Lab 1 JDBC and Index

- This lab aims to introduce Java Database Connectivity (JDBC) and use of indexing.
  - Task 1: index creation, testing and deletion
  - Task 2: Java Database Connectivity (JDBC) and index

MySQL Database

- To use a database you can either:
  - Download and install MySQL on your own computer, or
  - Use the school's MySQL server.
    - Read the attached document '*new_MySQL#1 Create privilege.pdf*';
    - http://csse-mysql.xjtlu.edu.cn

Install MySQL by yourself

- If you are using your own computer, download and install MySQL:
  - https://dev.mysql.com/downloads/mysql/
- Download MySQL JDBC API (the middleware)
  - https://dev.mysql.com/downloads/connector/j/
  - Install it in your classpath (or import it in your IDE)

Use the School's MySQL

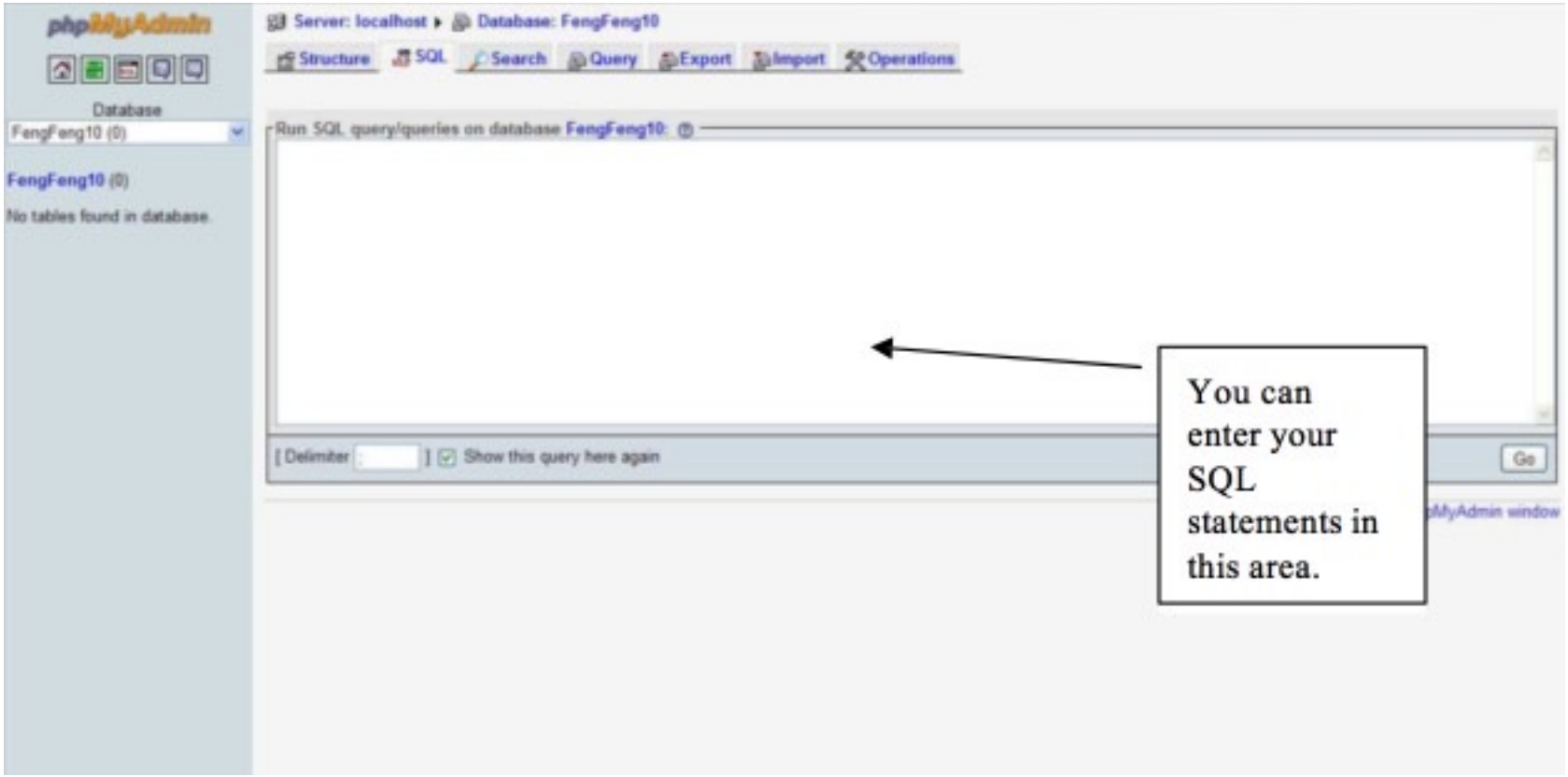
- Setup XJTLU VPN (*for off campus access only*)
  - guide.xjtlu.edu.cn->IT Guide for Staff/Student(at the top of the webpage)->STAFF/Student Guide to IT service.pdf.
- Create a database and relations (tables) on the school's MySQL server.
  - SAT MySQL: http://csse-mysql.xjtlu.edu.cn (IP: *10.7.1.127, but only available on campus network)*

Use the School's MySQL – cont'd

- You do not need to explicitly create your database as the system will create one for you once you log-in.

Use the School's MySQL – cont'd

- Click on the SQL tab or SQL icon and create the tables.



Database Preparation

- Once logged in with your username and password, the system will automatically create a database having the same name as your user name.
- Create a table by run the following statement
  - *CREATE TABLE Orf_Motif (orf varchar(12), acc_num varchar(12), num int(3), pos int(3), len int(3), mmatch varchar(12))*;
- Upload data into the table by importing the file '*yeast_prosite.sql*'.

Task 1

- (1) Run the following query:
  - *SELECT * FROM Orf_Motif WHERE num=7*
  - Record the time MySql needs to run this query.
- (2) Create an index on attribute *num*
  - *CREATE INDEX numIndex ON Orf_Motif (num);*
  - Run the same query: *SELECT * FROM Orf_Motif WHERE num=7*
  - Record the time to run this query.

Connect MySQL with JDBC

- MySQL provides connectivity for client applications developed in the Java programming language through a JDBC driver, which is called MySQL Connector/J.
- MySQL Connector/J is a JDBC Type 4 driver. The Type 4 designation means that the driver is a pure Java implementation of the MySQL protocol and does not rely on the MySQL client libraries.
- For large-scale programs that use common design patterns of data access, consider using one of the popular persistence frameworks such as Hibernate or MyBatis.
- You can download the SQL java connector from (if it exists on your computer then you do NOT need to download it again):
  - https://dev.mysql.com/downloads/connector/j/

Preparation

- Download files from Learning Mall Core (LM Core)
  - *JDBCIndex.java*
  - *mysql-connector-java-8.0.18.jar* (as an example, version may be different)
- Open the *JDBCIndex.java* in any editor. Replace the following three parameters with your own ones.
  - *static final String DB_URL = "jdbc:mysql://10.7.1.36/[DATABASE_NAME]";*
  - *static final String USER = "[USERNAME]";*
  - *static final String PASS = "[PASSWORD]";*

Task 2

- Open a Windows cmd or a MAC terminal; change to the fold lab1 (or any others); compile *JDBCIndex.java* using:
  - *javac -cp . JDBCIndex.java*
- If the compilation is successful then execute the following command to see the output:
  - *Windows: java -cp mysql-connector-java-8.0.18.jar; JDBCIndex*
  - *MAC OS: java -cp mysql-connector-java-8.0.18.jar:. JDBCIndex*
- Observe the query time with and without an index; record the output.