S/W Engineering

Target 100/100

Question/Answers

Quest Explain S/W Engineering? and purpose of S/W Engineering

Answer Software Engineering is a Technique through which we can developed or created S/W for computer system and any other electronic Devices.

- In other words S/W engineering is a process In which user needs are analyzed and S/W is designed based on the needs.

- In S/W engineering the development of S/W using well define scientific principle, method and processes.

- S/W Engineers build these S/W and Applications by using designing and programming languages

Purpose of S/W Engineering.

1. To Manage large S/W
2. for greater scalability
3. To manage the cost
4. To manage the dynamic nature of the S/W.
5. for better Quality Management.

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Ques-2 What is SDLC ?, full Explaination.

Answer SDLC stands for " S/w development life cycle" Model. It describes the sequence of phases or steps to develop any software.

In simple word " Entire life time of S/w from beginning to ending".

In Contains three main ~~types~~ stages :-

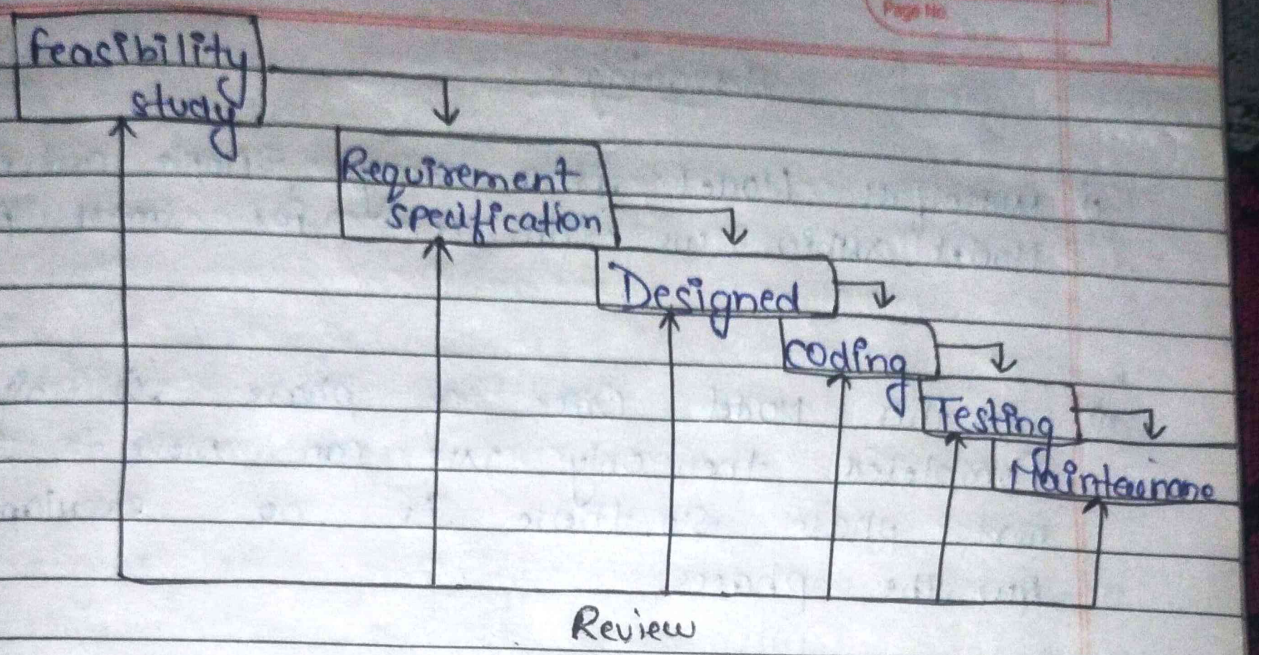
1) Conception stage
2) Implementation stage
3) Maintainance

The SDLC Model is classified into three Categories Based on three advantages and disadvantages -

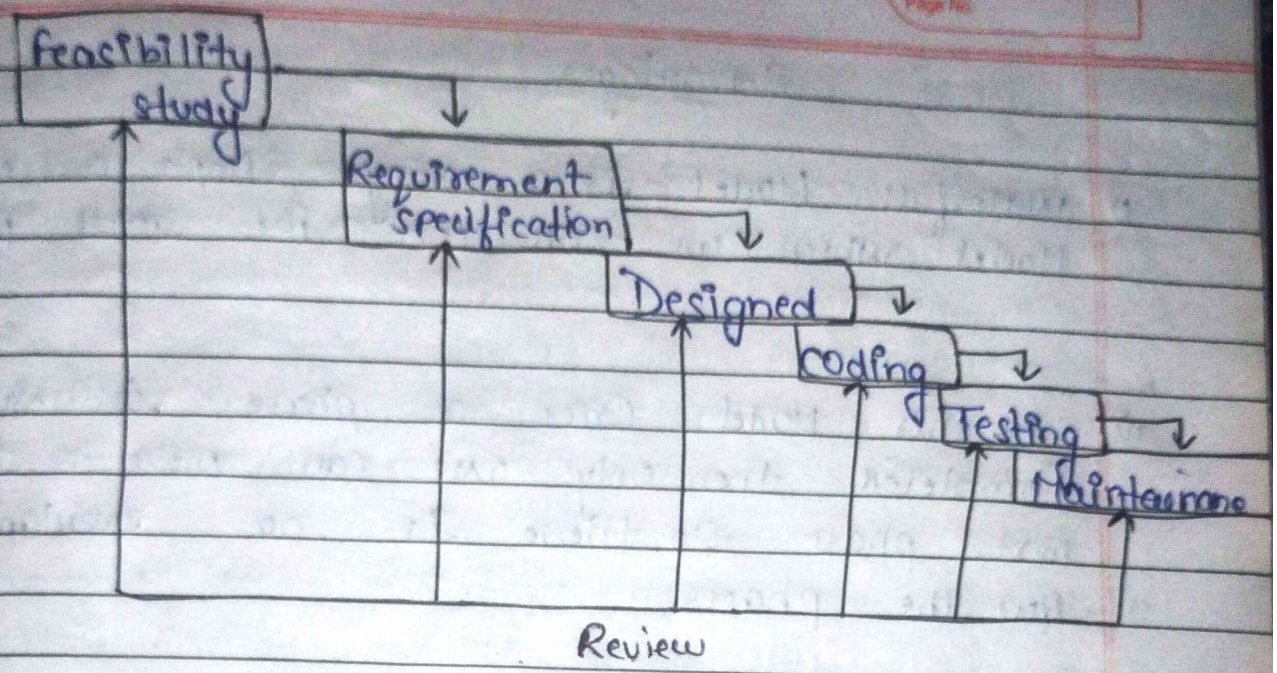
1) Waterfall Model
2) prototype Model
3) spiral Model

1) Waterfall Model :-

Very Important Questions



- The Waterfall Model is the Simple and classical Model of all the Models we have.
- This Model is also known as linear Sequential Model.
- This Model is the Theoretically Model not a practical Model.
- In this Model each and every phase must be Completed before moving to the next phase.
- This Model is Suitable for the small project where the technical Issues are very clear
- At the end of each phase a Review will take place



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Advantages

1) Waterfall Model is a very simple and easy Model which we can use for small project.

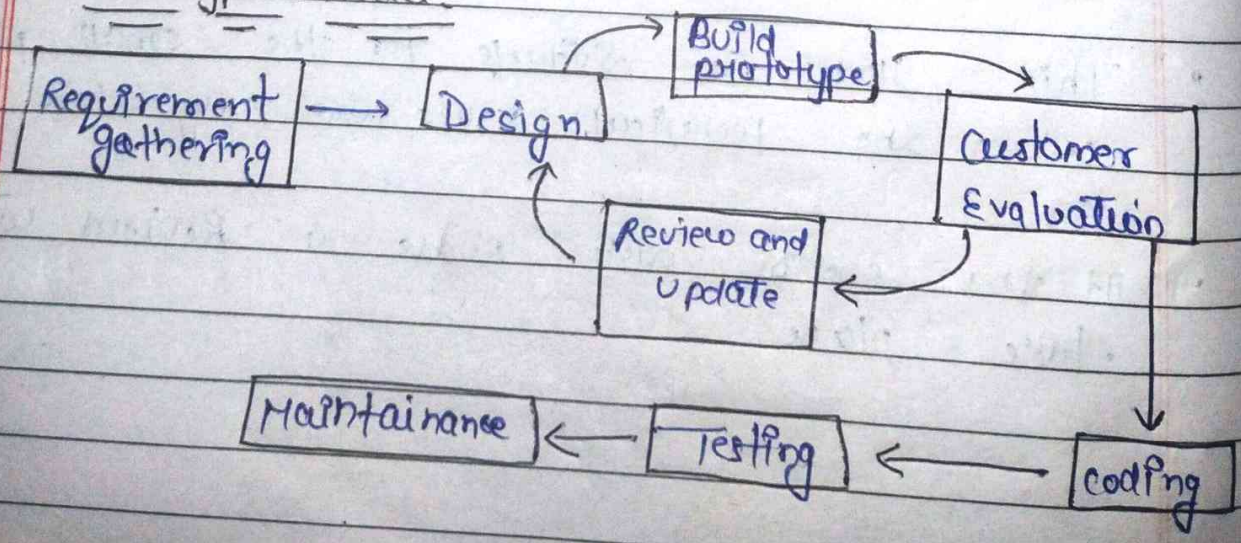
2) In this Model Once a phase is successfully Completed then only we can move to the next phase so there is no overlapping b/w the phases.

3) Each phase has a well defined task and a Review process

Disadvantages

1) Not use for Big project.
2) We can't move Back in last phase
3) This Model contains High Risk
4) It is poor Model for Complex and object Oriented projects.

Prototype Model:-



1) It is very S/W development Model.

2) In this Model client also involved at the time of designing of System

3. In, prototype Model is Modified until the client is not satisfied then we jumped to the Next phase.

4) The goal of prototype Model to provide a System with overall functionality.

5) prototype Model is an iterative development cycle b/w Developer and client

6) We can also use the prototype Model with other Model.

Advantages.

① Users are not satisfied with the prototype then a new prototype is created again.

2) Customer feed back is available for better System

3) It takes less time to make this project because one we have done the Requirement analysis from the Customer then it will take less time to develop the project

4) error can be detected at earlier phase

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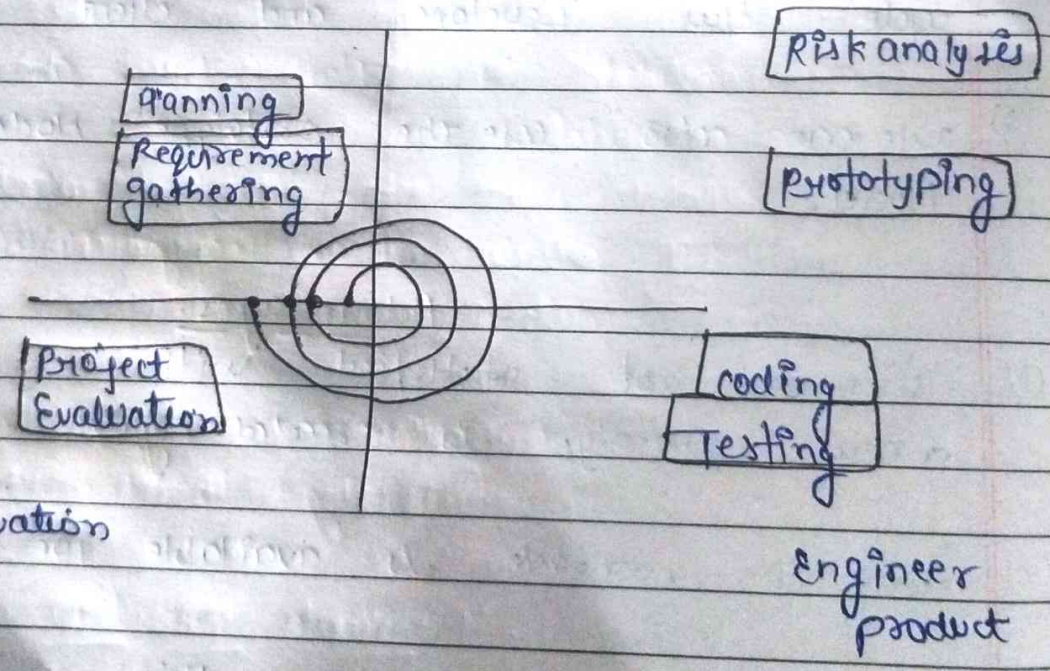
Disadvantages

(i) Total dependency on prototype
(ii) Sometimes it takes very long time to develop the prototype based on the user requirement

iii) The developer can try to reuse the prototype in another project even the project is not feasible

3) Spiral Model:-



① Spiral Model was developed By "Barry Boehm" in the year 1986 as a part of SEI (software Engineering Institute)

2) It is called Meta Model (Model about Models) because it contains all the life cycle Model.

3) The main purpose of spiral Model to Reduce the Risk in the project spiral Model has been introduced.

4) One Bussiness analyst is Required to Reduce the Risk with the Help of developer and client then we can say how must cost it will take the developed.

5) This Model is suitable for large and Complex project

6) It is called an spiral because the same activities are Repeated for all the loops (spiral)

7) Each spiral or loops Represents the s/w development process.

Advantages

1) Risks are analyzed at the early stage of project management
2) Very famous Model to develop large and Complex projects
3) Best technology has been used inside the spiral Model
4) Customer is available so we always get customer feedback on Regular Bases

Disadvantages

1) The cost of the project will be High because system analyst is Required to analysize the Risk
2) It is not suitable for small projects
3) Each loop contains four quadrant so takes more time to Complete

Question What is SRS ?

- SRS stands for " S/W Requirement specification
  It is a document prepared By Bussiness analyst or system analyst.

- It describes what will be the features of S/W and what will be its behaviour i.e how it will perform

- It is the description of S/W system to be developed with its functional and non-functional Requirement.

- The SRS consist of all necessary Requirements Required for the project Development

- In order to get all the details of S/W from customer and to write the SRS document system analyst is Required.

- SRS document is actually an agreement b/w the client and developer.

Parts of SRS document :-

1) functional Requirement of the system
2) Non-functional Requirement of the System
3) Goal of implementation.

Characteristics

1) Complete:- The SRS document must be complete by taking all the Requirement to Related to s/w development.

2) Consistent:- It should be consistent from begining to end, so that users can easily understand the Requirement.
And Consistancy can be achieved only when there is no conflict b/w the two Requirements.

3) Feasible:- All the Requirement Included in SRS document must be feasible to Implement.

4) Modifiable:- The SRS document must be created in such a Manner that it should be Modifiable.

5) Testable:- The entire s/w of the Indivisual module of the s/w must be testable.

6) Correct:- The all the Requirement given in the SRS document should be correct so, we can easily implement in s/w part.

7) Verifiable:- All the document of SRS must be verified

8) Unambigous:- The Module of the s/w must be unambigous so one module is compatible with another module.

Question What is S/W designing.

① S/W design is a very important phase in the SDLC. It is a technique through which we can design a meaningful Representation of something that we want to build.

- It is a process By which the Requirement (SRS) are translated into Blueprint for creating a S/W.

- The blueprint gives us the Complete details of working S/W.

- The design must meet all the user Requirement

- It also Reduces effort and errors that Come during the design.

- The entire S/W must be breakdown into no of Modules known as top level design

- The Required algorithum and data structure is used to implement a particular Module known as detail design

- The entire S/W designing concept is divided into two parts:-

- Top or High level design
- Detail design or Internal design

Question What is coupling and cohesion?

Answer: We Represent coupling in Top level Design and its describe the Inter dependency and Interaction b/w the Module of a s/w and coupling should be low for better s/w.

Types of Coupling :-

1) Content coupling.
2) Common Coupling.
3) External coupling.
4) Control coupling.
5) Stamp Coupling.
6) Data coupling.

Cohesion:-

Cohesion Represent detail design and it describe how the elements in a particular Module are closely Releated to each other and it should be High for better s/w design

Types of Cohesion:-

1) functional cohesion
2) Sequential Cohesion
3) Communicational Cohesion
4) procedural cohesion
5) Temporal Cohesion
6) Logical cohesion
7) Co-Incidental cohesion

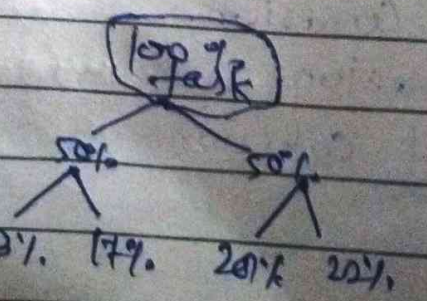
Question Difference b/w Cohesion and Coupling?

Cohesion	Coupling
1) Cohesion describes Relationship b/w two or more elements of a particular Module.	1) Coupling describe Relationship b/w two or more Module.
2) It focus on functional strength of Module.	2) It focus on dependency b/w the Module.
3) Cohesion should be High	3) Coupling should be low
4) It Represent top level design	4) It Represent detail design
diagram: Module [A - B]	diagram: module 1 [A] — [B] module 2

Question: What are the different approaches of s/w design

Ans ① Function oriented design (FOD)
② Object oriented design (OOD)

① Function oriented design:- In function oriented design the top lefmodule is successfuly decompose into more sub-module where each module has a well defined task



(2) object oriented Design-

i) In object oriented Design instead of Concentrating on function we concentrate upon object, an object Contains both data and functions which are used to create Application.

ii) In OOD the entire system is viewed as an object

iii) Each objects has its own state and Behaviour.

Question- What is structure analysis-

1) structure analysis is a systematic development Method that allow ~~that~~ to analyst to understand the overall functionality the system and its different activities in a graphical Representation known as DFD

2) structure analysis is a technique through which we will decompose the High level functions into no of sub-functions.

3 It has 3- Measures principle-

(1) Topdown decomposition Approach

2) Devide and Conquer principle

3) Graphical Representation of analysis Results

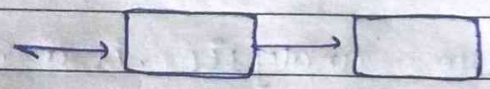
Question What is DFD.

- DFD stands of " Data flow diagram". It is also known as " Bubble chart". through which we can Represent the flow of data graphically in a Information System

- By using DFD we can easily understand the overall functionality of System because diagram Represent the incoming data flow, outgoing data flow and stored data in a graphical form

- It describes how data is processed in a System in terms of input and output

- A DFD Model uses a no of notations or Symbol to represent flow of data.

1. External Entity 

2. Data flow ⟶

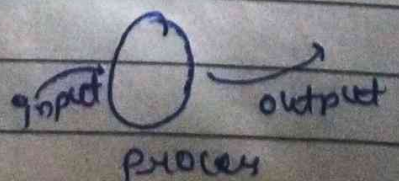
3 process or Bubble O

4) Data store ═ or ⊏═

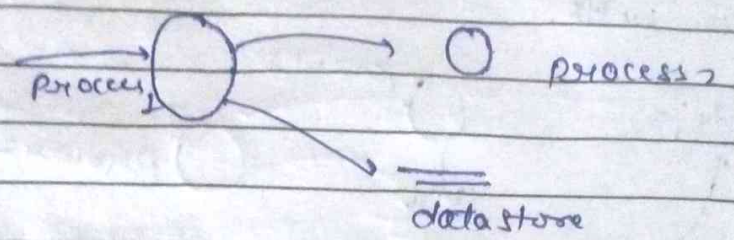
Rules of DFD-

① Each process should have atleast one input and one output

Ex

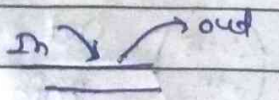


2 iii) All process in a DFD go to either another process or data store

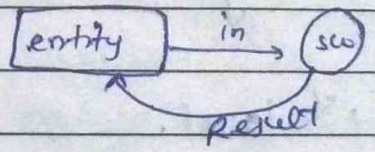


2 iv) Each data store should have atleast one data flow in and one data flow out

Ex



iv) All the External Entities must be connected through a process and entity can provide something to the s/w as well as the entity can consume some data from the s/w.

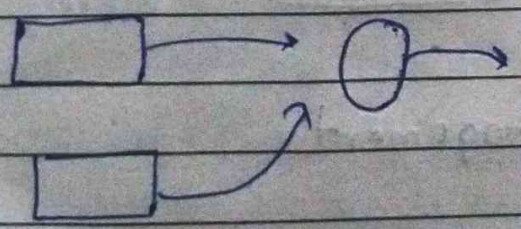


* levels of DFD,

① 0th level DFD.

It is a diagram which provides the entire system data flow and processing with a single process (bubble) is called as context.

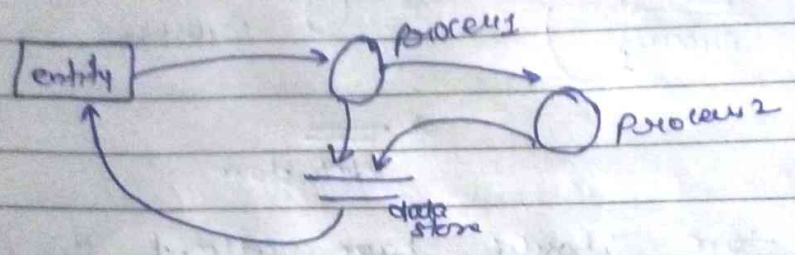
Ex



ii) I^{st} level DFD:-

This is a more detailed version of the previous level that includes the database and various important units.

Ex



Question Create a DFD for library management system.

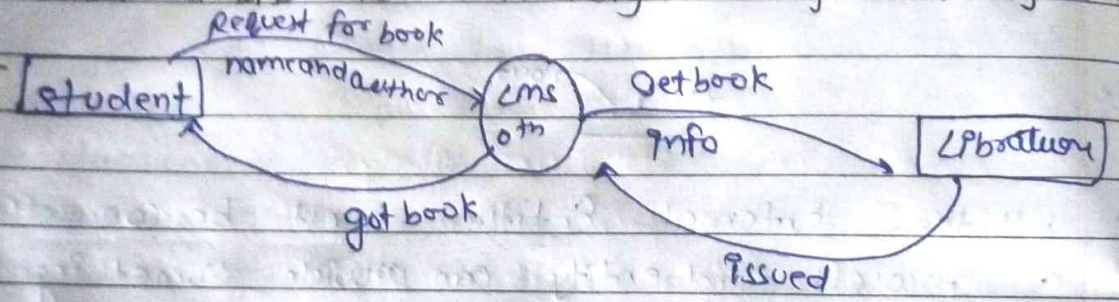
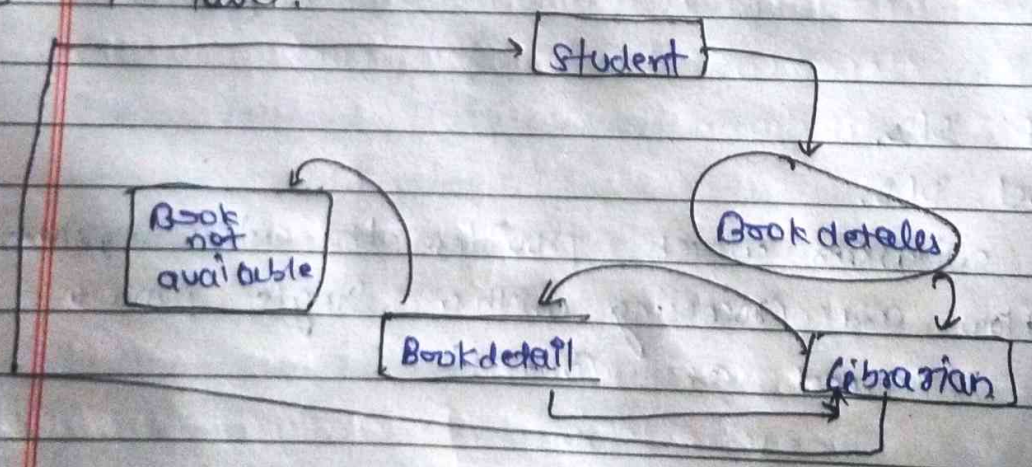


fig - 0th level.

1) 1st level.-



This is 1st level management.

Question What is coding and Testing.

Coding:-

1) Coding is an essential part of s/w Engineering to develop a dynamic and Reliable s/w.

2) By using we can transform the design of a system into a programming language.

3) Be should implement a well defined standard for coding known as coding standard.

4) By using coding standards our code will be easily understandable, easy debugging, error and we can extended it according to our Requirement.

5) The coding standard guidlines are the Rules how to write the code, so the overall coding become understandable.

⇒ The following steps describe the Representation of coding standards.

1) Less use of global variable.
2) Exception Handling Mechanism.
3) Naming Convention for global variables, local variables, constant
4) Use of Comments
5) A particular Module should Contain Maximum 0 lines of Code

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Question What is Testing.

Testing means s/w testing. It finding the bug in the developed s/w or existing s/w.

Before moving types of Testing we have to know about

i) Black box Testing or functional Testing

ii) White box Testing or Structural Testing

① Black box Testing:-

Black box Testing is that Testing in which the tester does not have knowledge of the coding.

In this Testing we have check the functional of the s/w that is input be pass and output the s/w produce

2) White box Testing:-

In white box Testing the tester has knowlege of coding and internal structure of existing s/w wheather the internal structure is correct or not.

iii) Unit Testing:- Unit Testing to check the independent and individual unit or module of S/W.

iv) Integration Testing:- This Testing will integrate all the modules one by one and check the compatability issues (weather one module is compatable with other module or not).

v) System Testing:- In this Testing we put the s/w in different enviroment and check weather the s/w is compatable with new enviroment or not.
Here the overall system Testing will be performed by Tester.

6) stress Testing:- In this Testing we check how system behaves heavy load means capability of the s/w how much load s/w can Handle.

7) performance Testing:- It checks the the speed and effectiveness of the s/w to make sure that its generate the Result within the specified time.

8) Usability:- In this Testing we check the GUI part created by developer to check weather the GUI part or designing of s/w, is user friendly or not

9) Acceptance Testing:- This Testing is done by the Customer to check the delivered product Meets the Requirement and works as a customer acception

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10) Alpha Testing:- This is the last Testing done by the developer side just before the delievery of the product. In this Testing the developer feet the inputs and Measures the output.

11) Beta Testing:- In this Testing Customer checks the functionality of the s/w and provide Suggestions to the development team wheather the s/w is provide a good Results or not.

* Verification and Validation:-

Verification:- "Are we Building the product Right."

Validation:- Are we building the Right product".

Question What is Total Quality Management?

Ans Total Quality Management is the Management activity that integrate all organizational functions Such as Marketing, Sales, finance developing a product, Customer Services and so on.

It mainly focuses on Customer Requirements, product Quality and top Management Commitment and Support.

TQM made by 3 word:-
- Management
- Quality
- Total

Total:- The Involvement and the Input of every one

Quality:- fully meets the Customer Requirements and Customer expectations.

Management:- The way, how we manage, operate, control and Handle our organization.

* The Key principles of TQM.

(i) Commitment from the Management
(ii) Employee enviroment.
(iii) Continous Improvement
(iv) Customer Requirement

Effects of TQM:

Improve Quality
↓
Increase productivity
↓
Lower cost & ~~an~~ higher profit
↓
Organization growth

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Question What is S/w Assurance?

(i) The S/w Quality Assurance is an Umbrella activity for checking the Quality of the S/w, wheather the S/w we are making is quality or not.

(ii) SQA is not checked at any particular phases, It runs along the S/w development. After every development process S/w quality assurance is checked

(iii) Generally the Quality of the S/w is verified by the third party organization like ISO (International standard organization) to ensure that the S/w must contain a Quality product and it working according to user Requirement.

(iv) A S/w Quality product has saveral Quality factors:-

1) portability
2) Reliability
3) functionality.
4) Error-free
5) Maintainability
6) Usability

Benefits of SQA

1) By using SQA, the Quality of S/w will be High.
2) If the S/w is Quality S/w then it saves our times & cost.
3) Ease-of-use
4) Security

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Ques What is ISO?

i) ISO stands for "International organization for standardization".

ii) It is an organization to verify the Quality of a product during the development of the product.

iii) ISO 9001 specific the Quality Management System means if you want to check a quality of a s/w product then you should use ISO 9001.

iv) ISO implicitly use the TQM technology to provide certificate for our organization based on quality of

Why ISO Certificate:-

(i) If a company is ISO certified then the company has big name in the International Market.

(ii) The company acquires the ISO certificate will change the internal structure mechanism just to implement the Quality services in the process but not finalize product.

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ution 1 What is SEI|cmm.

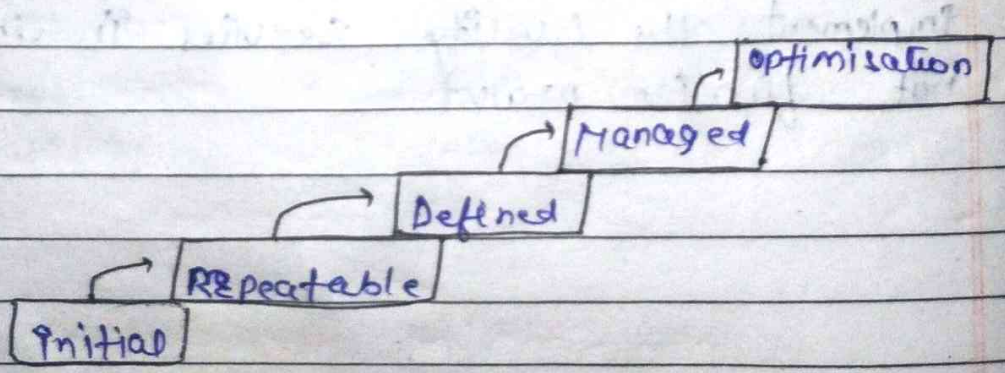
SEICmm stands for " Software Engineering Institute, Capability maturity model.

It is a process or Methodology used to develop and Refine an organizations s/w development process.

The cmm provides the different levels based on the standards a Company aquires so, If an IT Company is a new Company then the cmm will provide " Level 1" like this If the Company starts developing and following the guidlines provided by cmm to increase the Maturity level.

The cmm provide total - 5 levels:-

1. Initial
2. Repeatable
3. Defined
4. Manged
5. optimizing



3. The cmm is developed by " S/w Engineering Institute" for an IT organization just to check / verify the Maturity level of the organization.

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Question Difference b/w ISO 9000 and CMM?

Answer

ISO 9000	CMM
① It is a standard developed by International standard organization	1. It is a model developed by S/W Engineering Institute
2) Application for any type of industry.	3. Application for S/W Industry.
3. It verify the Quality of product then provide certificate to organization	3. It verify the Quality of S/W according to quality they provide level Based product
4. It has no any levels	4) It has five levels.
5. ISO-9000 certificate accepted by around 100+ country.	5) It mostly used in USA.
6) ISO gives either pass or fail certificate	6) CMM provides maturity of levels

4- What is S/W Maintainance

1) S/W Maintainance is very important activity in an organization because we want to do more better performance with our S/W.

2) S/W must be upgraded and maintain Regularly either depending upon the user Requirements or change in Technology.

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3) S/w maintainance is needed to correct the errors in the existing product, inhance the features and try to port or implement the s/w into new platforms.

4) In earlier, days s/w maintainance was the most neglected area by an organization but in the current trend we provide more focus on s/w maintainance in comparision to s/w Development

Types of s/w Maintainance:

1) Corrective Maintainance:- The problems Relected by the user at a time of using the s/w product

2) Adaptive Maintainance:- The adaptive Maintainance it has the ability to run an different platform, different O.S and change in GUI depending upon the new s/w or H/w.

3. perfective Maintainance:- The maintainance will describe that a s/w should be support new features different functions and we can extend the s/w according to the user Requirement

What is S/w Reverse Engineering.

1) S/w Reverse Engineering is also back Engineering It is the process of Recovering and understand the Basic Method design and the Requirement specification of legacy s/w product

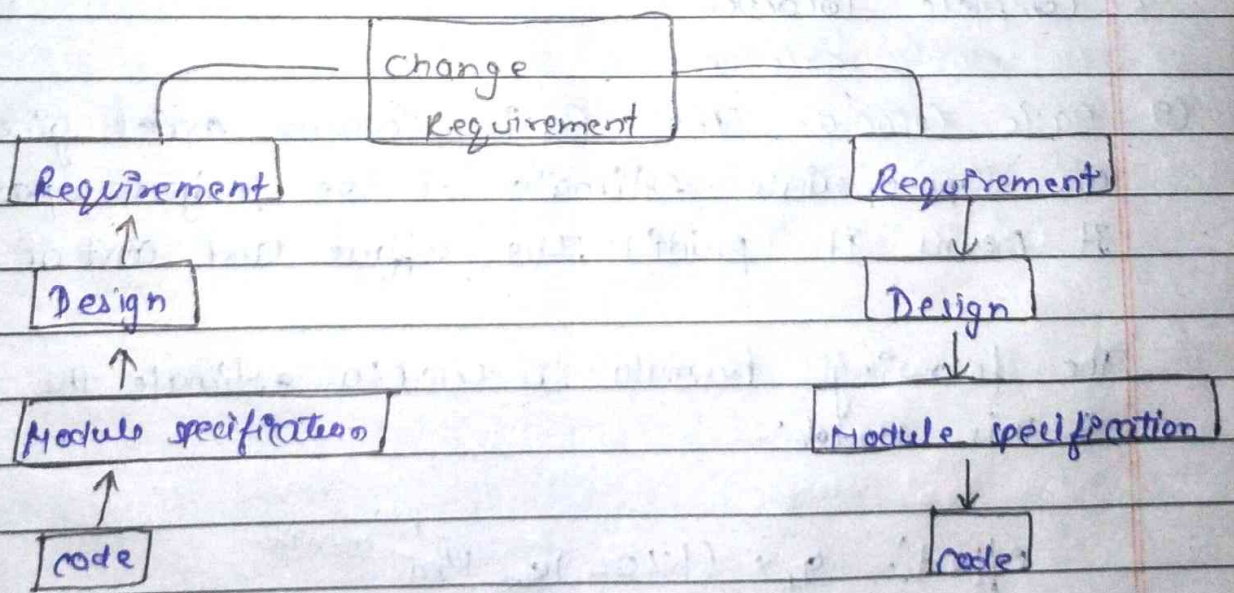
ii) First we analyze the already created s/w source code after that Recreating it so we can find out the original code with some improvement.

iii) Simple word. It is a process to Re-think, Re-structure & Re-built over legacy s/w.

Why Reverse Engineering Required!-
sometimes Situations arise that Require the use of Reverse-engineering.

for Ex It Is a part of a Super Computer is break, which is not freely Sold in market, then Reverse Engineering will not be used to understand the Design and manufacturing process of the part
After that, that part will be Manufactured.

figure-



Legacy.

updated Legacy

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Ques What is COCOMO Model.

COCOMO stands for "Constructive Cost Model" It is one of the very famous Model which is used to estimate the cost of the product

- COCOMO Model was proposed Boehm in the Year 1981
- Using this Model we can estimate the time and no of people (members) needed to develop a project
- According to Boehm, project cost estimation should be done through three stages:-

① Basic cocomo
② Intermediate cocomo
3. Complete cocomo

① Basic Cocomo - The Basic cocomo model gives an appropriate estimate of the project parameters, it means it pridict the effort and cost of project

The following formula is used to estimate the cost in this Model:-

effort:- $a_1 \times (KLOC)^{b_1}$ PM per month

me evelopment $T_{dev} = b_1 \times (\text{effort})^{b_2}$ months

Complete.

(ii) Intermediate cocomo:-

This is an extension of the Basic cocomo model the intermediate cocomo Model. This model is phase sensitive. It does not depend on any phase, It is used to calculate the amount of effort Required to Complete each phase.

It has Six phases:-

1) planning and Requirement
2) System design
3. Detailed Design
4) Module Code and Test
5) Integration & Test
6) Cost constructive model

(iii) Intermediate Model:-

This is an extension of the Basic Cocomo model The intermediate cocomo Model uses 15 additional predictors considering its enviroment to estimate a value or cost

Ques What do you understand by s/w. Full explaination

Software is Nothing but set of instructions or set of programs are known as s/w

s/w is that part of a Computer, which cannot be touched. s/w tell a Computer what to do and how to do it

Types of s/w

1) System S/W
2) Application S/W
3) Utility S/W

① System S/W:- System S/W is a S/W designed to provide a platform to other S/W.

System S/W Control and Manage the operations of Computer Hardware.

Ex Operating System (Windows, Android, Linux etc).

2) Application S/W:- The S/W that Helps you to do a specific type of works is called Application S/W.

Ex Ms Word, Excel etc.

3. Utility S/W:- Utility S/W Helps to Manage, maintain and Control Computer Resources

Ex Antivirus S/W
Backup S/W
Disk tool etc.

Ques- What do you mean by RAD.

- Quick Prototyping
- Iterative Development
- Incremental Releases
- User Involvement
- Time- Boxing
- parallel Development

Question Distinguish b/w generic and Customized s/w.

(1) Generic: Create for different Ranges of people and sold to open source any Customer who wishes to buy them

2. Project Management tools s/w for specific Market such as Appointment to doctor.

Customized - Only Heads single people or any organization.