DISTRIBUTED COMPUTER SYSTEMS

Group Assignment (100%)

1. **Synopsis**

This assignment aims to evaluate students’ in terms of two skill sets: Communication skills and Digital skills. The first skill set carries 60% weight of marks and the second skill set carries 40% weight of marks. Research progress should be presented in Week 7, while the whole assignment should be submitted and presented towards the end of the course.

**PLO5** – Communication skills

**PLO6** – Digital skills

|  |  |  |
| --- | --- | --- |
| CLO2 | Demonstrate the ability to implement sub-component of stand-alone application using RMI distributed technology (A3, PLO6) | Group Assignment |
| CLO3 | Explain the technique used in the development of RMI application, related to cloud computing and virtualization for distributed environment (A4, PLO5) | Group Assignment |

1. **Senario**

McGee group is one of the famous restaurant runs in Sri Petaling, Malaysia. Here food menu categorized based on drinks and food items. Each individual customer approaches directly by the supplier to serve food. However, some customers wanted to order and take away the food. So it increases waiting time for both type of customers. Sometimes due to huge volume of customers the restaurant not able to calculate the bills appropriately. Eventually, this paper based system increases time, cost and data loss under this restaurant business.

In order to avoid queue in the restaurant for ordering food, as group you are required to design & implement a FOS (Food Ordering System) for McGee restaurant using a RMI distributed technology. This involves writing both the server and the client program. Client program can use either a command line interface or a graphical user interface. The system should allow the customer to register an account with the First Name, Last Name, IC/Passport number. If the username exists in the system, then the system should notify the user to enter a different username. After the customers has registered successfully into the FOS then the customers area able to order the food items through the system. You may use any other Java collection or external database of your choice to develop the system. Also, the system should make sure that the communication between the customer and the McGee FOS is secured.

***Notes:***

* The tools are not limited to the above scenario, you can propose any tool such as Netbeans IDE, Eclipse, IntelliJ IDE, etc.
* You can choose only JAVA programming language to develop your system also you can choose any database or file system.
* It is highly recommended to develop client server based application with RMI technology.

1. **Tasks:**
   * + 1. Identify the problem statement and the background requirements for the given scenario.
       2. Explain the role of multi-threading, serialization and Object Oriented Programming (OOP) to solve problems in distributed systems.
       3. Develop a distributed application which follow the organization needs.
       4. The system should make sure that the communication between the customer and the McGee FOS is secured.
       5. Present a fault-tolerant distributed application also evaluate the implemented application based on quality requirements such as usability, maintainability and heterogeneity.
       6. Provide a clear use case model diagram for the distributed application developed.
       7. Facilitate constructive recommendation for McGee FOS to use cloud computing / virtualization for future enhancement.

8. Explain the necessary protocols recommended to use in distributed systems. (TCP/UDP)

9. Create a project plan for the given scenario in Gantt chart.

10. Choose any type of testing to provide necessary testing manual for the RMI system

11. Justify how useful the distributed system comparing with centralized system

1. **Guidelines for the Report:**

Document the results of your work in a professional and systematic manner, in the form of a computerized report. One (1) softcopy and hardcopy of your documentation is to be submitted. Your completed documentation should include the following sections:

1. Table of contents
2. Gantt chart
3. Abstract, Introduction, Problem background and Requirements
4. Research and evaluation
5. Role of multi-threading, serialization and Object Oriented Programming (OOP) to solve problems in distributed systems.
6. Use case diagram
7. Implementation of Distributed Application
8. Protocols
9. Testing
10. Conclusion
11. Future enhancement
12. References
13. Appendices and Workload Matrix
14. **Assessment**

This assignment will contribute 100% towards the course assessment and marks and will be evaluated based on the criteria explained in the Table 1. You have to fill up your details in the table below, print it and include it in your final report.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Individual (40%)** | | **Group (60%)** | | |
| Research &  design (20) | Presentation (20) | Implementation (40) | Report  (20) |  |

**Table 1: Assessment Criteria (Marks Breakdown)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Assessment Criteria | Students | | | | |
|  | Student 1 | Student 2 | Student 3 | Student 4\* |
| Name |  |  |  |  |
| TP. No |  |  |  |  |
| Marks | | | | |
| PLO4: Personal Skills (30%) | Weight | Student 1 | Student 2 | Student 3 | Student 4\* |
| Research & design | 10 |  |  |  |  |
| Presentation | 10 |  |  |  |  |
| Subtotal Marks (PLO4) | 20 |  |  |  |  |
|  | | | | | |
| PLO2: Cognitive Skills (70%) | Weight | Student 1 | Student 2 | Student 3 | Student 4\* |
| Implementation | 30 |  |  |  |  |
| Evaluation & Justification | 20 |  |  |  |  |
| Documentation | 30 |  |  |  |  |
| Subtotal Marks (PLO2) | 80 |  |  |  |  |
| Grand Total (PLO4+ PLO2) | 100 |  |  |  |  |

(\*) if any

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | 0 | 1-10 | 11-20 | 21-30 |
| Implementation (25%) | Not implemented the system or system not met the entire requirements | Implemented with minimal functions with more errors and still need to improve more | Able to meet the expected requirements with few errors | Followed appropriate standards and tool to fully developed without any error and met the expected requirements |
| Marks Awarded |  |  |  |  |
|  |  |  |  |  |
| Marks | 0 | 1-6 | 7-13 | 14-20 |
| Evaluation and Justification (15%) | Failed to evaluate and not justified anything | Evaluated and justified the RMI system with least standards and still need to focus more | Managed to evaluate and justify the RMI system with minimal expected improvement | In depth, precise evaluation and justification done for the RMI system |
| Marks Awarded |  |  |  |  |
|  |  |  |  |  |
| Marks | 0 | 1-10 | 11-20 | 21-30 |
| Documentation (30%) | Document not followed any standard without providing abstract, intro and conclusion | Provided ambiguous info about abstract, intro and conclusion with limited documentation standard. Still need to focus more | Appropriately provided abstract, intro and conclusion with following partial documentation standard. | Well documented with clear abstract, intro and conclusion provided. Documentation style followed fully. |
| Marks Awarded |  |  |  |  |
|  |  |  |  |  |
| Individual Component | | | | |
| Marks | 0 | 1-4 | 5-7 | 8-10 |
| Research and design (30%) | No information provided or not attempt the research and design for the given case study | Very less information found on research and system design not appropriated. Expect to have more detailed information | Relevant information about the research and system design provided appropriately with some improvement | Clearly described the information based on analysis and design is adequate with strong understanding |
| Marks Awarded |  |  |  |  |
|  |  |  |  |  |
| Marks | 0 | 1-4 | 5-7 | 8-10 |
| Presentation (10%) | Not presented or not attempt presentation | Presented with lack of communication and the presentation not clear. Need to focus more. | Satisfactory presentation and needed slight improvement | Sound knowledge presentation and covered the expected information |
| Marks Awarded |  |  |  |  |
|  |  |  |  |  |

1. **Submission requirements**
2. You are required to complete the assignment individually and submit (Online) it through **Moodle**.
3. Your assignment will be checked for Plagiarism through Turnitin. **Plagiarism** is a serious offence and will automatically be awarded **zero** (0) marks.
4. You need to ensure that you maintain originality in all your discussions and justifications. Copy paste work will not be entertained. Your reference list should be complete and accurate. Also, make sure that you cite other people’s work properly.
5. You are allowed to refer books, including electronic books, journals, articles, conference papers and online trusted data center web sites.
6. Not allowed to refer from blogs and forums.
7. Your report must be typed using Microsoft Word with Times New Roman font. Expected length is 3,000 words. You need use to include a word count at the end of the report (excluding title, source code of program & contents pages) Report should be in 1.5 spaces.
8. The report has to be well presented and should be *typed*.
9. The report should have a one (1”) margin all around the page as illustrated below:



1. Every report must have a *front cover*. The front cover should have the following details:-
   1. Name
   2. Intake code.
   3. Subject.
   4. Project Title.
   5. Date Assigned (the date the report was handed out).
   6. Date Completed (the date the report is due to be handed in).
2. **All** information, figures and diagrams obtained from external sources **must** be referenced using the Harvard referencing system accordingly.