


Unit-wise questions - Software Engineering

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1. Explain the software engineering and its role in Nation Development.

 **hide solution**
asked in 2068(II)

Solution

Software Engineering is an engineering discipline that is concerned with all aspects of software production from system specification through to maintenance. Software engineering includes activities such as software specification, software designing, software development, software validation, software deployment, software evolution. It is concerned with practicalities of developing and delivering useful software. Software engineering is not just concerned with technical process of software development but also includes activities such as software project management and the development of tools, methods and theories to support software production.

Software engineering is important for two reasons;

- More and more individuals and society rely on advanced software system. We need to be able to produce reliable and trustworthy system economically and quickly.
- It is usually cheaper in the long run to use software engineering methods, and techniques for software system rather than just write program as if it was a personal programming project.

National infrastructures and utilities are controlled by computer-based systems. We live in a world that is driven by IT. Software is a relatively low-investment, Eco-friendly, high growth global industry, a good target growth for industry for many countries. Every software exporting country have evolved a unique industry, shaped by its own resources and situation and by the particular global opportunities presented at the time. The world has moved from agricultural, industrial and post industrialization to the era of globalization and liberalization of a country. Hence information assets are seen as the key driver for economic growth, competitiveness, and business improvement. Software arena is a key strategic resume for value creation in an economy, intellectual capital and investment opportunity. Software development serves as vehicle for implementing responsive transparent start, a supportive business environment, enhanced learning environment, effective social program.

1. Explain the software and it's characteristics.

 **hide solution**
asked in 2069


Solution

Software is an organized collection of computer programs and associated documentation. A software system consist of a number of several programs, configuration files which are used to set of these programs and system documentations which describe the structure of system and user documentation which explain how to use the software.

Characteristics of software:

- **Functionality:** Refers to the degree of performance of the software against its intended purpose.
- **Reliability:** Refers to the ability of the software to provide desired functionality under the given conditions.
- **Usability:** Refers to the extent to which the software can be used with ease.
- **Efficiency:** Refers to the ability of the software to use system resources in the most effective and efficient manner.
- **Maintainability:** Refers to the ease with which the modifications can be made in a software system to extend its functionality, improve its performance, or correct errors.
- **Portability:** Refers to the ease with which software developers can transfer software from one platform to another, without (or with minimum) changes.

1. What is software? Discuss generic products and bespoke products with example. Discuss functional and non-functional system properties with example.

 **hide solution**
asked in 2071

Solution

Software is an organized collection of computer programs and associated documentation. A software system consist of a number of several programs, configuration files which are used to set of these programs and system documentations which describe the structure of system and user documentation which explain how to use the software.

Generic products and Bespoke products

Generic Products: These are stand-alone systems that are produced by a development organization and sold on the open market to any customer who is able to buy them. (i.e. developed to be sold to a range of different customers). e.g. Databases, Office packages, Drawing Packages etc.


Bespoke (custom) Products: These are the systems which are commissioned by a particular customer. A software contractor develops the software especially for that customer. (i.e. developed for a single customer according to their specification). e.g.: Control system for electronic device, software to support particular business process.

Functional and Non-functional system properties

Functional Property: These appear when all the parts of a system work together to achieve some objective. For example, a bicycle has the functional property of being a transportation device once it has been assembled from its components.

Non-functional Property: These relate to the behaviour of the system in its operational environment. They are often critical for computer-based systems as failure to achieve some minimal defined level in these properties may make the system unusable. Examples are reliability, performance, safety, and security.

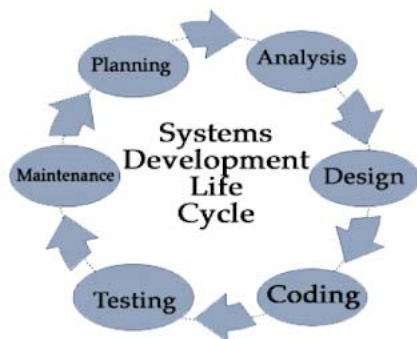
1. What are the different phases in software development life cycle? Explain.

 **hide solution**
asked in 2071(II)

Solution

System development life cycle is a very important method to develop an informative system. System development life cycle consist of six step and involves different persons. A system development life cycle work as an iterative model. Any change that is required in the system at any stage, the system development life cycle provide this facility to move back at any step to meet the requirements of the user's.

The steps of system development life cycle are as follow:



1. Preliminary investigation/system planning: Preliminary investigation is the first step of system development life cycle. In this step we interview the user. The preliminary investigation step involves to finds a user requirement and present problem in the current system. In this step we determine the resources or technologies, the cost of the software. If the proposed system is accepted by the user then next phase is started otherwise repeat this step again and again to meet the user requirement.

2. Requirement analysis: In this step, system analyst study the operation of the system and their relationship within an outside the system, and study that where improvement are required and how system work. Requirement specification document is produce in this step.

3. System design: In this step new system is design to meet the requirements of the user. The design of a new system depends on the requirements indetified in system analysis phase. System design defines the display of the system, the output of system.


4. Software development: Actual coding of the program is done in this step. The program is checked by using a dummy data. Documentation is prepared to explain certain procedure.

5. System testing and integration: Program is tested individually to check the develop program work according to the requirement. After individual testing the program module are integrated and then integrated module is tested to check whether system is work according to specification. The system is checked with actual data by real user's, and the result of the process is examines to ensure that the result is correct or not. If result is not correct or not according to requirement then adjustment is made in the program.

6. System implementation: In this step, the develop system is install and hand over to the user, and system user's are trained to operate the system carefully.

7. System maintenance: Maintenance of the system depends upon on modification and enhancements of the system. Maintenance of the system means that the current system working is effective even if system environment such as hardware, software is modified. The current system must up- to- date regularly.

1. Differentiate between software and software engineering. What are the characteristics and components of software? Explain.

 **hide solution**
asked in 2073

Solution

Software is an organized collection of computer programs and associated documentation. A software system consist of a number of several programs, configuration files which are used to set of these programs and system documentations which describe the structure of system and user documentation which explain how to use the software.

Software engineering is an engineering discipline that is concerned with all aspects of software production. Software engineering focus on cost effective development of high-quality software system. The result of software engineering is an effective and reliable software product.

Characteristics of software:

- **Functionality:** Refers to the degree of performance of the software against its intended purpose.
- **Reliability:** Refers to the ability of the software to provide desired functionality under the given conditions.
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Components of Software:

There are three components of the software:

1. Program:

A computer program is a list of instructions that tell a computer what to do.

2. Documentation:

Source information about the product contained in design documents, detailed code comments, etc.

3. Operating Procedures:

Set of step-by-step instructions compiled by an organization to help workers carry out complex routine operations.

1. Differentiate between software engineering and system engineering.

 **hide solution**
asked in 2074

Solution

Software engineering is an engineering discipline that is concerned with all aspects of software production. Software engineering focus on cost effective development of high-quality software system. The result of software engineering is an effective and reliable software product.

System engineering is an interdisciplinary field of engineering and engineering management that focus on how to design and manage complex system over their life cycle.

Difference between software engineering and system engineering

- Software engineering highly focuses on implementing quality software while system engineers highly concern about the users and domains.
- Software engineering includes in computer science or computer based engineering background while system engineering may covers a broader education area includes Engineering, Mathematics and Computer science.).
- Software engineers focus solely on software components while system engineering deals with a substantial amount of physical component of computers.
- Software Engineering deals with designing and developing software of the highest quality, while Systems Engineering is the sub discipline of engineering, which deals with the overall management of engineering projects during their life cycle.
- Software engineering techniques such as use-case modeling and configuration management are being used in the systems engineering process.

1.Explain the detail tasks in a software configuration management process with example.

asked in 2077


1. Suppose you are a Software Engineer of "ABC Software Company". You are developing large numbers of software. Have you faced any problems? Give your idea.

asked in 2075

2. Explain the agile software development. Compare between agile software development with prototyping software development.

asked in 2077

2. What are the key challenges facing in Software Engineering? Explain.

 **hide solution**
asked in 2068

Solution

Software engineering is an engineering discipline that is concerned with all aspects of software production. Software engineering focus on cost effective development of high-quality software system. The result of software engineering is an effective and reliable software product.

Software engineering focus on the following challenges:

i. Heterogeneity Challenge: Every organization is required to operate as a distributed system across the network that includes different types of computer and with different types of supporting system. The heterogeneity challenge is the challenge of developing software that is flexible enough to cope with heterogeneous system.

ii. Delivery Challenge: Traditional software engineering techniques are time consuming. The time they take is required to achieve software quality. However, business organization today must be responsive and change very rapidly. Their supporting software must change equally. The delivery challenge is the challenge to provide the software within short time without compromising software quality.

iii. Trust Challenge: Trust challenge is to develop a technique that demonstrates that software can be trusted by its user.

3. Compare between verification and validation. why validation is particularly difficult process? Explain with example. asked in 2077

4.What are the good characteristics of software? Explain. asked in 2077

5. Explain the process of requirement engineering. asked in 2077

4. Differentiate between software engineering and computer science? asked in Model Question

6. Differentiate between waterfall model and spiral model. asked in 2077

7. Explain the software quality assurance with example. asked in 2077

8. Discuss the structure of SRS document. asked in 2077

11. What is source code translation? Explain the program translation process with diagram. **hide solution** asked in 2074

Solution

The simplest form of software re-engineering is program translation where source code in one programming language is automatically translated to source code in some other language. The structure and organisation of the program itself is unchanged. The target language may be an updated version of the original language (e.g. COBOL-74 to COBOL-85) or may be a translation to a completely different language (e.g. FORTRAN to C).

Program translation process:

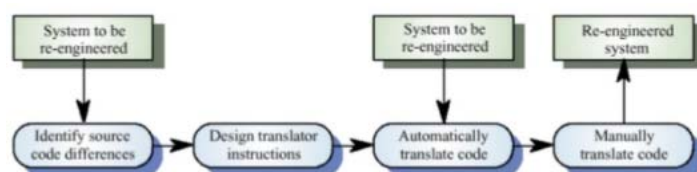


Fig: Program translation process

The above figure illustrates the process of source code translation. There may be no need to understand the operation of the software in detail or to modify the system architecture. The analysis involved can focus on programming language considerations such as the equivalence of program control constructs. Source code translation is only economically realistic if an automated translator is available to do the bulk of the translation. This may be a specially written program, a bought-in tool to convert from one language to another or a pattern matching system. In the latter case, a set of instructions how to make the translation from one representation to another has to be written. Parameterised patterns in the source language are defined and associated with equivalent patterns in the target language.

9. Explain with example how COCOMO can be used for software cost estimation? asked in 2077

12. Write short notes on: **hide solution** asked in 2072

a. Reverse engineering

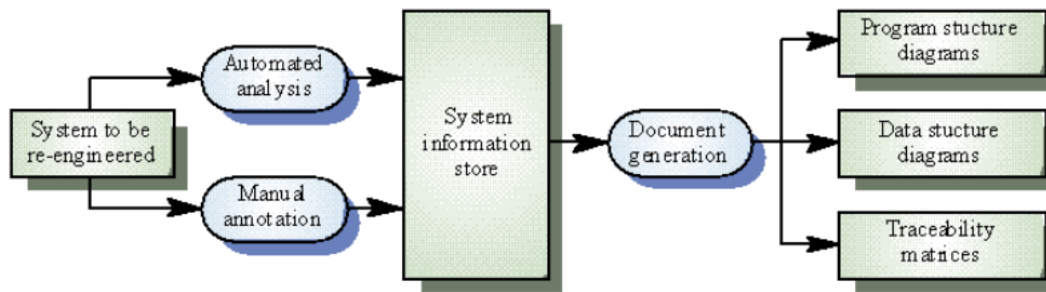
b. Function point

Solution

a. Reverse engineering

The objective of reverse engineering is to derive the design and specification of a system from its source code. It is the process of analyzing a program in an effort to create a representation of the program at a higher level of abstraction than source. The program itself is unchanged by the reverse engineering process. The software source code is usually available as the input.

Reverse engineering process:



b. Function point

Functional point is an element of software development which helps to approximate the cost of development early in the process. It may measure functionality from user's point of view.

Counting functional point (FP):

Step 1:

$F = 14 \times \text{scale}$, scale varies from 0 to 5 according to character of complexity adjustment factor (CAF).

Step 2:

$\text{CAF} = 0.65 + (0.01 \times F)$

Step 3:

Calculate unadjusted functional point (UFP)

Step 4:

Calculate functional point $\text{FP} = \text{UFP} \times \text{CAF}$

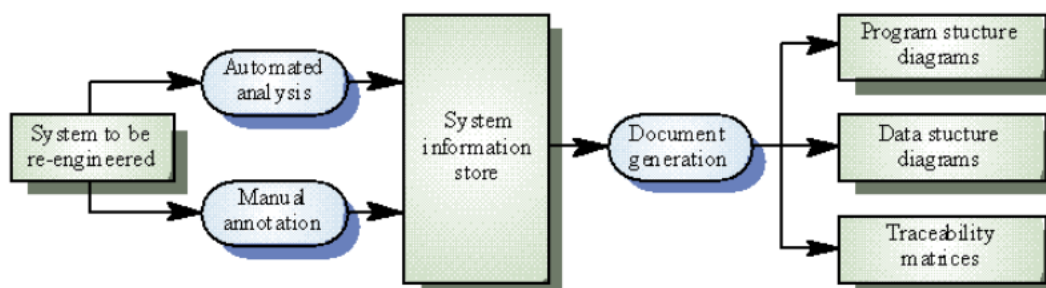
11. What is reverse engineering? Describe reverse engineering process.

hide solution
asked in 2075

Solution

The objective of reverse engineering is to derive the design and specification of a system from its source code. It is the process of analyzing a program in an effort to create a representation of the program at a higher level of abstraction than source. The program itself is unchanged by the reverse engineering process. The software source code is usually available as the input.

Reverse engineering process:



The process starts with an analysis phase. During this phase, the system is analysed using automated tools to discover its structure. In itself, this is not enough to re-create the system design. Engineers then work with the system source code and its structural model. They add information to this which they have collected by understanding the system. This information is maintained as a directed graph that is linked to the program source code.

Information store browsers are used to compare the graph structure and the code and to annotate the graph with extra information. Documents of various types such as program and data structure diagrams and traceability matrices can be generated from the directed graph. Traceability matrices show where entities in the system are defined and referenced. The process of document generation is an iterative one as the design information is used to further refine the information held in the system repository.

10. Discuss with example of reuse base software engineering.

asked in 2077

11. Write down the software version control process.

asked in 2077

12. Differentiate between Alpha testing and Beta testing.

asked in 2077

Unit: 2 Software Processes

25 questions

Unit: 3 Agile Software Development

questions

Unit: 4 Requirements Engineering

24 questions

Unit: 5 System Modeling

4 questions

Unit: 6 Architectural Design

12 questions

Unit: 7 Design and Implementation

10 questions

Unit: 8 Software Testing

26 questions

Unit: 9 Software Evolution

4 questions

Unit: 10 Software Management

14 questions

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