Diploma in Information Technology
Programming Fundamentals
Instruction for CA3 Group Assignment
July 2024 Semester

Assessment

This assessment is over **100 marks**. It constitutes **40%** of the overall assessment. The group assignment will cover **30%** and the group presentation will cover **10%**.

Rationale of Group Project

The rationale of the group project is to enable collaborative learning with your peers and learning to work as a team, which is commonplace in workplace environment. Students learn to apply theories taught in class and textbooks to real world situations.

In line with this objective, students are not allowed to reuse old assignments, or submit projects from previous semesters or copy largely from sources, particularly from the internet.

Forming Group

Students are to form groups of 3 to 5 students per group. As this a group project, each member is expected to put in his/her fair share of the effort into the project. It is essential that groups manage their group effectively to complete this project.

Students should resolve group dynamics issue and may seek the mediation through the lecturer as early as possible. Last minute mediation will not be entertained. Students may request for peer evaluation as a final resort if all mediation fails.

Finally, the lecturer reserves the right to assign a mark to an individual student different from the rest of the group if that student is deemed not to have put in his/her fair share of effort into the project.

The Group Task:

You and your group members have been assigned to develop a **Classroom Booking Application** in Java that provides functionality for managing classrooms, lecturers, and booking information to a school.

The application should be able to:

1. allow the school staff to create, update and delete and view classrooms.

2. allow the school staff to add, edit, remove and view lecturers.

3. allow the school staff to make and cancel classroom bookings.

4. allow the school staff to generate reports of classroom bookings by date, classroom and lecturer.

5. allow the school staff to generate reports of total number of classroom bookings.

6. provide error handling for any invalid inputs from the school staff.

Project Requirement

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

1. Design a class called **Classroom** to represent a classroom that can be booked for a lecturer.

   Include attributes such as:
   - Classroom number
   - Classroom name
   - Classroom location

   Include methods where appropriate.

2. Design a class called **Lecturer** to represent a lecturer who teaches in a classroom.

   Include attributes such as:
   - Lecturer ID
   - Full name
   - Contact number
   - Email address

   Include methods where appropriate.

3. Design a class called **Booking** to represent a classroom booking.

   Include attributes such as:
   - Booking ID
   - Booking date
   - Classroom
   - Lecturer

   Include methods where appropriate.

4. Design a class called **ClassroomBookingApp** to coordinate the overall application functionality.

   Include attributes such as:
   - Classrooms (ArrayList)
   - Lecturers (ArrayList)
   - Bookings (ArrayList)

   Include methods to:
   - Manage classrooms
   - Manage lecturers
   - Manage bookings
   - Generate reports

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

5. Implement Error Handling where appropriate.

6. Illustrate UML Class Diagrams for all classes.

7. Aside from the Java program, your group is to write a Reflection word document not exceeding 3000 words. The reflection may contain the following pointers:

   - Things you have learnt through doing the assignment.
   - Challenges faced in programming or group work.
   - Screenshot and explanation on unresolved/unachievable requirements.

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.

You may also refer to a sample command output shown in **Appendices B, C, D, E and F**. (Note: You do not need to follow the exact output. They are some guides to show the essence of the Classroom Booking Application)

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 compressed into a **.zip** file with your class number, group number, institution name, the module name and CA3. For example, "L01_Group_1_SIM_PF_CA3.zip".

The files inside this compressed .zip file are as follows:
1. Java Program (All project folders and files)
2. UML Class Diagram (Image file in either **.png** or **.jpg** format)
3. Group Reflection (Word document in **.docx** format)

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 **<u>Appendix A</u>** of this assignment.

Important Dates of CA3 Assignment

CA3 Individual Assignment Deadline: 12 August 2024, 11.59 am

Zip all assignment files. 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 A

No	Requirement	Marks
1	Classroom Java Class	10 marks
2	Lecturer Java Class	10 marks
3	Booking Java Class	10 marks
4	ClassroomBookingApp Java Class	45 marks
5	Error Handling	10 marks
6	UML Class Diagrams	10 marks
7	Group Reflection	5 marks
Total: 100 marks		

Appendix B

Main Menu

```
Welcome to the Classroom Booking Application

*** Main Menu ***
1. Manage Classrooms
2. Manage Lecturers
3. Manage Bookings
4. Generate Reports
0. Exit
Enter option: 1

** Classroom Menu **
1. Create classroom
2. Update classroom
3. Delete classroom
4. View all classrooms
5. Back to Main Menu
Enter option: 5

*** Main Menu ***
1. Manage Classrooms
2. Manage Lecturers
3. Manage Bookings
4. Generate Reports
0. Exit
Enter option: 2

** Lecturer Menu **
1. Add lecturer
2. Edit lecturer
3. Remove lecturer
4. View all lecturers
5. Back to Main Menu
Enter option: 5

*** Main Menu ***
1. Manage Classrooms
2. Manage Lecturers
3. Manage Bookings
4. Generate Reports
0. Exit
Enter option: 3

** Booking Menu **
1. Make a booking
2. Cancel a booking
3. View all bookings
4. Back to Main Menu
Enter option: 4

*** Main Menu ***
1. Manage Classrooms
2. Manage Lecturers
3. Manage Bookings
4. Generate Reports
0. Exit
Enter option: 4
```

```
** Reports Menu **
1. Generate bookings report by date
2. Generate bookings report by classroom
3. Generate bookings report by lecturer
4. Generate total number of bookings
5. Back to Main Menu
Enter option: 5

*** Main Menu ***
1. Manage Classrooms
2. Manage Lecturers
3. Manage Bookings
4. Generate Reports
0. Exit
Enter option: 0

Thank you for using the Classroom Booking Application!
```

Appendix C

Manage Classrooms Menu

```
*** Main Menu ***
1. Manage Classrooms
2. Manage Lecturers
3. Manage Bookings
4. Generate Reports
0. Exit
Enter option: 1

** Classroom Menu **
1. Create classroom
2. Update classroom
3. Delete classroom
4. View all classrooms
5. Back to Main Menu
Enter option: 1

Enter classroom number: 801
Enter classroom name: Alpho
Enter classroom location: A.4.08
New Classroom created!

** Classroom Menu **
1. Create classroom
2. Update classroom
3. Delete classroom
4. View all classrooms
5. Back to Main Menu
Enter option: 2

Enter classroom number to update: 811
Error: Invalid classroom number!

** Classroom Menu **
1. Create classroom
```

2. Update classroom
3. Delete classroom
4. View all classrooms
5. Back to Main Menu
Enter option: 2

Enter classroom number to update: 801
Update classroom name: Alpha
Update classroom location: A.4.18
Classroom '801' updated!

** Classroom Menu **
1. Create classroom
2. Update classroom
3. Delete classroom
4. View all classrooms
5. Back to Main Menu
Enter option: 1

Enter classroom number: 801
Error: Classroom number '801' already exists!

** Classroom Menu **
1. Create classroom
2. Update classroom
3. Delete classroom
4. View all classrooms
5. Back to Main Menu
Enter option: 1

Enter classroom number: 802
Enter classroom name: Beta
Enter classroom location: B.2.04
New Classroom created!

** Classroom Menu **
1. Create classroom
2. Update classroom
3. Delete classroom
4. View all classrooms
5. Back to Main Menu
Enter option: 1

Enter classroom number: 803
Enter classroom name: Charlie
Enter classroom location: A.1.16
New Classroom created!

** Classroom Menu **
1. Create classroom
2. Update classroom
3. Delete classroom
4. View all classrooms
5. Back to Main Menu
Enter option: 1

Enter classroom number: 804
Enter classroom name: Delta
Enter classroom location: B.4.20
New Classroom created!

```
** Classroom Menu **
1. Create classroom
2. Update classroom
3. Delete classroom
4. View all classrooms
5. Back to Main Menu
Enter option: 3

Enter classroom number: 805
Error: Classroom number '805' does not exist!

** Classroom Menu **
1. Create classroom
2. Update classroom
3. Delete classroom
4. View all classrooms
5. Back to Main Menu
Enter option: 4

Classroom Number: 801, Name: Alpha, Location: A.4.18
Classroom Number: 802, Name: Beta, Location: B.2.04
Classroom Number: 803, Name: Charlie, Location: A.1.16
Classroom Number: 804, Name: Delta, Location: B.4.20

** Classroom Menu **
1. Create classroom
2. Update classroom
3. Delete classroom
4. View all classrooms
5. Back to Main Menu
Enter option: 3

Enter classroom number: 804
Classroom '804' deleted!

** Classroom Menu **
1. Create classroom
2. Update classroom
3. Delete classroom
4. View all classrooms
5. Back to Main Menu
Enter option: 4

Classroom Number: 801, Name: Alpha, Location: A.4.18
Classroom Number: 802, Name: Beta, Location: B.2.04
Classroom Number: 803, Name: Charlie, Location: A.1.16

** Classroom Menu **
1. Create classroom
2. Update classroom
3. Delete classroom
4. View all classrooms
5. Back to Main Menu
Enter option: 5
```

Appendix D

Manage Lecturers Menu

```
*** Main Menu ***
1. Manage Classrooms
2. Manage Lecturers
3. Manage Bookings
4. Generate Reports
0. Exit
Enter option: 2

** Lecturer Menu **
1. Add lecturer
2. Edit lecturer
3. Remove lecturer
4. View all lecturers
5. Back to Main Menu
Enter option: 1

Enter lecturer ID: 1001
Enter lecturer full name: Jack Ma
Enter lecturer contact number: 91111111
Enter lecturer email: jackma@sim.edu.sg
New Lecturer added!

** Lecturer Menu **
1. Add lecturer
2. Edit lecturer
3. Remove lecturer
4. View all lecturers
5. Back to Main Menu
Enter option: 1

Enter lecturer ID: 1002
Enter lecturer full name: Peter Lim
Enter lecturer contact number: 92222222
Enter lecturer email: peterlim@sim.edu.sg
New Lecturer added!

** Lecturer Menu **
1. Add lecturer
2. Edit lecturer
3. Remove lecturer
4. View all lecturers
5. Back to Main Menu
Enter option: 1

Enter lecturer ID: 1003
Enter lecturer full name: Albert Einstei
Enter lecturer contact number: 93333334
Enter lecturer email: alberteinstei@sim.edu.sg
New Lecturer added!

** Lecturer Menu **
1. Add lecturer
2. Edit lecturer
3. Remove lecturer
4. View all lecturers
5. Back to Main Menu
Enter option: 2

Enter lecturer ID to edit: 1004
Error: Invalid lecturer ID!
```

```
** Lecturer Menu **
1. Add lecturer
2. Edit lecturer
3. Remove lecturer
4. View all lecturers
5. Back to Main Menu
Enter option: 2

Enter lecturer ID to edit: 1003
Edit lecturer full name: Albert Einstein
Edit lecturer contact number: 93333333
Edit lecturer email: alberteinstein@sim.edu.sg
Lecturer '1003' edited!

** Lecturer Menu **
1. Add lecturer
2. Edit lecturer
3. Remove lecturer
4. View all lecturers
5. Back to Main Menu
Enter option: 3

Enter lecturer ID to remove: 1004
Error: Lecturer ID '1004' does not exist!

** Lecturer Menu **
1. Add lecturer
2. Edit lecturer
3. Remove lecturer
4. View all lecturers
5. Back to Main Menu
Enter option: 4

Lecturer ID: 1001, Name: Jack Ma, Contact: 91111111, Email: jackma@sim.edu.sg
Lecturer ID: 1002, Name: Peter Lim, Contact: 92222222, Email: peterlim@sim.edu.sg
Lecturer ID: 1003, Name: Albert Einstein, Contact: 93333333, Email: alberteinstein@sim.edu.sg

** Lecturer Menu **
1. Add lecturer
2. Edit lecturer
3. Remove lecturer
4. View all lecturers
5. Back to Main Menu
Enter option: 3

Enter lecturer ID to remove: 1003
Lecturer '1003' removed!

** Lecturer Menu **
1. Add lecturer
2. Edit lecturer
3. Remove lecturer
4. View all lecturers
5. Back to Main Menu
Enter option: 4

Lecturer ID: 1001, Name: Jack Ma, Contact: 91111111, Email: jackma@sim.edu.sg
Lecturer ID: 1002, Name: Peter Lim, Contact: 92222222, Email: peterlim@sim.edu.sg

** Lecturer Menu **
```

```
1. Add lecturer
2. Edit lecturer
3. Remove lecturer
4. View all lecturers
5. Back to Main Menu
Enter option: 5
```

Appendix E

Manage Bookings Menu

```
*** Main Menu ***
1. Manage Classrooms
2. Manage Lecturers
3. Manage Bookings
4. Generate Reports
0. Exit
Enter option: 3

** Booking Menu **
1. Make a booking
2. Cancel a booking
3. View all bookings
4. Back to Main Menu
Enter option: 1

Enter booking date (dd/mm/yyyy): 29/07/2024
Enter lecturer id: 1001
Classroom '801' booked, booking ID is 50001

** Booking Menu **
1. Make a booking
2. Cancel a booking
3. View all bookings
4. Back to Main Menu
Enter option: 1

Enter booking date (dd/mm/yyyy): 29/07/2024
Enter lecturer id: 1002
Classroom '802' booked, booking ID is 50002

** Booking Menu **
1. Make a booking
2. Cancel a booking
3. View all bookings
4. Back to Main Menu
Enter option: 1

Enter booking date (dd/mm/yyyy): 29/07/2024
Enter lecturer id: 1001
Classroom '803' booked, booking ID is 50003

** Booking Menu **
1. Make a booking
2. Cancel a booking
3. View all bookings
4. Back to Main Menu
Enter option: 1
```

Enter booking date (dd/mm/yyyy): 29/07/2024
Error: No available classroom on '29/07/2024'!

** Booking Menu **
1. Make a booking
2. Cancel a booking
3. View all bookings
4. Back to Main Menu
Enter option: 2

Enter booking ID: 50005
Error: Booking ID '50005' does not exist!

** Booking Menu **
1. Make a booking
2. Cancel a booking
3. View all bookings
4. Back to Main Menu
Enter option: 2

Enter booking ID: 50002
Booking '10002' cancelled!

** Booking Menu **
1. Make a booking
2. Cancel a booking
3. View all bookings
4. Back to Main Menu
Enter option: 3

Booking ID: 50001, Date: 29/07/2024, Classroom number: 801, Lecturer ID: 1001
Booking ID: 50003, Date: 29/07/2024, Classroom number: 803, Lecturer ID: 1001

** Booking Menu **
1. Make a booking
2. Cancel a booking
3. View all bookings
4. Back to Main Menu
Enter option: 1

Enter booking date (dd/mm/yyyy): 01/08/2024
Enter lecturer id: 1002
Classroom '801' booked, booking ID is 50004

** Booking Menu **
1. Make a booking
2. Cancel a booking
3. View all bookings
4. Back to Main Menu
Enter option: 1

Enter booking date (dd/mm/yyyy): 01/08/2024
Enter lecturer id: 1001
Classroom '802' booked, booking ID is 50005

** Booking Menu **
1. Make a booking
2. Cancel a booking
3. View all bookings
4. Back to Main Menu

```
Enter option: 1

Enter booking date (dd/mm/yyyy): 01/08/2024
Enter lecturer id: 1002
Classroom '803' booked, booking ID is 50006

** Booking Menu **
1. Make a booking
2. Cancel a booking
3. View all bookings
4. Back to Main Menu
Enter option: 3

Booking ID: 50001, Date: 29/07/2024, Classroom number: 801, Lecturer ID: 1001
Booking ID: 50003, Date: 29/07/2024, Classroom number: 803, Lecturer ID: 1001
Booking ID: 50004, Date: 01/08/2024, Classroom number: 801, Lecturer ID: 1002
Booking ID: 50005, Date: 01/08/2024, Classroom number: 802, Lecturer ID: 1001
Booking ID: 50006, Date: 01/08/2024, Classroom number: 803, Lecturer ID: 1002

** Booking Menu **
1. Make a booking
2. Cancel a booking
3. View all bookings
4. Back to Main Menu
Enter option: 4

*** Main Menu ***
1. Manage Classrooms
2. Manage Lecturers
3. Manage Bookings
4. Generate Reports
0. Exit
Enter option:
```

Appendix F

Generate Reports Menu

```
*** Main Menu ***
1. Manage Classrooms
2. Manage Lecturers
3. Manage Bookings
4. Generate Reports
0. Exit
Enter option: 4

** Reports Menu **
1. Generate bookings report by date
2. Generate bookings report by classroom
3. Generate bookings report by lecturer
4. Generate total number of bookings
5. Back to Main Menu
Enter option: 1

Enter date (dd/mm/yyyy): 01/08/2024
Booking ID: 50004, Classroom number: 801, Lecturer ID: 1002
Booking ID: 50005, Classroom number: 802, Lecturer ID: 1001
Booking ID: 50006, Classroom number: 803, Lecturer ID: 1002
```

** Reports Menu **
1. Generate bookings report by date
2. Generate bookings report by classroom
3. Generate bookings report by lecturer
4. Generate total number of bookings
5. Back to Main Menu
Enter option: 2

Enter classroom number: 801
Booking ID: 50001, Date: 29/07/2024, Lecturer ID: 1001
Booking ID: 50004, Date: 01/08/2024, Lecturer ID: 1002

** Reports Menu **
1. Generate bookings report by date
2. Generate bookings report by classroom
3. Generate bookings report by lecturer
4. Generate total number of bookings
5. Back to Main Menu
Enter option: 3

Enter lecturer id: 1001
Booking ID: 50001, Date: 29/07/2024, Classroom number: 801
Booking ID: 50003, Date: 29/07/2024, Classroom number: 803
Booking ID: 50005, Date: 01/08/2024, Classroom number: 802

** Reports Menu **
1. Generate bookings report by date
2. Generate bookings report by classroom
3. Generate bookings report by lecturer
4. Generate total number of bookings
5. Back to Main Menu
Enter option: 4

Total number of bookings: 5

** Reports Menu **
1. Generate bookings report by date
2. Generate bookings report by classroom
3. Generate bookings report by lecturer
4. Generate total number of bookings
5. Back to Main Menu
Enter option: 5

*** Main Menu ***
1. Manage Classrooms
2. Manage Lecturers
3. Manage Bookings
4. Generate Reports
0. Exit
Enter option: 0

Thank you for using the Classroom Booking Application!