Java Database Difference Checker

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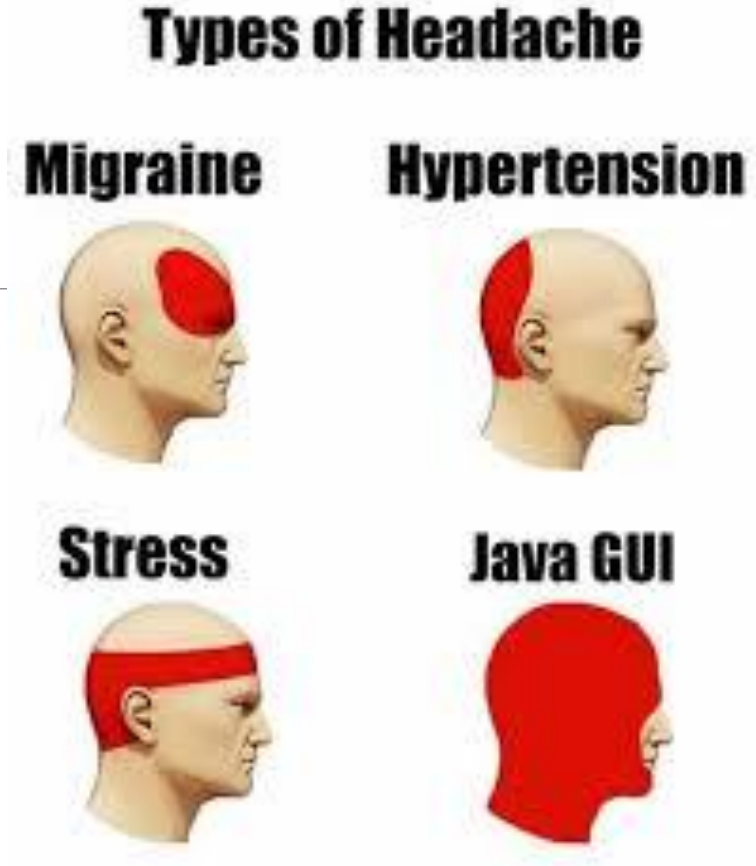
FOR SENIOR PROJECT DEFENSE(CSCI 499)

Problem Statement

- Many companies have a live and development database
- When updated, the live database should reflect the development one
  - How to do this?
    - Set up a process that updates the live database

Research and Background

- SQL
  - MySQL
    - Prior experience
  - SQLite
    - What was common?
- NoSQL
  - Couchbase
    - Prior experience, but API problems
  - MongoDB
    - Prior experience, but API problems
- Graphical User Interface (GUI)
  - Implementation while still learning



Hardware and Software Requirements

Hardware

- A working computer from the 21st century

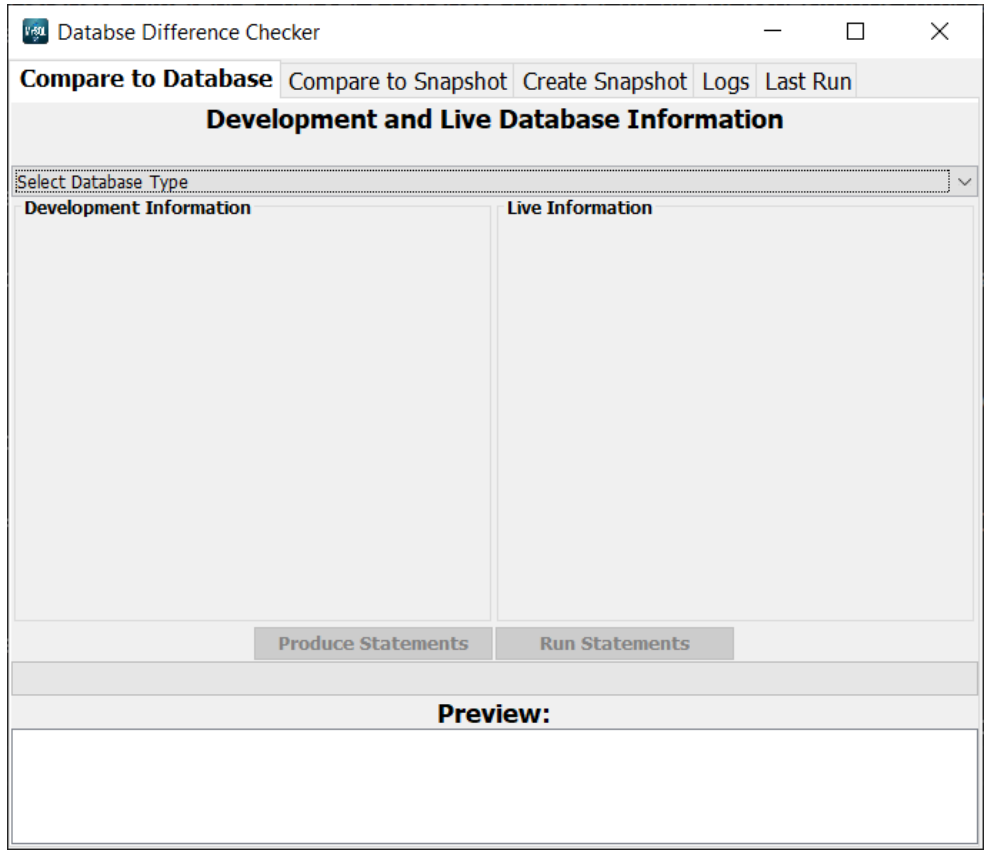
Software

- Java
- Python 2.7 or later
- Some kind of hosting service for the database implementation if need:
  - MySQL - WAMP
  - SQLite - NA
  - Couchbase - Couchbase Server Community Edition
  - MongoDB - MongoDB Compass Community

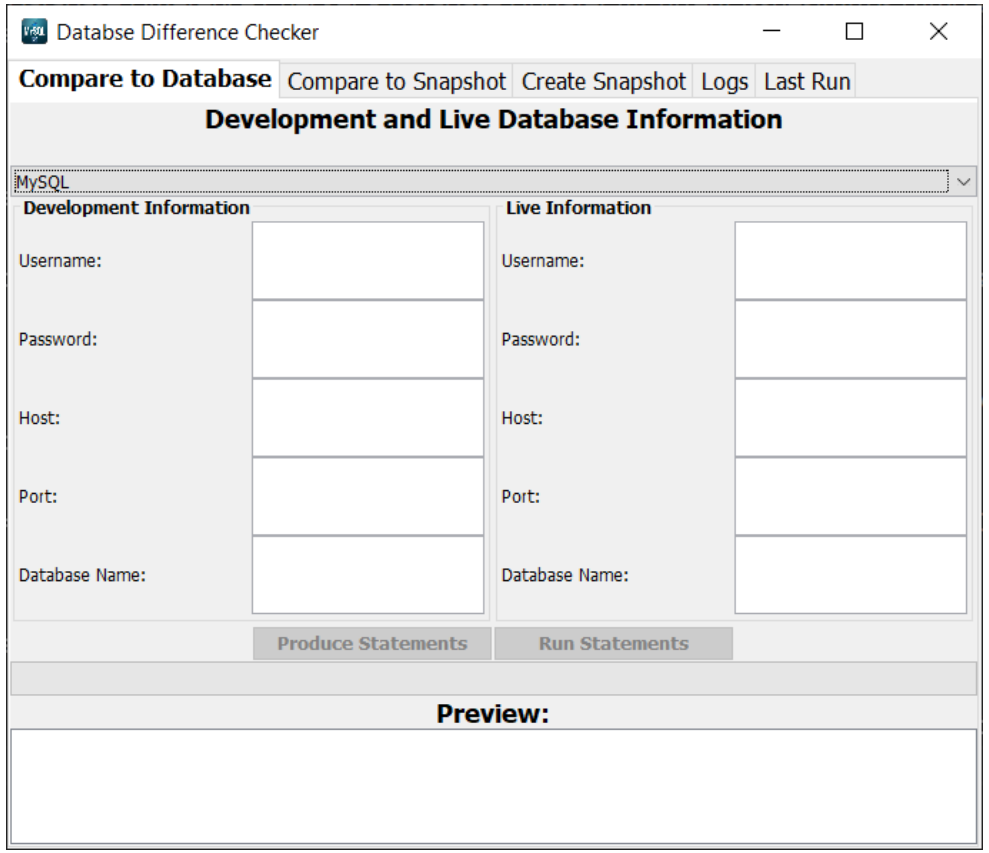
Program Description

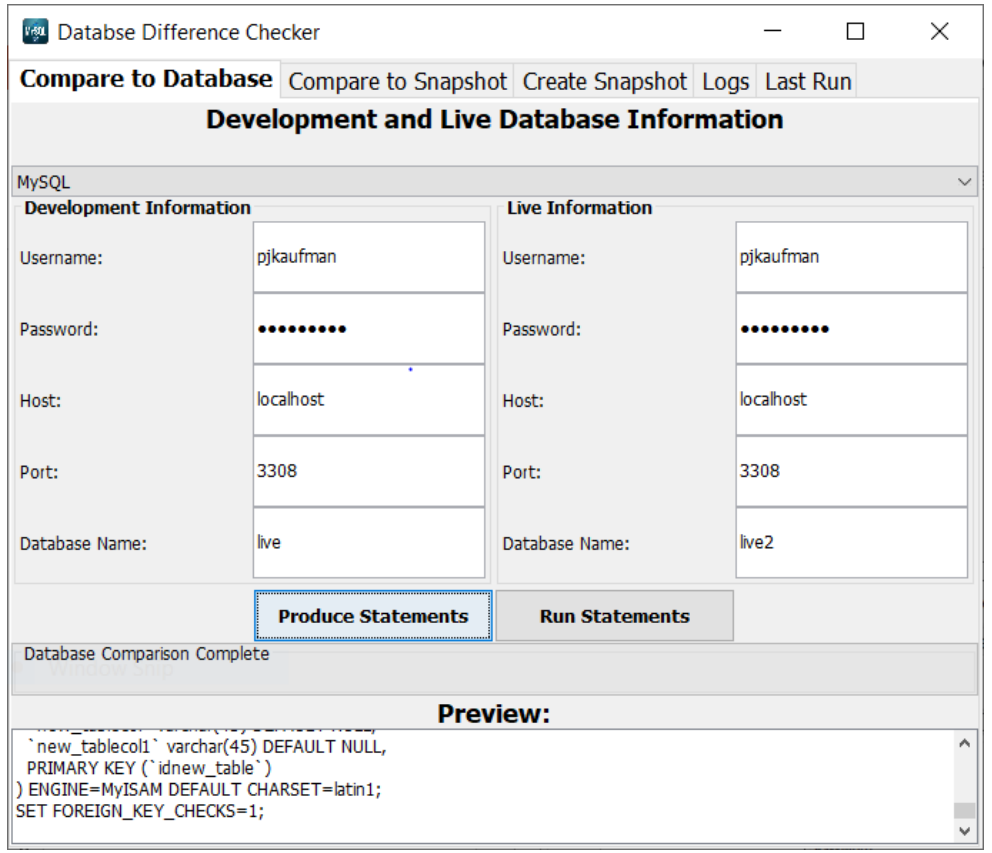
- The program compares two databases
  - The databases can be connected in two ways
- Can update live database
- Keeps track of run based data like errors and commands used to update the live database
- Works on NoSQL and SQL databases
  - Couchbase & MongoDB and MySQL & SQL Lite

Default Application Page

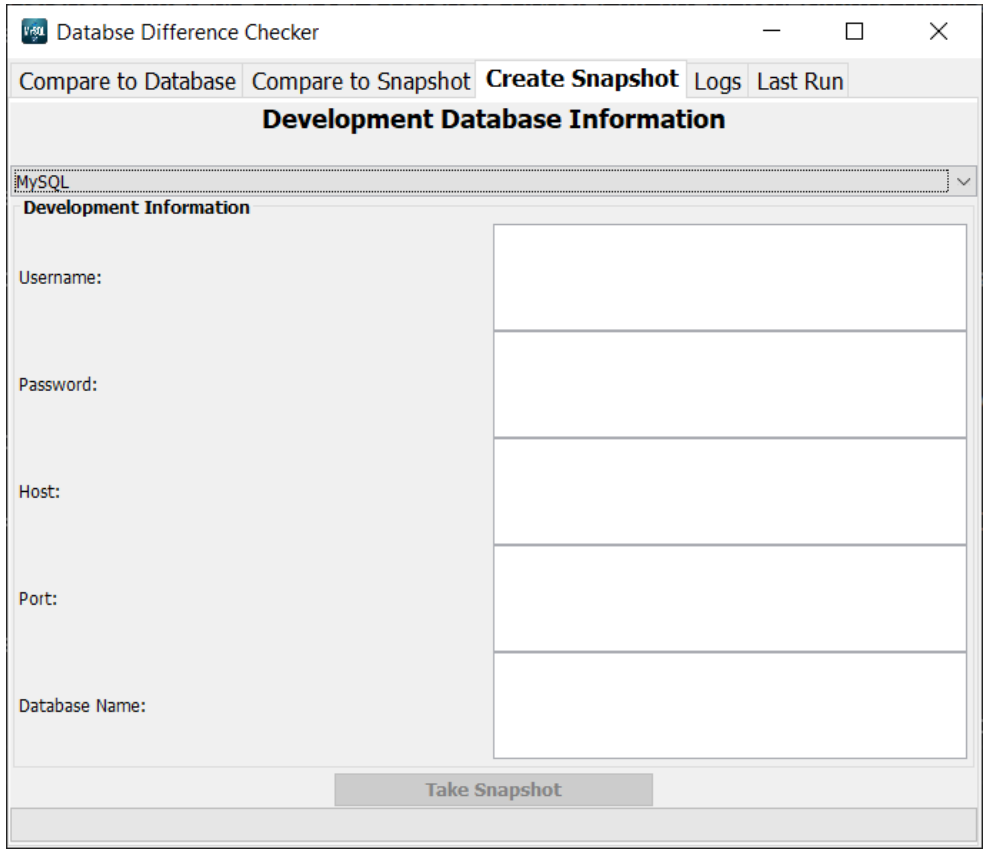


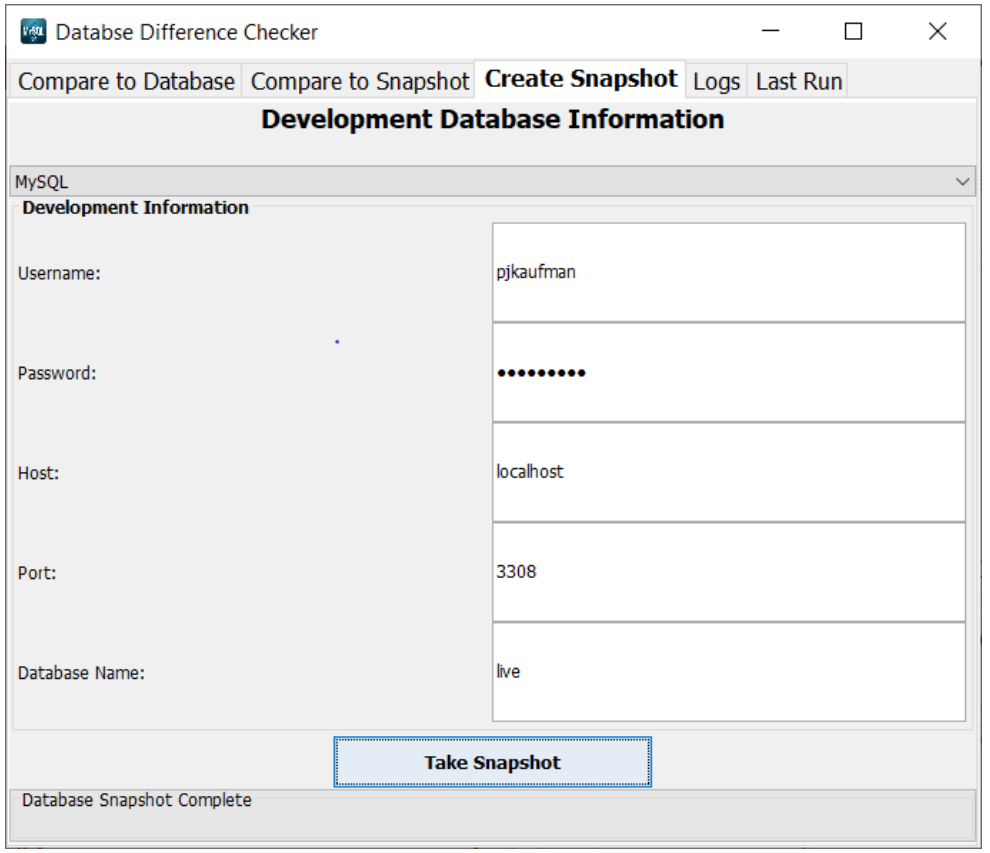
Two Database Comparison



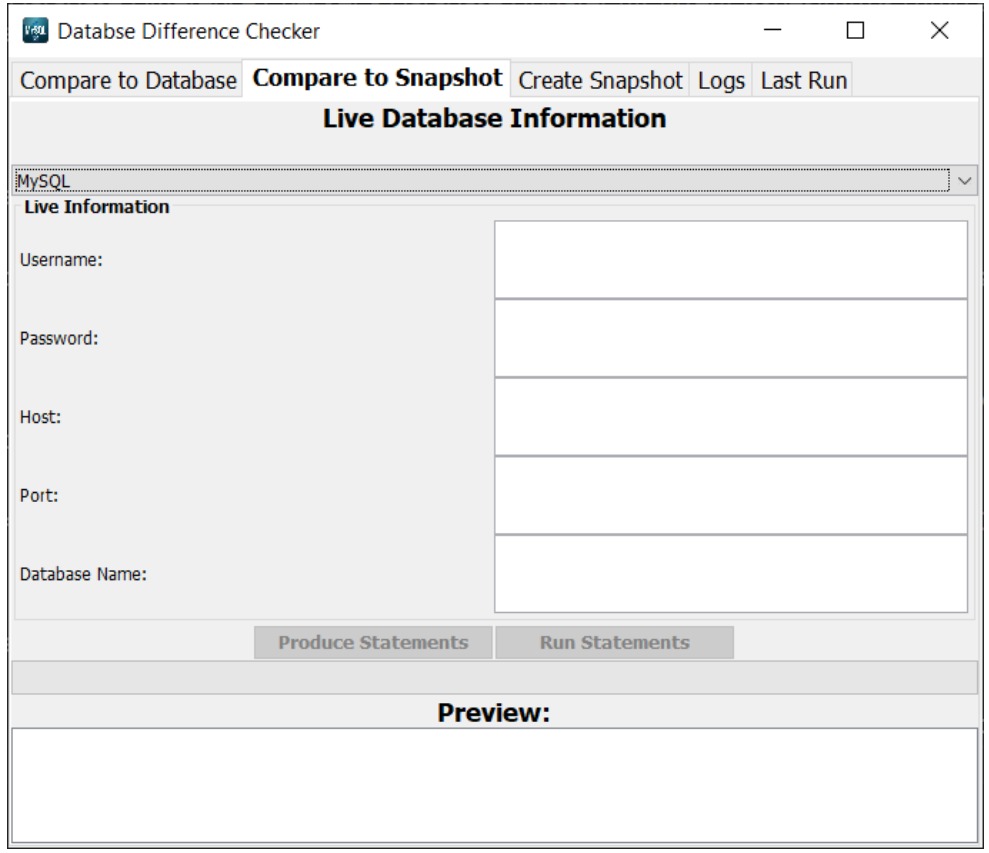


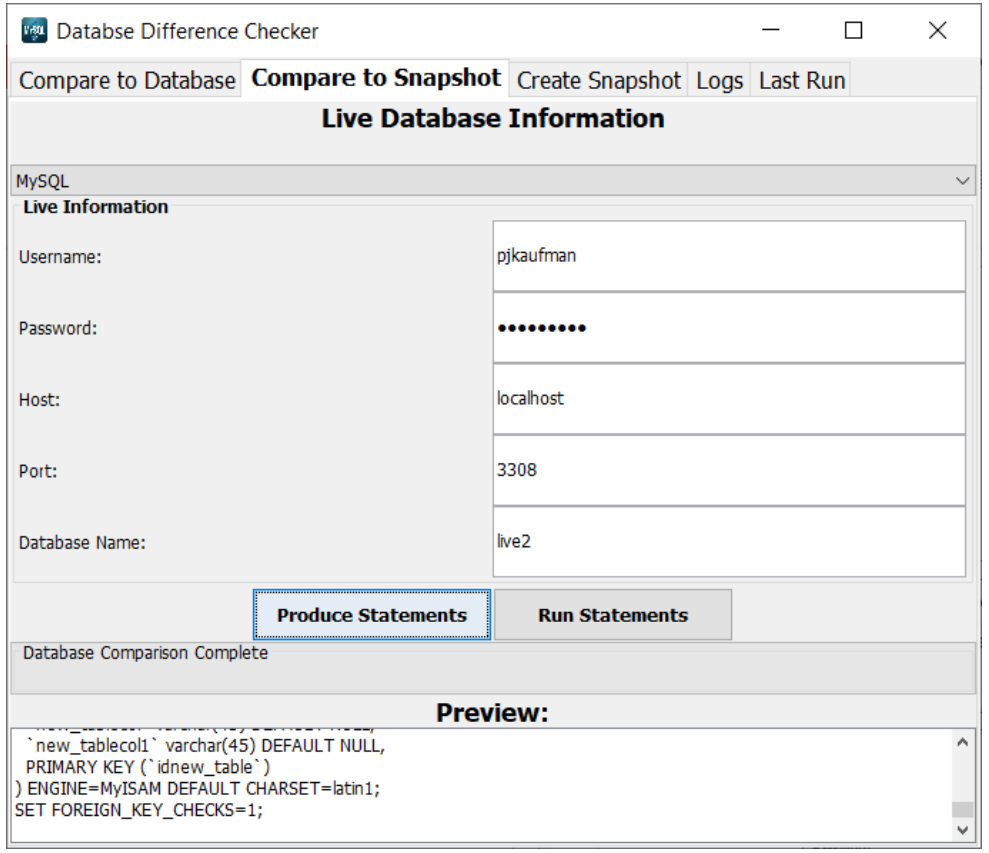
Creating a Database Snapshot



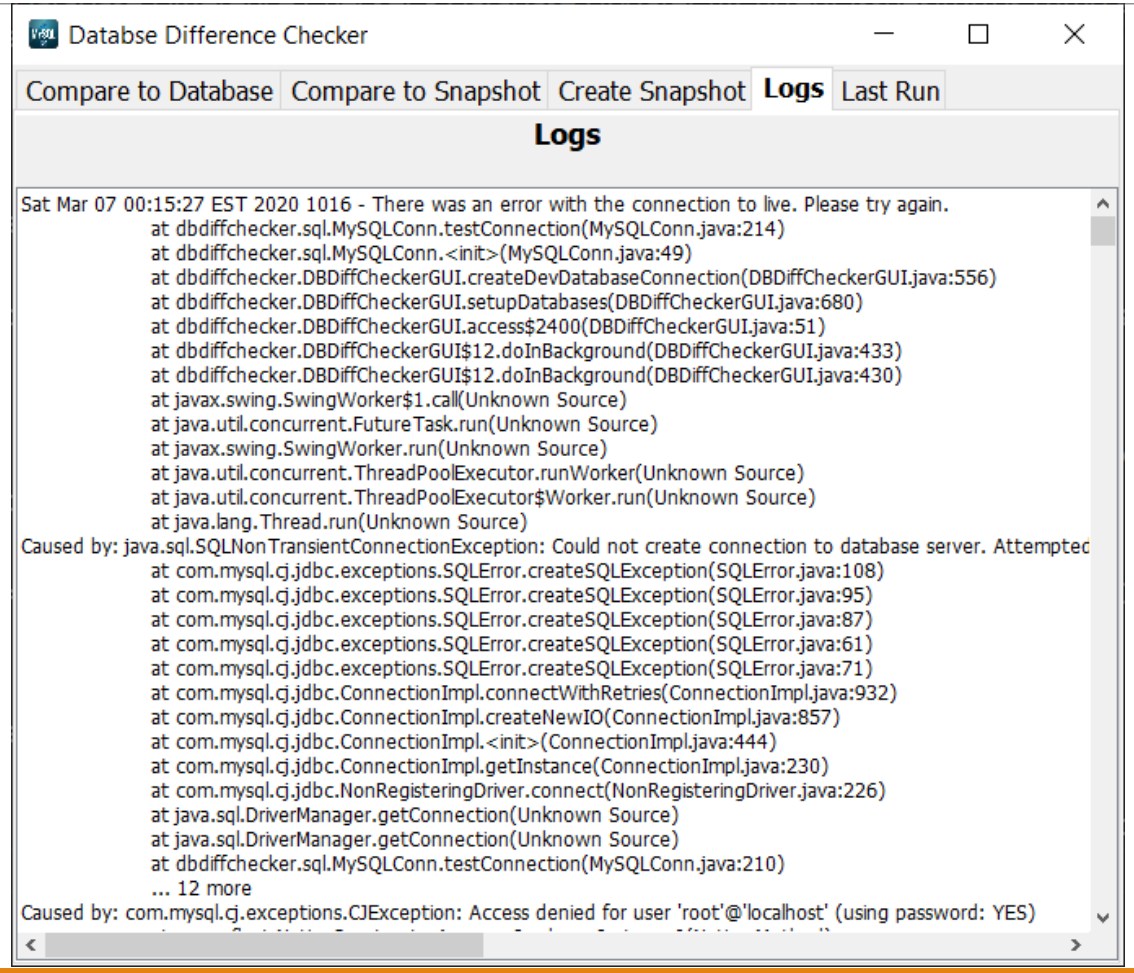


Comparing a Database with a Snapshot

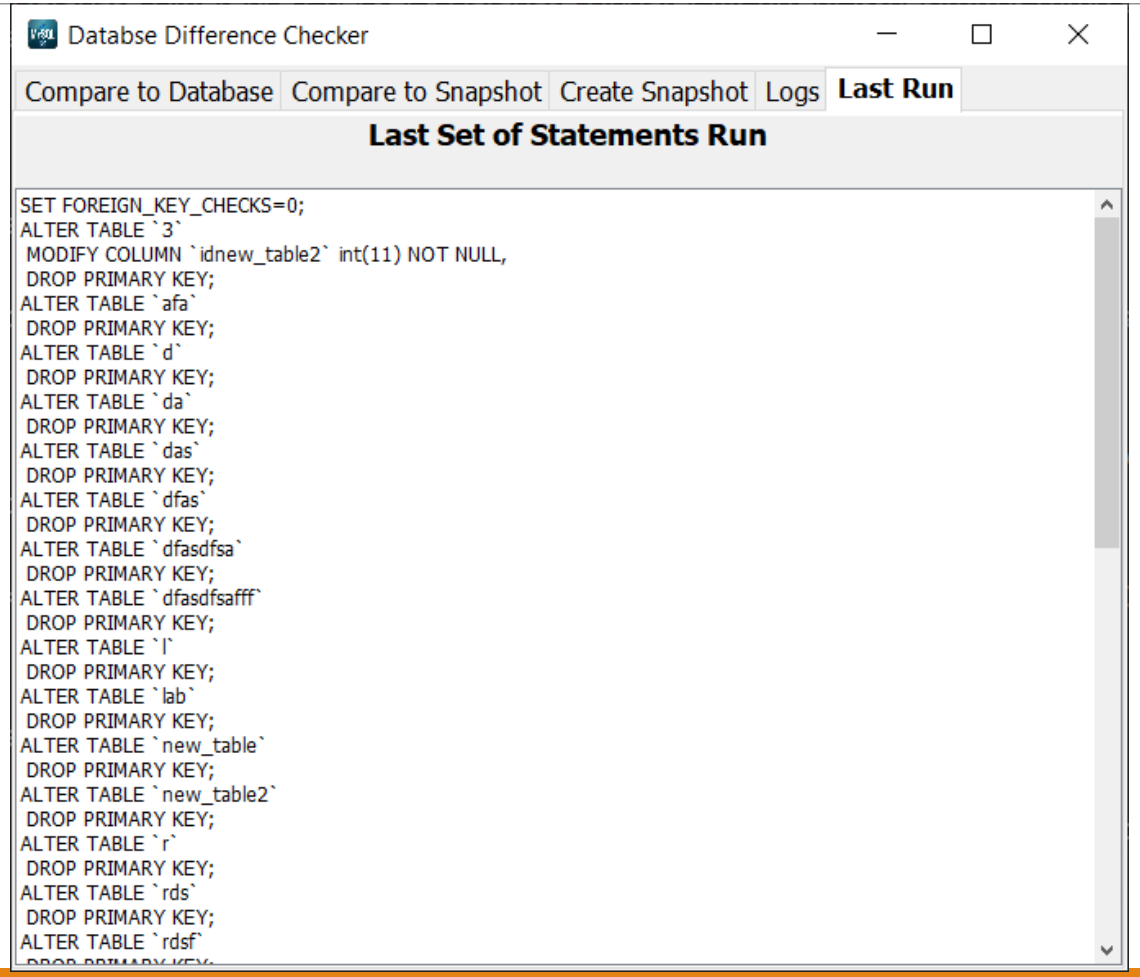




Logs


Databse Difference Checker
Compare to Database
Compare to Snapshot
Create Snapshot
Logs
Last Run
Logs
Sat Mar 07 00:15:27 EST 2020 1016 - There was an error with the connection to live. Please try again.
at dbdiffchecker.sql.MySQLConn.testConnection(MySQLConn.java:214)
at dbdiffchecker.sql.MySQLConn.<init>(MySQLConn.java:49)
at dbdiffchecker.DBDiffCheckerGUI.createDevDatabaseConnection(DBDiffCheckerGUI.java:556)
at dbdiffchecker.DBDiffCheckerGUI.setupDatabases(DBDiffCheckerGUI.java:680)
at dbdiffchecker.DBDiffCheckerGUI.access$2400(DBDiffCheckerGUI.java:51)
at dbdiffchecker.DBDiffCheckerGUI$12.doInBackground(DBDiffCheckerGUI.java:433)
at dbdiffchecker.DBDiffCheckerGUI$12.doInBackground(DBDiffCheckerGUI.java:430)
at javax.swing.SwingWorker$1.call(Unknown Source)
at java.util.concurrent.FutureTask.run(Unknown Source)
at javax.swing.SwingWorker.run(Unknown Source)
at java.util.concurrent.ThreadPoolExecutor.runWorker(Unknown Source)
at java.util.concurrent.ThreadPoolExecutor$Worker.run(Unknown Source)
at java.lang.Thread.run(Unknown Source)
Caused by: java.sql.SQLNonTransientConnectionException: Could not create connection to database server. Attempted
at com.mysql.cj.jdbc.exceptions.SQLError.createSQLException(SQLError.java:108)
at com.mysql.cj.jdbc.exceptions.SQLError.createSQLException(SQLError.java:95)
at com.mysql.cj.jdbc.exceptions.SQLError.createSQLException(SQLError.java:87)
at com.mysql.cj.jdbc.exceptions.SQLError.createSQLException(SQLError.java:61)
at com.mysql.cj.jdbc.exceptions.SQLError.createSQLException(SQLError.java:71)
at com.mysql.cj.jdbc.ConnectionImpl.connectWithRetries(ConnectionImpl.java:932)
at com.mysql.cj.jdbc.ConnectionImpl.createNewIO(ConnectionImpl.java:857)
at com.mysql.cj.jdbc.ConnectionImpl.<init>(ConnectionImpl.java:444)
at com.mysql.cj.jdbc.ConnectionImpl.getInstance(ConnectionImpl.java:230)
at com.mysql.cj.jdbc.NonRegisteringDriver.connect(NonRegisteringDriver.java:226)
at java.sql.DriverManager.getConnection(Unknown Source)
at java.sql.DriverManager.getConnection(Unknown Source)
at dbdiffchecker.sql.MySQLConn.testConnection(MySQLConn.java:210)
... 12 more
Caused by: com.mysql.cj.exceptions.CJException: Access denied for user 'root'@'localhost' (using password: YES)

Last Run Statements



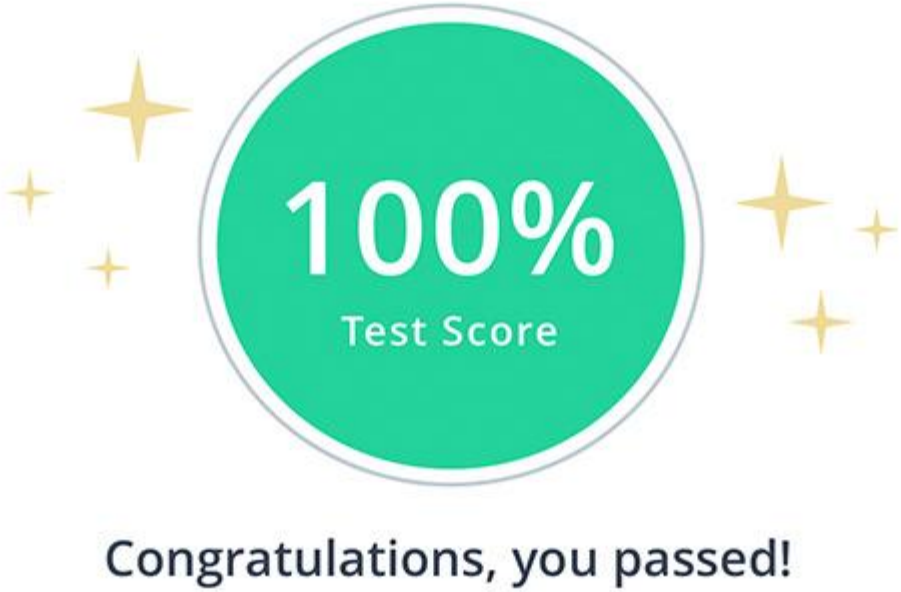
Test Results and Plan

Test Include:

- SQL Tests
  - MySQL Tests
  - SQLite Tests
  - Common Tests
- NoSQL Tests
  - Couchbase Tests
  - MongoDB Tests
- General Tests
  - FileHandler Tests

A total of 48 tests

All tests passed



Challenges Overcome

CHALLENGES

1. Other peoples documentation (APIs)
2. SQL Statements
3. GUI on Multiple OSes
4. Automation Script for Multiple OSes
5. Automation Script for Version 2.7 and 3.x
6. Scaling Text for GUI
7. Let User Know that Comparison is Occurring

SOLUTIONS

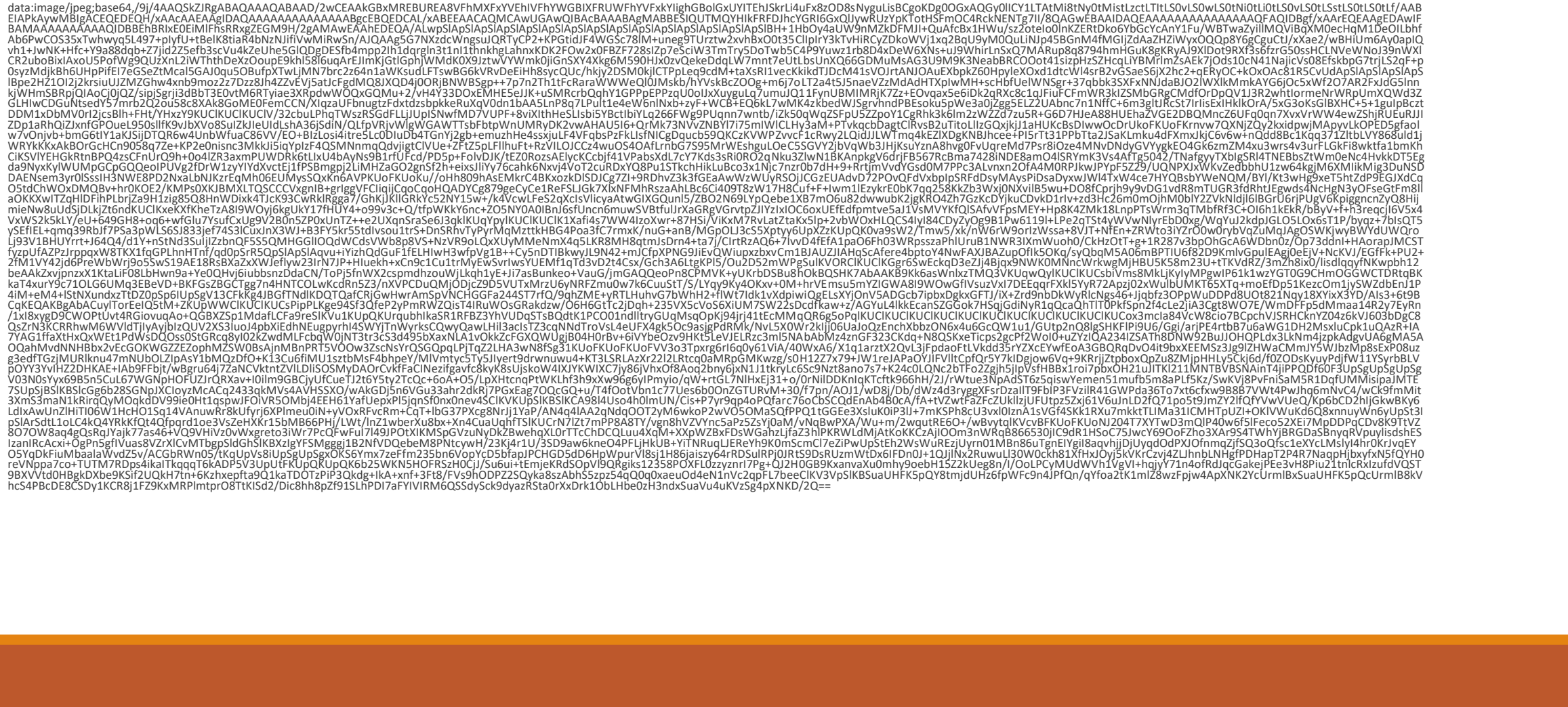
1. Tutorials and Ctrl + f
2. Research
3. Change JFrame type
4. Had to be `shell=True`
5. Lower level python functions
6. Custom Algorithm
7. Multithreading (SwingWorker)

Future Enhancements

1. Do not actually drop tables or delete documents
2. Add nested view comparison functionality
3. Make the GUI more intuitive*
4. Data input validation*
5. Consistent GUI size*

* These were completed in a separate project

Works Cited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Works Cited

https://cdn.dribbble.com/users/167717/screenshots/2830953/congrats.jpg