CS 311 - Introduction to Software Engineering

Assignment 01: due (Friday, Sep 28, 2018)

Part 1: Software Process | Software Development Life Cycle

Q1)- The government is planning to develop a new **"cloud-based electronic voting system"** The project manager wants to choose a process model what do you think is the suitable one? The software requirements are clear, but some how-to tasks related to security and data privacy need some research and risk management. Which software engineering process model (Software Development Life Cycle model) do you recommend for that project and why?

Sample Answer (no need to answer Q1, it only serve as an example to show you how to answer the remaining questions in Part 1)
Based on the given information it seems that the V-model is an appropriate software process model for the cloud-based electronic voting system. An electronic voting system is a critical system which needs an accuracy of data collection and privacy of data collected and how to manage fraud cases and detect them, which need deep business understanding and risk management as well as excellent testing cases.
This system cannot be operational in phases or iteration. For example, the voters can not start casting their votes to candidates if we do not have an identity management module or fraud detection and these modules will not operate until we have the vote casting module implemented. Therefore, the use of Agile or iterative/incremental models is not reasonable. In addition, the size of the development team for this system is expected to be large and possibly from different organizations. Finally, the requirements of an electronic voting system are unlikely to change (major change) during the project.

Q1.2)- Smart Apes is a software house that is currently working on an app to help seniors and elders living in retirement homes to manage their daily activities. Mainly the app will help them to schedule medical appointments, medication reminder, order grocery, and transportation services when needed. The company never developed apps for seniors and elders before. They are concern about the requirements and mainly the usability of the app. In the context of this above scenario as a project manager what will be the choice of the software lifecycle model? **[5 POINTS]**

Based on the information given above, it seems that the spiral model with an iterative and incremental model for development is the most appropriate software process model for the app. Smart Apes has not developed any apps for elderly people and they are concerned about the requirements for the app. The iterative approach reduces the cost of accomodating changing requirements. It also allows the developers to get feedback on the usability of the app before it is finalized, and make any necessary changes. The functions of the app (scheduling, reminders, ordering, transportation) can be broken up and developed as components iteratively. The spiral model offers risk assessment and reduction, which is relevant to this app because the elderly are relying on the app's functions for health reminders and medical appointments. If these were to malfunction, it could result in an unhealthy situation for the elderly user.

Other models are not good because they are too risky or need more knowledge on the domain to be effective.

Q1.3)- Suppose you are developing a software product in a new and growing market (e.g., cryptocurrencies) with your competitors who are also developing a product will be the same product. Which software process model to select and why? **[5 POINTS]**
Based on the information given, the Agile method seems to be the best software model for development. Since we our developing software for a new and growing market, we do not have very much information on what to expect when the market changes. The agile method is best for requirements that are not clear, as we can reasses new requirements at each iteration. Customers/stakeholders are also included in the development process which helps the developers significantly since the stakeholders should know more about the new market than the developers.

Other methods are not suitable for developing this software because of the limited knowledge of requirements and the domain.

Q1.4)- We are creating an online system to manage and visualize security alerts generated by different open source security appliances such as intrusion detection system (e.g., Snort, Bro), firewalls (IP Tables, firewalld) and it is needed immediately, what kind of software- development-life-cycle model should be used and why? **[5 POINTS]**

Since the software is needed immediately, the agile software process model appropriate for this case. The requirements are clearly defined; a system for managing and visualizing security alerts. The increments in the agile process are validated before final deployment, which is needed for a secuirty system. The software must be reliable as mulfunctions can cost the user a lot (e.g false negative security alerts). The system is not using unfamiliar technology since it is using open source programs and is not complex. This makes the use of agile process more plausible as these are the main problems with it.

Many other processes cannot be used as they are not efficient with a short time schedule.

Part 2: Requirement Analysis and Engineering

Q2.1) You are building a highly interactive website to replace the current website of the school of computer science at the University of Far-Far-Away. Identify the different groups of primary and secondary users of the website. For each group describe between 3-5 functional requirements. How could you verify these requirements? In your opinion what are the possible non-functional requirements for this website and which ones are the most important? **[25 POINTS]**

The primary users of the website will be students, alumni, people looking for post-secondary eduation, and department staff. The functional requirements for this group will be:

-students, staff, and alumni should be able to login to their user account

-promotional elements of the site should be customizable by staff

-site should work consistently across Opera, Firefox, Chrome, Edge browsers, and mobile platforms

-site should have a file sharing section, where only staff can upload files/links for students

The secondary users of the website could be parents of students. Possible functional requirements for this group could be:

-simple interface for tuition pricing and tax forms

-interface for printing class schedules

-staff contact links should be available

Possible non-functional requirements for this site will be:

-site must load quickly

-users must be able to download files from the site quickly

-site must have accessibility services for hearing/sight impaired

-pages on the site should be easily accessable

-site login must be secure

Out of these non-functional requirements, the most important ones are loading times and security. If the site takes a long time to load, the interactiveness of it will be stifled and no one will want to use the site unless they have to. Login security is also important because there is sensitive information about each user stored with the university. An unsecure website would be bad and would look bad for the computer science department at Far-Far-Away University.

Part 3: Agile Software Development

Please read the paper **"Impact of Agile Methodology on Software Development Process"** by Gaurav Kumar, Pradeep Kumar Bhatia and answer the following questions [there is a link on BlackBoard to download the paper]

Q3.1) What are the advantages and the limitations of the Agile methodology according to the authors. Do you agree or disagree with the authors?**[5 POINTS]**

The author touched upon many advantages of the Agile methodology. Some of these advantages are:

-used to help address challenges of an unpredictable, disordered business and technology environment.

-achieve higher quality software in a shorter period of time

-minimizes overall risk and allows project to adapt to changes quickly

-improved communication between team members

-faults are detected earlier as testing is performed at each iteration

-software functionality progress can be checked at each increment

-uses refactoring which leads to higher code reuse and better quality

The limitations of the Agile methodology explained in this article are:

-focuses on processes for getting requirements and coding. Does not focus on product design

-high testing lead times and low coverage

-many teams requiring high coordination and communication from project manager

-does not scale well to larger projects

-too much time can be spent on a single feature

-management overhead is increased

Q3.2) Do you think the authors in this paper as a positive, negative, or neutral opinion of adopting Agile methodology in software development and why you think their view is positive, negative, or neutral? **[5 POINTS]**

I think the authors have a positive view on adopting Agile methodology. They explain the types of Agile methods and which situations they can be used most effectively in. When talking about the benefits of the Agile method, the authors connect the points they make with the principles of the Agile method. Studies and surveys were also included to support the use of Agile methodology in the industry. Although limitations of the Agile method were included in the jounal, the point of the section is to point out the particular situations where the Agile method may not be the best choice.