F20SC/F21SC: [1]Industrial Programming (2021/22)

Resit Assessment   Weighting – 100%

In this assignment, you are required to develop a business logic with an administrative and a user interface for a part of a book store management system, dealing with potentially high volumes of data. This is an **individual project**.

PART 1 – Administrative interface (in Python):

This part concerns the development of a Python application, which allows the administrative user to add, edit, delete and search for books and view book details.

1. You have to use Python to design the application and MySQL to create the database and provide code to establish the connection between Python and MySQL to facilitate the required process.
2. Create the Books table in MySQL as per the instructions given in Appendix 1.
3. Provide a user friendly GUI and write code to add, edit and delete books.
4. Allow the user to select Book ID from a summary view and then be able to view book details of the selected ID.
5. Provide a summary of the contents of the book store, printing the number of books available, the number of books per subject area, the range of publication dates (from oldest and to youngest), the range of prices (from minimum to maximum) and the average price of a book in the bookstore.

PART 2 – User interface (in C#):

This part concerns the development of an end user interface (in C#) and an underlying business logic for the book store system, allowing a user to login, search for books, view book details, check for availability and reserve a book.

Stage 1:

As a first step, make sure that all the technologies required for the development of this project is installed on your system. In particular, the MySQL DBMS (see the Software section of this document).

Using the MySQL server, you are then required to create a database *library,* which consists of four tables *books, authors, customers and reservation* (the schema of such tables is based on the TPC-W specification http://www.tpc.org/tpcw/specs.asp). The details of such tables are provided in Appendix A.

Stage 2:

In this part of the project, you are required to develop a graphical front end to implement the application server of the site with a user interface. The details of the functionality required are provided below:

- <u>Home:</u> This is the starting point for the application. The user should specify whether he/she is a customer or not. If a customer, a customer id is required to be passed for the application. If not a customer, the user should register first and provide customer id. The response should contain customer details and a link to the Search Request functionality.
- <u>Search Request:</u> This part should allow the user to enter a search criterion (search by name, by author, by subject) and a value for the chosen criterion.
- <u>Search Result:</u> The reply of the search request should be provided by a search result summary, which requires a search criterion and a value. The response should contain links to Search Request and Book Detail.
- <u>Book Detail:</u> This part returns the details of a particular book. A book id parameter is required for this interaction. The response should contain links to Search Request and Check for availability functionalities.
- <u>Check for availability:</u> This part returns the available number of the particular book by tracking the stock from the books table. A book id parameter is required for this interaction. The response should contain links to the reservation page.
- <u>Reserve a book:</u> A record of reserving books should be associated with each user, and here such a count is updated. If no record is associated with a user, one should be created in this interaction. New items should always be added to the record. A separate function should allow the deletion of an item. Every time when a reservation is made, the B_STOCK in the Books table is updated accordingly. The response contains the updated reservation record, displayed as a list of items with unit prize and per-item costs together with the total cost for all reserved items. This summary should include links to the records page for each item and to the Search Request page.

Software

The following technologies should be used to develop the site:
- Python interpreter and libraries (http://www.python.org/).
- Pick one of the many Python SQL libraries: PyMySQL is one possible choice.
- C# with the LINQ interface to connect to the Database.
- MySQL as the Database Management System (http://www.mysql.com/).

Submission

You must submit the project files (source code and stand-alone executables in a .zip file) and the report (as a .pdf file) through Canvas **no later than 4th August 2022**. Additionally, a screencast or video of running the application, with an explanation as voice-over audio needs to be submitted to Canvas. This is mandatory, and without the screencast or video the submission is incomplete and may be marked as 0 points.

Report Format (Attach separate report for Python and C# applications)

1. Introduction
   - State the purpose of the report, your remit and any assumptions you have made during the development process.

2. Requirements' checklist
   - Here you should clearly show which requirements you have delivered and which you haven't.

3. Design Considerations
   - Here you should clearly state what you have done to your application to make it more usable and accessible.

4. User Guide
   - Use screen shots of the running application along with text descriptions to help you describe how to operate the application.

5. Developer Guide
   - Describe your application design and main areas of code in order to help another developer understand your work and how they might develop it. You may find it useful to supplement the text with code fragments.

6. Testing
   - Show the results for testing all cases and prove that the outputs are what are expected.
   - If certain conditions cause erroneous results or the application to crash then report these honestly.

7. (**F21SC only**) Reflections on programming language and implementation
   - Based on your experience in implementing this application, reflect which language features and technologies have been most helpful, identify limitations of your application and suggest ways how to overcome these limitations. Also reflect on the usability of each of the languages (either system or scripting language) for this application domain, and on its wider applicability.

8. Conclusions
   - Reflect on what you are most proud of in the application and what you'd have liked to have done differently.
   - An optional final section of references is also encouraged.

Marking Scheme

Criteria	Possible Marks
Meeting System Requirements (Python App)	15
Meeting System Requirements (C# App)	30
Report Quality Content and communication (Design Considerations, Reflections, User guide & Developers guide)	20
The Application Sufficient comments, Sensible variable/object names, Good code/class/method design.	15
Testing Analysis of inputs and outputs Coverage of all cases	10
Initiative, innovation, professionalism, creativity and efforts above & beyond the call of duty	10
Total Mark	**100**

Appendix A
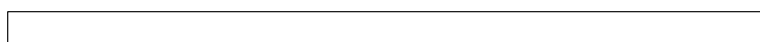
Book Store Database*

Books Table: **Contains details of the books available at the site.**

Field	Type	Description
B_ID	**Numeric**	**Unique id of item**
B_TITLE	**Variable text**	**Title of item**
B_A_ID	**Numeric**	**Author ID of item**
B_PUBLISHER	**Variable text**	**Publisher of item**
B_PUB_DATE	**Date**	**Date of publication**
B_SUBJECT	**Variable text**	**Subject of item**
B_UNIT_PRIZE	**Numeric**	**Prize for one item**
B_STOCK	**Numeric**	**Quantity in stock**

Author Table: **Contains information on book authors.**

Field	Type	Description
A_ID	**Numeric**	**Unique author ID**
A_FNAME	**Variable text**	**First name of author**
A_LNAME	**Variable text**	**Last name of author**

Customers Table: **Contains information on site customers.**

Field	Type	Description
C_ID	**Numeric**	**Unique ID per customer**
C_NAME	**Variable text**	**First name of customer**
C_ADD	**Variable text**	**Address of customer**

Reservation Table: **Contains information on reservations made.**

Field	Type	Description
R_ID	**Numeric**	**Unique ID per reservation**
R_C_ID	**Numeric**	**Retrieved from Customers table**
R_C_NAME	**Variable text**	**Retrieved from Customers table**
R_B_ID	**Numeric**	**Retrieved from Books table**
R_B_TITLE	**Variable text**	**Retrieved from Books table**
R_B_QUANTITY	**Numeric**	**Number of Books reserved**

* Based on TPC-W: **http://www.tpc.org/tpcw/specs.asp**