

Homework 1 - Principles of Software Engineering (ICS431)

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Question 1

- a. In waterfall model, the tasks are divided in smaller parts, and to be executed in five stages. This model is very suitable for projects that do not require many versions shipped at once as well as very easy to understand or very complex details. Further this model lacks developing and providing the showcase uncompleted versions very frequently, so that it takes too long to have very first initial version. In other hand, it is a good model to provide high quality models; this is due to its slow developing process that helps catching errors in very early stages. Stakeholders involvement varies depending on the current stage of the project, for instance customers are only asked to use the product at the beginning of *verification* stage. Finally, it eases the tracking of the progress since each stage is uniquely separated from its neighbor ones.
- b. We can think of *incremental delivery* model as polarization of waterfall model. To explain, it allows the development of many version (*increments*) of software at once which allows deliveries and/or maintaining multiple versions. It is suitable for projects that have UI and GUI to build, since developer need to keep validating its responsibility for many devices as well as for relatively small projects. That is, it provides very fast developing process. However, having many versions and many developers working simultaneously can lead to errors and bugs in the projects leading to lower quality outcomes, compared to waterfall model. Also, users, customers, and developers are all-time involved in the process. The feature of this models, it can show a very mature version of the software and collect feedback then re-run the process again and again.
- c. The general idea of *component-based software development* is dividing a systems into independent subsystems. This workflow might be so hard to accomplish but it simplifies way much re-using any component in very different places in the software which speed up the developing process as well as keeping the overall good quality. Customers/stakeholders involvement is similar to the incremental model as well as for the visibility of each stage.
- d. In the *rational unified process*, it has very similar concept with the waterfall model but the former provides a repeating process again and again. it is intended to be tailored by the development organizations and software project teams that will select the elements of the process that are appropriate for their needs. It is easy to apply due to its simple structure.
- e. Agile has is a way to model and document software systems based on best practices. This flexibility allows to choose whatever model to use such as Agile or RUP. This can increase the speed of delivering versions, with quite good quality outcomes. Stakeholders differs depending on the used model to rely on.

Question 2

1. This requires many versions developed at the same time as well as having a quick initial version to test the UI and its responsive to many devices. Thus, incremental model is the best for this case.
2. It has similar features to the one above, but this one requires high level of security and quality measures, not mention the entire process should all clear from the beginning. Then, they should follow the waterfall model.
3. Those are independent subsystems that can be implemented as separated services then integrate them all as one entire system. Thus, component-based software development is the best here.
4. It simple clear idea, with just one user interface for smartphones, so it better to use waterfall model.