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Sub: Software Engineering

Introduction: Software engineering is the systematic application of engineering approaches to the development of software. Software engineering is a direct sub-field of engineering and has an overlap with computer science and management science. It is also considered a part of overall systems engineering.

Software Overview:

Let us understand what Software Engineering stands for. The term is made of two words, software and engineering.

Software is more than just a program code. A program is an executable code, which serves some computational purpose. Software is considered to be collection of executable programming code, associated libraries and documentations. Software, when made for a specific requirement is called software product.

Engineering on the other hand, is all about developing products, using well-defined, scientific principles and methods.

Software engineering is an engineering branch associated with development of software product using well-defined scientific principles, methods and procedures. The outcome of software engineering is an efficient and reliable software product.

Definitions

IEEE defines software engineering as:

The application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software; that is, the application of engineering to software.(2)The study of approaches as in the above statement. Fritz Bauer, a German computer scientist, defines software engineering as:“Software engineering is the establishment and use of sound engineering principles in order to obtain economically software that is reliable and work efficiently on real machines

Software Engineering Fields

- Software requirements
- Software design
- Software development
- Software testing
- Software maintenance

The process to gather the software requirements from client, analyze and document them is known as requirement engineering. The goal of requirement engineering is to develop and maintain sophisticated and descriptive ‘System Requirements Specification’ document.

Software design is the process of preparing the plan for a software application while satisfying a problem’s functional requirements and not violating its non-functional constraints. During this process, trade offs need to be made, like the trade off between performance and resource consumption, so that the application is optimized to meet the non-functional requirements.

Software development, the main activity of software construction is the combination of programming, verification, software testing, and debugging. A Software development process is the definition, implementation, assessment, measurement, management, change, and improvement of the software life cycle process itself.

Software Testing is defined as an activity to check whether the actual results match the expected results and to ensure that the software system is Defect free. It involves execution of a software component or system component to evaluate one or more properties of interest. Software testing also helps to identify errors, gaps or missing requirements in contrary to the actual requirements.

Software Maintenance is the process of modifying a software product after it has been delivered to the customer. The main purpose of software maintenance is to modify and update software application after delivery to correct faults and to improve performance.