respect to spaces, names with spaces considered two fields not one.

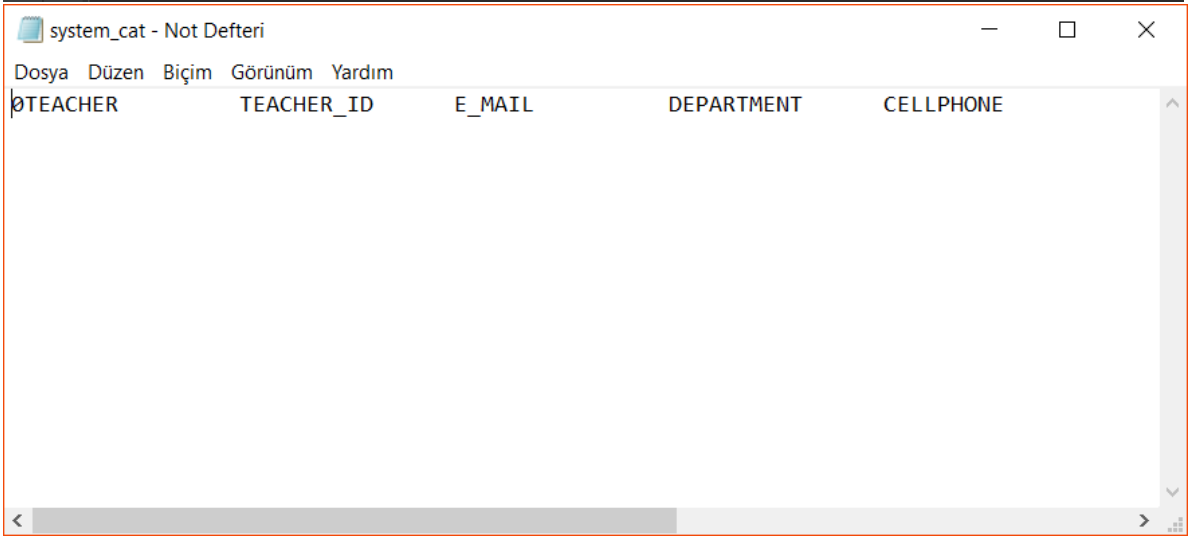
- Record values are integers and cannot contain spaces as well.

- Create a Record, Search for a Record Delete a Record and List all Records scanning the file page by page, which wasn't mentioned in the pseudocode of the design.

Sample Usage & Outputs

- Create A Type





- Delete A Type

```
SELECT OPERATION:
1 -> DDL Operations
2 -> DML Operations
3 -> QUIT
1
1 - Create a Type.
2 - Delete a Type.
3 - List all Types.
2
enter the type name of the type you want to delete
STUDENT
insert anything for new operation
```

Deleting a type makes the isEmpty field 1 so it can be overwritten.

```
1STUDENT          STUDENT_ID       E_MAIL
```

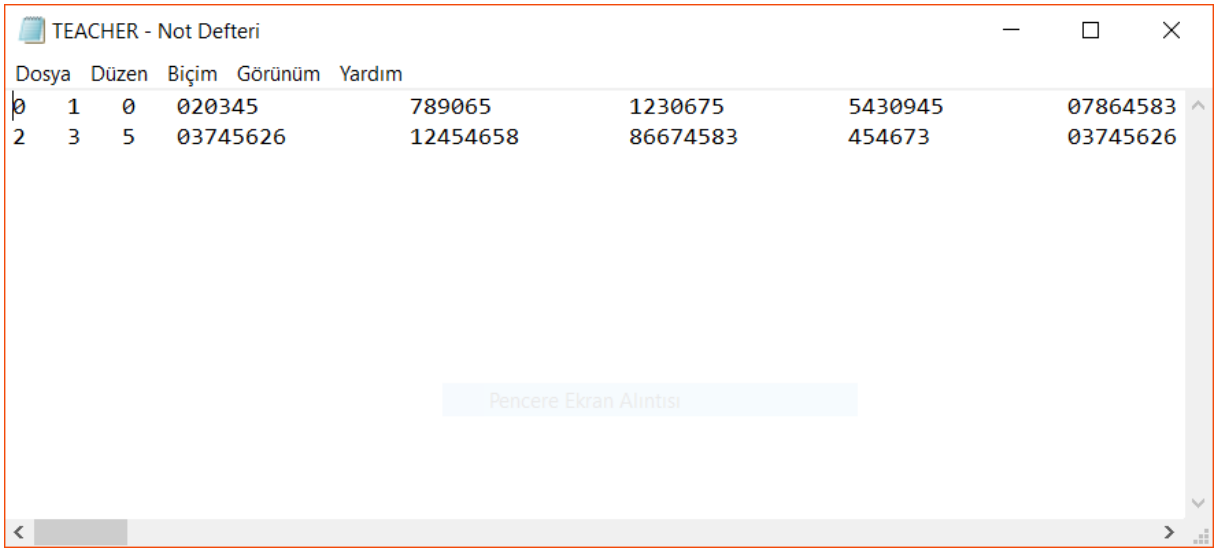
- List All Types

```
SELECT OPERATION:
1 -> DDL Operations
2 -> DML Operations
3 -> QUIT
1
1 - Create a Type.
2 - Delete a Type.
3 - List all Types.
3
TEACHER         TEACHER_ID      E_MAIL          DEPARTMENT      CELLPHONE
WORKER          NAME            AREA            CELLPHONE
ASSISTANT       ASSISTANT_ID    E_MAIL          DEPT
RESEARCH        AREA            BUDGET          HEAD_OF_RESEARCH
insert anything for new operation
```

- Create a Record

```
SELECT OPERATION:
1 -> DDL Operations
2 -> DML Operations
3 -> QUIT
2
1 -> Create a Record
2 -> Delete a Record
3 -> Search a Record
4 -> List All Records
1
enter the record type you want to create
TEACHER
enter the field value
20345
enter the field value
789065
enter the field value
1230675
enter the field value
5430945
insert anything for new operation
```

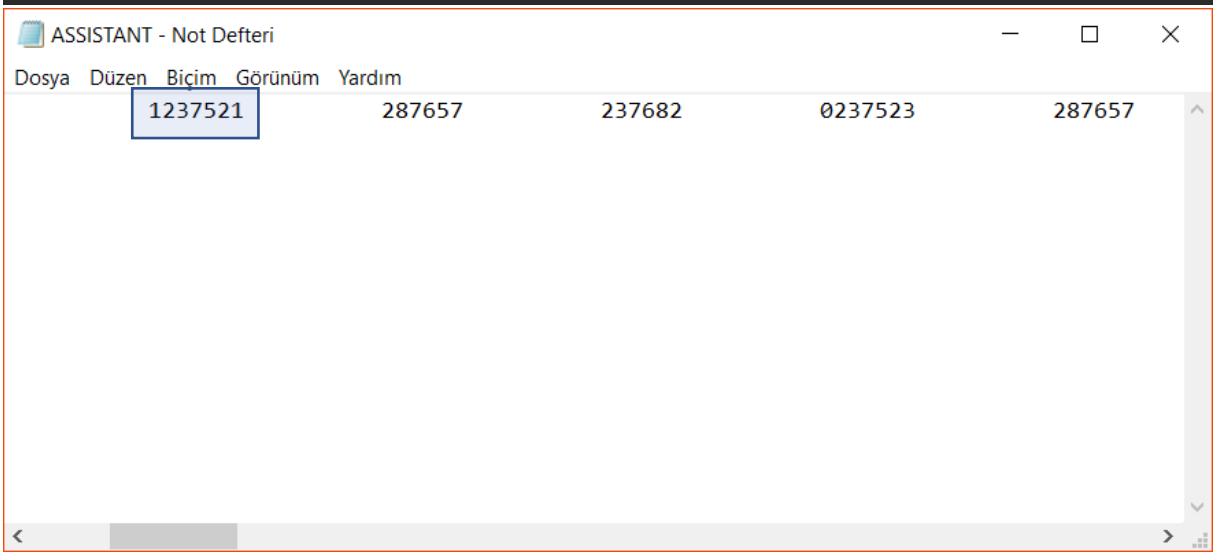
After a few record insertion



The first three fields are page headers and there is a long list of records in them. And the first zero in front of the first field is the isEmpty field.

- Delete a Record

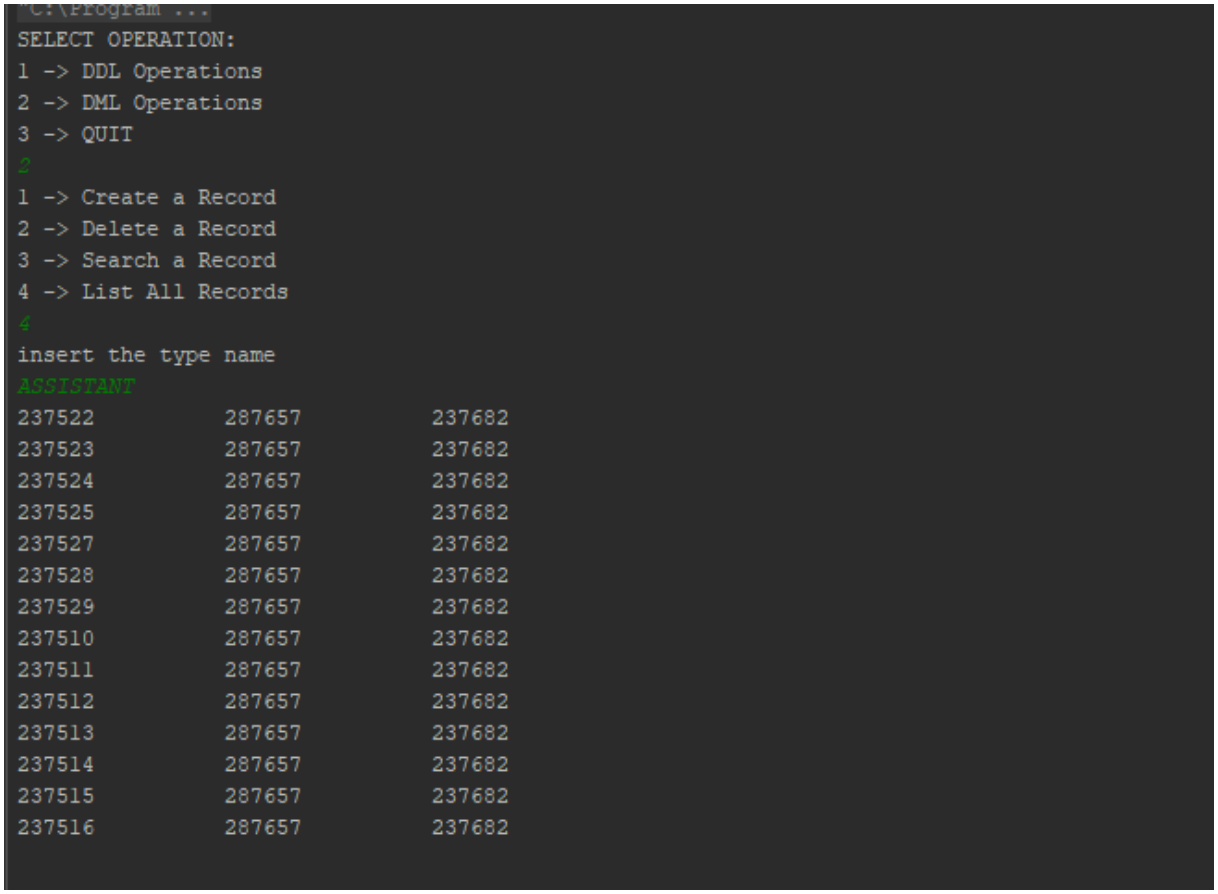
```
SELECT OPERATION:
1 -> DDL Operations
2 -> DML Operations
3 -> QUIT
2
1 -> Create a Record
2 -> Delete a Record
3 -> Search a Record
4 -> List All Records
2
enter the type name of the record you want to delete
ASSISTANT
enter the primary key of the record
237521
insert anything for new operation
```



- Search for a Record

```
"C:\Program ...
SELECT OPERATION:
1 -> DDL Operations
2 -> DML Operations
3 -> QUIT
2
1 -> Create a Record
2 -> Delete a Record
3 -> Search a Record
4 -> List All Records
3
enter the type name of the record you want to search
ASSISTANT
enter the primary key of the record
237524
237524          287657          237682
insert anything for new operation
```

- List All Records



Conclusions & Assessment

While implementing this storage manager system I understood the necessity of headers and the information kept there, the role of the metadata and the system manager. This storage system manager may not be efficient while dealing with big amount of data, but I believe this project helped me a lot understanding the concepts and the aim of the components of a database management system.

I think I can improve this implementation, make it more efficient, do more bug fixes and input checks. But apart from that, I think this implementation serves its purpose of being instructive and enlightening about the needs, the goals and the concept of such systems.