



ASSIGNMENT 1

Introduction to Software Engineering

Note

No plagiarism, no copy paste or similar approach

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Q1) A software development company has been approached by a client to build a mobile application that will allow the client to track the location of their employees in real-time. The client is a government agency, and the employees are field agents who are required to carry out sensitive operations.

As a software engineer working on this project, you have discovered that the client's intentions for the use of this application may raise ethical and privacy concerns. You are also aware that this application could potentially be used to infringe on the privacy rights of the employees.

What should you do in this specific scenario and why?

- a. Continue working on the project and ignore the ethical concerns.
- b. Refuse to work on the project and explain your concerns to the client.
- c. Bring the ethical concerns to the attention of your supervisor and seek their guidance.
- d. Try to negotiate with the client to make changes to the application to address the ethical concerns.

For attempting the above question explore software engineering ethics.

Q2) A software development company has been contracted to develop a new software system for a hospital. The software will automate many of the hospital's processes and will be used by several different departments, including doctors, nurses, and administrators.

You are the lead software engineer in charge of developing this system. You have been working closely with the hospital's IT department to gather requirements and define the system's features.

However, during the development process, you receive a request from a doctor in the hospital who wants a specific feature added to the system that was not included in the original requirements. This feature is important to the doctor, as it will make their work easier and more efficient.

What should you do in this situation? [independent of any process model selected (*the selection of process model should not affect your answer*)].

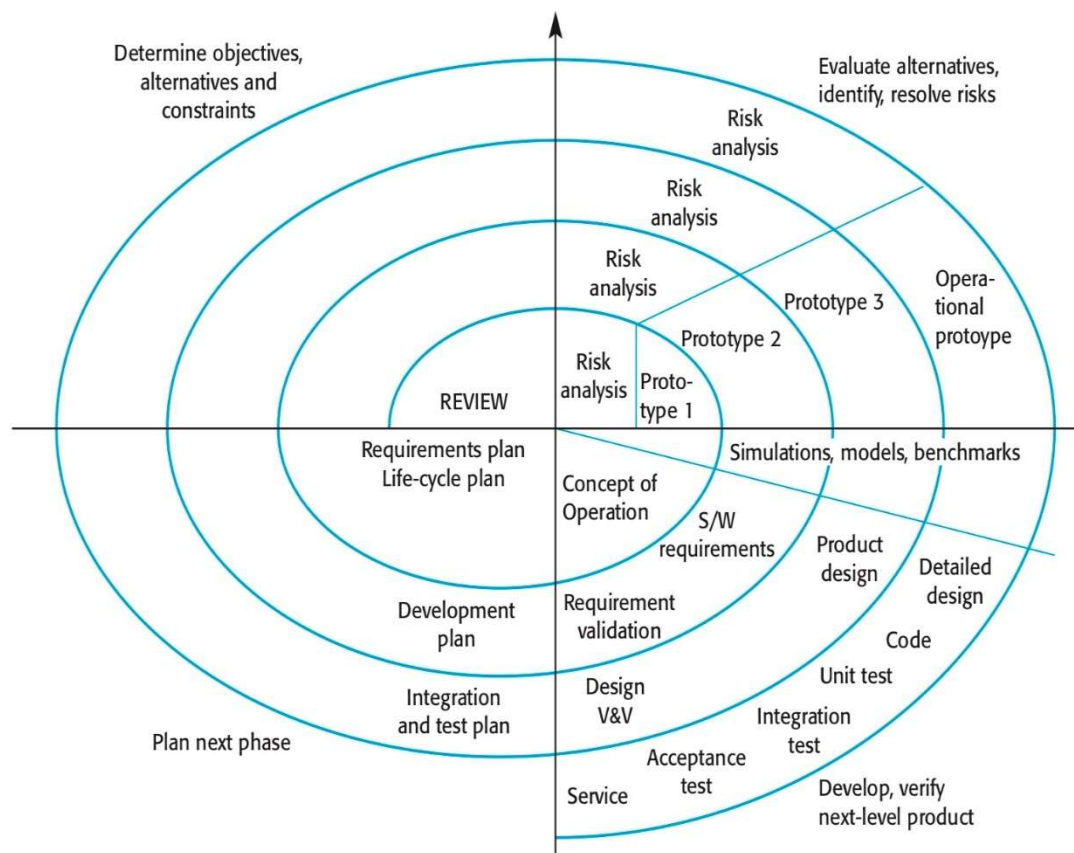
- a. Ignore the request, as it was not part of the original requirements.
- b. Add the requested feature, but only after consulting with the IT department.
- c. Add the requested feature, but only after consulting with all stakeholders, including the IT department, the doctor, and other relevant departments.
- d. Deny the request, as it would require significant changes to the system.

Q3) Read, learn and understand spiral model from the following.

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Boehm's spiral model of the software process

Barry Boehm (Boehm, 1988) proposed a risk-driven software process framework (the spiral model) that integrates risk management and incremental development. The software process is represented as a spiral rather than a sequence of activities with some backtracking from one activity to another. Each loop in the spiral represents a phase of the software process. Thus, the innermost loop might be concerned with system feasibility, the next loop with requirements definition, the next loop with system design and so on. The spiral model combines change avoidance with change tolerance. It assumes that changes are a result of project risks and includes explicit risk management activities to reduce these risks.



Each loop in the spiral is split into four sectors:

1. *Objective setting* Specific objectives for that phase of the project are defined. Constraints on the process and the product are identified and a detailed management plan is drawn up.

Project risks are identified. Alternative strategies, depending on these risks, may be planned.

2. *Risk assessment and reduction* for each of the identified project risks, a detailed analysis is carried out. Steps are taken to reduce the risk. For example, if there is a risk that the requirements are inappropriate, a prototype system may be developed.
3. *Development and validation* After risk evaluation, a development model for the system is chosen. For example, throw-away prototyping may be the best development approach if user interface risks are dominant. If safety risks are the main consideration, development based on formal transformations may be the most appropriate process, and so on. If the main identified risk is sub-system integration, the waterfall model may be the best development model to use.
4. *Planning* The project is reviewed and a decision made whether to continue with a further loop of the spiral. If it is decided to continue, plans are drawn up for the next phase of the project.

The main difference between the spiral model and other software process models is its explicit recognition of risk. A cycle of the spiral begins by elaborating objectives such as performance and functionality. Alternative ways of achieving these objectives, and dealing with the constraints on each of them are then enumerated. Each alternative is assessed against each objective and sources of project risk are identified. The next step is to resolve these risks by information-gathering activities such as more detailed analysis, prototyping and simulation.

Once risks have been assessed, some development is carried out, followed by a planning activity for the next phase of the process. Informally, risk simply means something that can go wrong. For example, if the intention is to use a new programming language, a risk is that the available compilers are unreliable or do not produce sufficiently efficient object code. Risks lead to proposed software changes and project problems such as schedule and cost overrun, so risk minimization is a very important project management activity. Risk management, an essential part of project management.