CSCI 3901 Assignment 5

Due date: 11:59pm Thursday, April 6, 2023 in git.cs.dal.ca at
https://git.cs.dal.ca/courses/2023-winter/csci-3901/assignment-5/xxxx.git
where xxxx is your CSID (this repository already exists, so clone it and then add your code to it).

Field Code Changed

Problem 1

Goal

Access SQL through Java. Gain some exposure to XML.

Question

In the bicycle stores company, management periodically wants a summary of the company's operation over a period of time. In particular, management is interested in information on new activity in the given period of time.

Your job is to extract the summary information from the database. You will store the summary information in a file that follows an XML format. Someone else will then use XML tools (notably XSLT) to convert your information into something that management will review.

Input

Your program will obtain the following information from the keyboard in the following order:

- The starting date for the period to summarize
- The ending date for the period to summarize
- The name of the file for the output

All dates will be in a YYYY-MM-DD format.

Output

Your program will send all of its output to the specified file.

The data that you extract will be in 3 categories:

1. Customer information
    a. Report the customer name, address, value of orders, and number of bicycles purchased in each brand for customers who became customers (have their first order) in the given time period.
2. Product information
    a. Report, for each product whose first sale is in the given period, the product name, product brand, product categories, and the name of the stores that sold the product along with the number of units sold there.
3. Store information
    a. Report, for each store, their city, number of staff, number of customers served in the given period, and the value of sales to each customers in the given period

Your output file will be in an XML format. XML uses a set of tags to surround data to let you know what the data is. Some tags can be nested in other tags.

We will use a simple version of XML. The first line of your XML file should provide information on the version of XML to use. The following line will be sufficient:

```
<?xml version="1.0" encoding="UTF-8" ?>
```

Following this first line, we get a set of nested tags to store the data. The starting tag has the format <…> and the matching ending tag has the format <…/> (differing by the ending slash) where … is the tag name. The outermost tag is activity_summary

Here is a description of the correct nesting (in a data type definition (DTD) format):

```
<!ELEMENT activity_summary (time_span, customer_list, product_list, store_list) >
<!ELEMENT time_span (start_date, end_date) >
<!ELEMENT customer_list (customer*) >
<!ELEMENET customer (customer_name, address, order_value, bicycles_purchased) >
<!ELEMENT address (street_address, city, state, zip_code) >
<!ELEMENT product_list (new_product *) >
<!ELEMENT new_product (product_name, brand, category*, store_sales*) >
<!ELEMENT store_sales (store_name, units_sold) >
<!ELEMENT store_list (store*)>
<!ELEMENT store (store_name, store_city, employee_count, customers_served, customer_sales *>
<!ELEMENT customer_sales (customer_name, customer_sales_value) >
```

All items without an ELEMENT line are of type #PCDATA (if that matters to you). The address in customer is just the first address line in the database.

As an example to read this information, the tags activity_summary must contain nested tags for each of year, customer_list, product_list, and store_list. The tag customer_list will contain zero or more tags with name "customer", as identified by the * after the "customer" tag in the ELEMENT clause.

In an XML file, the spacing doesn't matter. I encourage you to use spacing and tabs to make the XML file readable by a person.

Information on XML can be found at w3schools.com.

Sample output (just one entry shown for each section, for brevity), that is fictitious (so not data taken from the current database):

```
<?xml version=”1.0” encoding=”UTF-8” ?>
<activity_summary>
        <time_span>
                <start_date> 2016-02-12 </ start_date>
                <end_date> 2016-02-19 </ end_date>
        </time_span>
        <customer_list>
                <customer>
                        <customer_name> Tameka Fisher </customer_name>
                        <address>
                                <street_address> 769C Honey Creek St. </street_address>
                                <city> Redondo Beach </city>
                                <state> CA </state>
                                <zip_code> 90278 </zip_code>
                        </address>
                        <order_value> 52151.81 </order_value>
                        <bicycles_purchased > 40 </bicycles_purchased>
                </customer>
        </customer_list>
        <product_list>
                <new_product>
                        <product_name> Trek Fuel EX 8 29 - 2016 </product_name>
                        <brand> Electra </brand>
                        <category> Electric Bikes </category>
                        <category> Comfort Bicycles </category>
                        <store_sales>
                                <store_name> Baldwin Bikes </store_name >
                                <units_sold> 20 </unit_sold >
                        </store_sales>
                </new_product>
        </product_list>
        <store_list>
                <store_name> Baldwin Bikes </store_name>
                <store_city> Baldwin </store_city>
                <employee_count> 5 </employee_count>
                <customers_served> 15 </customers_served>
                <customer_sales >
                        <customer_name> Kasha Todd </customer_name>
                        <customer_sales_value> 312.42 </customer_sales_value>
                </customer_sales>
                <customer_sales >
                        <customer_name> Daryl Spence </customer_name>
                        <customer_sales_value> 1299.00 </customer_sales_value>
                </customer_sales>
```

</store_list>
</time_period_summary >

Constraints

- You may use any data structure from the Java Collection Framework.
- Write your solution in Java. The solution code must be your own.
- Use the mysql JDBC connection for Java.
- If in doubt for testing, I will be running your program on timberlea.cs.dal.ca. Correct operation of your program shouldn't rely on any packages that aren't available on that system.

Notes

- Use SQL vs Java as you deem best.
- Be sure to document your approach and any resources that you use.
- Look at where the bulk of the marks are in the marking scheme to help focus your efforts.
- You can run your queries against the csci3901 database on db.cs.dal.ca I will also make the sql file for the database available to you so that you can create your own copy of the database.
- You are expected to submit
    - Your Java code
    - External documentation
    - An argument as to why your solution is ready to be deployed

Marking scheme

- Documentation (internal and external) – 3 marks
- Program design, organization, and style – 2 marks
- Proper XML file format, including human readability – 3 marks
- Correct extraction of customer information – 4 marks
- Correct extraction of product information – 4 marks
- Correct extraction of store information – 4 marks
- Ability to extend or change the data to report easily and how convinced you've made the manager to deploy your solution – 4 marks