**SOFTWARE TESTING**

**SDLC MODELS:**

As we discussed previously, Software Development is a methodology to develop the Software, Going forward let’s see some of the SDLC Models:

1. Waterfall Model  
2. Incremental Model  
3. V- Model  
4. Agile Model  
5. Spiral Model

**1. Waterfall Model:**

**WATERFALL MODEL** is a sequential model that divides software development into pre-defined phases. Each phase must be completed before the next phase can begin with no overlap between the phases. Each phase is designed for performing specific activity during the SDLC phase. It was introduced in 1970 by Winston Royce.

Timeline

Description automatically generated

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| **Different phases** | **Activities performed in each stage** |
| **Requirement Gathering stage** | * During this phase, detailed requirements of the software system to be developed are gathered from client |
| **Design Stage** | * Plan the programming language, for Example [Java](https://www.guru99.com/java-tutorial.html), [PHP](https://www.guru99.com/php-tutorials.html), * or database like Oracle, MySQL, etc. * Or other high-level technical details of the project |
| **Built Stage** | * After design stage, it is built stage, that is nothing but coding the software |
| **Test Stage** | * In this phase, you test the software to verify that it is built as per the specifications given by the client. |
| **Deployment stage** | * Deploy the application in the respective environment |
| **Maintenance stage** | * Once your system is ready to use, you may later require change the code as per customer request |

### **When to use SDLC Waterfall Model**

Waterfall model can be used:

* Requirements are not changing frequently.
* Application is not complicated and big.
* Project is short.
* Requirement is clear.
* Environment is stable.
* Technology and tools used are not dynamic and is stable.
* Resources are available and trained.

### **Advantages and Disadvantages of Waterfall-Model**

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| **Advantages** | **Dis-Advantages** |
| * Before the next phase of development, each phase must be completed | * Error can be fixed only during the phase |
| * Suited for smaller projects where requirements are well defined | * It is not desirable for complex project where requirement changes frequently |
| * They should perform quality assurance test (Verification and Validation) before completing each stage | * Testing period comes quite late in the developmental process |
| * Elaborate documentation is done at every phase of the software's development cycle | * Documentation occupies a lot of time of developers and testers |
| * Project is completely dependent on project team with minimum client intervention | * Clients valuable feedback cannot be included with ongoing development phase |
| * Any changes in software is made during the process of the development | * Small changes or errors that arise in the completed software may cause a lot of problems |

**2. Incremental Model:**

Incremental Model is a process of software development where requirements are broken down into multiple standalone modules of software development cycle. Incremental development is done in steps from analysis design, implementation, testing/verification, maintenance.

Each iteration passes through the **requirements, design, coding and testing phases**. And each subsequent release of the system adds function to the previous release until all designed functionality has been implemented.

[](https://www.guru99.com/images/6-2015/052615_1049_WhatisIncre2.png)

The system is put into production when the first increment is delivered. The first increment is often a core product where the basic requirements are addressed, and supplementary features are added in the next increments. Once the core product is analyzed by the client, there is plan development for the next increment.

## **Characteristics of an Incremental module includes:**

* System development is broken down into many mini development projects.
* Partial systems are successively built to produce a final total system.
* Highest priority requirement is tackled first.
* Once the requirement is developed, requirement for that increment are frozen.

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| **Incremental Phases** | **Activities performed in incremental phases** |
| **Requirement Analysis** | * Requirement and specification of the software are collected |
| **Design** | * Some high-end function are designed during this stage |
| **Code** | * Coding of software is done during this stage |
| **Test** | * Once the system is deployed, it goes through the testing phase |

## **When to use Incremental models?**

* Requirements of the system are clearly understood.
* When demand for an early release of a product arises
* When software engineering team are not very well skilled or trained
* When high-risk features and goals are involved
* Such methodology is more in use for web application and product based companies.

## Advantages and Disadvantages of Incremental Model

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| **Advantages** | **Disadvantages** |
| * The software will be generated quickly during the software life cycle | * It requires a good planning designing |
| * It is flexible and less expensive to change requirements and scope | * Problems might cause due to system architecture as such not all requirements collected up front for the entire software lifecycle |
| * Throughout the development stages changes can be done | * Each iteration phase is rigid and does not overlap each other |
| * This model is less costly compared to others | * Rectifying a problem in one unit requires correction in all the units and consumes a lot of time |
| * A customer can respond to each building |  |
| * Errors are easy to be identified |  |