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**FACULTY OF SCIENCE AND TECHNOLOGY**

**COURSEWORK FOR THE BSC (HONS) INFORMATION TECHNOLOGY; BSC (HONS) COMPUTER SCIENCE; YEAR 2**

**ACADEMIC SESSION 2017; SEMESTER 3**

**NET3204: Distributed System**

**Project DEADLINE: Week 12**

**INSTRUCTIONS TO CANDIDATES**

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# This assignment will contribute 30% to your final grade.

* This is a Group assignment of 5 members.

**IMPORTANT**

# The University requires students to adhere to submission deadlines for any form of assessment. Penalties are applied in relation to unauthorized late submission of work.

# Coursework submitted after the deadline but within 1 week will be accepted for a maximum mark of 40%.

# Work handed in following the extension of 1 week after the original deadline will be regarded as a non-submission and marked zero.

**Lecturer’s Remark** (Use additional sheet if required)

I.............................. (Name) ...................std. ID received the assignment and read the comments....................................... (Signature/date)

**Academic Honesty Acknowledgement**

“I .........................................(student name). verify that this paper contains entirely my own work. I have not consulted with any outside person or materials other than what was specified (an interviewee, for example) in the assignment or the syllabus requirements. Further, I have not copied or inadvertently copied ideas, sentences, or paragraphs from another student. I realize the penalties *(refer to page 16, 5.5, Appendix 2, page 44 of the student handbook diploma and undergraduate programme)* for any kind of copying or collaboration on any assignment.”

….................................. (Student’s signature / Date)

Overview

The aim of this project is to achieve the learning outcomes of [c, d] of this subject as mentioned in the syllabus, your role is to analyse, apply, and design a distributed software application using AKKA middleware. You also need to demonstrate your work at the time of submission. This overall assignment mark will contribute 30 % of your final grade.

You are to form a group consisting of not more than 5 members and appoint a Group Leader.

The final assignment marks could be varied in your group as your individual mark will be weighted to reflect any unequal contributions of your development works within a group and your individual presentation.

(You must fill the Assignment Reflection form and submit to Lecturer during presentation.)

**assignment SPECIFICATION**

|  |  |
| --- | --- |
| **Learning Outcome Being Assessed** | 1. Evaluate the importance of scalability and reliability in distributed systems 2. Develop simple distributed systems with application of principles and protocols of distributed computing |
| **Submission Deadline**  **eLearn Submission** | **Monday, (Week 14) by 4.00p.m.**  Late submission will be capped to 50% (unless a concrete reason is provided).  Create a submission folder named as “Project\_yourID” (one of the members’ ID). Put your project folder and documentation report into this submission folder. Zip it and submit this zipped file into the eLearn. |
| **Outline of Problem** | This assignment requires student to design a distributed system that is scalable and reliable.  Students are required to demonstrate the ability to apply their knowledge on distributed system in their implementation of the solution. Student also requries familiar themselves with middleware to hardness the scalability and reliability that its offer. |
| **Detail Question** | Propose a Distributed System Project such as the following   1. Distributed Race Car / Games 2. Distributed shared white board 3. Distributed file sharing 4. Distributed chat system 5. …   You are required to design the proposed distributed system with scalability and reliability.  You should use middleware such as AKKA to support your development. You have to produce a system architecture design that explain the physical model and interactive model of the distributed system.  This system should utilize distributed system concept in designing and developing.    You should design a test case for your proposed system to test the handling of communication omission or process omission.  A report should be written to explain the architecture of the distributed system in term of physical and interactive model and the outcome of the testing. |
| **What you should hand in** | The following items are to be handed in:   * A cover page (use the template provided). Indicate the percentage contribution of each member. * A documentation report includes   + Introduction to the proposed distributed system.   + The physical and interactive model of the proposed system (System architecture diagram, communication protocol sequence diagram).   + Explanation how scalability and reliability can be guarantee in the program.   + Test case that you have proposed to test your distributed system and result of the test case– in hardcopy * The project/solution files, including the source code for the Item class, all pre-compiled classes, test driver program and application program. – in **sotfcopy** * An A4 page to be written **individually** by each team member personal reflection that includes:   + An explanation of your understanding any distributed system concepts that you have apply in your assignment.   + A description of how you applied the distributed concepts in your assignment.   + The problems encountered during this assignment and how you solved these problems.   + An evaluation of the strengths and weaknesses of your submitted work.   + Include each group’s member contribution percentage.   NOTE: Submitting the coursework means you have agreed that your work is original and comply with the rules and regulations (refer to Academic Impropriety) |
| **Paper Size / Format** | |  |  | | --- | --- | | Paper size | A4 (Use only one side of the paper) |   For the personal reflection write-up,   |  |  | | --- | --- | | Paragraph format | 1.5-line spacing | | Font size | 12 points | |
| **Academic Impropriety** | You may only work with the students in your team to produce your deliverables for this assignment.  Sunway University takes a strong stand on plagiarism. Any students found to have copied work, colluded or presented work that is not their own will be punished under the terms stated in the rules and regulations booklet. Students are permitted to use 3rd party components, however all such code must be well described and credit awarded to the respective owner. Students must also ensure that the majority of source code is their own, and that the core algorithms are their own work. The use of copyright materials is forbidden.  \*subject to change anytime without prior notification  **The work that you submit must conform to those regulations.** |
| **Assessment:**  **Report**  **Demonstration**  during your Practical class in week 13 and 14 of semester. | Contributes 30% to the overall coursework mark.  Refer to ASSESSMENT CRITERIA FOR Project table for further elaboration of marking distribution. Total of 5 marks allocated in each column in table. Total mark is 40 marks and will average to 30 marks.  Marks for a team member = Total obtained marks x % contribution  All students are required to demonstrate their course work where you will demonstrate your product to the lecturer. The lecturer will not examine every line of code in your work, and as such it is your responsibility to demonstrate all features according to the mark **allocation** requirements. Your oral presentation must also include other items you have done over and above the requirements here and any challenges/difficulties etc. to your project which would have not been documented in your report.  All group members must share equally in the presentation which will normally be 30 minutes duration, i.e. each member presents about 5-6 min., include Q&A.  Note that the mark is given based on individual performance, however, marks will be deducted if the overall group presentation is not consistent, cohesive and collective. Member not attending the presentation will be given zero mark. |

**ASSESSMENT CRITERIA FOR Project**

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| --- | --- | --- | --- | --- | --- | --- |
| **Mark /**  **General Impression** | **Area / Assessment Criteria** | | | | | |
| **Distributed System Design** | | **Application Program** | | **Explanation and Description** | |
| **Fulfillment of Scalable and Reliable Requirements** | **Fulfillment of Middleware Requirements** | **Fulfilment of requirements** | **Documentation (Report)** | **Concepts** | **Application** |
| 5  Excellent | Correct and complete   * Architecture Design that is scalable * Communication Protocol Design that is reliable * Originality, Unique | * Correct use of middleware such as AKKA or * Correct use of other middleware * No threading or locking issues. | The following are provided   * Program able to send messages across the network. * Task are carry out correctly. * Program able to handle fault such as network connectivity or program crashes * The system able to support increasing number of node connected to the system. | * Complete and well written documentation. * All Required section is included. * Table of content is formatted properly. * Very few typo or spelling mistake. | An excellent explanation that reflects a complete and correct understanding of all the concepts. | An excellent description that demonstrates a correct implementation of all the concepts. |
| 4  Very Good | Correct and complete   * Architecture Design that is partially scalable * Communication Protocol Design that is partially reliable * Partial originality, some uniqueness | * Near correct use of middleware such as AKKA or * Near correct use of other middleware * Minor threading or locking issues. | The following are provided   * Program able to send messages across the network. * Task are carry out correctly. * The system able to support increasing number of node connected to the system. | * Complete and well written with only one very minor error in documentation. * Not all required section is included only miss one section. * Table of content is formatted reasonably. * Few typo or spelling mistake. | A good  explanation that reflects a correct understanding of most of the concepts. | A good description that demonstrates a correct implementation of all the concepts. |
| 3  Average | Partially Correct and partially complete   * Architecture Design that is workable by not scalable * Communication Protocol Design that is workable by not reliable * Partial originality, less unique | * Did not use of middleware such as AKKA but use of other middle such as RMI * Significant threading or locking issues but still workable with the expense of performance | The following are provided   * Program able to send messages across the network. * Task are carry out correctly. | * Quite complete and good written with only few minor error in documentation. * Not all required section is included only miss few section. * Table of content is formatted. * Few typo or spelling mistake. | The description demonstrates an adequate understanding of most of the concepts. | The description adequately describes the implementation of the concepts in the assignment. |
| 2  Poor | Incorrect and not complete   * Architecture Design that is not good. * Communication Protocol Design that is not refine. | * Did not use of any middleware but only socket programming * Major threading or locking issues with near risk of incorrect operation. | The following are provided   * Program able to send messages across the network. | * Incomplete in documentation with few major error. * Not all required section is included with missing lot of section. * Table of content is partially formatted. * Lot of typo or spelling mistake. | The description is incomplete or does not reflect understanding of the concepts. | Description of implementation is unclear / incorrect. |
| 1  Very Poor | Very major errors or more than 1 incomplete architecture and communication design. | * Did not use of any middleware or socket programming * Wrong use of threading and locking with incorrect operation. | Grossly incomplete application program.  Very major errors. | * Grossly incomplete in documentation with major error. * Major required section is not included. * Table of content is not formatted. * Lot of typo or spelling mistake. | The description is grossly incomplete or does not reflect understanding of the concepts. | Description of implementation is grossly unclear / incorrect. |