SECJ2203: Software Engineering

Project Proposal

Final Year Project (Maniacs System)

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School of Computing, Faculty of Engineering

Prepared by: <Software Maniacs>

NO.	NAME	MATRIC NUMBER
1	Mohd Firdaus bin Zamri	A20EC0080
2	Lue Guo Ming	A20EC0073
3	Erica Desirae Mauritius	A20EC0032
4	Nur Haznirah binti Hazman	A20EC0114

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1. Introduction (CLO 1 – 2 marks)

1.1 The Goal

The proposed system of our project is named as Maniacs System. This system is developed for the management of students' final year projects with industry (FYP-i/PSM-i). The current FYP-i system is not mature enough as users conduct processes in several platforms, causing difficulties to communicate, and make mistakes in their work.

Within the proposed system, the goal is to invent an interactive transaction-based software (web-based application) that is eligible to several users. Users should involve the PSM-i coordinators, students, industry and university coaches and examiners. Generally, the system should provide all necessary information and guidance for users to complete their works. Moreover, it should contain multiple functions for different types of users. The objectives to propose such a system are:

- To improve the reliability of information.
- To provide formal, updated and detailed information to all users on time.
- To aid coordinator in lessening their burden during the final year project assessment.
- To reduce the storage of data due to redundancy of information.
- To ensure effective communication among different users.
- To ease the classification and management of several documents.

1.2 The Scope

Possible technologies can be used to develop the system include:

- Server
    a. Web browser (Google Chrome, Firefox, Opera, Microsoft Edge)
    b. Cloud service (Google drive, Google Docs)
- Programming tool
    a. Visual Studio Code (HTML, CSS, JS, Java, C…)
- Database
    a. OracleApex (MySQL tool)
- Diagram drawing tool
    a. diagram.io
    b. lucid chart
- Prototyping tool

a. Figma
b. InVision

Table 1: Software product, module and function

Software Product	Module	Function
System software	Window Mac OS Linux Fedora	- Work within operating system - Manage resource in a system - Provide clean interface to OS services
Real-time software	Video conferencing Aircraft navigation Data analysis Stock trading	- Monitor, analyze, control real world event - Complete task within deadline - Response time range 1 millisecond to 1 second
Business software	Finance Accounting Payroll Inventory	- Manage information - Access 1 or more database - Focus on business process and information
Embedded software	Image processing Motion detection Traffic control Timing and automation	- Run on specific devices that implemented with CPU - Include microwave ovens, washing machines, automobiles etc. - Software act as a control panel to control the product or system
System for modeling and simulation	3D model Climate and weather model Solar activity model Planetary illumination Natural disaster model	- Model physical processes or situations - Require high technical and computing skill - Require high-performance parallel systems for execution

		- Computationally intensive
Stand-alone software	Word processing Multimedia Spreadsheet Graphic Design	- Independent software - Can be any general-purpose function
Interactive transaction-based software	e-Commerce e-Learning Cloud service	- Execute on remote computer/server - Accessed by users on multiple devices
Artificial intelligence software	Robotics Expert system Pattern recognition Adaptive control	- Use non-numerical algorithms to solve complex problem

There are several services and activities that need to be performed in system development. Basically, the development of a system is divided into five phases, which are specification, design, implementation, validation and evolution. In the specification phase, analysis is needed to determine the functional, non-functional, system and user requirement to define how the system works. In the design phase, several designs such as architectural design, interface design, component design, data design and several diagrams such as UML, ERD, DFD diagrams are built to construct the organization of the system and understand the process, data flow. In the implementation phase, the system is built by implementing the requirements and testing the system function. In the validation phase, a developed system is needed to be tested by users, do surveys to determine user needs and system problems. In the evolution phase, the system can operate and undergo maintenance up to date to fulfill user needs. There are several types of software process models that arrange and modify those activities to build a system: waterfall model, incremental development, reuse-oriented software engineering.

1.3 Project Duration

In this project, the development of the system will be divided into three phases according to project distribution. In Phase 1, we will prepare a proposal to initialize the system goal and objective. Then we will decide and construct a suitable software process model as a reference for our workflow and direction. In Phase 2**,** we will specify the system requirement and prepare a system documentation. Phase 2 is to study the existing system to build a suitable model with requirements and several workflow diagrams. Phase 3 is the proposed system design after we identify weaknesses of the existing system.

Estimated phase details as shown below:

Phase1: Proposal

- Initialize the system goal, objective
- Software process model construction

Phase 2: System requirement specification

- System analysis (Questionnaire/Interview on current system)
- Determine functional, non-functional, user, system requirement
- Construct suitable diagrams (UML/DFD/ERD…)

Phase 3: Proposed System Design

- System architectural design (Workflow/DFD)
- Detailed description of components (Data type)
- Data design (dataflow/ERD/sql)
- Interface design (prototype)

Estimated Duration of the project:

Phase 1 starts at Week 5 (17/4/2022), ends at Week 6 (29/4/2022), 13 days

Phase 2 starts at Week 8 (8/5/2022), ends at Week 10 (28/5/2022), 21 days

Phase 3 starts at Week 11 (29/5/2022), ends at Week 13 (18/6/2022), 21 days

According to project distribution, an estimated total of 55 days to finish the project.

2. Software Process Model (CLO 3 – 8 marks)

2.1 Software Process Model Goal

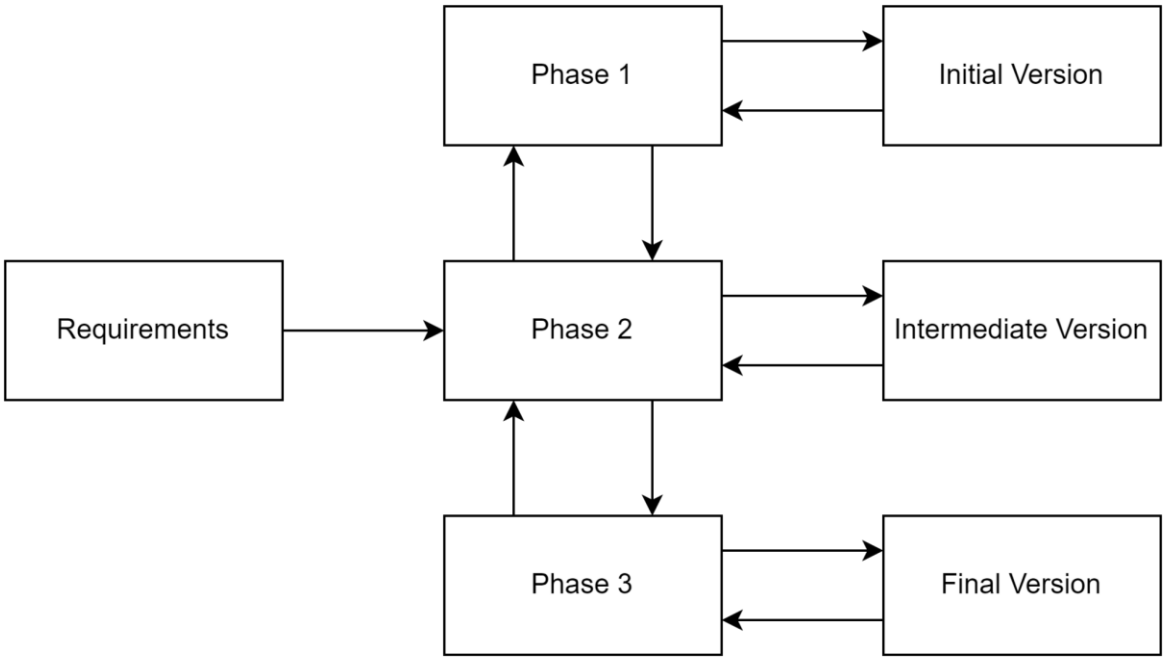
A software process model is a representation of a process that is abstract. It provides a description of a process from a range of viewpoints. A model defines the phases and order of a process, where it will describe the tasks that must be completed, each task's input and output, each task's pre- and post-conditions as well as each task's flow and order. The goal of a Software Process Model is to give direction for coordinating and managing tasks so that the final product and objectives are met as efficiently as possible. Hence, it will be easier for the developer to know what they should do in each phase, and they can easily detect the errors in each process. For instance, most students are beginners and have zero knowledge in developing software. Thus, a software process model is a perfect guide for them in developing a software. Moreover, a software process model could aid developers in planning out a project as the software process model shows the flow of a project, and they could plan out the time as well date for each flow by using a Gantt Chart.

2.2 Software Process Model Chosen and Justification

The ideal Software Process model for our project is Incremental Software Development. This is because incremental software development, which is a basic component of agile development methodologies, is preferable to a waterfall approach considering the systems whose requirements are expected to change throughout the development process as this model has a few significant benefits than Waterfall Model. First of all, in some form or another, incremental development is presently the most frequent technique for the creation of application systems and software products. This technique can be either plan-driven or agile, or a combination of the two. The system increments are established in advance in a plan-driven method, whereas, in an agile approach, the early increments are recognized but the creation of later increments is dependent on progress and client priorities. One of the benefits is that the model is feasible to deliver and deploy relevant software to customers more quickly. Hence, customers can utilize and obtain benefit from the product sooner than with a waterfall method. Moreover, the expense of this model adapting to changing client needs is decreased. The amount of analysis and documentation that must be completed is far less than that needed by the waterfall methodology. In addition, with this model, it is easy to obtain client feedback on

development work that has been completed. Customers may provide feedback on software demonstrations and check how much has been incorporated.

2.3 Software Process Model Illustration



2.4 Software Process Model Detail Activities and Gantt Chart

PROGRESS	TASK	COMMENT
PHASE 1 - PROPOSAL A proposal to initialize the system goal and objective. Then we will decide and construct a suitable software process model as a reference for our workflow and direction. (Use Telegram group or Google Meet or Webex as a communication platform)	Task 1 - Do the Software Process Model Goal, Software Process Model Chosen and Justification, Software Process Model Illustration	- Discuss in a telegram group. - If there are any problems, just ask for help from the group members. - Do all the tasks together but for the person in-charge, they need to focus more on their parts.
	Task 2 - Do the introduction (Goal, Scope, Project Duration)	
	Task 3 - Do the Software Process Model Goal, Software Process Model Chosen and Justification,	

	Software Process Model Illustration	
	Task 4 - Do the Software Process Model Detail Activities and Gantt Chart	
PHASE 2 - SYSTEM REQUIREMENT SPECIFICATION Specifying the system requirement and preparing a system documentation. Phase 2 is to study the existing system to build a suitable model with requirements and several workflow diagrams. (Use Telegram group or Google Meet or Webex as a communication platform)	Task 1 - Do the questionnaire or an interview on the current system	- Discuss in a telegram group. - If there are any problems, just ask for help from the group members. - Do all the tasks together but for the person in-charge, they need to focus more on their parts.
	Task 2 - Determine the functional, non-functional, user and system requirement	
	Task 3 - Analyze questionnaire or an interview on the current system and construct the suitable diagrams	
	Task 4 - Analyze questionnaire or an interview on the current system and construct the suitable diagrams	
PHASE 3 - PROPOSED SYSTEM DESIGN The proposed system design after we identify weaknesses of the existing system. (Use Telegram group or Google Meet or Webex as a communication platform)	Task 1 - System architectural design	- Discuss in a telegram group. - If there are any problems, just ask for help from the group members. - Do all the tasks together but for the person in-charge, they need to focus more on their parts.
	Task 2 - Detailed description of components	
	Task 3 - Data design	
	Task 4 - Interface design	

*For person in-charge and duration for every task, refer to the Gantt chart.

**Link to Gantt chart:

https://docs.google.com/spreadsheets/d/1ZyUBwfXf6ZFacvEBNvjgzRdKp7EYnwUwBemO4XXm4Fw/edit?usp=sharing