*Assignment 3*

# Simple DBMS

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# Simple DBMS

- ## Description:

Implement a simple DBMS that handles data stored in XML files. The table supports only two types: varchar and int. The simple DBMS support the following SQL statements:

- o Create database
- o Create table
- o Insert into table
- o Delete from table
- o Drop database
- o Drop table
- o Select from table
- o Update table

1- User can execute the above SQL statements by enter their query in console.
2- Console will send the query to the parser.
3- The parser will validate the query.
4- If query is valid parser will call the appropriate method.
5- The method will execute the query if it is valid.
6- Console gives user the choice to continue or to exit.
7- If user enters any inputs except query program will stop.

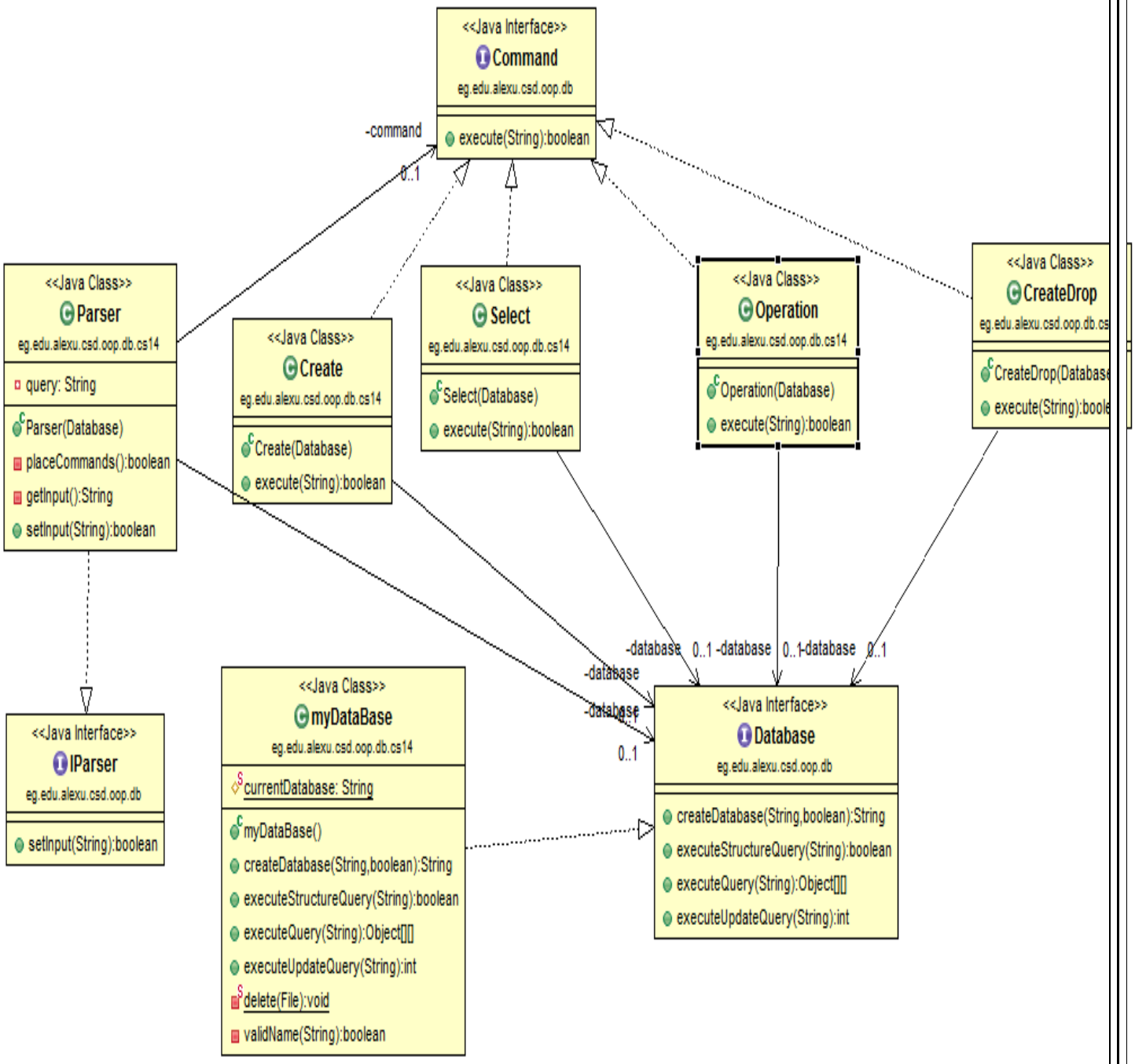
- ## Design decisions:

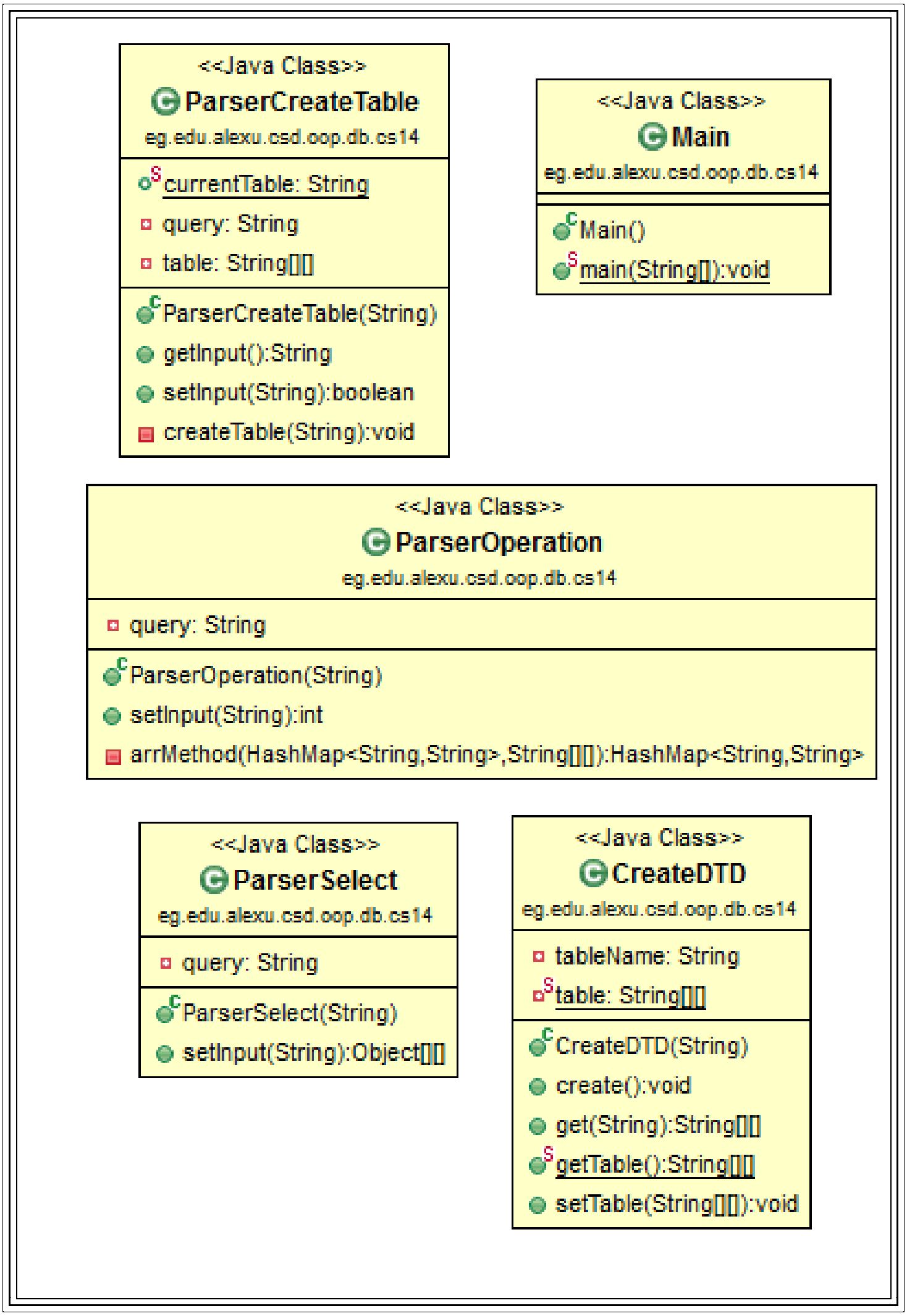
1- Command Design pattern is used to deal with methods in database interface
2- Singleton Design pattern is used to deal with xml file.
3- DOM parser is used to parse and validate xml files.
4- Data is cached in list while working on it then it is written in xml file.
5- For faster execution of query current table name and it's data are saved so if the next query will be on the same table it is not required to read it again.
6- Console tells User if the query is valid or not.

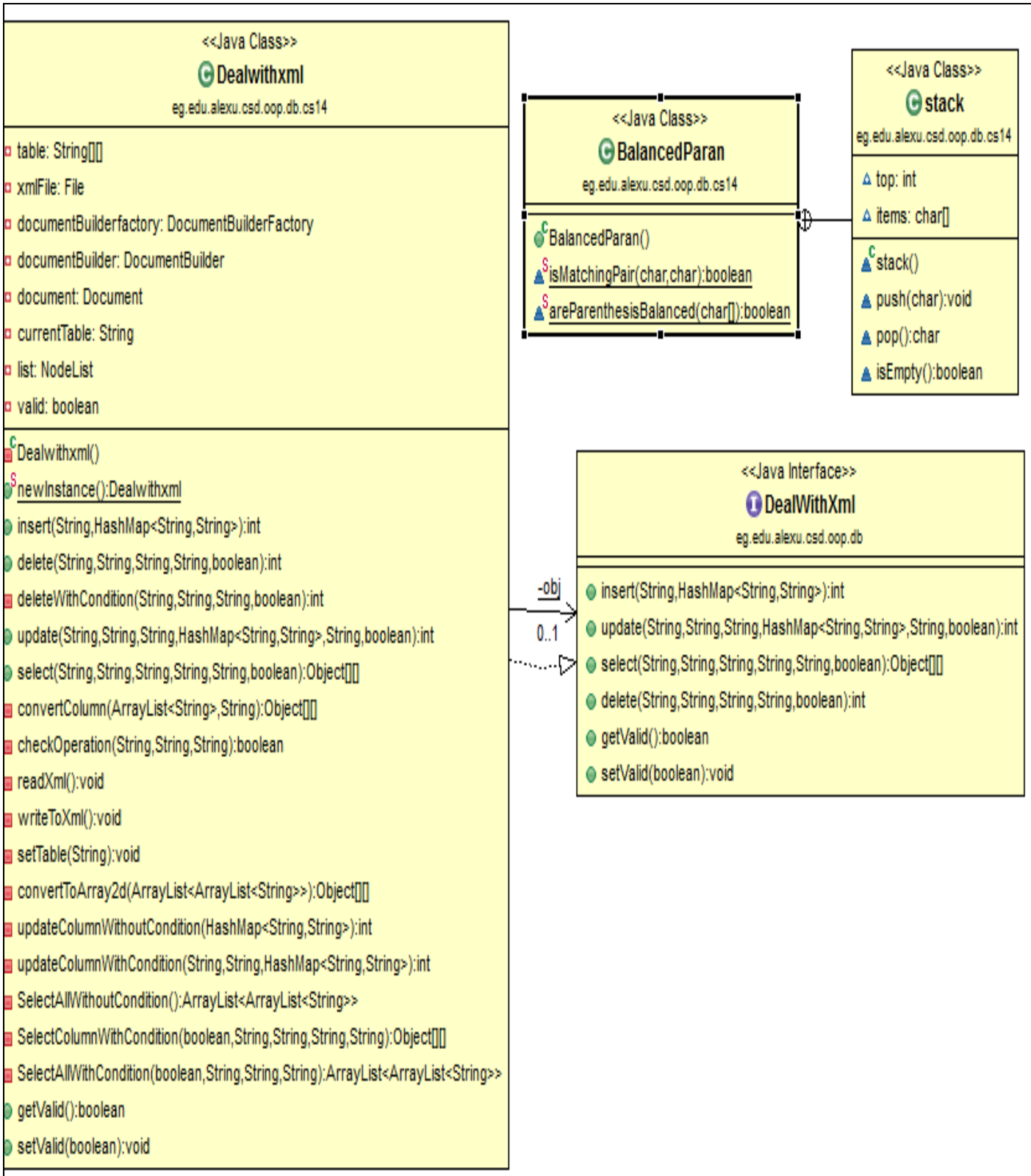
- ## User guide:

1- Enter the database name.
2- Enter the table name.
3- Enter insert query.
4- You can delete, select, insert or update table.
5- You can delete table or create new one.
6- You can delete database or create new one.
7- Enter "0" (without double quotations) to stop running program.

- **UML diagram:**


<<Java Interface>>
Command
eg.edu.alexu.csd.oop.db
execute(String):boolean
-command
0..1
<<Java Class>>
Parser
eg.edu.alexu.csd.oop.db.cs14
query: String
Parser(Database)
placeCommands():boolean
getInput():String
setInput(String):boolean
<<Java Class>>
Create
eg.edu.alexu.csd.oop.db.cs14
Create(Database)
execute(String):boolean
<<Java Class>>
Select
eg.edu.alexu.csd.oop.db.cs14
Select(Database)
execute(String):boolean
<<Java Class>>
Operation
eg.edu.alexu.csd.oop.db.cs14
Operation(Database)
execute(String):boolean
<<Java Class>>
CreateDrop
eg.edu.alexu.csd.oop.db.cs
CreateDrop(Database
execute(String):boole
-database
0..1
-database
0..1
-database
0..1
-database
0..1
<<Java Interface>>
IParser
eg.edu.alexu.csd.oop.db
setInput(String):boolean
<<Java Class>>
myDataBase
eg.edu.alexu.csd.oop.db.cs14
currentDatabase: String
myDataBase()
createDatabase(String,boolean):String
executeStructureQuery(String):boolean
executeQuery(String):Object[][]
executeUpdateQuery(String):int
delete(File):void
validName(String):boolean
<<Java Interface>>
Database
eg.edu.alexu.csd.oop.db
createDatabase(String,boolean):String
executeStructureQuery(String):boolean
executeQuery(String):Object[][]
executeUpdateQuery(String):int


<<Java Class>>
ParserCreateTable
eg.edu.alexu.csd.oop.db.cs14
currentTable: String
query: String
table: String[][]
ParserCreateTable(String)
getInput():String
setInput(String):boolean
createTable(String):void
<<Java Class>>
Main
eg.edu.alexu.csd.oop.db.cs14
Main()
main(String[]):void
<<Java Class>>
ParserOperation
eg.edu.alexu.csd.oop.db.cs14
query: String
ParserOperation(String)
setInput(String):int
arrMethod(HashMap<String,String>,String[][]):HashMap<String,String>
<<Java Class>>
ParserSelect
eg.edu.alexu.csd.oop.db.cs14
query: String
ParserSelect(String)
setInput(String):Object[][]
<<Java Class>>
CreateDTD
eg.edu.alexu.csd.oop.db.cs14
tableName: String
table: String[][]
CreateDTD(String)
create():void
get(String):String[][]
getTable():String[][]
setTable(String[][]):void


<<Java Class>>
Dealwithxml
eg.edu.alexu.csd.oop.db.cs14
table: String[][]
xmlFile: File
documentBuilderfactory: DocumentBuilderFactory
documentBuilder: DocumentBuilder
document: Document
currentTable: String
list: NodeList
valid: boolean
Dealwithxml()
newInstance():Dealwithxml
insert(String,HashMap<String,String>):int
delete(String,String,String,String,boolean):int
deleteWithCondition(String,String,String,boolean):int
update(String,String,String,HashMap<String,String>,String,boolean):int
select(String,String,String,String,String,boolean):Object[][]
convertColumn(ArrayList<String>,String):Object[][]
checkOperation(String,String,String):boolean
readXml():void
writeToXml():void
setTable(String):void
convertToArray2d(ArrayList<ArrayList<String>>):Object[][]
updateColumnWithoutCondition(HashMap<String,String>):int
updateColumnWithCondition(String,String,HashMap<String,String>):int
SelectAllWithoutCondition():ArrayList<ArrayList<String>>
SelectColumnWithCondition(boolean,String,String,String,String):Object[][]
SelectAllWithCondition(boolean,String,String,String):ArrayList<ArrayList<String>>
getValid():boolean
setValid(boolean):void
<<Java Class>>
BalancedParan
eg.edu.alexu.csd.oop.db.cs14
BalancedParan()
isMatchingPair(char,char):boolean
areParenthesisBalanced(char[]):boolean
<<Java Class>>
stack
eg.edu.alexu.csd.oop.db.cs14
top: int
items: char[]
stack()
push(char):void
pop():char
isEmpty():boolean
-obj
0..1
<<Java Interface>>
DealWithXml
eg.edu.alexu.csd.oop.db
insert(String,HashMap<String,String>):int
update(String,String,String,HashMap<String,String>,String,boolean):int
select(String,String,String,String,String,boolean):Object[][]
delete(String,String,String,String,boolean):int
getValid():boolean
setValid(boolean):void

- **Snapshots:**

- **Test 1:**

```
welcome to you in Simple DBMS
Enter your query to enter in required database :
CREATE DATABASE test12
Enter your query to enter in required table :
CREATE TABLE table_name12(column_name1 varchar, column_name2 int, column_name3 varchar)
Enter your query to do any operation in this table :
INSERT INTO table_name12(column_NAME1, COLUMN_name3, column_name2) VALUES ('value1', 'value3', 4)
Enter 1 to continue enter query to do any operation in this table
OR 0 to get out of this table:
1
Enter your query to do any operation in this table :
INSERT INTO table_name12(column_NAME1, COLUMN_name3, column_name2) VALUES ('value1', 'value3', 4)
Enter 1 to continue enter query to do any operation in this table
OR 0 to get out of this table:
1
Enter your query to do any operation in this table :
INSERT INTO table_name12(column_name1, COLUMN_NAME3, column_NAME2) VALUES ('value2', 'value4', 5)
Enter 1 to continue enter query to do any operation in this table
OR 0 to get out of this table:
1
Enter your query to do any operation in this table :
INSERT INTO table_name12(column_name1, COLUMN_NAME3, column_NAME2) VALUES ('value5', 'value6', 6)
Enter 1 to continue enter query to do any operation in this table
OR 0 to get out of this table:
1
Enter your query to do any operation in this table :
SELECT * From table_name12
+--------------------+--------------------+--------------------+
|column_0            |column_1            |column_2            |
+--------------------+--------------------+--------------------+
|value1              |4                   |value3              |
|value1              |4                   |value3              |
|value2              |5                   |value4              |
|value5              |6                   |value6              |
+--------------------+--------------------+--------------------+
Enter 1 to continue enter query to do any operation in this table
```

- **Test 2:**

```
welcome to you in Simple DBMS
Enter your query to enter in required database :
CREATE DATABASE test1
Enter your query to enter in required table :
CREATE TABLE table_name1(column_name1 varchar, column_name2 int, column_name3 varcha
Enter your query to do any operation in this table :
CREATE TABLE table_name1(column_name1 varchar, column_name2 int, column_name3 varcha
you enter invalid thing
Enter 1 to continue
OR 0 to exit
0
```

- **Test 3:**

```
welcome to you in Simple DBMS
Enter your query to enter in required database :
CREATE DATABASE test3
Enter your query to enter in required table :
CREATE TABLE table_name3(column_name1 varchar, column_name2 int, column_name3 varchar)
Enter your query to do any operation in this table :
INSERT INTO table_name3 VALUES ('value1', 3,'value3')
Enter 1 to continue enter query to do any operation in this table
OR 0 to get out of this table:
0
Enter 1 to continue
OR 0 to exit
0
```

- **Test 4:**

```
welcome to you in Simple DBMS
Enter your query to enter in required database :
CREATE DATABASE test8
Enter your query to enter in required table :
CREATE TABLE table_name8(column_name1 varchar, column_name2 int, column_name3 varchar)
Enter your query to do any operation in this table :
INSERT INTO table_name8(column_NAME1, COLUMN_name3, column_name2) VALUES ('value1', 'value3', 4)
Enter 1 to continue enter query to do any operation in this table
OR 0 to get out of this table:
1
Enter your query to do any operation in this table :
INSERT INTO table_name8(column_NAME1, COLUMN_name3, column_name2) VALUES ('value1', 'value3', 4)
Enter 1 to continue enter query to do any operation in this table
OR 0 to get out of this table:
1
Enter your query to do any operation in this table :
INSERT INTO table_name8(column_name1, COLUMN_NAME3, column_NAME2) VALUES ('value2', 'value4', 5)
Enter 1 to continue enter query to do any operation in this table
OR 0 to get out of this table:
1
Enter your query to do any operation in this table :
UPDATE table_name8 SET column_name1='11111111', COLUMN_NAME2=22222222, column_name3='333333333' WHERE coLUmn_NAME3='VALUE3'
Enter 1 to continue enter query to do any operation in this table
OR 0 to get out of this table:
0
Enter 1 to continue
OR 0 to exit
0
```

- **Test 5:**

```
welcome to you in Simple DBMS
Enter your query to enter in required database :
CREATE DATABASE test13
Enter your query to enter in required table :
CREATE TABLE table_name13(column_name1 varchar, column_name2 int, column_name3 varchar)
Enter your query to do any operation in this table :
INSERT INTO table_name13(column_NAME1, COLUMN_name3, column_name2) VALUES ('value1', 'value3', 4)
Enter 1 to continue enter query to do any operation in this table
OR 0 to get out of this table:
1
Enter your query to do any operation in this table :
INSERT INTO table_name13(column_NAME1, column_name2, COLUMN_name3) VALUES ('value1', 4, 'value3')
Enter 1 to continue enter query to do any operation in this table
OR 0 to get out of this table:
1
Enter your query to do any operation in this table :
INSERT INTO table_name13(column_name1, COLUMN_NAME3, column_NAME2) VALUES ('value2', 'value4', 5)
Enter 1 to continue enter query to do any operation in this table
OR 0 to get out of this table:
1
Enter your query to do any operation in this table :
INSERT INTO table_name13(column_name1, COLUMN_NAME3, column_NAME2) VALUES ('value5', 'value6', 6)
Enter 1 to continue enter query to do any operation in this table
OR 0 to get out of this table:
1
Enter your query to do any operation in this table :
SELECT column_name1 FROM table_name13 WHERE coluMN_NAME2 < 5
+--------------------+
|column_0            |
+--------------------+
|value1              |
|value1              |
+--------------------+
Enter 1 to continue enter query to do any operation in this table
OR 0 to get out of this table:
0
```