Ain Shams University
Faculty of Engineering
Computer Engineering and Software Systems Program

CSE222: Software Engineering (2) – Fall 2018

P R O J E C T   R E Q U I R E M E N T S

This project is a group project with the group between 4 and 6 students. In this project you need to propose project idea to the TA and get approval from her in the first week of the project. A detailed description that elaborates on the proposed project is needed. We are going to mainly focus of the system architecture hence, there is no full implementation of the project required, but prototype is needed for some parts of the project. Some of the ideas are as follows, you may have other ideas:

1. Hospital Information System

Information system in hospitals becomes an intrinsic part of everyday's tasks. This project should provide a hospital information system that takes into account the different sub-systems that facilitate the tasks performed in medical facilities. Several sub-systems will be provided by this system such as out-patient sub-system, operation scheduling, staff management, medical cases management, pharmacy … etc.

2. University Information System

Universities normally have information systems that facilitate management of the different services provided. This system mainly consists of a set of sub-systems such as registration, grading, class schedule management, exam schedule management, library, staff schedule management, classrooms allocation … etc. Providing an automated counter-part of these tasks definitely increases the productivity and enhances these services.

3. Flight Management Advisor

Flight management becomes a problem of prime importance. Controlling the time that each flight takes off or lands is a challenge that has several objectives that should be taken into account. First, the time between consecutive take offs must be strictly controlled, the restrictions on the airport capabilities must be taken into account (e.g., number of runways, their directions, and overall length), the weather conditions should be taken into account, aircraft size ... etc. Providing detailed information for the incoming/outgoing flights is another capability that should be provided by this system. The system should take into account the alternatives available for emergency conditions, for example, available nearby airports, any potential issues with the aircraft … etc. The system should have a capability that allows user to test certain scenarios that might occur, their potential problems, and the potential solutions. Flight schedule management is another important task that should be provided by this system.

4. Communication Network Simulator

Simulating a communication network is a really important task that mainly used to mimic the behavior of real communication networks. It can be used to evaluate the performance of the corresponding real network before the deployment. Communication network simulator should take into account the different sources of traffic to the network with their mathematical models, how the traffic is going to be forwarded inside the network, the type of media carrying the traffic, the destination behavior … etc. Random events should be carefully modeled where necessary to the mathematical model that best fits real communication network.

5. Traffic Control Simulator

Traffic in mega-cities is a challenging problem. Building a simulator for such a system could be used to figure out potential traffic problems and finding the best solution for it. This kind of simulator should provide the user with capabilities to model the traffic flows across the streets of the city, a facility to model the city itself with its streets and traffic directions, a way of providing alternate traffic paths in normal situations as well as in case of crashes or natural disasters or any emergency conditions. Allowing the user to introduce extra express paths to connect certain points in the city could be used for planning in real situations. Controlling the traffic signals across the city is another important issue that must be provided by this simulator. Providing a fast path to emergency vehicles can be realized and tested in this system.

What we need in the project is to do the following:

1. Provide a detailed description of functional and non-functional requirements of the project.
2. Build a prototype of functional requirements that are not that clear. You do not need even to use a programming language in this section. Analysis this prototype to clarify the required functional requirements.
3. Provide level-3 DFD diagram for the project.
4. Provide the state diagram.
5. Assume the project to be implemented by CBSE methodology. Describe the components used and indicate if they are Black-box or Grey-box components, justify your analysis.
6. Provide a detailed analysis of the components used. Additionally, provide a complete risk analysis for the project.
7. Use UML to provide detailed component diagram of the project. Provide the detailed inteferfaces of these components.
8. Propose the detailed architure of the project and justify your choice.
9. Describe the logical, implementation, Process, Deployment, and scenario views of the project.
10. Describe the detailed architecture of the project using an ADL, the choice of a specific ADL is totally your decision.
11. Analyze the functional points of the project.
12. Provide a detailed analysis of the project cost and indicate the cost model utilized and justify your choice. Please use at least two cost model.

The following are required to be submitted by the end of your project:

- The developed prototype.
- Project document, one document is needed for each group.
- All project deliverables must be submitted to LMS including the project document.
- Project document shall contain the following sections a cover page that shows the names of the groups and the project name. Functional and non-functional requirements. Additionally, system architecture where the detailed architecture of the system should be described and translated into ADL. A detailed component diagram should be provided assuming that shows the interactions between the different components that constitute the system. Model design should also be detailed in a separate section. Additionally, cost estimation of the whole project should be provided in another section. In addition to the rest of the above items. Use UML when applicable.

Notes:

- Use UML notations (when applicable) for the diagrams you provide in your document.
- Use a professional drawing tool (e.g., MS-VISIO) to draw the diagrams in your document.
- Use consistent document format (font sizes, titles, subtitles, captions, paragraph formatting … etc.). Recommended font sizes are: main title 14pt, subtitles 12pt, main text 12pt, and captions 10 pt. Recommended font type is "**Arial Black**" for titles and subtitles, and "Arial" for all other texts. Recommended spaces before and after paragraphs are 12pt before and 6pt after each paragraph, and 1.5 spacing is highly recommended. Justified paragraphs from both sides are also recommended.
- Figures and tables must be centered in the pages, and they should be numbered separately. Each figure/table must have a caption that appears below the figure/table.
- Pages must be numbered consistently except the cover page.
- All reports must be written in English, always avoid typos and grammatical errors.