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**PROCESS MODELS**

WATERFALL MODEL

In the waterfall model approach the process is divided into phases in which the outcome of phase Pn is used as input for phase Pn+1. It consists of 6 phases namely:

Requirement analysis, System design, Implementation, Testing, Deployment, Maintenance.

It involves high amount of uncertainty and not recommended for complex, scalable and prone to modifications projects.

For ex, Supply Chain Management Systems. It’s a software used by companies to manage flow of goods, data and resources related to any product or service they sell. The development of these software is quite straightforward and the probability of modifications in the software in the future is also low. Even if the software requires modifications, the requirements usually do not change and everything is modified on the base already made during the initial deployment stages.

EVOLUTIONARY MODEL

This model relies on customer-developer interaction and evolution of the system according to it. It suggests breaking down of the work in smaller chunks and delivering them to the customer one by one. It is of two types:

Exploratory Deployment:

Project starts with well-understood system requirements and working with customers to evolve final system from the outline.

Throw away prototyping:

This objective is to understand system requirements through prototyping the project and it starts with poorly understood system requirements.

This approach lacks process visibility and often is poorly structured.

Example: Evolution of cars. Cars have been in the market for long time but if we compare where they were at the start and where they are now; it’s a night and day difference. In the start they were merely functional, sometimes even used just to showcase wealth. They were designed according to the technology available back then and requirements back then. Now, we are already working on prototypes of self-driving cars, integration of cars with the smart functionalities to make user experience better. There had been misfires in that field too where features that were not actually useful were introduced for a short timespan just because of initial appeal and later removed due to realization of how impractical they were but that’s part of the evolutionary model and prototyping. This highlights both the advantages and drawbacks of the evolutionary model.

RE-USE ORIENTED MODEL

It is based on systematic reuse where systems are integrated from existing components or commercial off the shelf systems. It has 4 stages of development:

Component analysis

Requirement analysis

System design with reuse

Development and integration

For example, the very well-known programming language Python. Python is extremely useful in the field of data science and complex computations. It is Turing complete and despite being so complex in terms of its library management, it is based of very fundamental C programming language. Python’s one of most implementation is called CPython and is written in C. Other implementations are also present like IronPython which is implementation of .NET framework and JPython as Java VM implementation. It uses the basic tools provided by these frameworks to create something that’s more than the sum of its components.

INCREMENTAL MODEL

In this model, the process is divided into multiple standalone modules of the SDLC and each module goes through the same six phases as mentioned above in the waterfall model. The process continues until the system is achieved. Its is useful when the project has lengthy development scheduler and customer demands quick release of product. Its flexible, easier to test and debug and scalable however it needs good planning, the cost of production is high and works on application with modular interface only. Example social media app such as Facebook or Instagram. To the very basic version of them the applications can be broken down into login-logout phase, messaging implementation, user-profile management, network and friend request management, homepage feed management, recommendations management and much more. Each of the modules go through the 6 phases of waterfall model individually before integration and it makes it easy to debug and maintain the application.

SPIRAL DEVELOPMENT MODEL

Process is represented as a spiral rather than sequence of activities with backtracking. Each loop represents a phase in the process. Risk assessment is very good in this approach.

An example of this approach is MS-Excel since we have to create cells first, then populate the cells and then perform operations such as merge cells, split cells etc.

AGILE MODEL

In agile model the product is broken into small incremental builds and each build undergoes iteration of planning, requirement analysis, designing, coding, unit testing, and acceptance testing.

This model focusses on keeping up the project with the methods which best suit the project requirements and each unit is assigned time of completion to maintain consistency.

For example recent phone companies such as Xiaomi are able to give tough competition of established tech-giants such as Samsung just because they came into existence into an era when online shopping was dominating, so they were able to analyse the situation and focus their resources on the methodologies which went in-sync with the trend whereas Samsung had to change their business model to merge with this new era of technology. As a result Xiaomi is now dominating the smartphone market because they used methods which best suited the project requirements.