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14/01/2025

(Assignment No. 01)

* ~~Experiment No. 01~~ *

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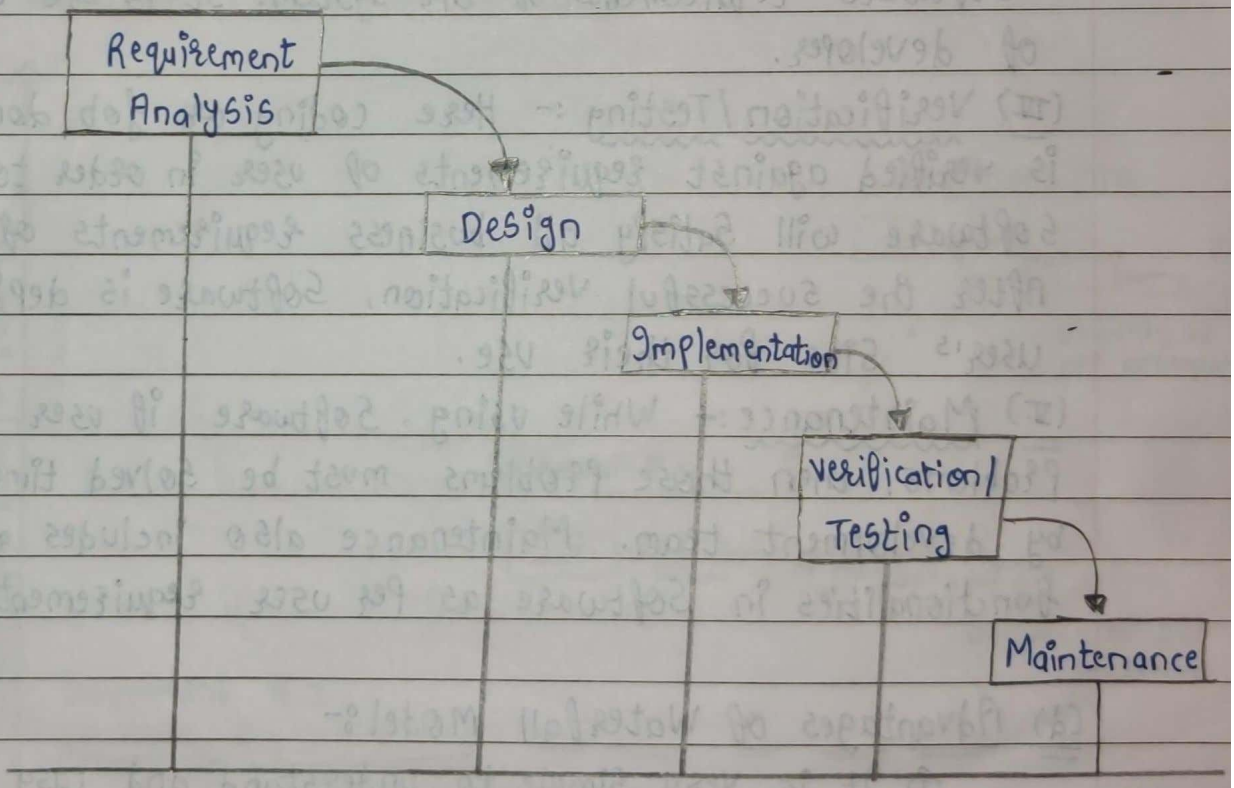
Q:> Explain Software Development Models.

ANS→ i> Applying technological, scientific and administrative approach to designing, developing, testing and maintaining the software product in order to meet customer's requirements with best quality of products is referred as software engineering.

ii> The different Development Models are :-

→ (1) Waterfall Model :- (a) Water fall model is the first approach used in Software development process.



(b) It is also called as classical life cycle model or linear Sequential model.

(c) In water fall model any phase of development process begins only if previous phase is completed.

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(I) Requirement Analysis :- In this Phase, all business requirements of system are gathered and analysed by Communication between Stakeholders and manager. At the end of this Phase Requirement Specification Document (RSD) is created.

(II) Design :- Based on Requirement specification document, Design of the systems is created called Software Architecture. It is the blue Print of system representing System's internal structure and behaviour.

(III) Implementation :- In this Phase, actual coding is constructed for Software architecture using hardware and Software requirements of the system. It is the responsibility of developer.

(IV) Verification / Testing :- Here coding or job done by developer is verified against requirements of user in order to ensure that Software will satisfy all business requirements of user. After the successful verification, Software is deployed at user's site for their use.

(V) Maintenance :- While using Software if user faces some problems, then those problems must be solved time to time by development team. Maintenance also includes adding new functionalities in Software as per user requirements.

(d) Advantages of Waterfall Model :-

(i) It is very simple to understand and easy to use.

(ii) Phases of Waterfall Model do not overlap with each other.

(iii) It is useful for small projects in which requirements are clear initially.

(iv) It is easy to manage development process

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(c) Disadvantages of Waterfall Model :-

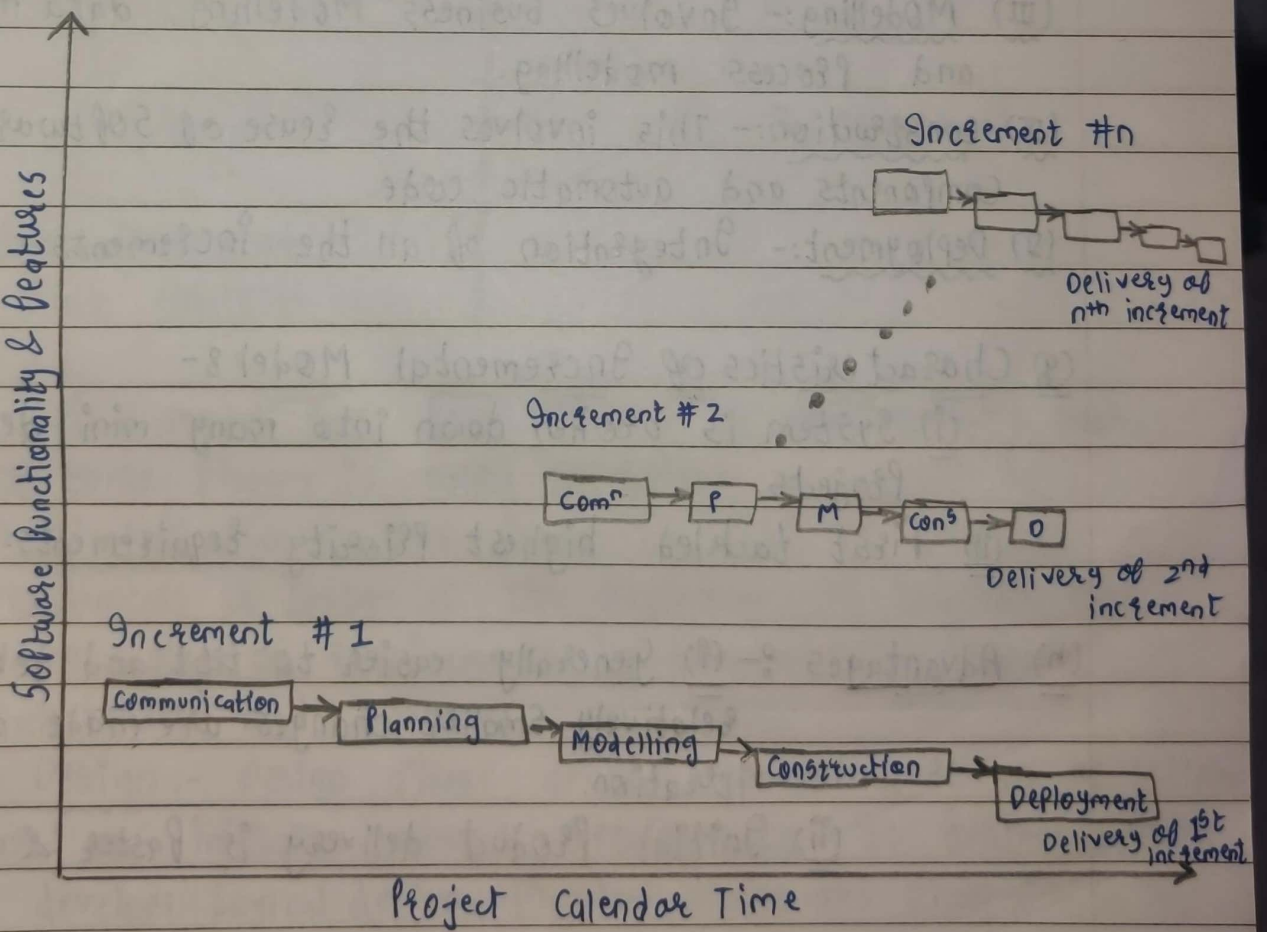
(i) It is not useful for large projects.

(ii) Not suitable for projects in which requirements are not clear initially.

(iii) It is very difficult to modify system requirements in the middle of development process.

(d) This Model is used only when the requirements are very well known, clear & fixed; Product definition is Stable; There are no ambiguous requirements.

→ (2) Incremental Model :- (a) The incremental model applies the Waterfall Model incrementally.



(b) The Series of releases is referred to as "increments", with each increment providing more functionality to the customers.

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(c) After the 1st increment, a core product is delivered, which can already be used by the customer.

(d) Based on customer feedback, a plan is developed for the next increments, and the modifications are made accordingly.

(e) This process continues with increments being delivered until the complete product is delivered.

(f) The Incremental Philosophy is also used in the Agile process model.

(I) Communication:- Helps to understand the objective.

(II) Planning:- Required as many people work on the same project but different functions at same time.

(III) Modelling:- Involves business modelling, data modelling and process modelling.

(IV) Construction:- This involves the reuse of software components and automatic code.

(V) Deployment:- Integration of all the increments.

(g) Characteristics of Incremental Model :-

(i) System is broken down into many mini development projects.

(ii) First tackled highest priority requirements.

(h) Advantages :- (i) Generally easier to test and debug because relatively smaller changes are made during each iteration.

(ii) Initial product delivery is faster & costs less.

(i) Disadvantages :- (i) Resulting cost may exceed the cost of the organization.

(ii) Problems may arise related to system architecture which were not evident in earlier prototypes.

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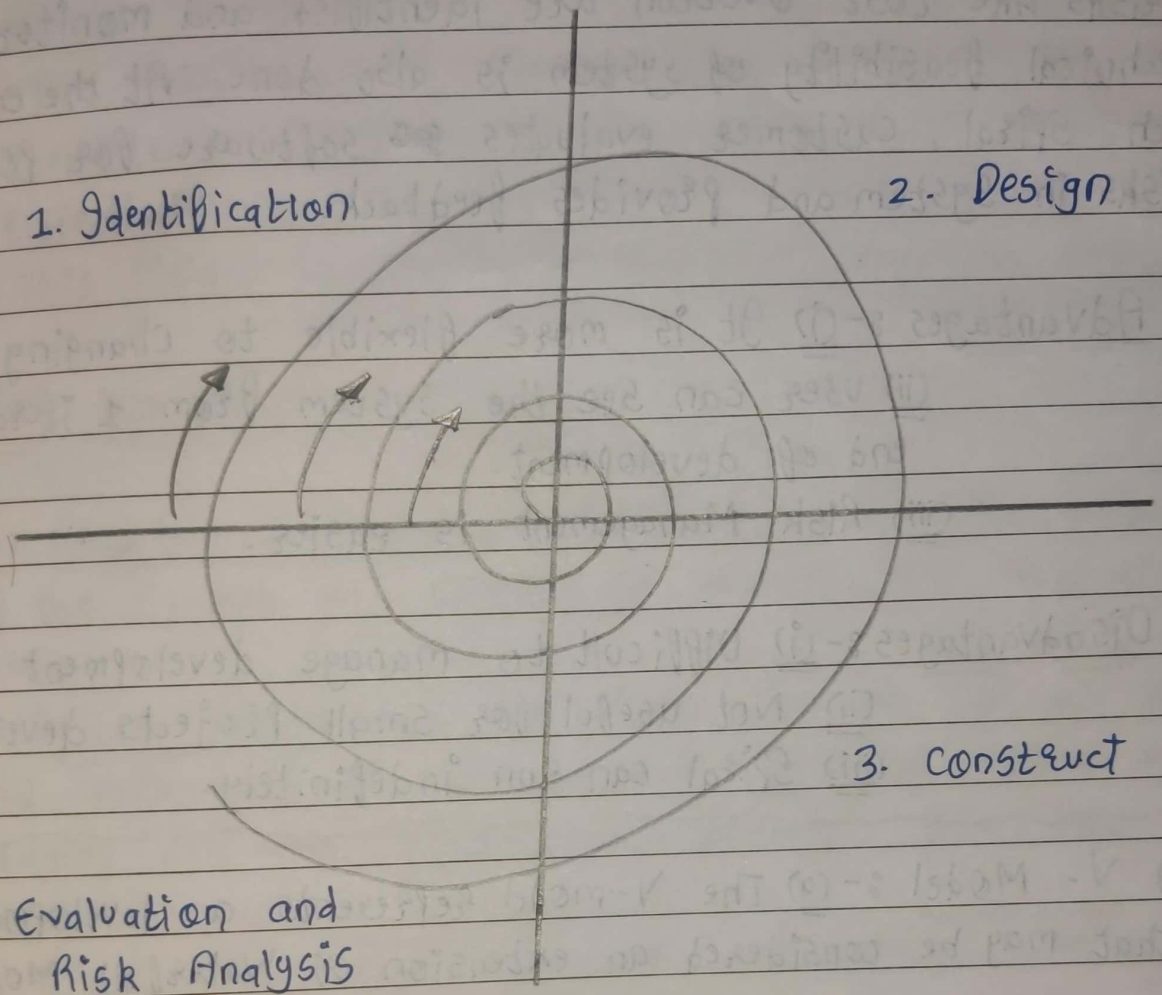
→ (3) Spiral Model :- (a) Spiral Model is a combination of iterative model & Waterfall model.



(b) Spiral model has four phases of development, each of these phases is called as spiral.

(I) Identification :- This phase identifies all business requirements of system at the beginning. It involves clear understanding of requirements by communication between stakeholders and customer.

(II) Design :- Design Phase develops conceptual design of system based on initially gathered requirements. In further spirals, it develops Logical design, Physical design and final design of system.

(III) Construct :- This phase develops a code for conceptual design to get user feedback. In next subsequent spirals, detailed working model of Software is constructed with increment

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number and are delivered to customer for feedback.

(IV) Evaluation & Risk analysis:- In this phase management risks like cost overrun are identified and monitored, technical feasibility of system is also done. At the end of each spiral, customer evaluates software for potential risks in system and provides feedback.

(c) Advantages :- (i) It is more flexible to changing requirements.
(ii) User can see the system from 1 iteration to end of development.
(iii) Risk Management is easier.

(d) Disadvantages :- (i) Difficult to manage development process.
(ii) Not useful for small projects development.
(iii) Spiral can run indefinitely.

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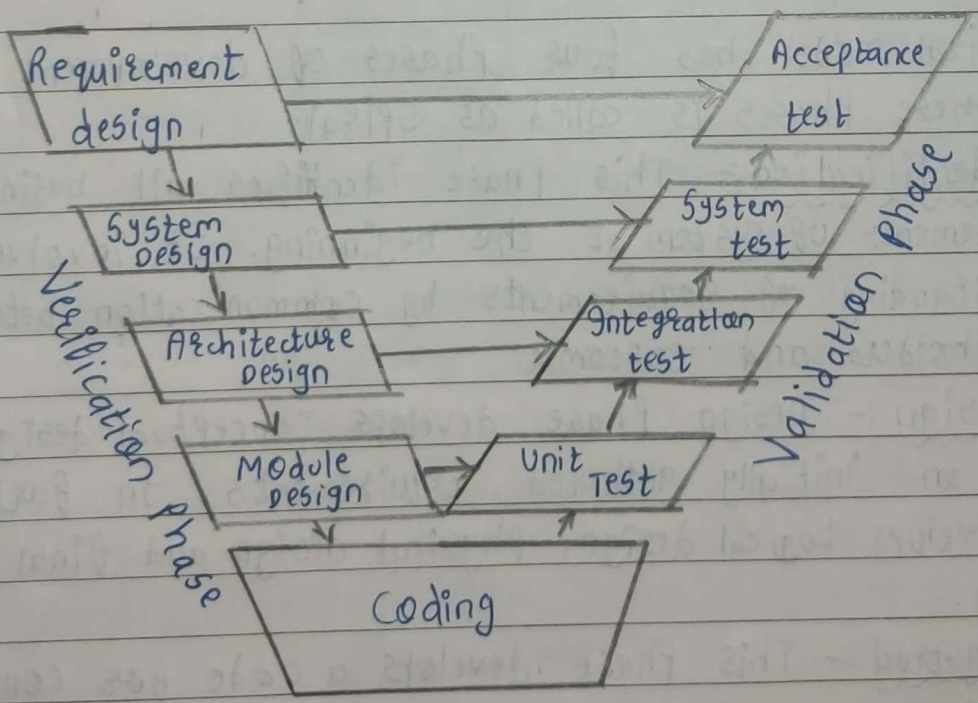
(4) V- Model :- (a) The V-model represents a development process that may be considered an extension of Waterfall Model.



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(b) Instead of moving down in a linear way, the process steps are bent upwards after the coding phase to form typical V-shape.

(c) The horizontal & vertical axes represent time or project completeness (left-to-right) and level of abstraction respectively.

(d) This Model is basically divided into two phases :-

* (A) Verification Phases :-

(I) Requirement Analysis :- In this phase, the requirements of the system are collected by analysis the needs of the users.

(II) System Design :- In this phase, system engineers analyze and understand the business of the proposed system by studying the user requirements document. Blueprints is Designed.

(III) Architecture Design :- In this, integration testing design is carried out in the particular phase. The baseline in selecting the architecture is that it should realize all which typically consist of list of Modules, etc.

(IV) Module Design :- This phase can also be referred to as low-level design. The Unit test design is developed in this Stage.

* (B) Validation Phases :-

(I) Unit Testing :- This verifies all the smallest entity can function correctly when isolated form rest of the codes/units

(II) Integration Testing :- Verify that units created & tested independently can coexist & communicate among themselves. Test results are shared with customer's team.

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(III) System Testing:- Composed by client's business team. It also ensures that expectations from application developed are met.

(IV) User Acceptance Testing:- Verifies that delivered System meets user's requirement and System is ready for use in Real time.

(e) Advantages:- (i) Simple & Easy to use
(ii) Proactive defect tracking
(iii) Avoids the downward flow of defects.
(iv) Good for small projects in which requirements are easily understood.

(f) Disadvantages:- (i) Very Rigid & least flexible Model.
(ii) No early Prototypes are produced.
(iii) If changes in Midway, then there is need to update the test documents along with requirement documents.