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/**
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 * File name: labTwelve.java
 * Project name: Lab 12
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 *                          from a solution written by Donald Sanderson
 * Course-Section:  CSCI2020-ALL
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 */

// Step 1 - get all necessary imports
import java.sql.Date;           // Class for dates retrieved from a DB
import java.sql.DriverManager;  // DriverManager for establishing a DB link
import java.sql.SQLException;   // SQLException exceptions for DB classes
import java.sql.Connection;    // Connection establishes a logon to the DB
import java.sql.Statement;     // Holds and executes the sql statements
import java.sql.ResultSet;     // Holds the results of a query

// Note that this block of imports is a subset of ...
//
//import java.sql.*;
//
// ...which imports all of these classes, along with some others that we don't
// use in this exercise. Depending on what problems your solution is meant
// to solve, you may want to import more or less, and in some cases may want
// to just import the entire package with the commented import statement.
// A description of the java.sql package is available at
// http://docs.oracle.com/javase/1.4.2/docs/api/java/sql/package-summary.html

public class labTwelve {
    /* This class implements the solution to lab 12, including handling NULL
     * values in the GIVEN_NAME column.
     */

    public static void main(String[] args)
    {
        // Step 2 - declare ALL necessary variables

        // First, we need strings for building our connection and statement(s)
        String connection;      // holds the connection string
        String username;        // holds the user name
        String password;        // holds the password
        String sqlStatement;    // holds the SQL statement to be run

        // JDBC variables will use those strings
        Connection myConn;      // JDBC Connection object
        Statement myState;      // JDBC Statement object
        ResultSet myResults;    // JDBC ResultSet object

        // Now we need variables to hold values in our while loop
    }
}
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String givenName;        // holds the given name for the current row
String familyName;       // holds the family name for the current row
int salary = 0;          // holds the salary for the current row
int oldSalary = 0;       // holds the salary from the previous row
String compare;          // holds "Higher", "Less" or "The Same"
// end declare variables

// Step 3 - start a try block because you may have errors
try
{
    // provide some feedback so we know what's happening
    System.out.println("Begin Connection Process...");

    // Step 4 - link our class to the JDBC driver
    System.out.println("Linking class to JDBC driver...");
    DriverManager.registerDriver(new oracle.jdbc.OracleDriver());

    // Step 5 - establish a connection to the database and register with
    // the driver
    // first, build these strings up to use with the Connection object
    connection = "jdbc:oracle:thin:@pythia.etsu.edu:1521:csdb";
    username = "heyitsjordan";
    password = "lookitshispassword!";
    // then, build your connection/register with the driver
    myConn = DriverManager.getConnection(connection, username, password);
    // now we have a connection

    // Step 6 - create a Statement object
    // we are going to build up the object declared earlier,
    // and register it with our connection
    myState = myConn.createStatement();

    // Step 7 - create a ResultSet object
    // we declared the object already, in accordance with coding standards,
    // so now we can just set it to null and use it in a bit (we
    // could have done that when we declared the variable, but here
    // we are anyway)
    myResults = null;

    // Step 8 - build and execute a query
    // we will use the sqlStatement string we declared earlier to hold a
    // query that we will build up a piece at a time, then we will
    // have the Statement object execute the query, sending the
    // output into the ResultSet variable we created.
    sqlStatement = "select INSTRUCTOR.GIVEN_NAME, INSTRUCTOR.FAMILY_NAME,
INSTRUCTOR.SALARY";
    sqlStatement += " from INSTRUCTOR";
    sqlStatement += " order by INSTRUCTOR.FAMILY_NAME";

    // we can look at the concatenated query to find any errors, if we like
    System.out.println("Query to be executed: " + sqlStatement);

    // and now to execute and catch the output
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myResults = myState.executeQuery(sqlStatement);

// Step 9 - process one row at a time
// now that the query has been run, we need to look through the
//     results and do our stuff to them. We will set up a while
//     loop to look through the results one at a time as long as
//     there are results to look through. We can use the next()
//     method in the ResultSet class to see if there is another
//     row to retrieve.
while(myResults.next())
{
    // we can get the individual fields from the results by using
    //     the column name and making sure we are using a compatible
    //     variable to hold the result

    // INSTRUCTOR.FAMILY_NAME is a string, we will use the familyName
    //     String that we declared earlier to hold it
    familyName = myResults.getString("FAMILY_NAME");

    // INSTRUCTOR.GIVEN_NAME is a string as well, same deal as before
    givenName = myResults.getString("GIVEN_NAME");
    // and now we can use a simple if statement to see if the result
    //     was null.
    //     note that we are not comparing the result to a string
    //     with a value "NULL", we are seeing if the field for this
    //     row was a null value. if it does, we will just substitute
    //     a few blank spaces for the name
    if (myResults.isNull())
    {
        givenName = "        ";
    }

    // INSTRUCTOR.SALARY can be held by an int
    salary = myResults.getInt("SALARY");
    // and now we can compare the current salary to the previous
    //     salary to see if it is higher, lower or the same
    if (salary > oldSalary)
    {
        compare = "Higher";
    }
    else if (salary < oldSalary)
    {
        compare = "Lower";
    }
    else
    {
        compare = "The Same";
    }

    // Now that we have all of our pieces, we can put them together
    //     in a nice, pretty output string
    System.out.println("Instructor: " + givenName + " " +
        familyName + "'s salary of " + salary + " is " +
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        compare + " than the previous instructor's salary of " +
            oldSalary + ".");

        // and finally, we need to change the value of the oldSalary to
        //      our current salary
        oldSalary = salary;
    } // end while

    // Step 9 - close stuff in the opposite order we opened them
    myResults.close(); // first, the ResultSet
    myState.close();   // then the Statement
    myConn.close();    // and finally the Connection

} // end try
catch (SQLException mySqlError)
{
    // really simple error handling. We are just going to catch the
    //      error and dump the error stack
    System.out.println("An Error has occured, dumping error stack...");
    mySqlError.printStackTrace();
} // end catch

} // end main

} // end class labTwelve
```