IT314 – Software Engineering [Lab Session I]

Instructions:

- Please go through the lecture slides.
- Each student has to submit their assignments individually.

Lab 1: Choosing Software Process Models

Give reasons for your answer by taking examples (features, non-functional aspects, domain) based on the type of system being developed, and 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: The requirement of the project, data processing, is well understood and simple, so the **Waterfall Model** is the most appropriate software process model.

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

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

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

➢ Incremental 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 requirements are changing fast, so for the changing requirements, the system has to be flexible, and the model should

integrate new features for every new requirement. This requires technical expertise and professional management of the project, so the **Spiral Incremental Model** is the most appropriate software process model.

e) A website for an online store that 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.

➢ Throw-away Prototype Model: The website requires a new release with new features to be done very frequently, which shows that the website is designed to capture the essence of the desired features, and these features will be completely replaced by some new features that will be what goes to market, so the **Throw-away Prototype Model** is the most appropriate software process 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: For the virtual reality system to support software maintenance, the requirements keep on changing, and it can not be predicted before the implementation, and it also requires complex programming, so the **Incremental model** is the most appropriate software process model.

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 passengers to find train times from terminals installed in stations.

➢ 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 a missile guidance system that can identify a target accurately.

➢ Waterfall Model: The missile guidance system is the safety-critical model. The analysis and design requirements must be scheduled without any flaws before system implementation, so the **Waterfall Model** is the most appropriate software process model.

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 ensure 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 the ECG machine.

➢ Waterfall Model: The ECG machine is a safety-critical system. The requirements of the ECG machine are certain and well-understood, so the **Waterfall Model** is the most appropriate software process 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.