** **Final Group Report [12%] & S/W [8%]** Submission Deadline: Dec 4 (Sunday), 2016 at 23:55.

Total : 20% of CA

* The (Final Report + S/W) should be submitted via the **"Group Project – Submission" of our course Moodle website.**

This group project specification contains the following items:

* For each of the above projects, a group should submit the finalized design and implementation of a mobile or client-sided learning analytics application for careful analyses and visualization of learners' behavior on notebook PCs (C or Java-based) OR mobile (Android-based) devices so as to facilitate students' learning effectiveness. The client version should be run on any web browser of MS Windows-based, Linux or MacOS based laptop PC whereas the mobile app can be run on the simulator of the latest Android SDK (Android Virtual Device 3.0 or above). Besides, the mobile & client application, no matter for the web browser or mobile application, can assume certain data/message format for communication with a local / remote server for which the detail of the server or data/message should be specified in the final report. In the prototype implementation, students may implement a simple server program using text files of designated formats or simply using existing HTTP server (such as the Apache HTTP server) to support the client application. IN case a student group is not interested to work on the suggested Project, the group is welcome to approach Dr. Tam to discuss about other possibilities.

RULES:

- ✓ ***Grouping***: To encourage the spirit of teamwork in industry, each group should consist of 2 – 3 (max) members. Each member should take up equal share of work, and be actively involved throughout the analysis, design, implementation, testing and documentation phase. Any member who is **not involved in any part of the group project will immediately receive zero mark for that part** as clearly defined in this project specification. Any student who fails or

feels reluctant to pair up with another student can form a single-person team who can choose freely to work on the above suggested projects. However, there will be **no extra bonus to be given to such single-person group** since each submission should be evaluated primarily on the "quality" of the work. Besides, **no group is allowed to have more than 3 students for fairness unless with our prior permission**!!

- ✓ ***Submission***: For the final group report, all the source programs/files (such as .html, .java or .xml) required to **successfully build** the ultimate client application should be included in the ZIP file. Otherwise, no mark will be given to the S/W part. Students are free to use C, Java, JavaScript to implement the client application for notebook PC OR Java + XML to implement for the Android version. If any group uses any publicly available C, Java or JavaScript library downloaded from the Internet or other source, they should formally acknowledge/declare the source(s) in their final report; otherwise NO mark will be given to the S/W part.

To standardize the evaluation strategies of different projects, the SAME evaluation criteria were SET for EACH group project as follows:

Evaluation Criteria	Marks
ii) **Clarity and Presentation of the Final Group Report** (i.e. whether the report can clearly present any modification from the initial design to final design, justify the reasons behind such modification, and the detailed final design [including the adopted server model, the socket types for various messages and/or I/O mechanism used, logic-flow (control) diagram, event handling mechanisms, data-flow or simple message diagram, and all the main findings including the weakness and strengths of the implemented system/network model on the notebook PC version OR the Android app]?)	8%
iii) **Clarity of the S/W Documentation = Source Programs** (i.e. whether the source programs contain sufficient and clear comments ?)	4%
iv) The Implementation/Software: **a) Basic Functionalities of the submitted S/W for notebook PC / Android apps** (i.e. whether the S/W satisfies the system specifications stated under each topic?)	6%

b) Clarity and Presentation of the submitted Test-and-Evaluation Plan (i.e. whether the test plan is concise and clear enough to direct an effective testing on the "basic functionalities"? whether the evaluation plan is carefully planned and detailed enough to consider most average and exceptional cases?)	2% Sub-total = 20%

- Each group will be roughly given 7 weeks (now TO Dec 4, 2016) to design, implement and prepare documents for the chosen mini-group project. Below is our brief "suggested" timetable of 7 weeks for each team to manage his/her own group project:

Suggested Activities	Duration
a) Analysis & Design	1 week
b) Implementation	3 weeks
c) Testing and Improvement	2 week
d) Preparing Documents for Group Submission	1 week

** Students are gently reminded that each group project should NOT be focused on as a "programming exercise" as obvious from the above mark allocations that 6% (out of 20% in total) are directly related to the basic functionalities of the S/W produced. During marking, we would carefully evaluate on the problem analysis, design principle and practical issues (such as the adopted server model and the estimated network traffic or performance, etc) considered, and the completeness of the evaluation plan. Therefore, to ensure fairness, we may ONLY provide some relevant reference material on Java and Android programming, and will NOT provided "any specific technical support" for each individual student/group due to our limited manpower.

A Checklist of Items Required for the Submission of Each Group

** Each of the following submission items should be identified with each student's FULL NAME & UNIVERSITY NUMBER printed on the cover page of the concerned document.

Items for Submission	Details
ii) **Executable Files (.class and all required files such as HTML/XML…etc) + Source Programs (if any, like xx.java for Java or Android programs, yy.js for JavaScript, and other source files) for the implemented S/W by the group** **[**Deadline: Dec 4 (Sun), 2016 at 23:55]**	If extra libraries are required for compilation/execution, please include in your ZIP file. Also, for some specific compilation/execution setting, please include an"README.txt" to clearly explain.
iii) **The Final Group Report** (at least 8 pages per group excluding the program listings) which should at least contain the following discussion: - Problem Definition (if any); - Basic Functionalities of the Involved Sub-Systems; - Design Approach/Server Model and I/O Mechanism(s) Used; - Strength and Shortcomings of Existing Sub-System; - Future Extensions/Improvements (if more time is given). - **[**Deadline: Dec 4 (Sun), 2016 at 23:55]**	For clarity, each report should have a "Table of Content" after the cover page. Also, each page of the report should be numbered on the lower RHS corner.
iv) **User Manual** (at least 1 page) to explain to the targeted users how to use the basic/extra functionalities of the implemented sub-system or functions + **ALL Program Listings** (no page limit !) for each Group submission **[**Deadline: Dec 4 (Sun), 2016 at 23:55]**	The user manual should be clearly written for the targeted users to learn to use the basic functionalities.
v) **A Separate Test-and-Evaluation Plan** (at least 1 page) to clearly explain to marker how to TEST and EVALUATE the concerned functions/sub-system for each Group submission. Accordingly, it should contain at least: A TEST PLAN – how to use a step-by-step approach to test all the basic functionalities of the implemented sub-system satisfied the system specification stated in this **specification**; You should also include the average and exceptional cases for testing in this part! **[**Deadline: Dec 4 (Sun), 2016 at 23:55]**	

** : item ii), iii), iv) and v) to be compressed into 1 single ZIP file named "XXYY -Final-Report.ZIP" for submission via the online H/W submission system by **Dec 4 (Sun), 2016** at 23:55, where XXYY is the university number of the team member who submits the ZIP file.


Group Project: A Learning Analytics Application for Critical Analyses and Visualization of Learners' Behavior

The aim of this group project is to design and develop a networked system involving both server and client application for careful and thorough analyses and visualization of the learners' data and/or learning profiles so as to the concerned course instructors to perform learning analytics for enhancing students' learning effectiveness. The learning analytics application should be generic and applicable to any class of a school at a specific sector, say secondary (Year 7 – 9) or university (Year 1 – 4). For simplicity, the class size is assumed to be 35 – 100 (max). Students are free to design and implement server-side (like JSP) or client-side processing (such as JavaScript) for the learning analytics and visualization tasks of the relevant learners' data and/or learning profiles. There is no specific format assumed for network protocol, client-server model, and the format of the learners' data and/or learning profiles stored on the server. Therefore, each group is free to design for the network protocol (TCP or UDP), the specific client-server model, and also its own data / message format for the learners' data and/or learning profiles. Examples of the learner's data / profiles may include the full name, sex, age, educational background (level, major/minor, specialization if any, etc), courses/subjects taken, academic results, learning styles / characteristics (visual, logical or verbal learner), etc.

For the client application, you may simply store all the required data in any form like a simple text file, excel file or relational database file, on your local server machine. Your client application should provide a simple login screen for registered teachers to log in,

analyze the learners' data and/or learning profiles, and lastly visualize the results of analyses in charts, graphs or web forms. The learners' data and/or learning profiles can be stored in any form like a simple text file, excel file or relational database file, on the local server PC. The aim of this group project is to allow student to practise the design principle and knowledge of "real-world" mobile application development acquired in this course and help the students to appreciate the flexibility of programming-with-libraries approach for building useful network application for learning analytics in university or other educational organization.

Below are some suggested links for reference on relevant topics – DO NOT copy from such or any other links:

Wikipedia : Learning Analytics at:
https://en.wikipedia.org/wiki/Learning_analytics

EDUCAUSE – Learning Analytics:
https://library.educause.edu/topics/teaching-and-learning/learning-analytics

LACE – What Are Learning Analytics:
http://www.laceproject.eu/faqs/learning-analytics/

5 Reasons Why Learning Analytics Are Important for eLearning:
https://elearningindustry.com/5-reasons-why-learning-analytics-are-important-for-elearning

-----END OF Group project Specification-------