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CS 564: Database Management Systems
PP 2: SQL
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How to run

- Use `make sql` to run 10 SQL queries for part A

- Use `make run-jar` to run the executable jar file for part B

Assumptions

- The JDBC application connects to the course database cs564instr on Linux lab at

  UW-Madison.

- It reads from hw2 schema and all tables are created under the public schema.

- It is assumed that the user has the permission to those schemas under cs564instr

  database.

- The file login.config is present in the same folder as executable.jar

Files

- Readme.txt: Readme file in txt format

- Readme.pdf: Readme file in pdf format

- query1.sql - query10.sql: one file per question, including the resulted rows in the comment

- pgtest.java: Java code that shows the prompt and output data based on input information

- executable.jar: Compiled jar file for pgtest.java. Use `make run-jar` to run the file

Output

```
[szhong@snares-03] (1)$ make
javac pgtest.java
java -Djava.security.auth.login.config=login.config -classpath
./postgresql-8.4-703.jdbc4.jar:. pgtest
Debug is  true storeKey false useTicketCache true useKeyTab false doNotPrompt
false ticketCache is null isInitiator true KeyTab is null refreshKrb5Config is
false principal is null tryFirstPass is false useFirstPass is false storePass
is false clearPass is false
Acquire TGT from Cache
Principal is szhong@CS.WISC.EDU
Commit Succeeded

Please specify execution mode (Enter T (Table) / Q (Query) / E (Exit)): t
Please enter table name: holidays
How many samples do you want: 10
Do you want to set seed? (Enter Y/N): n
Use previous seed: 0
Please select output mode (Enter S (Save in new table) / O (Output)): o
weekdate    isholiday
2010-05-07  false
2010-10-08  false
2010-10-15  false
2010-12-24  false
2011-02-11  true
2011-06-17  false
2011-07-01  false
2011-09-09  true
2011-10-07  false
2012-02-03  false
Do you want to continue sampling? (Enter Y/N): n
```

```
================================================================================

Please specify execution mode (Enter T (Table) / Q (Query) / E (Exit)): t
Please enter table name: stores
How many samples do you want: 10  5
Do you want to set seed? (Enter Y/N): y
Please enter the seed for sampling: 39
Please select output mode (Enter S (Save in new table) / O (Output)): o
store type  size
33    A     39690
39    A     184109
40    A     155083
41    A     196321
43    C     41062
Do you want to continue sampling? (Enter Y/N): y
How many samples do you want: 5
Do you want to set seed? (Enter Y/N): y
Please enter the seed for sampling: 20
Please select output mode (Enter S (Save in new table) / O (Output)): o
store type  size
9     B     125833
26    A     152513
27    A     204184
32    A     203007
38    C     39690
Do you want to continue sampling? (Enter Y/N): n

================================================================================

Please specify execution mode (Enter T (Table) / Q (Query) / E (Exit)): temp
Please enter table name: temporaldata
How many samples do you want: 10
Do you want to set seed? (Enter Y/N): n
Use previous seed: 20
Please select output mode (Enter S (Save in new table) / O (Output)): o
store weekdate     temperature fuelprice   cpi    unemploymentrate
1     2011-03-11   53.56 3.459 214.11105   7.742
1     2012-01-27   54.26 3.29  220.07886   7.348
3     2010-06-18   83.52 2.637 214.78583   7.343
19    2010-11-12   40.3  3.065 132.97832   8.067
24    2011-08-12   72.52 3.995 136.14413   8.358
32    2012-01-20   36.86 3.055 196.77966   8.256
35    2011-02-25   33.05 3.274 137.37645   8.549
35    2011-07-01   73.76 3.748 139.36375   8.684
35    2012-10-12   55.4  4.0   142.93762   8.665
44    2011-08-12   75.95 3.606 129.20158   6.56
Do you want to continue sampling? (Enter Y/N): n
```

```
===============================================================================

Please specify execution mode (Enter T (Table) / Q (Query) / E (Exit)): t
Please enter table name: sales
How many samples do you want: 10
Do you want to set seed? (Enter Y/N): y
Please enter the seed for sampling: 0
Please select output mode (Enter S (Save in new table) / O (Output)): o
store  dept   weekdate      weeklysales
7      87     2011-03-04    11488.98
8      59     2012-09-07    203.28
13     17     2011-09-30    15799.2
18     95     2011-03-25    49958.1
21     42     2012-01-06    5561.71
29     6      2010-07-09    4793.38
37     59     2011-09-09    66.07
40     36     2012-06-08    1300.0
43     4      2011-05-13    18788.87
44     10     2011-11-18    192.1
Do you want to continue sampling? (Enter Y/N): n

===============================================================================

Please specify execution mode (Enter T (Table) / Q (Query) / E (Exit)): e
[szhong@snares-03] (2)$
```

Javadoc: (starting from next page)

PACKAGE CLASS TREE DEPRECATED INDEX HELP

PREV CLASS **NEXT CLASS** FRAMES NO FRAMES ALL CLASSES
SUMMARY: NESTED | FIELD | CONSTR | METHOD DETAIL: FIELD | CONSTR | METHOD

Class pgtest

java.lang.Object
    pgtest

```
public class pgtest
extends java.lang.Object
```

Main Class for the project

Constructor Summary

Constructors
Constructor and Description
pgtest()

Method Summary

All Methods	Static Methods	Concrete Methods

Modifier and Type	Method and Description
private static void	**iteration**() This method is called on each iteration of sampling
static void	**main**(java.lang.String[] args) The entry of the program **Prompter SQLExecutor QueryBuilder ResultPrinter**
private static void	**printLineSeparator**() Print out the line seperator used between each iteration
private static java.lang.Integer[]	**sampleNumer**(int R, int n, long seed, java.util.Set<java.lang.Integer> selected) Randomly generate some row numbers of rows that has not been sampled yet, assuming row number of queries are consecutive.

Methods inherited from class java.lang.Object
clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

Constructor Detail

pgtest

```
public pgtest()
```

Method Detail

main

```
public static void main(java.lang.String[] args)
```

The entry of the program Prompter SQLExecutor QueryBuilder ResultPrinter

Parameters:

args - not used

iteration

```
private static void iteration()
                        throws java.sql.SQLException
```

This method is called on each iteration of sampling

Throws:

java.sql.SQLException

sampleNumer

```
private static java.lang.Integer[] sampleNumer(int R,
                                               int n,
                                               long seed,
                                               java.util.Set<java.lang.Integer> selected)
```

Randomly generate some row numbers of rows that has not been sampled yet, assuming row number of queries are consecutive.

Parameters:

R - number of rows remaining in the query.

n - number of rows to be sampled.

seed - seed for the random number generator

selected - a set of row numbers that have already been selected.

Returns:

an array of row numbers to be sampled

printLineSeparator

```
private static void printLineSeparator()
```

Print out the line seperator used between each iteration

Class Prompter

java.lang.Object
    Prompter

```
class Prompter
extends java.lang.Object
```

The prompter prompts the user in order to ask for input Error messages are printed if user's inputs are invalid

Field Summary

Fields

Modifier and Type	Field and Description
private static java.util.Scanner	**in**
private static long	**seed**

Constructor Summary

Constructors

Constructor and Description
Prompter()

Method Summary

All Methods	Static Methods	Concrete Methods

Modifier and Type	Method and Description
(package private) static boolean	**continueSample**() Ask user whether to continue sampling
(package private) static java.lang.String	**outputTableName**() Asks the user for output mode S for same in new talbe and O for output if the input string has more than one character, it reads the first character as the input if S is selected, the user is required to

	input a table name other input will be treated as invalid input
private static void	**panic**() Print the error message "invalid input"
private static java.lang.String	**prompt**(java.lang.String message) Print the message to the console, and return the trimed user input in lower case
(package private) static boolean	**promptYesOrNo**(java.lang.String message) Promoted the message to user, and askes for Y/N input
(package private) static int	**sampleSize**() Ask user for the number of samples they want for the query/table.
(package private) static long	**seed**() Ask user for the seed used for random sampling.
(package private) static java.lang.String	**userQuery**() Asks user if he/she wants to sample from a table or a query.

Methods inherited from class java.lang.Object

```
clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString,
wait, wait, wait
```

Field Detail

in

```
private static java.util.Scanner in
```

seed

```
private static long seed
```

Constructor Detail

Prompter

```
Prompter()
```

Method Detail

outputTableName

```
static java.lang.String outputTableName()
```

Asks the user for output mode S for same in new talbe and O for output if the input string has more than one character, it reads the first character as the input if S is selected, the user is required to input a table name other input will be treated as invalid input

Returns:

```
output table name if S is selected, or null if O is selected
```

userQuery

```
static java.lang.String userQuery()
```

Asks user if he/she wants to sample from a table or a query. If the input starts with T, it will ask user for the table name to be sampled from. If the input starts with Q, it will ask for the query to be sampled from. If the input starts with E, the program will exit. This method is case insensitive.

Returns:

```
user query
```

sampleSize

```
static int sampleSize()
```

Ask user for the number of samples they want for the query/table. The input must be an integer that is greater than zero. If inval input is detected, the user will be prompt to input a new number.

Returns:

```
the positive integer sample size
```

seed

```
static long seed()
```

Ask user for the seed used for random sampling. The input cound be a long integer. If N is selected, the previous seed will be used

Returns:

```
seed the seed used for random sampling
```

continueSample

```
static boolean continueSample()
```

Ask user whether to continue sampling

Returns:

```
whether the user wants to continue sampling
```

promptYesOrNo

```
static boolean promptYesOrNo(java.lang.String message)
```

Promoted the message to user, and askes for Y/N input

Parameters:

```
message – the message printed to the console
```

Returns:

```
true if the user input starts with y, or false if the user input starts with n
```

prompt

```
private static java.lang.String prompt(java.lang.String message)
```

Print the message to the console, and return the trimed user input in lower case

Parameters:

```
message – the message to be printed to the console
```

Returns:

panic

```
private static void panic()
```

Print the error message "invalid input"

PACKAGE   CLASS   TREE   DEPRECATED   INDEX   HELP

PREV CLASS   **NEXT CLASS**   FRAMES   NO FRAMES   ALL CLASSES
SUMMARY: NESTED | FIELD | CONSTR | METHOD   DETAIL: FIELD | CONSTR | METHOD

PACKAGE   CLASS   TREE   DEPRECATED   INDEX   HELP

PREV CLASS   NEXT CLASS   FRAMES   NO FRAMES   ALL CLASSES
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Class QueryBuilder

java.lang.Object
    QueryBuilder

---

class **QueryBuilder**
extends java.lang.Object

The class is used to generate a SQL query in String

Field Summary

Fields	
Modifier and Type	**Field and Description**
private static java.lang.String	**TMP_TABLE_NAME**

Constructor Summary

Constructors
Constructor and Description
QueryBuilder()

Method Summary

All Methods	Static Methods	Concrete Methods

Modifier and Type	Method and Description
(package private) static java.lang.String	**dropRowNum**(java.lang.String tableName) Generate a query which drops the column called "rownum" in the given table
(package private) static java.lang.String	**dropTable**(java.lang.String tableName) Generate a query which drops the table of given table name
(package private) static java.lang.String	**getCount**(java.lang.String query) Generate a query that gets the number of rows in the table returned by the query
private static java.lang.String	**IntArrayToString**(java.lang.Integer[] array) Convert an integer array to a String

private static java.lang.String	**preprocessTableName**(java.lang.String tableName) This method checks if a table name is null.
(package private) static java.lang.String	**sampleRowIntoTable**(java.lang.String query, java.lang.Integer[] sampleRowNum, java.lang.String tableName) Generate a query to select sample rows of input row number by using the input query, and insert them into a new table named as the input table name
(package private) static java.lang.String	**selectAllFromTable**(java.lang.String tableName) Generate a query that selects everything from the given table
(package private) static java.lang.String	**setPath**() Generate a query to set search path
private static java.lang.String	**truncateSemicolon**(java.lang.String query) A helper function used to truncate the semicolon of the query if exists

Methods inherited from class java.lang.Object

clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

Field Detail

TMP_TABLE_NAME

private static final java.lang.String TMP_TABLE_NAME

See Also:

Constant Field Values

Constructor Detail

QueryBuilder

QueryBuilder()

Method Detail

setPath

static java.lang.String setPath()

Generate a query to set search path

Returns:

```
query to set search path to public, hw2
```

dropRowNum

```
static java.lang.String dropRowNum(java.lang.String tableName)
```

Generate a query which drops the column called "rownum" in the given table

Parameters:

```
tableName - the name of table to be altered
```

Returns:

```
query that alter the table
```

dropTable

```
static java.lang.String dropTable(java.lang.String tableName)
```

Generate a query which drops the table of given table name

Parameters:

```
tableName - the name of table to be droped
```

Returns:

```
query that drops the table of given name
```

selectAllFromTable

```
static java.lang.String selectAllFromTable(java.lang.String tableName)
```

Generate a query that selects everything from the given table

Parameters:

```
tableName - the name of table to be selected from
```

Returns:

```
query that selects everything from the given table
```

sampleRowIntoTable

```
static java.lang.String sampleRowIntoTable(java.lang.String query,
                                           java.lang.Integer[] sampleRowNum,
                                           java.lang.String tableName)
```

Generate a query to select sample rows of input row number by using the input query, and insert them into a new table named as the input table name

Parameters:

```
query - Query to run
```

```
sampleRowNum - Number of samples to select
```

tableName – The new table name

Returns:

Generated query to select row and save into a new table

getCount

```
static java.lang.String getCount(java.lang.String query)
```

Generate a query that gets the number of rows in the table returned by the query

Parameters:

query – the query that genrate the result

Returns:

the number of rows in the result table returned by the query

preprocessTableName

```
private static java.lang.String preprocessTableName(java.lang.String tableName)
```

This method checks if a table name is null.

Parameters:

tableName – the table name to be checked

Returns:

if tableName is not null, the input tableName will be returned. Otherwise a temperate table name will be returned.

truncateSemicolon

```
private static java.lang.String truncateSemicolon(java.lang.String query)
```

A helper function used to truncate the semicolon of the query if exists

Parameters:

query – the query to be truncated

Returns:

a query with semicolon truncated

IntArrayToString

```
private static java.lang.String IntArrayToString(java.lang.Integer[] array)
```

Convert an integer array to a String

new Integer[]{1, 2, 3} => 1, 2, 3

Parameters:

array – the array to be converted

Returns:

the resulting String

PACKAGE   CLASS   TREE   DEPRECATED   INDEX   HELP

PREV CLASS   NEXT CLASS   FRAMES   NO FRAMES   ALL CLASSES
SUMMARY: NESTED | FIELD | CONSTR | METHOD   DETAIL: FIELD | CONSTR | METHOD

Class SQLExecutor

java.lang.Object
       SQLExecutor

```
class SQLExecutor
extends java.lang.Object
```

The class is used to execute SQL query

Field Summary

Fields	
Modifier and Type	**Field and Description**
private static java.sql.Connection	**conn**

Constructor Summary

Constructors
Constructor and Description
SQLExecutor()

Method Summary

All Methods	Static Methods	Concrete Methods

Modifier and Type	Method and Description
(package private) static void	**connect**(java.lang.String url) Start a connection with the specified database.
(package private) static java.sql.ResultSet	**executeQuery**(java.lang.String query) Execute a query and returns the result set
(package private) static int	**executeUpdate**(java.lang.String query) Execute a query that updates the table (no return value)
(package private) static java.lang.Integer	**getCount**(java.lang.String query)

| | Find the number of rows that will be returned by the given query. |

Methods inherited from class java.lang.Object

```
clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString,
wait, wait, wait
```

Field Detail

conn

```
private static java.sql.Connection conn
```

Constructor Detail

SQLExecutor

```
SQLExecutor()
```

Method Detail

connect

```
static void connect(java.lang.String url)
```

Start a connection with the specified database.

Parameters:

```
url - url of the database specified.
```

getCount

```
static java.lang.Integer getCount(java.lang.String query)
                         throws java.sql.SQLException
```

Find the number of rows that will be returned by the given query.

Parameters:

```
query - the query to be sampled from
```

Returns:

the number of rows of the given query

Throws:

`java.sql.SQLException`

executeQuery

```
static java.sql.ResultSet executeQuery(java.lang.String query)
                                throws java.sql.SQLException
```

Execute a query and returns the result set

Parameters:

`query – the query to be executed`

Returns:

`the result set for the query`

Throws:

`java.sql.SQLException`

executeUpdate

```
static int executeUpdate(java.lang.String query)
                 throws java.sql.SQLException
```

Execute a query that updates the table (no return value)

Parameters:

`query – the query to be executed`

Returns:

`either (1) the row count for SQL Data Manipulation Language (DML) statements or (2) 0 for SQL statements that return nothing`

Throws:

`java.sql.SQLException`

PACKAGE **CLASS** TREE DEPRECATED INDEX HELP

PREV CLASS NEXT CLASS FRAMES NO FRAMES ALL CLASSES
SUMMARY: NESTED | FIELD | CONSTR | METHOD   DETAIL: FIELD | CONSTR | METHOD

Class ResultPrinter

java.lang.Object
    ResultPrinter

```
class ResultPrinter
extends java.lang.Object
```

The class is used to print the result set

Constructor Summary

Constructors
Constructor and Description
ResultPrinter()

Method Summary

All Methods	Static Methods	Concrete Methods

Modifier and Type	Method and Description
(package private) static void	**print**(java.sql.ResultSet rs) This method prints out the content of a result set
private static void	**printHeader**(java.sql.ResultSet rs) This method prints the header of the table to be output.
private static void	**printRow**(java.sql.ResultSet rs) Print the result selected from the result set in the format of each row corresponding one data entry

Methods inherited from class java.lang.Object
clone, equals, finalize, getClass, hashCode, notify, notifyAll, toString, wait, wait, wait

Constructor Detail

ResultPrinter

```
ResultPrinter()
```

Method Detail

print

```
static void print(java.sql.ResultSet rs)
           throws java.sql.SQLException
```

This method prints out the content of a result set

Parameters:

```
rs - the table to be output (query result)
```

Throws:

```
java.sql.SQLException
```

printHeader

```
private static void printHeader(java.sql.ResultSet rs)
                         throws java.sql.SQLException
```

This method prints the header of the table to be output.

Parameters:

```
rs - the table to be output (query result)
```

Throws:

```
java.sql.SQLException
```

printRow

```
private static void printRow(java.sql.ResultSet rs)
                      throws java.sql.SQLException
```

Print the result selected from the result set in the format of each row corresponding one data entry

Parameters:

```
rs - the table to be output (query result)
```

Throws:

```
java.sql.SQLException
```

PACKAGE CLASS TREE DEPRECATED INDEX HELP

PREV CLASS NEXT CLASS FRAMES NO FRAMES ALL CLASSES
SUMMARY: NESTED | FIELD | CONSTR | METHOD DETAIL: FIELD | CONSTR | METHOD