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Course Code:- CSF-321
Course Title:- Softwear Engineering.

Ans totue Quees:- 1(a)

* Define Softwear Eng:- Softueare
engineering defined as a process
of analizing usen require ments and
tee desinig. buiding and testing
Softueare appriciation teat ueill ndfiby
those requirement.

The various definition of Softuear
engineening.

IEEE, in its Standard, 610.12.1990.
destinnes softueare eng as tue appriciation
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and mainte nece. of soft uear.

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Ans to the Qus NO-1 (b)

Q. Describe waterfall model and validation process :—

* **waterfall Model:—** The waterfall Model was the first process model to be introduced. It is also referred to as a linear-Sequential life cycle model. It is very simple to understand and use. In a waterfall Model each phase must be Completed before the next phase can begins and there is no overlapping in the phase.
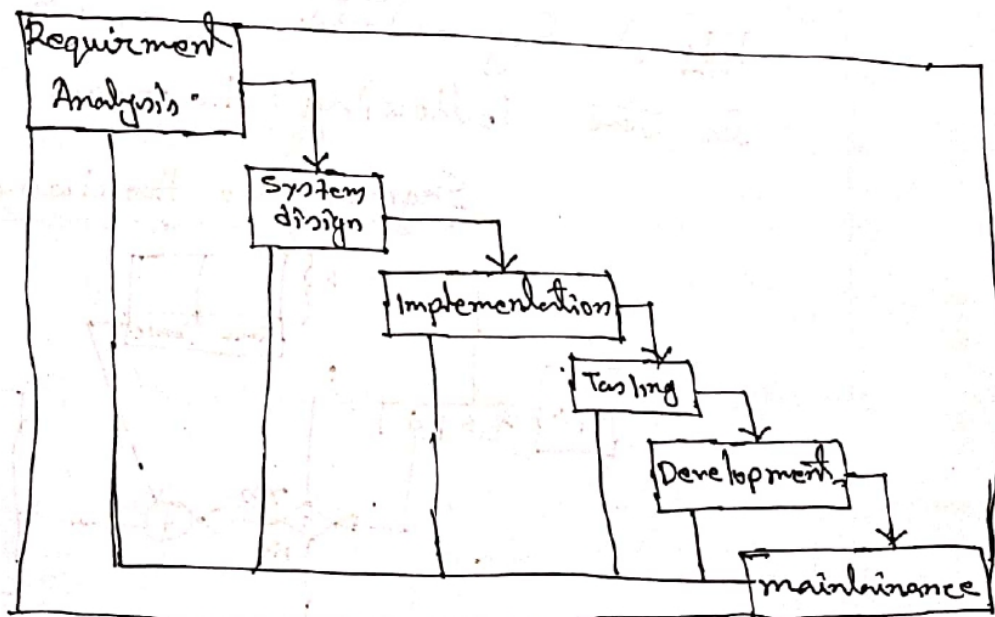
The waterfall model is the earliest SDLC approach that was used for Software development.

The waterfall model illustrates the software development process in linear-Sequential flow. this means that any phase in the development process begins only if the previous phase is Complete in this waterfall Model. The phase do not overlap

* Waterfall Model — design :

The waterfall model approach was the first SDLC Model to be used widely in software engineering to ensure the success of the project. In "the "waterfall" approach, the whole process of software development is devided into separate phase. in this waterfall Model. Typically, the out come of one phase acts on the input for the next phase Sequentially.

The following illustration is a representation, of the different phase of the waterfall Model.

The Sequential process in the waterfall model are

* Requirment - Gathering and Analysis :- All possible requirment of the systems to be developed are captured in this phase and documentation in a requirment specification document.

* System design :- The requirment specification from the first phase are studed in this phase and the system design in a prepared. this system design helps in specification hardware and systems requirments and helps in defining the overall System architecture.

* Implementation :- with mpuls form the System design, the System is the first developed in a small programs called units, which are integrated with the next phase. Each unit is developed and tested for its functionality, which is refored to as Unit Testing.

* Integration and Testing :- All the units developed in the implementation phase are integrated into a system after testing of each unit post integration the entire System is tested any faults and failures.

* **Deployment of System :-** Once the functional and non-functional into the market,

* **<u>Maintenance</u> :-** There are some issues that come up in the client environment. To Fix those issues, patches are relesed, Also to enhance the product some better version: are relesed, maintainance is done to deliver these changes in the coustomer mvironment.

All these phase are cascaded to each other in which progress is seen as flowing Steadily downwards (like a waterfall) through the phases. The next phase is started only after the defined Set. of goals are achived for the previous phase and it is signed of, So the Name " waterfall Model", In this model, phase do not overlap
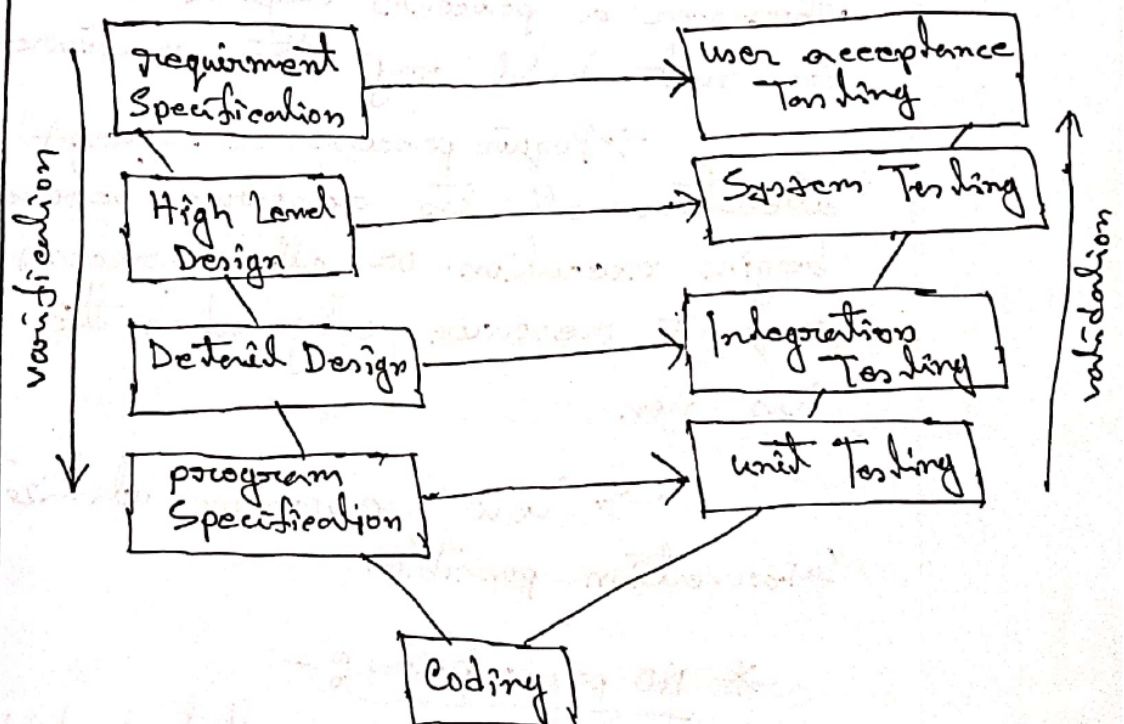
* **<u>Validation process</u> :-** validation is the process of checking weather the Software product is up to the mark or

in other words product has high-level requirment. it is the process of checking the validity of the product

· validation is the Dynamic Testing:-

Activites involved in validation
* Black - box Testing
* White - box Testing
* Unit Testing
* Integration testing

Ans to the Qus NO - 1 (c)

□ Describe characterstics of SRS?

Softwar Requirment Specification (SRS) is a document that Completely describes that what the proposed software should do without describing how the software will do it. The basic goal of the requirment phase is to produce the SRS, which describes the Complet behavior of the proposed Softwar. SRS is also helping the clients to understand their own needs.

* Characteristics of SRS:-

Correctness: User overview is used to ensure the Correctness of requirments stated in the SRS. SRS is said to be correct if it covers all the requirments that are actually expected from the System.

* Completeness:- Completeness of SRS indicates every sense of Completion including the numbering of all the page.

resolving the to be determined parts to as much extent as possible as well as Covering all the functional and non-functional requirement properly.

* Consistancy :- requirment in SRS are said to be consistance if there are no Conflicts between any Set of requirments example of Conflict include difference in terminologies used at sparate place, logical Conflict like the time period of report-generrertion, etc.

* Unambiguousness :- SRS is said to be Unambiguousness if all the requirment stanted have only 1 interpratation. Some of the way to prevent Unambiguousness include the use of modeling Techniques lik ER diagrams, proper reviews and buddy checker, etc.

* Modifiability :- SRS should be made as modifiable as possible and should be capable of easily accepting changes

to the System to some extent, modification should be properly indexed and cross-referenced.

* Verifiable :- SRS should be made as modifiable as possible and should be capable of easily accepting changes to the System to some extent. modification should be properly indexed and cross-referenced.

* Traceability :- one should be able to trace a requirment to the design component and then to code segment in the program. Similarly. one should be able to Trace a requirment to the corresponding Test cases.

* Design Independed :- There should be an option to choose from multiple design. alternatives for the Final System, more specifically. The SRS should be able to
* Thats not melud Any. implemention detail,

* Testability :- SRS should be written in such a way that it is easy to generate test case and test plans from the document.

* Understandable by the Coustomer : An end-user may be an expert in his/her specific domain but might not be an expart in Computer science, Hence, the use of format notation and symbols should be avoided too as much extent as possible, The language should be kept easy and clear

* Right level of abstraction :- if the SRS is written for the requirmen phase, the detail should be explained explicitly. where as for a feasibility study, fewer detail can be used. Hence, the level of abstraction varies according to the process of the SRS.

Ans to the Que NO - 2 (a)

2-a

⊞ Define Categories of softwar maintainence?

* Softwar maintainance :- is the process of modifying a soft war product after it has been delevered to the coustomer. The main purpose of softwar maintainance is to modify and update software application after delivery to correct faults and to improve performance.

* Categories of Softwar maintainance:-

maintainane can be devided into the following:.
Corrective Softwar maintenanc :- Corrective Softwar maintenance is what one would typically associate with maintenance of any kind, Correct Softwar maintenane address the cross and faults within Softwar application that could impact various parts of your Softwar, including the teg design, logic

and code. Those Correction usually come from bug reports that ware created by users or coustomer - but corrective Softwar maintenane can help to spot them before your coustomer do. which can help your brand's reputation.

* Adaptive Softwar maintenanc : - Adaptive Softwar maintenance becomes important when the environment of your Softwar changes. this can be brought on by changes to the operating System, Hardware, Software dependencies, could storage, or even changes within the operating system, Sometime, adaptive Softwar maintenane reflect organization policies or rules as well. updating Services, making modification to vendors, or changing payment processors can all necesshate adaptive Softwar maintenance,

* perfective Softwar maintenanc :- perfective Softwar maintenanc focuses on the evolution of requirments and fetures that exist as us your system, As user interact withthe your application they may notice things

that you did not or suggest new feature that they would like as part of the Software, which could become future project or enhancement; perfective Software maintenance takes over some of the work, both adding features that can enhance user exprience and removing feature that are not effective and functional. This can include features that are not used or those that do not help you to meet your end goals.

* preventive Software maintenance:-

preventive Software maintenance helps to make changes and adaptation to your Software so that it can work for a longer period time. The focus of the type of maintenance is to prevent the deterioration of your Software as it continues to adapt and chang, thes services can include optimizing code and updating documentation as needed.

preventive Software maintenance helps to reduce the risk associated with operating Software for a long time. helping it to become more stable, understandable, and maintainable for all business and organization, Software maintenance is an essential part of the Software development lifecycle, This isn't something that one can skip or avoid. It is absolutely necessary for the success of your Software and any evaluation into the feature.

Ans to the Que NO - 2.(b)

① what is the difference between black box Testing and white box Testing!

* Black-Box-Testing :- In black-box Testing, a tester doesnot have any information about the internal working on the Software System, Black-box testing is a high level of Testing that focuses on the behavior of the Software.

It involves Testing from an external or end-user perspective, Black-box Testing can be applied to virtually every level of Software Testing; unit integration. System and acceptance.

      * White-Box Testing :- White-Box Testing is a testing technique that checks the internal functioning of the System, in this method, Testing is based on the Coverage of Code statement, branches, paths or Condition, White-Box Testing is considered low-level Testing. The white-Box Testing method assumes that the paths of the logic in a unit or program is know.

      田 Defferance between Black-Box and White-Box Testing:

Blac-Box Testing	White-Box-Testing.
It is a way Software Testing in which the internal structure of the program or the Code is hidden. and nothing is know about it.	It is a of Testing the Software in which the tester has knowledge about the internal Structure or the Code or the program of the Software.

Black-Box Testing	White-Box Testing
It is mostly done by Softwar Testers	It is mostly done by Softwar developers
No knowledge of imple mentation is needed	Knowledge of implemen tation required
It can be referred to as outer or external Softwar testing	It is Inner or the internal Softwar Testing
This testing can be mini fted on the basis of the requirment Specifica tion document	This type of testing of Softwar is Stated after a detailed design document
No knowledge of progra ming is required	It is mandatory to have knowldge of programming
It is the behaviore Testing of the Software	It is the logic of the Softwar
It is applicable to the higher level testing of Softcoar	It is generally applicable to the lower level of Softwar testing
It is also called Close Testing	It is also alca called box Testing
It is the tort time Consuming	It is most time Consuming

Ans to the Qus No - 2 (c)

⊞ Mention what are the types of documents in SQA :-

Software Quality Assurance (SQA):- is a process that assures that all Softwar engineering process, method, activities and work items are monitored and comply with the defined Standards. These defined standard chuld be one or a Combination of any like ISO 9000, CMM1 Model, JS015504- etc.

SQA incorporates all Softwar development process starting from defining requirment to Coding unulil release. Its prime goal is to ensure quality. **⊞ The SQA plan document consists of the below Section :-**

① purpose Section
② Referance Section
③ Softwar Configuration managment Section
④ problem reporting and Corrective action Section
⑤ Tools, Technologies and methodologies Section
⑥ Code Control Section
⑦ Records collection maintenance, and retention Section
⑧ Testing methodology

Ans to the Que NO - 3 (a)

田 what is Software project mangement :-

* project :- A project is a group of tasks that need to complete to reach reach a clear result. A project also defines as a set of inputs and output which are required to achieve a goal. project can very from simple to difficuly and can be operated by one person or a humderd.

project useally described approved by a project manager or team executive, They go beyond their expectation and object and its up to the team to hurdle. logistic and comple the project, on time. for good project Development. Some teams split the project into specific tasks so they can manage responsibility and utilize team strengths.

* Softwar project management :- Softwar project management is an art and discipline of planing and supervising Softwar project. It its a sub-discipline of Softwar project management in which Softwar project planned, implemented monitored and Controlled.

It is procedure of managing, allocating and timeing resource to develop Computer Softwar that fullfills requirment

In Softwar project management. The client and the developers need to know the Length, period and cost of the project.

Ans to the Quy NO - 3.(b)

Define project manager roles and responsibility :- →

* Softwar project manager :- A Softwar

project manager defines the requirement of the project, builds the project team, lays out a bluprint for the whole project including. The project scope and parameters, clearly Communicate the goals of the project to the team. The target to be Achieve, allots budget to the various Task to be Completed, and ensures that the expectation of the Board of Directors and Stakeholders are met through timely Completion of the project.

This article discusses the roals and responsibilityes of a project manager in a Softwar Company.

* Roals of Softwar project manager:

Leader! A project manager must lead his team toward success. He should provide the direction and make them what is expected of them. clearly explain The roles of each member of the Team

* **Liaison** :- The project manager is a link between his clients, his team, and his own supervisors. He must coordinate and transfer all the relevent from the client to his teams and report to the upper management.

* **Mentor** :- He must be their to guide his team every step and ensure that the teams has choesion. He provides advise to his teams wherever they need it and point them in the right Direction

⊞ Responsibities of a Softwar project manager

* **planning** :- In order for a project to be successfull and Completed within a specified time, The project manager for a Softwar company must plan effectively - This also includinar.

<u>Scope</u>: The project must clearly define the scope of the project. and answer questions like. who is the customer? what need will the Software Satisfy? How will it be beneficial to others what are the operational requirments for the project. ?

* Design variations
* variations by the client.
* Occurrence of dispute and fixing any discrepancies arising due to personal conflicts between the team members.

* Incomplete or inaccurate cost estimate
* if the project has been delayed then b he must try to fix the gap brought about by the delay

* Time menagment - Time estimation for the various activities is a major significance as it help Set the daily priorities of each team member

* Implementation of Monitoring :- Implementation of the project's activities. include delegating different activities and ensuring their Completion on time, Executing the plan of action and ensuring that it is Monitored along the way is a key responsibility if his. A project manager must Set out the project boundaries and scope for the project which formul,
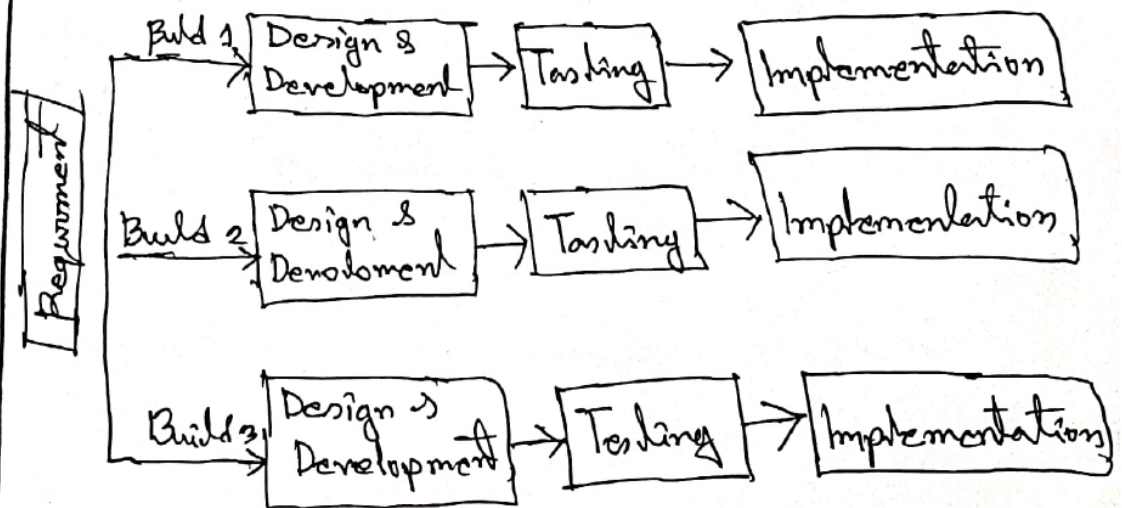
Ans to the Qus No - 3 (e)

⊞ Define Iterative Model advantage and disadvantages :-

* Iterative Model :- The Iterative process starts with a simple implementation of a small Set of the Software requirment and iteratively enhance the evolving versions until the complete System is implementation and ready to be deployed.

* Iterative Model design :- The iterative process starts with a symple implementation of a subset of the Software requirment. and iterative enhance the evolving vision until the full system is implemented. at each iteration, design. modification are made and new functional capabilities are added, The basic idea behind this method is to develop a System through repeated cycle (itralive) and in smaller portion at a time (incremental). -

* The following illustraction is a represen tation of the Iterative and incremental model:

Advantage and disadvantage of iterative model.

The advantage of the iterative and incremental SDLC Model are as Follows —

* Some working functionality can be developed quickly and early in the cycle.

* Result are obtained early and periodically

* parallel development can be planned

* progress can be measured

* less costly to change the scope/requirment

* Easier to manage risk — high-risk part is done first.

* Risk analysis is better

* It support changing requirment.

* initial operating time is less

The disadvantage of the iterative —

* more resources may be required

* Although the cost of change is lesser, It is not very suitable for changing requirment.

* More mangement attention is required

* System artecture or desing issues may arise because not all requirments are galherd at the begining of the entire lifce.

* Defining increment may require a definitation of the complete System.
* Not suitable for smaller project.
* Managment complexcidy is more
* The end of the project may not be known which is a risk
* Highly skilled resource are required for risk analiysis.

Ans to the Qun NO - 4. (a)

what is Quality :- Softwar Quality :-
Softwar quality product is defined in terms of its fitness of purpose, That is Quality product does precisely what the users want it to do. for Softwar products. The fitness of use is generally explaned in terms of satisfaction with the requir ments laid down in the SRS document, Although "Fitnee of purpose" is a satisfee tory interpretation of quality for many device such as a car, a table fan, a

a grinding machine etc for Software products. "fitness of purpose is not a wholly satisfactory definition of Quality.

Importance of Quality :-

Saves time and Money :- The advantage of having System and process in place during development is that they anticipate and prevent most bugs and flaws from developing in the first place. as a result, The error that the surface are relatively minor and can be fixed easily.

On the other hand. without QA most bugs would potentially be bigger and may only be caught in the testing phase, or after the program was released. fixing these bugs after the fact would require more time. which in turn could cost more

maintains product Quality :- QA

process are designed to ensure that the Software product works reliable and is stable. in addition. There are Quality Control (QC) Tests designed to test the

functionality, performance, security, usability, and more. as a result, the final product has minimal defects and is guaranteed to work is intended.

*Ensur Security:- whidht a Software program might perform all function as intended. it may not nesssarily be Completely Secure. if ther is any weakness in its defenses, The product and user data could be compromised.

* protects your reputation:-
The Quality of your Software can rafect on your company and brand. by releasing a high-Quality product that offers. excellent features with the Comprehensive Security you can build a positive reputation for your business.

* Customers Satisfaction:-
In order to ensure satisfied customers. your product needs. to fullfill their needs. It should have the feature required and work properly. The role of QA is exactly that to make sure that the Software gives your Customer.

Ans to the Que No- 4 (b)

□ Software Quality assurance Activities:-
SQA is the process of evaluating the quality of a product and enforcing adherence to Software product Standards and procedures. It is an umbrella activity that ensure Conformance to Standard and procedures throughout the SDLC of Software products.

There are a large number of tasks involved in SQA activities.

* Formulating A Quality mangement plan.
* Applying Software Engineering Techniques.
* Conducting formal Technical Reviews.
* Applying A multi-tiered Testing Strategy.
* Enforcing process Adherene
* Controlling change
* Measuring the impact of change
* performing SQA Audits
* keeping Record and reporting

* **Enforcing process Adherence:-** The task of SQA emphasizes the need for process adherance during product-development. In addition, The development process should also adhere to procedures defined for product Development Therefore, this is a combination of two Task product evaluation

* **process Monitoring:-** process Monitoring ensures that appropriate Step to follow the product development procedures are carried out, SQA monitors processes by Comparing The actual step carried out the step in the documented procedures, product evaluation and process monitoring ensure that the development and control process,

* **Controlling change:** The task combines human procedures and automated tools to provides a mechanism for chang control. The Change Control mechanism ensure Software Quality by formulizing requests for chans evaluting

* **Formulating Quality management plan:-** One of the task of SQA is the formulation of a Quality managment plan. The Quality managment plan identifies the Quality aspects of the Software product to be developed. It helps an planning cheapoint for work product and the development process. It also tracks changes made to the development process based on the result of the checks.

* **Applying Software Engineering:-** The application of Software engineering Techinques helps the Software designer to achieve high-Quality Specification. The designer gathers information using Techniques such as interviews and Fast

* **Conducting formal Technical Reviews:** Formal Technical review (FTR) is conducted to access the Quality and design of the photolype. It is a meeting with the technical staff to discuss the quality requirment of a Software product and its design Quality