IT314 – Software Engineering [Lab Session I]

Lab 1: Choosing Software Process Models

Giving reasons for your answer by taking examples (features, non-functional aspects, domain) based on the type of system being developed, suggest the most appropriate generic software process model that might be used as a basis for managing the development of the following system.

a) A simple data processing project.

- Waterfall model: As it is a simple data processing project, requirements will be given in advance with minimal or no changes. It will be simple and easy to explain to customers.

b) A data entry system for office staff who have never used computers before. The user interface and user-friendliness are extremely important.

- Prototyping model: As the staff has never used computers before and importance is given to the user interface, Prototyping Model is the most appropriate soware process model.

c) A spreadsheet system that has some basic features and many other desirable features that use these basic features.

- Incremental and Waterfall model: The spreadsheet system has some basic features, which are well understood and simple, and it has many other desirable features that use these basic features. These desirable features can be added according to the requirement and the specifications of the user, so the Incremental Waterfall Model is the most appropriate software process model.

d) A web-based system for a new business where requirements are changing fast and where an in-house development team is available for all aspects of the project.

- Spiral Incremental Model: The web based system for new business is a spiral incremental model because as the requirements are changing fast, it is a type of unclear requirements and hence new functionality can be added on every iteration by measuring the risk and specific experience. A good project is visibility is available for the new business and can suggest the requirements according to the needs.

e) A Web-site for an on-line store which has a long list of desired features it wants to add, and it wants a new release with new features to be done very frequently.

- Incremental and Prototyping model: As it is the website of an online store, a good user interface of a long list of desired features is necessary . When we want to add new features, it could be easily added using the incremental model. Hence, the user experience of customers can be achieved by Prototype Model and frequent changes can be achieved by Incremental Model.

f) A system to control anti-lock braking in a car.

- Waterfall model: The Waterfall Model is the most appropriate software process model for safety-critical systems. The anti-lock braking in a car is a safety-critical system. The analysis and design requirements must be scheduled without any flaws before system implementation.

g) A virtual reality system to support software maintenance

- Incremental model: The most appropriate software process model for virtual reality systems to support software maintenance is the Incremental Model. The system requirements keep on changing and it can not be presumed before the implementation and it even requires complex programming for the software.

h) A university accounting system that replaces an existing system.

- Waterfall model: The system requirements can be predicted due to the already existing system. The requirements are stable, well-understood, and reusable, so the Waterfall Model is the most appropriate software process model.

i) An interactive system that allows railway passenger to find train times from terminals installed in stations.

- Prototyping model: Incremental and Prototype Model: Some new features may be added to this interactive system, the requirements of the user may change, and fast delivery is essential to be implemented, so the Incremental and Prototype Model is the most appropriate software process model.

j) Company has asked you to develop software for missile guidance system that can identify a target accurately.

- Waterfall model: The missile guidance system that can identify a target accurately can be developed using the Waterfall Model. It is a government and defense project with pre-determined requirements. In this application, all the requirements are to be delivered on time.

k) When emergency changes have to be made to systems, the system software may have to be modified before changes to the requirements have been approved. Choose a process model for making these modifications that ensures that the requirements documents and the system implementation do not become inconsistent.

- Spiral Incremental: The model should be flexible enough to integrate the new features as the requirements change according to the emergency. The model should also provide support for risk handling. The requirements are uncertain, and the emergencies may involve a high amount of risk, so the Spiral Incremental Model is the most appropriate software process model.

l) Software for ECG machine.

- Waterfall model: The most suitable model for development of ECG machines will be the waterfall model. As ECG machines are a safety-critical system, the analysis and design requirements must be appropriate such that there are no flaws in measurement. Hence, ECG Software is achieved using the Waterfall Model.

m) A small scale well understood project (no changes in requirement will be there once decided).

- Waterfall Model: The requirements are certain and well understood. The project is small-scale and basic, so the Waterfall model is the most appropriate software process model.