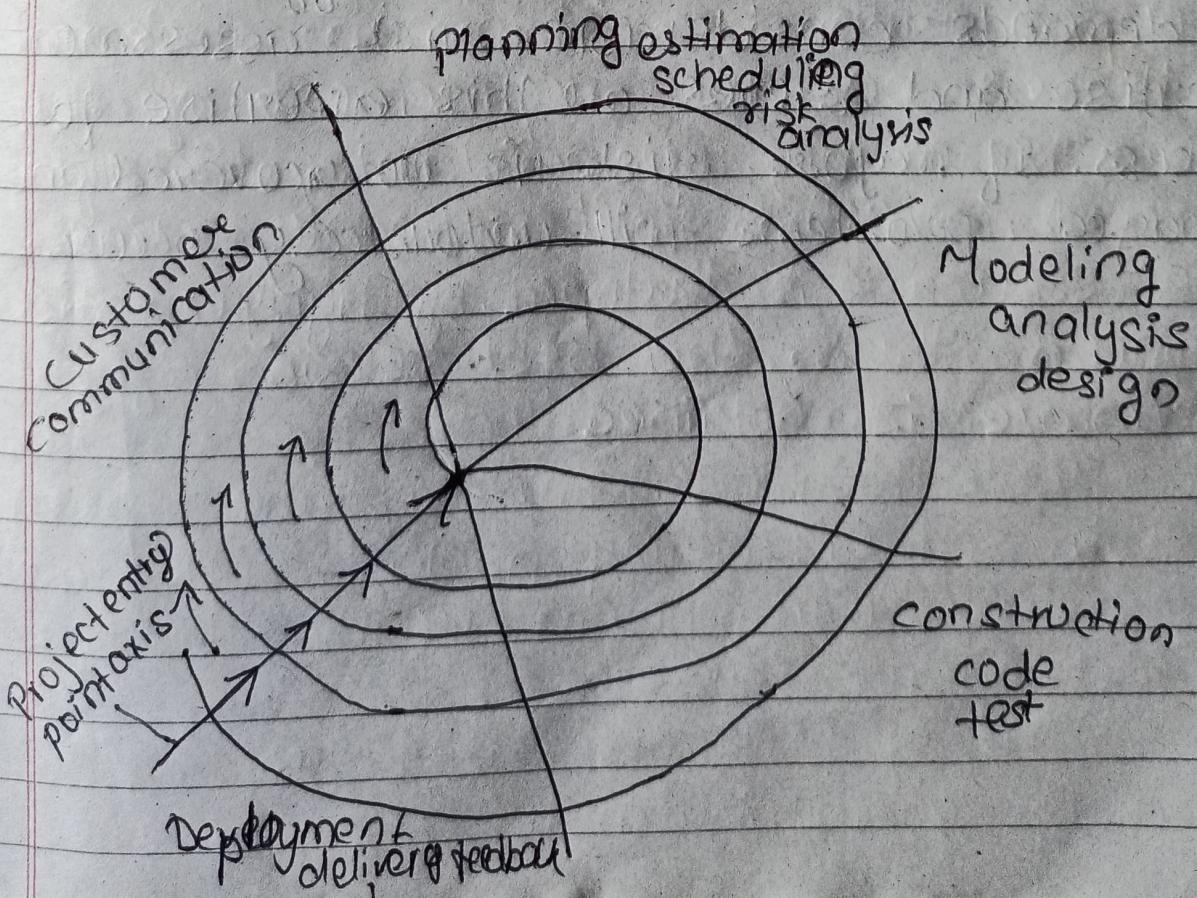


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Software Project Management Concepts

Q1(a) Explain Spiral Model of Software development with a neat diagram.

Ans The spiral model of software development is an evolutionary software process model that couples the iterative nature of prototyping with the controlled and systematic aspects of the waterfall model. A spiral model is divided into a set of framework activities defined by the software engineering team. Each of framework activities represent one segment of the spiral in a clockwise direction path. As this evolutionary process begins, the software team perform activities that are implied by a circuit around the spiral in a clockwise direction, beginning at the center.



The first circuit around the spiral might result in the development of a product specification; subsequent passes around the spiral might be used to develop a prototype and then progressively more sophisticated versions of the software with adjustments to the project plan.

Unlike other process models that end when software is delivered, the spiral model can be adapted to apply throughout the life of the computer software. The spiral model uses prototyping as a risk reduction mechanism. Prototyping approach can be applied at any stage in evolutionary product. The spiral model is not solution for all difficulties. It demands considerable risk assessment expertise and relies on this expertise for success. If major risk is not uncovered and managed, problems will undoubtedly occur.

- b) What is evolutionary software process model? Explain. Also show that as you move outward along the process flow path of an evolutionary model. What can you say about the software that is being developed or maintained?

Ans

Evolutionary models are inherently iterative in nature that helps to develop increasingly more complete versions of the target software. Since, software evolves over a period of time, making a straight line path to an end product unrealistic; tight market deadlines make completion of a comprehensive software product impossible. Thus, evolutionary models ~~are~~ such as incremental model, spiral model, win-win Spiral model and concurrent development model helps to meet the customer requirement throughout the life of the computer software.

Any state of evolutionary software process model can be represented schematically as a series of major technical activities, tasks and associated stages. With active communication with user ~~in~~ in each stage, the analysis activity makes transition from state one to state two. In each state, the technical risk is handled and managed.

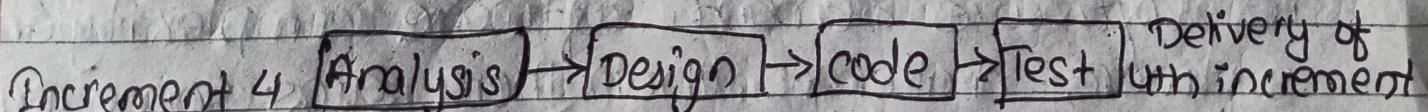
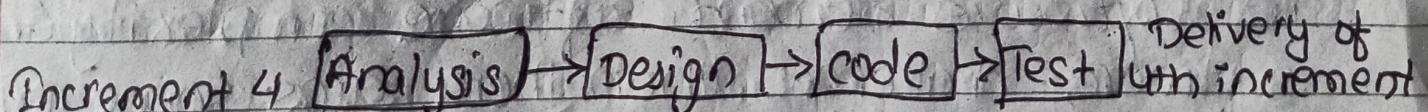
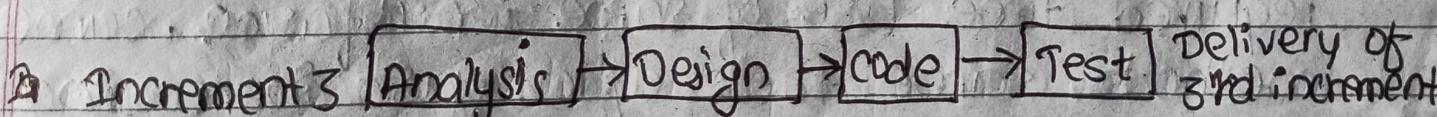
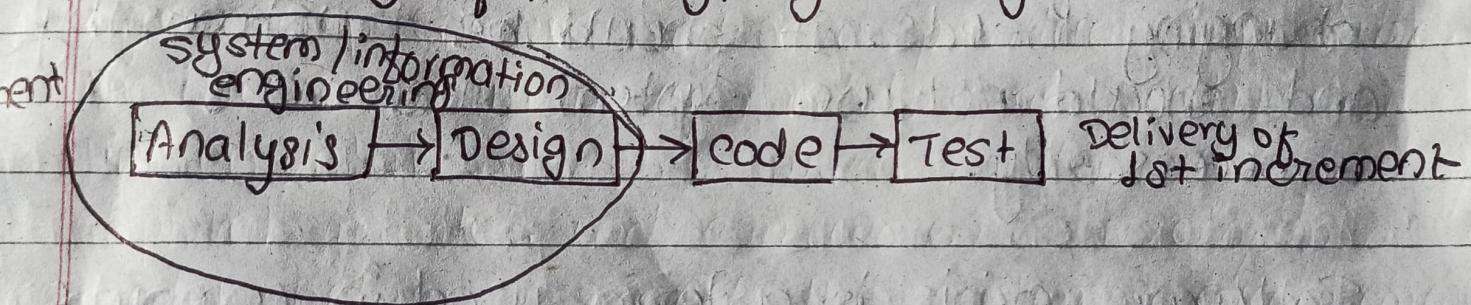
or path

The software development task, is divided into a set of framework activities by the software engineering team. Each of the activities represent one segment of the path. As this evolutionary process begins, the software team performs activities that are implied by the series of events that will trigger transitions from state to state. Risk is considered as each transition is made. A combination of work products and conditions that are attained along the path for each evolutionary pass. Thus, we move outward along the process flow path of evolutionary model.

The software obtained ~~after~~ is well developed with no or minimum risk and ~~as~~ is as per the requirement of the user. The activity of maintaining the software remains ~~as~~ active until software retires. The software is developed by highly expertise engineers. Thus, the best version of software is obtained.

c) What is software process model?
 Explain incremental model with diagram
 To solve real life problems in industry settings, Software Engineers or a team of engineers must incorporate development strategy that covers the process, methods and tools. This strategy is called a software process model or Software Engineering Paradigm

Incremental model is a combination of linear sequential model philosophy with the iterative philosophy of prototyping paradigm.



Subsequent increments is repeated each time until the complete product is produced (final version). Each increment is a stripped down version of the final product. Each version fulfills users need and provides a platform for evaluation by user.

and hence cost their development. Low manpower is required to plan increments for reduction and management of various technical risk

2(a) What are the characteristics of software? Explain software crisis. What are the reasons of software crisis?

The software should deliver the required functionality and performance to user and should be maintainable, dependable and usable. Software must evolve to meet changing needs. It should be trustworthy and should not use system resources unnecessarily.

Software crisis is a term used in computer science for the difficulty of writing useful and efficient computer programs in the required time. Use of same workforce, same methods, same tools after fast increasing in software demand, software complexity and software challenges, then there arises some problems like software budget problem, software efficiency problem, software quality problem, software managing and delivery problem etc. This condition is called software crisis.

Reasons of software crisis are:

Lack of communication between software developer

and users.

Increase in size of software.

Increase complexity of problem area.

Project management problem

Lack of understanding of problem and its environment.

High optimistic estimates regarding sim development time and cost.

- (b) Can evolutionary model be satisfactorily used for the development of all types of project? Describe the prototyping model.

Ans With the rapid changes seen and continuous changes observed in the modern computer science software by very tight time lines and emphatic need for customer - user satisfaction, the fast time-to-market is the most important management requirement. If a market window is missed, the software project itself may be missed.

Evolutionary models do have many weaknesses. The intent of evolutionary model is to develop high-quality software in an iterative or incremental manner. However the prototyping and other more sophisticated evolutionary processes project a problem planning because of the uncertain number of cycles required to construct the product. It is less focused on

flexibility and extensibility while more focused on high quality which is scary. Thus, evolutionary model can not be satisfactorily used for the development of all types of project despite of its unquestionable benefits.

The prototyping model is a systems development method in which a prototype is built, tested and then reworked as necessary until an acceptable prototype is finally achieved from which the computer complete system or product can now be developed. This model begins with requirement gathering, then a quick design occurs which leads to development of prototype. Customer evaluates the prototype and uses it to refine requirements. The iteration occurs as a prototype is modified to satisfy customers need.

3(a) Explain the terms people, product and project. What do you mean by generic framework activities and umbrella activity in software process?
Any People: The architects, developers, testers, and their supporting management, plus users, customers and other stakeholders are the prime movers in a software project.

Product: Product refers to the estimated estimation of the cost, time and effort required to produce the finished software product.

Project:- The project contains all and everything of the entire development method and to avoid project failure the manager needs to take some steps, needs to first concerning some common warnings etc.

The generic process framework consists of five activities ~~is~~ as communication, planning, modeling, construction and deployment. ~~communication with customers to understand objectives and gather requirements~~

Brief explanation is as follows:

- Communication: communicate with customer to understand objectives and gather requirements.
- Planning: Create a "map" defines the work by describing the tasks, risks and resources, work products and work schedule.
- Modeling: Create a "sketch", what it looks like architecturally, how the constituent parts fit together and other characteristics.
- Construction: code generation and the testing.
- Deployment:- Delivered to the customer who evaluates the products and provides feedback based on the evaluation.

 The umbrella activities such as project tracking and control, risk management, quality assurance, configuration management, quality assurance, technical reviews and other and others are

applied through out the process.

- (b) Explain component based development process highlighting its advantages over conventional approach.

Ans Component based development process is evolutionary in nature demanding an iterative approach to the creation of software. It incorporates the following steps:

1. Available component-based products are researched and evaluated for the application domain in question.
2. Component integration issues are considered.
3. A software architecture is designed to accommodate the components.
4. Components are integrated into the architecture.
5. Comprehensive testing is conducted to ensure proper functionality.

The advantages over conventional approach are

1. It leads to software reusability.
2. The development cycle time and cost is low.

4. Write short notes on:
a) formal method

Ans It covers a set of activities that leads to a formal mathematical specification of computer software. It adopts mathematical notations for specification, development and verification of computer based systems. A variation on this approach, called cleanroom software engineering is currently applied by some software development organizations. This model helps to detect and correct several errors during program verification that would have gone undetected. It is time consuming and expensive and requires highly trained software engineer. The customer also need to be good in technically good to participate on the customer communication/feedback mechanism.

- b) fourth Generation Techniques

It covers a broad array of software tools. Each tools helps s/w engineer to specify some characteristics of the s/w at high level. These tools can automatically generate source code based on the developer's specification. At present, it is one of the dominant approach to software development. More higher the level of specification, faster the development. Ability lies in specifying the S/W using specialized language forms or graphic tools to

describe the problem to be solved. It makes prototyping quite flexible and easier. It is suitable for both small projects as well as longer system projects.

c) Process Technology

From the many software development process models, one or more must be adapted for use by software team. To accomplish this, process technology tools have been developed to help software organization analyze their current process, organize work tasks, control and monitor progress and manage technical quality. Process technology tools allows a software organization to build an automated process model, task set and umbrella activities. Each member of software team can use such tools to develop.

- check list of work task to be performed.
- work product to be produced.
- Quality assurance activities to be conducted.