

## Task 1

- How did you use connection pooling?

The connections to MySQL instance is defined in /webapp/META-INF/context.xml for both master and slave. Inside servlets, I use Context.lookup() to find and declare MySQL instance I use (defined in the context.xml), and use datasource.getConnection() method to get the connection from the MySQL and close the connection after request end.

-File name, line numbers as in Github

File name: context.xml(/Fablix\_Web/src/main/webapp/META-INF/)

Line numbers: main instance: line 6-12; slave instance: line 14-20; master Instance:22-28

File name: KeywordSearchServlet.java(/Fablix\_Web/src/main/java/)

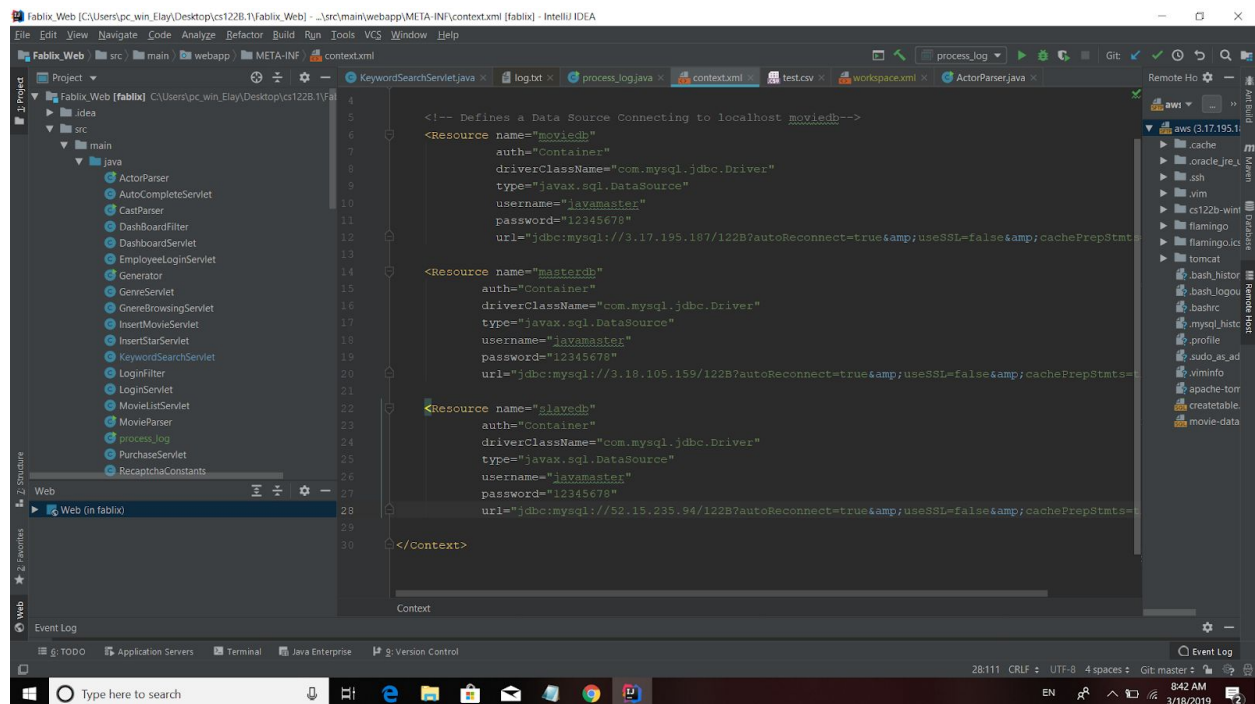
Line numbers: declare the connection to the MySQL instance: line 67-75

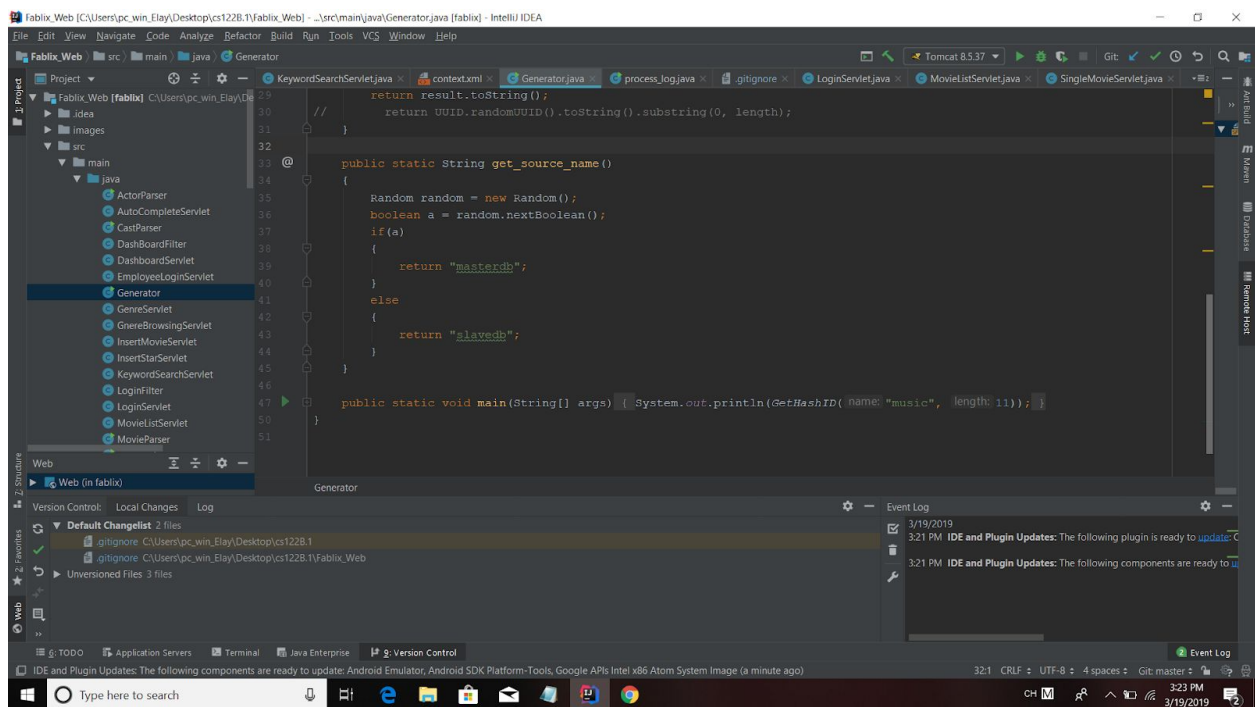
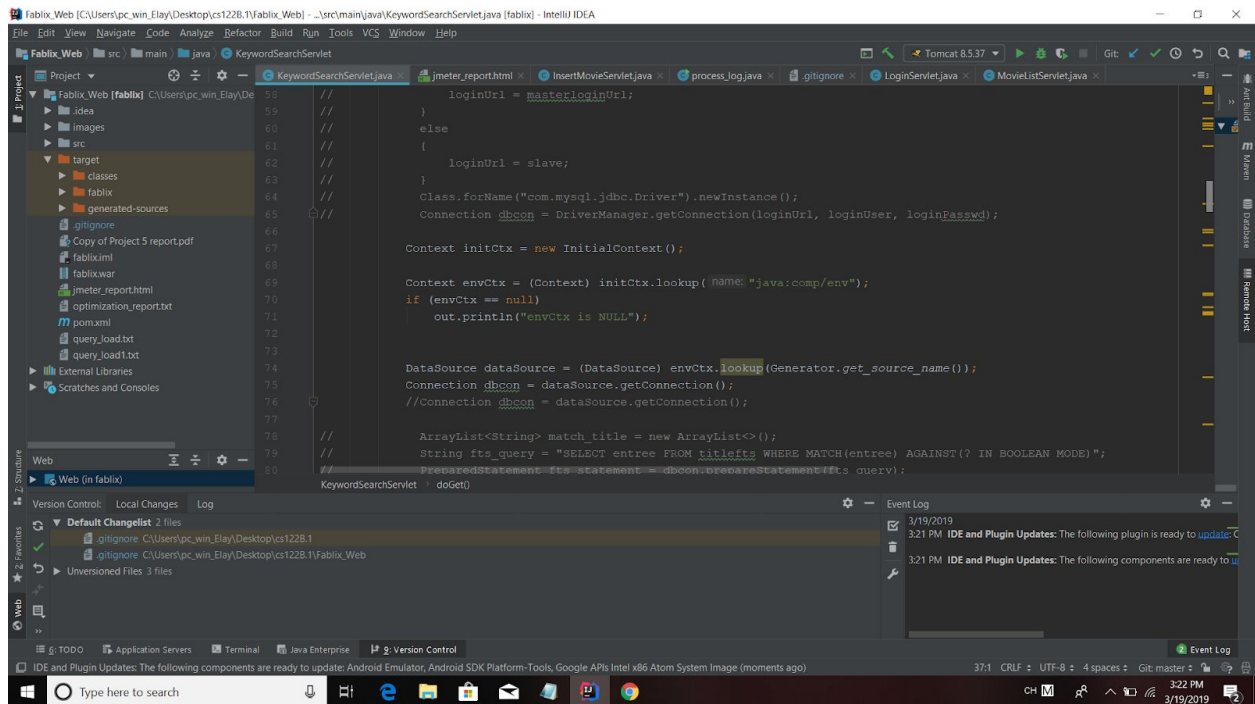
(I applied connection pooling to all servlets which have interaction with MySQL instance )

File name: Generator.java(/Fablix\_Web/src/main/java/)

Line number: line: 33-45 (randomly return the master/slave MySQL instance.)

- Snapshots showing use in your code





## How did you use Prepared Statements?

For all servlets involved in search, I use the prepared statement. I construct basically the complete query and replace all user input parts with placeholders("?",), and after I receive the user input, I use the setString(the\_index\_of\_placeholder, user\_input) to fill the SQL query.

- File name, line numbers as in Github

File name: KeywordSerachServlet.java(/Fablix\_Web/src/main/java/)

Line numbers: line 94-120, line 149-156

File name: SsrchServlet.java(/Fablix\_Web/src/main/java/)

Line numbers: line 42-71, line 96-101

File name: AutoCompleteServlet.java(/Fablix\_Web/src/main/java/)

Line numbers: line 47-56

File name: EmployeeLoginServlet.java(/Fablix\_Web/src/main/java/)

Line numbers: line 81-83, line 113-115

File name: GnereServlet.java(/Fablix\_Web/src/main/java/)

Line numbers: line 41-43(no placeholder)

File name: GnereBrowsingServlet(/Fablix\_Web/src/main/java/)

Line numbers: line 49-64, line 91-95

File name: InsertMovieServlet(/Fablix\_Web/src/main/java/)

Line numbers: line 42-48

File name: InsertStarServlet(/Fablix\_Web/src/main/java/)

Line numbers: line 36-39

File name: LoginServlet.java(/Fablix\_Web/src/main/java/)

Line numbers: line 95-97, 137-139

File name: SingleMovieServlet.java(/Fablix\_Web/src/main/java/)

Line numbers: line 44-53, line 71-75

File name: SingleStarServlet.java(/Fablix\_Web/src/main/java/)

Line number: line 43-50, line 63-67

File name: TitleBrowsingServlet.java(/Fablix\_Web/src/main/java/)

Line number: line 49-62, line 92-96

- Snapshots showing use in your code







```
Fablix_Web / src / main / java / GenreServlet
jmeter_report.html x context.xml x KeywordSearchServlet.java x AutoCompleteServlet.java x EmployeeLoginServlet.java x GenreServlet.java x
31 Context initCtx = new InitialContext();
32
33 Context envCtx = (Context) initCtx.lookup( name: "java:comp/env");
34 if (envCtx == null)
35     out.println("envCtx is NULL");
36
37
38 DataSource dataSource = (DataSource) envCtx.lookup(Generator.get_source_name());
39 Connection dbcon = dataSource.getConnection();
40 Connection dbcon = dataSource.getConnection();
41 //
42 String query = "Select distinct(genres.name) as a From genres";
43 PreparedStatement statement = dbcon.prepareStatement(query);
44 ResultSet resultSet = statement.executeQuery();
45 JSONArray j = new JSONArray();
46
47 while (resultSet.next())
48 {
49     j.add(resultSet.getString( columnLabel: "a"));
50 }
51 out.write(j.toString());
52 response.setStatus(200);
53
54 dbcon.close();
55 statement.close();
56 resultSet.close();
57
58 catch (Exception e)
59 {
60     JSONObject error = new JSONObject();
61     error.addProperty( property: "error_message", e.getMessage());
62     out.write(error.toString());
63     response.setStatus(500);
64 }
65 out.close();
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67 }
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```
Fablix_Web  src  main  java  InsertMovieServlet
Tomcat 8.5.37
Git: master

GenreBrowsingServlet.java  InsertMovieServlet.java
30 response.setContentType("application/json");
31 PrintWriter out = response.getWriter();
32
33 String title = request.getParameter( s: "title");
34 String year = request.getParameter( s: "year");
35 String director = request.getParameter( s: "director");
36 String star = request.getParameter( s: "star");
37 String genre = request.getParameter( s: "genre");
38
39
40 try
41 {
42     Connection dbcon = dataSource.getConnection();
43     String script = "{CALL INSERT_MOVIE(?,?,?,?)}";
44     PreparedStatement statement = dbcon.prepareStatement(script);
45     statement.setString( parameterIndex: 1,title);
46     statement.setString( parameterIndex: 2,year);
47     statement.setString( parameterIndex: 3,director);
48     statement.setString( parameterIndex: 4,star);
49     statement.setString( parameterIndex: 5,genre);
50
51     ResultSet resultSet = statement.executeQuery();
52     while (resultSet.next())
53     {
54         JSONObject r = new JSONObject();
55         String res = resultSet.getString( columnLabel: "res");
56         r.addProperty( property: "status", res);
57         out.write(r.toString());
58         response.setStatus(200);
59         resultSet.close();
60         dbcon.close();
61         return;
62     }
63 }
64 catch (Exception e)
65 {
66     System.err.println(e);
67     JSONObject r = new JSONObject();
68     r.addProperty( property: "error_message", e.getMessage());
69 }

InsertMovieServlet
Run  TODO  Application Servers  Terminal  Messages  Java Enterprise  Version Control
Compilation completed successfully in 4 s 98 ms (14 minutes ago) 21:14 LF UTF-8 4 spaces Git: master Event Log
```

```
Fablix_Web  src  main  java  InsertStarServlet
Tomcat 8.5.37
Git: master

GenreBrowsingServlet.java  InsertMovieServlet.java  InsertStarServlet.java
26 response.setContentType("application/json");
27 PrintWriter out = response.getWriter();
28
29 String name = request.getParameter( s: "name");
30 String byear = request.getParameter( s: "year");
31 if (byear.isEmpty()) byear = null;
32
33 try
34 {
35     Connection dbcon = dataSource.getConnection();
36     String script = "{CALL INSERT_STAR(?,?)}";
37     PreparedStatement statement = dbcon.prepareStatement(script);
38     statement.setString( parameterIndex: 1,name);
39     statement.setString( parameterIndex: 2,byear);
40
41     ResultSet resultSet = statement.executeQuery();
42     while (resultSet.next())
43     {
44         JSONObject r = new JSONObject();
45         String res = resultSet.getString( columnLabel: "res");
46         r.addProperty( property: "status", res);
47         out.write(r.toString());
48         response.setStatus(200);
49         resultSet.close();
50         dbcon.close();
51         return;
52     }
53 }
54 catch (Exception e)
55 {
56     System.err.println(e);
57     JSONObject r = new JSONObject();
58     r.addProperty( property: "error_message", e.getMessage());
59     out.write(r.toString());
60     response.setStatus(500);
61 }

InsertStarServlet
Run  TODO  Application Servers  Terminal  Messages  Java Enterprise  Version Control
Compilation completed successfully in 4 s 98 ms (15 minutes ago) 17:14 LF UTF-8 4 spaces Git: master Event Log
```

```
Fablix_Web / src / main / java / LoginServlet
GnereBrowsingServlet.java x InsertMovieServlet.java x InsertStarServlet.java x LoginServlet.java x

83 try
84 {
85     Context initCtx = new InitialContext();
86
87     Context envCtx = (Context) initCtx.lookup( name: "java:comp/env");
88     if (envCtx == null)
89         System.out.println("envCtx is NULL");
90
91
92     DataSource dataSource = (DataSource) envCtx.lookup(Generator.get_source_name());
93     con = dataSource.getConnection();
94     con = dataSource.getConnection();
95     //
96     String query = "Select id from customers where email = ? ";
97     PreparedStatement statement = con.prepareStatement(query);
98     statement.setString( parameterIndex: 1, username);
99     ResultSet resultSet = statement.executeQuery();
100     while (resultSet.next())
101     {
102         String id = resultSet.getString( columnLabel: "id");
103         con.close();
104         statement.close();
105         resultSet.close();
106         return id;
107     }
108 } catch (Exception e)
109 {
110     System.out.println(e.getMessage());
111     return "";
112 } finally {
113     try {
114         con.close();
115     } catch (Exception e)
116     {}
117 }
118 return "";
119 }
120 }

LoginServlet doPost()

Run TODO Application Servers Terminal Messages Java Enterprise Version Control
Compilation completed successfully in 4 s 98 ms (15 minutes ago) 8 chars 24:79 LF UTF-8 4 spaces Git: master
```

```
Fablix_Web / src / main / java / SingleMovieServlet
GnereBrowsingServlet.java x InsertMovieServlet.java x InsertStarServlet.java x LoginServlet.java x SingleMovieServlet.java x

35 Context envCtx = (Context) initCtx.lookup( name: "java:comp/env");
36 if (envCtx == null)
37     out.println("envCtx is NULL");
38
39
40 DataSource dataSource = (DataSource) envCtx.lookup(Generator.get_source_name());
41 Connection dbcon = dataSource.getConnection();
42 Connection dbcon = dataSource.getConnection();
43
44 String query =
45     "SELECT movies.id, title, 'year', director, rating, GROUP_CONCAT(distinct genres.name SEPARATOR ', ' ) as gname, GROUP_CONCAT(distinct stars.name SEPARATOR ', ' ) as sname
46     FROM movies left join ratings r on movies.id = r.movieid, genres, genres_in_movies, stars_in_movies, stars
47     where movies.id = ? and movies.id = genres_in_movies.movieid and genres_in_movies.genreid = genres.id and stars_in_movies.starid = stars.id
48     group by title;";
49
50 PreparedStatement statement = dbcon.prepareStatement(query);
51
52 statement.setString( parameterIndex: 1,id);
53
54 ResultSet rs = statement.executeQuery();
55
56 JSONArray movie_list = new JSONArray();
57
58 while(rs.next())
59 {
60     String movie_id = rs.getString( columnLabel: "id");
61     String title = rs.getString( columnLabel: "title");
62     int year = rs.getInt( columnLabel: "year");
63     String director = rs.getString( columnLabel: "director");
64     float rating = rs.getFloat( columnLabel: "rating");
65     if(Float.compare(rating, 0f) == 0){rating = -1;}
66     String list_of_genres = rs.getString( columnLabel: "gname");
67     String list_of_stars = rs.getString( columnLabel: "sname");
68
69     JSONArray json_stars = new JSONArray();
70     String star_query = "SELECT distinct stars.name, stars.id\n" +
71         "FROM stars left join ratings r on stars.id = r.starid, genres, genres_in_movies, stars_in_movies, movies
72         where stars.id = genres_in_movies.starid and genres_in_movies.genreid = genres.id and movies.id = ?
73         group by stars.name, stars.id";
74 }

SingleMovieServlet

Run TODO Application Servers Terminal Messages Java Enterprise Version Control
Compilation completed successfully in 4 s 98 ms (16 minutes ago) 22:14 LF UTF-8 4 spaces Git: master
```



```
Fablix_Web / src / main / java / TitleBrowsingServlet
TitleBrowsingServlet.java x InsertMovieServlet.java x InsertStarServlet.java x LoginServlet.java x SingleMovieServlet.java x SingleStarServlet.java x TitleBrowsingServlet.java x
45 String page = request.getParameter( "page" );
46 String records = request.getParameter( "records" );
47
48
49 String select_query = "SELECT movies.id, title, `year`, director, rating, GROUP_CONCAT(distinct genres.name SEPARATOR ' ') as genres";
50 String from_query = "FROM movies left join ratings r on movies.id = r.movieId, genres, genres_in_movies, stars, stars_in_movies";
51 String where_join = "WHERE movies.id = genres_in_movies.movieId and genres_in_movies.genreId = genres.id and stars_in_movies.movieId = movies.id";
52 String title_condition = "AND movies.title like ? ";
53 String group_clause = "GROUP BY title";
54 String order_clause = get_sort_clause(sort);
55 String offset_clause = get_offset_clause(page, records);
56
57 String query = select_query + from_query + where_join + title_condition + group_clause + order_clause + offset_clause;
58 String queryt = "Select count(distinct movies.id) as a" + from_query + where_join + title_condition;
59 PreparedStatement statement = dbcon.prepareStatement(query);
60 PreparedStatement statement1 = dbcon.prepareStatement(queryt);
61 statement.setString( parameterIndex: 1, x: fc+"%");
62 statement1.setString( parameterIndex: 1, x: fc+"%");
63
64 ResultSet resultSet = statement.executeQuery();
65 ResultSet w = statement1.executeQuery();
66
67 System.out.println(queryt);
68
69 JSONArray movie_list = new JSONArray();
70 ArrayList<String> x = new ArrayList<>();
71
72
73 while (w.next())
74 {
75
76 String total = w.getString( columnLabel: "a");
77 //System.out.println(total);
78 x.add(total);
79
80
81 while(resultSet.next())
82 {
83
84
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```

- Address of AWS and Google instances
  - AWS Balancer: [3.17.195.187/fablix/](http://3.17.195.187/fablix/)
  - AWS Master: 52.15.235.94
  - AWS Slave: 3.18.105.159
  - GCP Balancer: [34.73.131.140/fablix/](http://34.73.131.140/fablix/)
- Have you verified that they are accessible? Does Fablix site get opened both on Google's 80 port and AWS' 8080 port?

Yes

AWS Single: [3.17.195.187:8080/fablix](http://3.17.195.187:8080/fablix/)

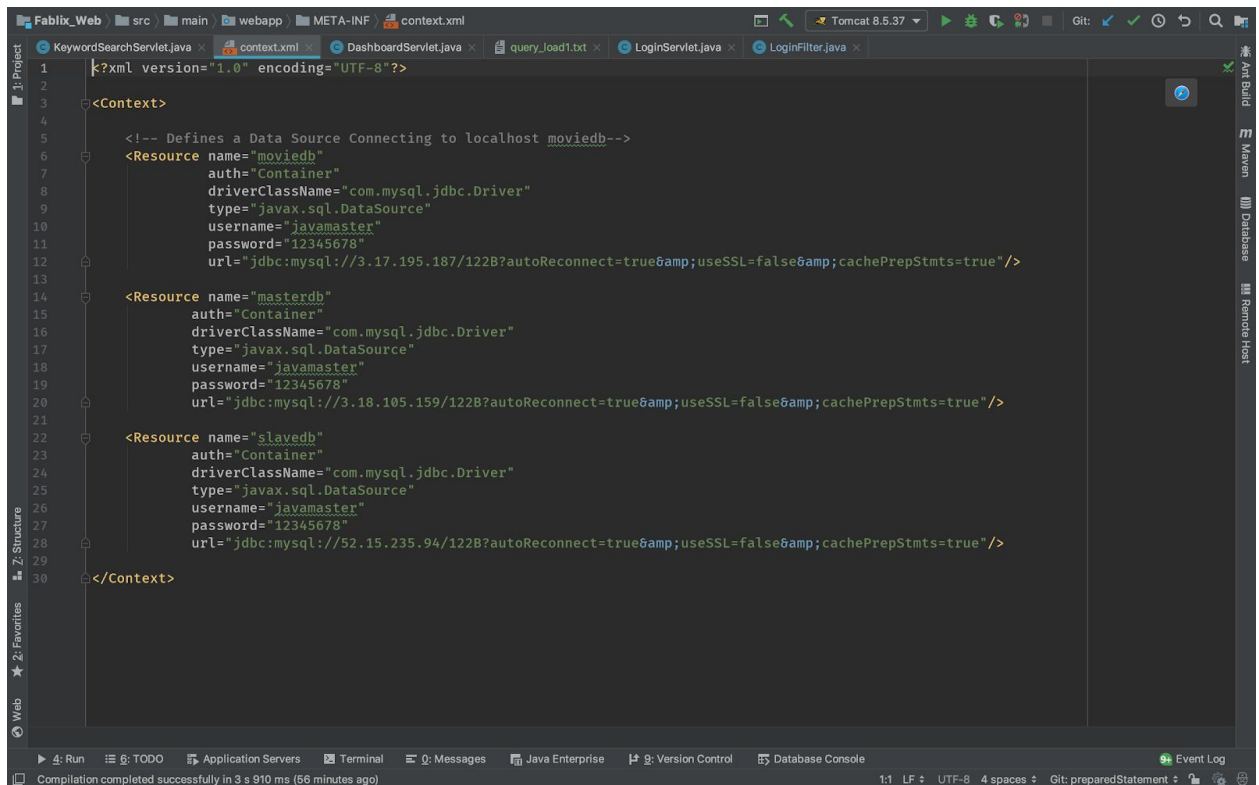
- Explain how connection pooling works with two backend SQL (in your code)?

There are two database resources written in context.xml,  
For the servlet which only read from database it connect to master/slave randomly(read only),  
for the servlet which need to write into database it connect to the master(read/write)

- File name, line numbers as in Github

Fablix\_Web/src/main/webapp/META-INF/context.xml  
Line 14-28

- Snapshots



The screenshot shows an IDE window with the file `context.xml` open. The file contains XML configuration for three data sources: `moviedb`, `masterdb`, and `slavedb`. Each data source is configured with a driver class name, type, username, password, and URL. The `moviedb` data source is configured to connect to `localhost`. The `masterdb` and `slavedb` data sources are configured to connect to `3.17.195.187` and `3.18.105.159` respectively. The IDE interface includes a project explorer on the left, a toolbar at the top, and a status bar at the bottom.

```
<?xml version="1.0" encoding="UTF-8"?>
<Context>
  <!-- Defines a Data Source Connecting to localhost moviedb-->
  <Resource name="moviedb"
    auth="Container"
    driverClassName="com.mysql.jdbc.Driver"
    type="javax.sql.DataSource"
    username="javamaster"
    password="12345678"
    url="jdbc:mysql://3.17.195.187/122B?autoReconnect=true&useSSL=false&cachePrepStmts=true"/>
  <Resource name="masterdb"
    auth="Container"
    driverClassName="com.mysql.jdbc.Driver"
    type="javax.sql.DataSource"
    username="javamaster"
    password="12345678"
    url="jdbc:mysql://3.18.105.159/122B?autoReconnect=true&useSSL=false&cachePrepStmts=true"/>
  <Resource name="slavedb"
    auth="Container"
    driverClassName="com.mysql.jdbc.Driver"
    type="javax.sql.DataSource"
    username="javamaster"
    password="12345678"
    url="jdbc:mysql://52.15.235.94/122B?autoReconnect=true&useSSL=false&cachePrepStmts=true"/>
</Context>
```

- How read/write requests were routed?

We randomly choose which db(master or slave) will be used in the servlet that only reads the db. We choose the master db in the servlet that writes to db

- File name, line numbers as in Github

All `***Servlet.java` uses random db except for `PurchaseServlet.java`, `InsertMovieServlet.java` and `InsertStarServlet.java`, which are using master db only.

- Snapshots





- Have you uploaded the HTML file (with all sections including analysis, written up) to Github? Where is it located?  
Yes the file have been uploaded to the project.  
Path: /Fablix\_Web/jmeter\_report.html
- Have you uploaded the script to Github? Where is it located?  
Yes:  
Path: /Fablix\_Web/src/main/java/process\_log.java
- Have you uploaded the WAR file and README to Github? Where is it located?  
Path to the war file: is /Fablix\_Web/fablix.war  
Path to the README file: /Fablix\_Web/README.md