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Software Development Life Cycle

Summary: As in any other engineering disciplines, software engineering also has some structured models for software development. This document will provide you with a generic overview about different software development methodologies adopted by the contemporary software firms. Read about software development models here.

Curtain Raiser

Like any other engineering products, software products are oriented towards customers. It is either market driven (or) it drives the market. Customer Satisfaction was the buzzword of the 80's. Customer Delight is today's buzzword and Customer Ecstasy is the buzzword of the new millennium. Products that are not customer (user) friendly have no place in the market although they are engineered using the best technology. The interface of the product is as crucial as the internal technology of the product.

Market Research

A market study is made to identify a potential customer's need. This process is also known as market research. Here, the already existing need and the possible/potential needs that are available in a segment of the society are studied carefully. The market study is done based on lot of assumptions. Assumptions are the crucial factors in the development or inception of a product development. Unrealistic assumptions can cause a nosedive in the entire venture. Though assumptions are abstract, there should be a move to develop tangible assumptions to come up with a successful product.

Research and Development

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Once the Market study is made, the customer's need is given to the Research and Development (R&D) Department to conceptualize a cost-effective system that could potentially solve customer's needs better than the competitors. Once the conceptual system is developed and tested in a hypothetical environment, the development team takes control of it. The development team adopts one of the software development methodologies that is given below, develops the proposed system, and gives it to the customers.

The Marketing group starts selling the product to the available customers and simultaneously works in developing a niche segment that could potentially buy the product. In addition, the marketing group passes the feedback from the customers to the developers and the R&D group to make possible value additions in the product.

while developing a product, the company outsources** the non-core activities to the other companies who specialize in those activities. This accelerates the product development process largely. Some companies work on tie-ups to bring out a highly matured product in a short period.

Following are the basic popular models used by many software development firms.

System Development Life Cycle Model

Prototyping Model

Rapid Application Development Model

Component Assembly Model

System Development Life Cycle Model

This is also known as Classic Life Cycle Model (or) Linear Sequential Model (or) waterfall Method. This has the following activities.

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1. System/Information Engineering and Modeling
2. Software Requirements Analysis
3. Systems Analysis and Design
4. Code Generation
5. Testing
6. Maintenance

System/Information Engineering and Modeling

As software is always of a large system (or business), work begins by establishing requirements for all system elements and then allocating some subset of these requirements to software. This system view is essential when software must interface with other elements such as hardware, people and other resources. System is the basic and very critical requirement for the existence of software in any entity. So if the system is not in place, the system should be engineered and put in place. In some cases to extract the maximum output, system should be re-engineered and spiced up. Once the ideal system is engineered or tuned up, the development team studies the software requirement for the system.

Software Requirements Analysis

This is also known as feasibility study. In this phase, the development team visits the customer and studies their system. They investigate the need for possible software automation in the given system. By the end of the feasibility study, the team furnishes a document that holds the different specific recommendations for the candidate system. It also includes the personnel assignments, costs, project schedule, and target dates. The requirements gathering process is intensified and focussed specially on software. To understand the nature of the program(s) to be built, the system engineer ("analyst") must understand the information domain for the software, as well as required function, behavior, performance and interfacing. The essential purpose of this phase is to find the need and to define the problem that needs to be solved .

System Analysis and Design

In this phase, the software's overall structure and its nuances are defined. In terms of the client/server technology, the number of tiers needed for the package architecture, the database design, the data structure design etc are all defined in this phase. Analysis and Design are very crucial in the whole development cycle. Any glitch in the design phase could be very expensive to solve in the later stage of the software development. Much care is taken during this phase. The logical system of the product is developed in this phase.

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Code Generation

The design must be translated into a machine-readable form. The code generation step performs this task. If design is performed in a detailed manner, code generation can be accomplished with out much complication. Programming tools like Compilers, Interpreters, Debuggers are used to generate the code. Different high level programming languages like C, C++, Pascal, Java are used for coding. With respect to the type of application, the right programming language is chosen.

Testing

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Once the code is generated, the program testing begins. Different testing methodologies are available to unravel the bugs that were committed during the previous phases. Different testing tools and methodologies are already available. Some companies build their own testing tools that are tailor made for their own development operations.

Maintenance

Software will definitely undergo change once it is delivered to the customer. There are many reasons for the change. Change could happen because of some unexpected input values into the system. In addition, the changes in the system could directly affect the software operations. The software should be developed to accommodate changes that could happen during the post implementation period.