Robert Johnson

Software Engineering – Midterm

Due March 20, 2020

**1. 20 points) List the various software engineering processes/stages that were mentioned in class**

**and provide a brief description (~1-2 sentences) for each.**

1. Specification- This is first stage when the client/customer tells the company what product they are wanting to have made. Based on what the client specifies, the company must identify the resources and time that will be needed for them to complete this project. The company making the product needs to know what the priority of the requirements for what the final product should look like as well so they can start to plan.
2. Design and implementation- This process is basically taking the requirements and plan you got from the specification task and crunching everything down into more clear and detailed tasks. Then, as it names itself states, you are going through and designing and implementing the solutions for these tasks.
3. Verification and validation- This stage of development can vary based on what design methodology your team used (plan driven vs agile). Here you group up what your team has accomplished so far and go through and do review and testing for different things, validating that they work. Then, depending how much time and experience the customer has, you can verify with them if what you have so far is what they were looking for.
4. Evolution/Change- This isn’t the “final” stage or process per se but rather a concept to understand throughout all the processes. The concept that software engineers will constantly be dealing with rapid evolution in technology and change in their workplace and change throughout creating a single product. Software engineers at the end of the day, must be able to accept that evolution and change will inevitably occur throughout their careers.

**2. 20 points) Under what circumstances, criteria, is it better to use a plan-driven methodology such**

**as waterfall instead of agile? Why is waterfall better under these circumstances?**

It would be better to use plan driven methodology such as waterfall in cases where the customer knows specifically what their final product should look like. If they are very detailed and specific on the requirements and what all the things they want and express this clearly in the specification phase. Also, it would be better in situations when the customer/client won’t have the time themselves to work with the software engineers consistently like needed in agile. In cases like this you won’t have the ability to do small sprints and constantly verify with the customer if “this” is good and exactly how they want it, instead you would want to plan and specify as much as possible with them during the first few meetings and then use a plan driven methodology. When your dev team isn’t going to be individually motivated/focused on the project the whole time like is needed when working with agile as well. This could be for reasons like your company is an agency that works with many different products and doesn’t only make certain products and a developer could be working with several different projects at a time. In this case you would want them to have a goal set out early on with waterfall and let them meet back with the rest of the team later in the project. Plan driven methodologies also tend to need to have better documentation and comments throughout the processes, so in case of employer turn-over, it is easy to pick back up where someone else left off.

**3. 20 points) Create an example user story and identify the various parts.**

The user story template I followed is: “As a [type of user], I want to [what action they want] so that I can [benefit/value from this action].” For example, maybe you are creating a communications program such as skype, discord, google hangout, etc. An example of a user story could be, “As an app user, I want to use my webcam and microphone so that I can communicate with my military husband overseas through video chat.” In this example, the [type of user] is “an app user”, the [what action they want] is ability to use webcam and microphone, and the [benefit and value for this action] would be so they can intimately meet and talk with their spouses over video chat who may be long distance. This same example of the action they want, could benefit businesses using the program who want to video chat with clients overseas.

**4. Ideally requirements should be complete, consistent, and realistic.**

**◦ 10 points) Why might requirements be incomplete?**

In software engineering, requirements could be incomplete for justified and unjustified reasons. For justified reasons, maybe you are creating a game and working in agile environment where you have small sprints every few weeks. Say you are just starting up the project and only have a small idea of what the game is going to be like. Each small sprint you don’t have specific complete requirements to get done because you don’t actually know what different things should be in the game. In this case, the management of your team is giving you space to be creative and test different things to have in the game and can throw them out if they are bad ideas or don’t work out. For unjustified reasons, it depends on where you work and who meets with the clients during the specification stage. If the management who is meeting with client doesn’t have a lot of experience on the software side, they might not ask the client the right questions to find clear and complete requirements. In this case, there should be someone in the meeting who can ask the customer questions that will be easier for the software dev team to understand.

**◦ 10 points) Why might requirements be inconsistent?**

Requirements could be inconsistent based once again who meets with the client, who is staying in touch with the clients, and who is managing the time and resources of a project. Typically, requirements are inconsistent when multiple different stakeholders within a system are wanting different things. If stakeholders’ needs are conflicting with each other, the devs end up with inconsistencies on their end and it is their job to report and call out these conflicts. Then, it is up to the stakeholders to find a solution and compromise amongst each other so they developers end up with a clear and consistent requirement they can work towards and be able to test efficiently.

**5. 20 points) Using the attached Java classes (Car.java and Wheel.java) as a guide, create**

**representative JSON string that might be produced upon serialization of a Car object. You are**

**free to populate the Car and Wheel object properties with any data you like as long as it is**

**empty/blank and accurately represents the associated property’s data type (i.e., a numeric data**

**type contains a number).**

{

“make”: “Ford”,

“model”: “Focus”,

“wheels”: [

{“make”: “GoodYear”, “model”: “Eagle”, “width”: 150},

{“make”: “GoodYear”, “model”: “Eagle”, “width”: 150},

{“make”: “GoodYear”, “model”: “Eagle”, “width”: 150},

{“make”: “GoodYear”, “model”: “Eagle”, “width”: 150}

]

}