**Previous Question**

**Question:** Describe the importance of software Engineering? What should be steps taken under the process of developing a software system.

**Answer:**

Software Engineering

Software Engineering is a part of computer science in which several kind of method, thoughts and techniques used for getting the high quality software and computer programs.

1. Minimum cost
2. On given time
3. Continuous production

We can judge the usefulness of the software Engineering with the importance of its attributes. Both are used for the same manner. The basic target of software Engineering is to provide the high quality software, which can be delivered.

1. On given time,
2. Within budget &
3. That fulfills the need.

Thus we can say that this is the best way or programs to get the following points:

1. To provide the best output of software system.
2. To make easy to use the software systems and develop them.
3. To improve the rate of production.
4. To maintain the budget for development of Software system.
5. Job satisfaction of software engineering.

It is necessary to produce a high quality software to fulfill the below given points.

1. Consistency
2. Improved quality
3. Minimum cost
4. Within time
5. Reliability &
6. Fulfill the need of user

**Question:** Explain the principles which play a major role in development of software.

**Answer:**

Principles of software development

A set of rules which is made on the basis a number of observations done by user is called the principles of software development. We have described the software development principles which are given below:

1. **Quality on preference** - Quality is the first objective of software development process. Because a low level of quality not accepted by the user or client. We have a lot of definitions about the quality product. According to customer he wants the best response on given time with a lot of capacity. The aim of developer should be make unique design software.
2. **Possibility of high quality software** - Scope of higher quality is always there. For getting the high quality many techniques, design inspections on time and hired the best employee for this can be adopted.
3. **be on time delivery** - The better way is to send the sample to the customer so that he can use that software and give feedback. On the basis of feedback developer can take charge and developed the software according to the need of customer.
4. **Fix the problem** - Before getting any solution of problem fix the problem which cause is customer needs. After getting the problem we are trying to use alternate solution of that problem basis on time, cost and risk factor.
5. **Valuation of alternate design** - When we know the need of customer then we observed much kind of algorithms and architectural so that with the help of them we can build the software. We select that alternate who have the quality of safety, alteration and more functional.
6. **Selection of appropriate process model** - Software development process model have a large area of choice just like waterfall, prototype and spiral module are the suitable examples for this. But there is a fact that every process is not suitable or in favor every time. So on the bases of need of software, area of applications and most importantly risk factor should be sensible.
7. **Minimum gap between client and developer** - According to famous Dijkestra intellectual gap may be describe, is the distance between the real world problem and the computerized solution to the problem. If the maintenance of the software is easy then the gap will be low. With the help of the object oriented design and jack system of development method we can find that the structure of software which will be near real world structure.
8. **Design for change** - The techniques or method which is used in development process of software should have capacity of change.
9. **Reduce tricks** - We should try to reduce of those programs and code who makes compaction in that process.
10. **Management** - In the comparisons of good technology, good management is the best option because it helps the employees to motivate them for doing their duties in the proper way. Management planning cannot be done for a long period because its base is time and situation which can change any time. With a lack of resources a person who has deep knowledge of management can provide a positive result in every case.
11. **Right person is the base of success** - For the success of any planning we need to experts, experienced and skilled person. An expert can provide the best output with those sources who are not enough in normal condition. On the other hand without experienced person became fail in this condition. So quality is the main part in the selection time of employees.
12. **Use carefully** - For getting the best output it is necessary to use different method and techniques with carefully otherwise they provide the wrong output.
13. **Keep updated** - In the present time, this world is more progressive and competitive so to survive in the present time it is necessary to stay updated every time for new technology and their risk factors.

**Question:** Describe the components and quality which is necessary for the documents of software specification.

**Answer:** Software specification document may be defined as a set of those documents that have complete detail about the software just like functions of software, need of software, structure of design and its efficiency. A set of these valuable facts satisfied the software system. To reduce the gap between developer and user is the main objective of these documents. With the help of these document user and developer easily understand the need and expectation to this software system. Till time a client not gets the proper documentation regarding the software specification, he never thinks about that this software system is in favor or not. It satisfied the need of the user or not. Without a specified document it is not easy for any one that he can satisfy his customer that this software system complete their expectation.

A specified document regarding software have a lot of quality find which are defined below, with the help of these qualities a software system can achieve his goal.

1. **Completeness** - The base of specified software system documents is to cover all points which satisfied the customer. In case if complete information not find in those document then a number of question raised against this and it will not be good for the developer and client. Both parties lose their trust from this. In short, a software satisfied documents describe all the points related to its function and performance.
2. **Accurate** - 100% accuracy should be present when a software specification document present because it misguide the client if this report is not accurate.
3. **Understandable** - Software specification document should not be confusing that means the vision or objective should be clear and understandable so that user can easily understand it and become satisfied with this report.
4. **Regularity** - Regularity is also a main part of this document because every part or point covered step by step so that trust can be built in the favor of these documents.
5. **Alterable** - Alteration quality also should be present in software specification document because need of client and software can be any time change. So for this change a large scope should be present in this document report.
6. **Followable** - If the software specified document covered all point step by step then any one can easily understand it and checked it again at every level. In short cross check is easily done with this report.
7. **Valid** - All document related to it should be valid by law, requirement and the client need.

**Question:**What are the benefits of metrics in software engineering?

**Answer:** - Software metrics have a very large area and during the period of software development process it has much kind of applications regarding this. Software metrics plays a major role in software Engineering, The benefits are given below:

1. It makes the better control, planning and clear visibility.
2. It helps to increase the production and quality.
3. With the help of this we can measure the size of the software.
4. We can find out the cost of developed software.
5. With the help of software metrics we can find out the errors which creates problem on the first level of development life cycle.
6. We can find out the many kind of test techniques and method during this process.
7. With the help of this we can better control and examine this process of development life cycle.
8. We can take idea that how much cost and size would be this software.
9. With the help of better supervision on this we can find out the more important information about the capacity of productivity and quality.
10. With the help of software metrics we can analyze the problem which occurred in development process and helpful in better decision making.

**Question:** Give the benefits of verification and validation in software development and tell about the techniques of verification and validation in the process of software development.

**Answer:** - Verification and validation has a great role in software development process so it is necessary that verification and validation is done at each step. It covers the following parts:

1. Surety that software functions as per user's need.
2. Improvement in Quality.
3. To increase the efficiency of the work during the process of development.
4. Alteration in the software.

Techniques for Verification & validations

1. **Quality surety** - With the help of proper planning and systematic performance and both control may be the surety of better quality. The main objective of quality assurance is that to check the actions which are used in development process so that the margin of the error becomes zero and if in case error occurred during the process then solves the problem. To get the better output many actions taken by the developer.
2. **Walkthrough** - During the process of walkthrough material checked and valuate by the reviews. This process has deep supervision that the material used have the quality for the expert's opinion. Getting the problem area is the objective of walkthrough .With the help of expert's problems are resolved and all of this discussed in a meeting. Important thoughts to get the benefits from walkthrough:
   * A specific reason must be required for the walkthrough session.
   * Every work step taken on the basis of schedule to check that all products are working.
   * Error should be noted down and resolution must be done in walkthrough session.

Benefits

* + Error easily caught at the first level which reduces the wastage of time.
  + It improves the communication and coordination of team which are working on project.
  + With the help of other we can learn much more.

1. **Inspection** - In this step, a trained inspector required who can do better in inspection process. Inspection can be done on whole life cycle of software development and a better result can come out. According to Fagan -

*Three separate Inspections are to be performed. One is following design but priority to implementation. One is following implementation but priority to unit testing and one following unit testing.*

According to Fagan -

*An inspection team consist four persons who play the role of moderate, designer, implementer and tester.*

1. **Statistical analysis** - With the help of software tool when a program text is analysis that is called statistical analysis techniques. It covers following points.
   * To get the error of structural and get the difference actual and expected measurement.
   * To produce the important information for easily understanding the programs and documentation process.
   * It is helpful for getting the problems.
   * It is helpful for reducing the cost of error.
2. **Symbolic Execution** - Execution of symbol is a method of validation in which we input the data in the form of symbol and numbers are not used for input in this process.If the program implemented normally then input which is variable of a program unit are assigned symbolic values rather than literal values.In case when we input the data then we get the output in the forms of symbols.

**Question:**Write short note on Software failure, Black box testing, White box testing and Stress Testing.

**Answer:**

Software failure

Software failure may be define as software that have not able to do his work which is required from the software. In simple words we can say that when software not showing any error and performed continuously but output is not according to requirement that means system is failed. The difference between measured value and the required value show the degree of software failure.

Black box testing

Black box testing techniques may be define as a software testing techniques where the person who test The product have no any idea about the internal working of a system being tested. Functional testing is also a second name of black box testing techniques. Performance and behavior of the system are tested with Black box testing techniques. "What" is very important part in Black box testing.

Output are verified after inputting instruction if output have the quality then with the help of Black box testing techniques complete function tested of the product. Uses of Black box testing techniques are done at very late stage of testing. Sets of input situations are completely exercise in Black box testing techniques. Black box testing techniques have some approaches like Equivalence partitioning, boundary value analysis. Black box testing techniques have the focus on information domain. With the help of Black box testing techniques some errors we can easily check.

1. Incorrect functions
2. Data structure Errors
3. Errors in performance

White box testing

White box testing may be defined as a software testing, techniques where internal function of a software system is tested. White box testing has some others name like structure Testing and glass box testing, open box testing extra. For testing the structure of a program white box White box testing techniques is used. "How" is the important part of white box testing technique. Checkout the input and output is not the goal of white box testing but the care of the different kind of programming and structure of data is the goal of white box testing techniques.

In the process of testing it gives the output very earlier stage. To get the accuracy each program tested with white Box testing techniques. To perform the white box testing techniques basic path testing techniques is use. White box testing techniques have the focus on structural Controlling. Some tested are given below which are tested in white box testing techniques.

1. loops of the procedure
2. Internal data structure
3. Decision points
4. Execution paths

Stress testing

Stress testing cannot be performed in normal condition. With the help of this a system use in that condition when demand increased or decreased quickly.

* How a input function performed when the speed of input became more than expectations.
* More excessive search and hunting of data on click is also involved in stress testing.