Difference Between Waterfall & Iterative Model

Starting with,

BASIC UNDERSTANDINGS

What is Waterfall Model?

The waterfall model is a classical model used in system development life cycle to create a system with a linear and sequential approach. Now the question that arises in everyone mind is that what is linear and sequential approach, so a systematic, sequential approach to software development that begins at the system level and progresses through communication, planning, modeling, construction and deployment can be termed as is linear and sequential approach. In the same waterfall model follows the sequential approaches which can be further understand by the figure below,

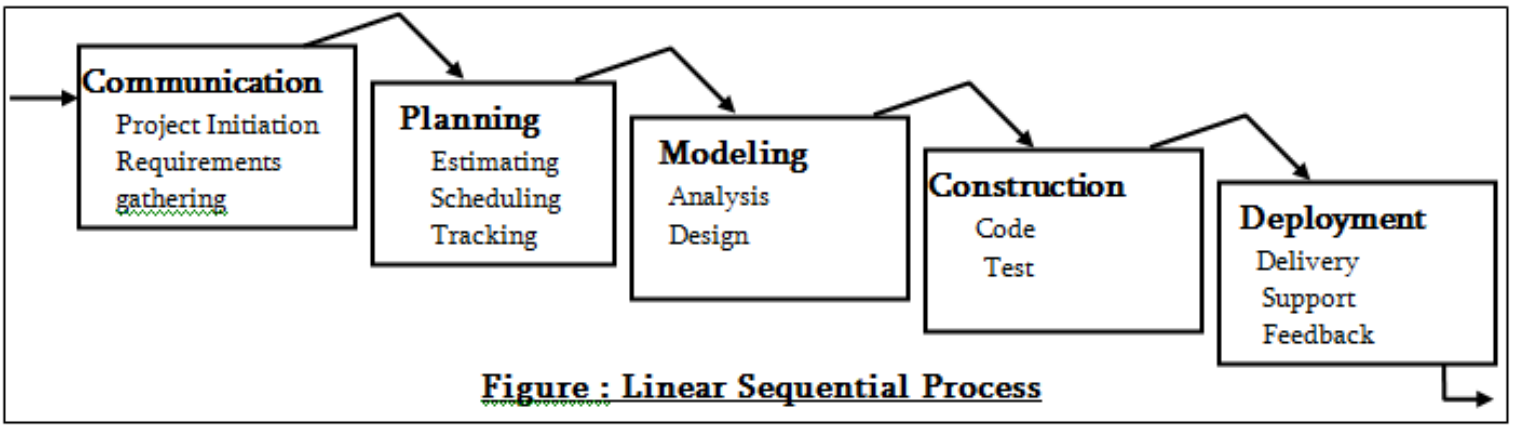


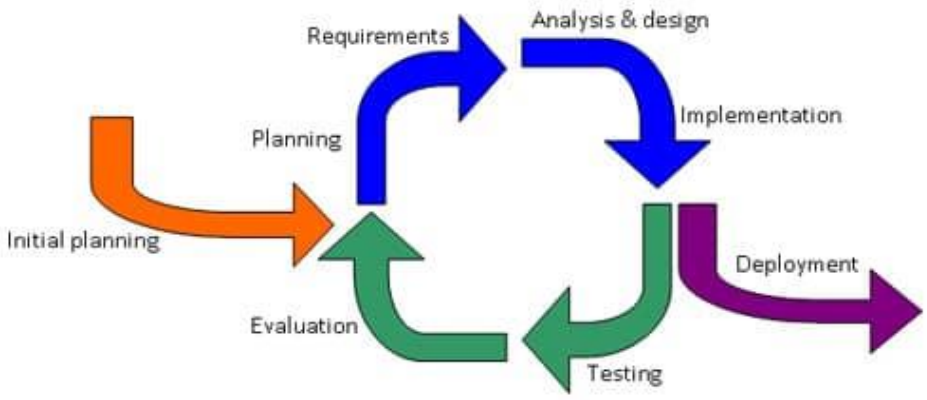
Figure : Linear Sequential Process

Now take a look at,

What is Iterative Model?

An iterative life cycle model does not attempt to start with a full specification of requirements. Instead, development begins by specifying and implementing just part of the software, which can then be reviewed in order to identify further requirements. This process is then repeated, producing a new version of the software for each cycle of the model.

More about iterative model can be understood from the following figure,



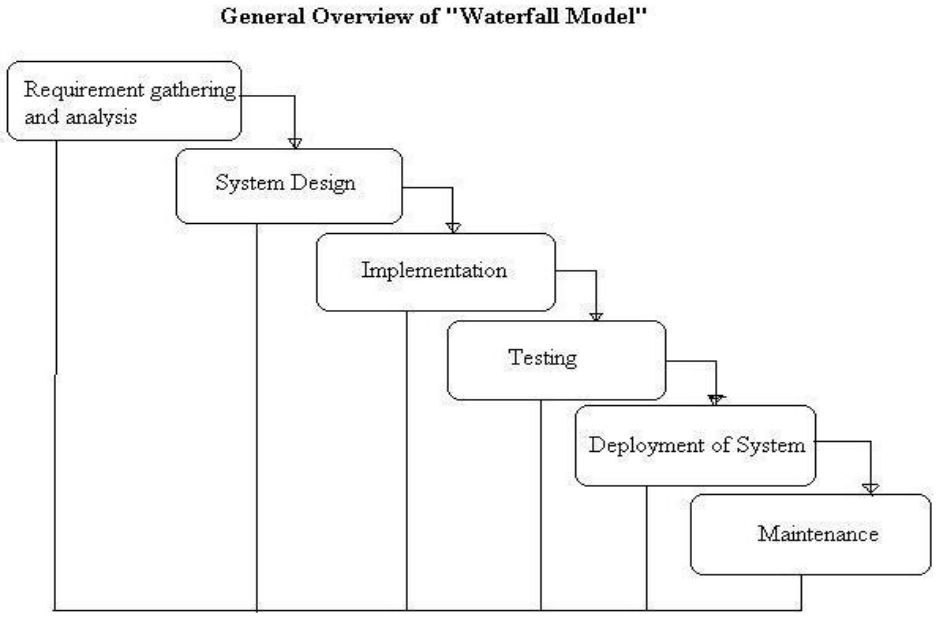
Model 1: Typical iterative development process

Here we can see that starting from the initial planning and following the cycle path there is no constraints, means that we can come back to any state before deploying. Further about this will be explained in the phases.

2.
Phases
For Waterfall & Iterative model

Now after having a bit knowledge about what waterfall and iterative **SDC** models are we will go through what phases (stages) these models go through and what are their constraints.

Waterfall Model



Here above we can see the diagrammatic form of waterfall model and its phases below are their phases defined:

Requirements

Requirements are gathered by the business analyst and they are analyzed by the team.

System Design

The architect and senior members of the team work on the software architecture, high level and low level design for the project.

Implementation

The development team work on coding project. They take the design documents and ensure that their solution follows the design.

Testing

The testing team tests the complete application and identifies any defects in the application. These defects were fixed by developers.

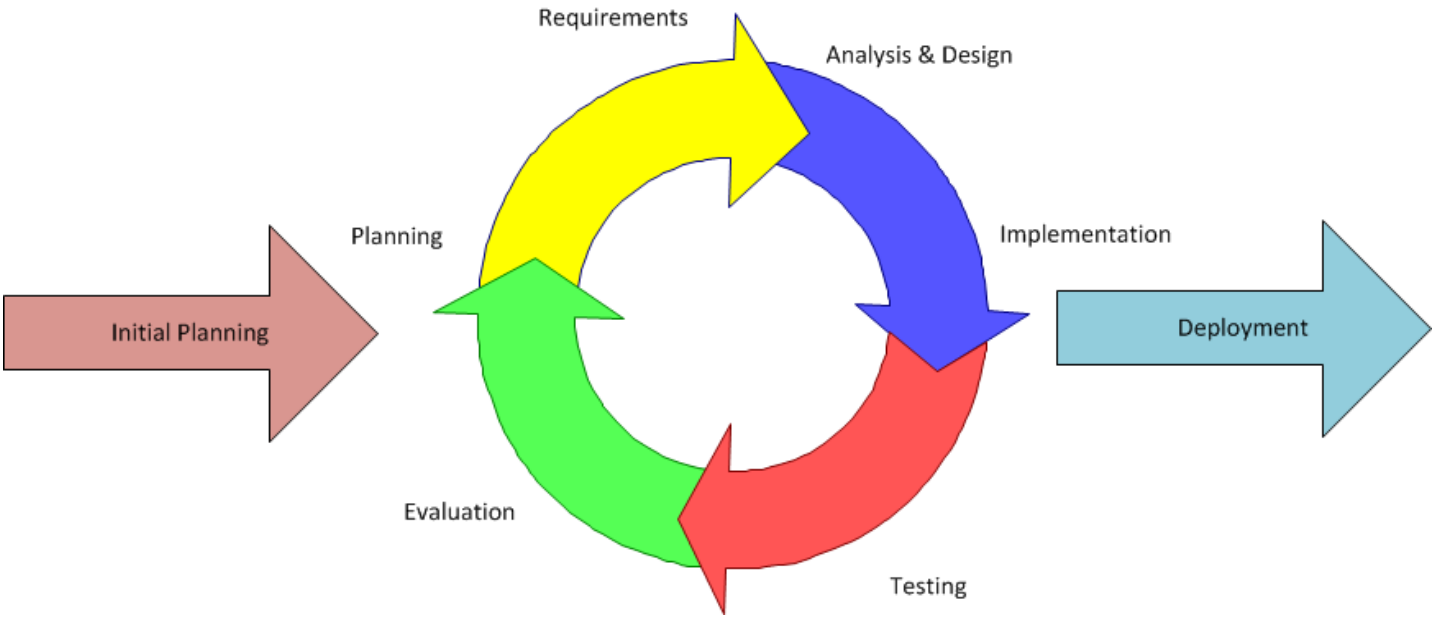
Deployment

The team builds and installs the application on the servers which were produced for the banking application.

Maintenance

During the maintenance phase, the team ensures that the application is running smoothly on the servers without any downtime.

Iterative Model



Requirements

Requirements are gathered and analyzed. Major req. is fixed while some functional req. can be evolved with the time.

Design & Development

Software team design the software. Different diagrams are drawn in this phase for software.

Testing

Test the software by using different software testing techniques. Most common are white box, black box testing techniques.

Implementation

Programs are written and all the designed is converted into computer programs, collectively called software.

3.
Advantages
Waterfall & Iterative model

After the phases comes the part where we get to know what are the pros of using these **SDC models**

Waterfall Model

- This model is simple and easy to understand and use.

- It is easy to manage due to the rigidity of the model – each phase has specific deliverables and a review process.

- In this model phases are processed and completed one at a time. Phases do not overlap.

- Waterfall model works well for smaller projects where requirements are clearly defined and very well understood.

Iterative Model

- In iterative model we can only create a high-level design of the application before we actually begin to build the product and define the design solution for the entire product. Later on we can design and built a skeleton version of that, and then evolved the design based on what had been built.

- In iterative model we are building and improving the product step by step. Hence we can track the defects at early stages. This avoids the downward flow of the defects.

- In iterative model we can get the reliable user feedback. When presenting sketches and blueprints of the product to users for their feedback, we are effectively asking them to imagine how the product will work.

- In iterative model less time is spent on documenting and more time is given for designing.

4.
Disadvantages
Waterfall & Iterative model

Just like a coin have two sides these **SDC models** also have some disadvantages:

Waterfall Model

- Once an application is in the testing stage, it is very difficult to go back and change something that was not well-thought out in the concept stage.

- No working software is produced until late during the life cycle.

- High amounts of risk and uncertainty.

- Not a good model for complex and object-oriented projects.

- Poor model for long and ongoing projects.

- Not suitable for the projects where requirements are at a moderate to high risk of changing.

Iterative Model

- Each phase of an iteration is rigid with no overlaps.
- Requirements changes, again and again, can cause over budget and over time.
- Design can be changed again and again due to non-perfect requirements.
- Project completion date prediction is a problem because software is changing again and again in iteration.

5.
When to use ?
Waterfall & Iterative model

Waterfall Model

- When the requirements are very well known, clear and fixed.
- Product definition is stable.

- There are no ambiguous requirements.

- The project is short.

Iterative Model

- When the project is large.

- When requirements are clear.

- Major requirements must be defined; however, some details can evolve with time.