Diploma in Information Technology
Programming Fundamentals
Instruction for CA3 Individual Assignment
January 2023 Semester

Continual Assessment 3 Individual Assignment (40%)
The Java application constitutes to 30% while the class presentation constitutes to 10% of the overall assessment. Total marks for this assessment is 100 marks.

Case Study:
Aethyr IT is a full-service solution provider that focuses on leveraging their infrastructure and footprint to support a broad spectrum of organisations with rapid deployment and emerging technologies. Over the years, Aethyr IT has evolved into an advanced solutions provider, focused on servicing customers and creating value through long term relationships that we build. They have established unique service level agreements (SLA's) and fixed costs based on our customers' needs and budget. They strive to deliver more efficient, effective and relevant quality services and solutions tailored to the increasingly complex demands of organisations, in order to boost productivity of operations and to maximise value for our customers.

Aethyr IT also strives towards technology that provides a real advantage to a business. The most powerful connection that a business can make is through all its stakeholders. Aethyr IT binds together business and technology. In their latest development project, they have been tasked to develop a Java application meant for National Library in Singapore. The application is called "Bookkeep Rental Management" and it primarily aids bookkeepers in quick accessibility and rental management of books in the library.

The individual task:
As a developer that is part of Aethyr IT. Your task is to develop a simplified "Bookkeep Rental Management" Java Application (using IntelliJ), satisfying all requirements listed below. As this is a simplified application, it should be in a command line form only.

Project Requirement
With what you have learned from the module, you are task to develop the Java application with the following:

1. You are required to write **FIVE (5)** Java classes.

   a. Book
   b. UserAccount
   c. Rental
   d. AdminAccount
   e. ManagementSystem (Main Class)

For each Java class activity, you are to meet the following requirements:

* For storing of any form of data, you are to use the ArrayList class only.

Book class

Fields:
- Book ID: int
- Book Name: String
- Book Description: String
- Book Genre: String
- Book Rental Price: double

Constructor:
- Arguments: book id, name, description, genre, rental price.

Methods:
- Set and Get methods for the respective fields.

UserAccount class

Fields:
- User ID: int
- User First Name: String
- User Last Name: String
- User Created Date: String
- User Genre Preferences: ArrayList (String)

Constructor:
- Arguments: user id, first name, last name, created date.

Methods:
- Set and Get methods for the respective fields.
- **addGenre** method will allow adding genre to User Genre Preferences ArrayList.
- **removeGenre** method will allow removing of genre from User Genre Preferences ArrayList.

Rental class

Fields:
- Rental ID: int
- Rental Date: String
- Rental UserAccount: UserAccount Object
- Rental Book List: ArrayList (Book Object)

Constructor:
- Arguments: rental id, date, useraccount object.

Methods:
- Set and Get methods for the respective fields.
- **addBook** method will allow adding of rented book object to rental records.
- **removeBook** method will allow removing of rented book object to rental records.
- **totalRentalPrice** method will calculate and return the total price of books rented under user account.

AdminAccount class

Fields:
- Admin ID: int
- Admin Name: String
- Admin Username: String
- Admin Password: String

Constructor:
- Arguments: admin id, name, username, password.

Methods:
- Set and Get methods for the respective fields.

ManagementSystem class

Fields:
- Admin Account List: ArrayList (AdminAccount Object)
- Rental List: ArrayList (Rental Object)
- User Account: ArrayList (UserAccount Object)
- Book List: ArrayList (Book Object)

Note: This would be the main class. You are to use all classes and methods created to achieve the following option outcome that the application can perform. Should you require additional methods to support the options, you are allowed to do so.

Application menu options:
1. Admin account sign in (Other menu options will be shown only when authentication is successful)
2. Admin Account
    a. Add/Delete admin account
    b. Show admin account list
3. Books
    a. Add/Delete book
    b. Show book list
    c. Most expensive book rental
    d. Cheapest book rental
4. User Accounts
    a. Add/Delete user account
    b. Show user account list
5. List all user rental records
6. Show top user that rent the most books
7. Show individual user matched books (Based on their genre preferences)
8. Exit

Note: The application only terminates when the user pick option 8.

2. Implement Error Handling methods on relevant methods/classes.

You are required to satisfy all requirements mentioned above.

You are free to add more appropriate fields and methods to the any of the above Java classes.

You need to handle all possible errors that will occur during the program execution.

Documentation
On top of the Java Application development, you will also be required to submit a report with the following documentation:

A short reflection on this assignment with the following pointers:

- Things you have learnt through doing the assignments
- Screenshot and explanation on unresolved/unachievable requirements.
- Not more than 1000 words

Assessment Topics
Topics 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17

Instructions
<u>Submitting Assignment</u>
All assignment files are to be zipped into a folder with your full name, student number, institution name, the module name and CA3. Example "full_name_student_no_sim_pf_ca3".

Students should keep a copy of assignment submitted.

<u>Penalty Marks for Late Submission of Assignment</u>
By one day: 20% to be deducted from total marks.
More than one day: submission will NOT be graded.

A **marking rubric** for this assignment can be found in the appendix of this assignment.

Important Dates of CA3 Assignment
CA3 Individual Assignment Deadline: 13 February, 11.59am
Zip all assignment file. Submit your assignment via Canvas. All assignment files must be submitted in order to be graded.

<u>Lecturer Contact</u>
You should contact your lecturer via your SIM email whenever you have any issue about your project.

Appendix

S/N	Requirement	Marks
	Java Project (100 marks)	
1	Book Java Class	5 marks
2	UserAccount Java Class	10 marks
3	Rental Java Class	10 marks
4	AdminAccount Java Class	5 marks
5	ManagementSystem Java Class	50 marks
6	Implement Error Handling Methods	5 marks
7	Presentation	10 marks
8	Reflection	5 marks