SNS COLLEGE OF ENGINEERING

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE NAME : 19CS302 AGILE SOFTWARE ENGINEERING

II YEAR /III SEMESTER

Unit 1- Introduction to Software Engineering

Topic 3: Process Model-Generic and Prescriptive model

Brain Storming

1. How to a software is developed?

What is a software process model?

A simplified representation of a software process, presented from a specific perspective.

Examples of process perspectives:

Workflow perspective : represents inputs, outputs and dependencies

Data-flow perspective : represents data transformation activities

Role/action perspective :represents the roles/activities of the people involved in software process

Generic Model

These **generic models** are abstractions of the **process** that can be used to explain different approaches to the software development.

There are five generic process framework activities:

1. Communication:
The software development starts with the communication between customer and developer.

2. Planning:
It consists of complete estimation, scheduling for project development and tracking.

Conti...

3. Modeling: Modeling consists of complete requirement analysis and the design of the project like algorithm, flowchart etc.

The algorithm is the step-by-step solution of the problem and the flow chart shows a complete flow diagram of a program.

4. Construction: Construction consists of code generation and the testing part.

Coding part implements the design details using an appropriate programming language.

Testing is to check whether the flow of coding is correct or not.

Testing also check that the program provides desired output.

5. Deployment: Deployment step consists of delivering the product to the customer and take feedback from them.

If the customer wants some corrections or demands for the additional capabilities, then the change is required for improvement in the quality of the software.

Prescriptive Model

The name 'prescriptive' is given because the model prescribes a set of activities, actions, tasks, quality assurance and change the mechanism for every project.

There are three types of prescriptive process models. They are:

1. The Waterfall Model
2. Incremental Process model
3. RAD model

Water Fall Model

- The waterfall model is also called as 'Linear sequential model' or 'Classic life cycle model'.

- In this model, each phase is fully completed before the beginning of the next phase.

- This model is used for the small projects.

- In this model, feedback is taken after each phase to ensure that the project is on the right path.

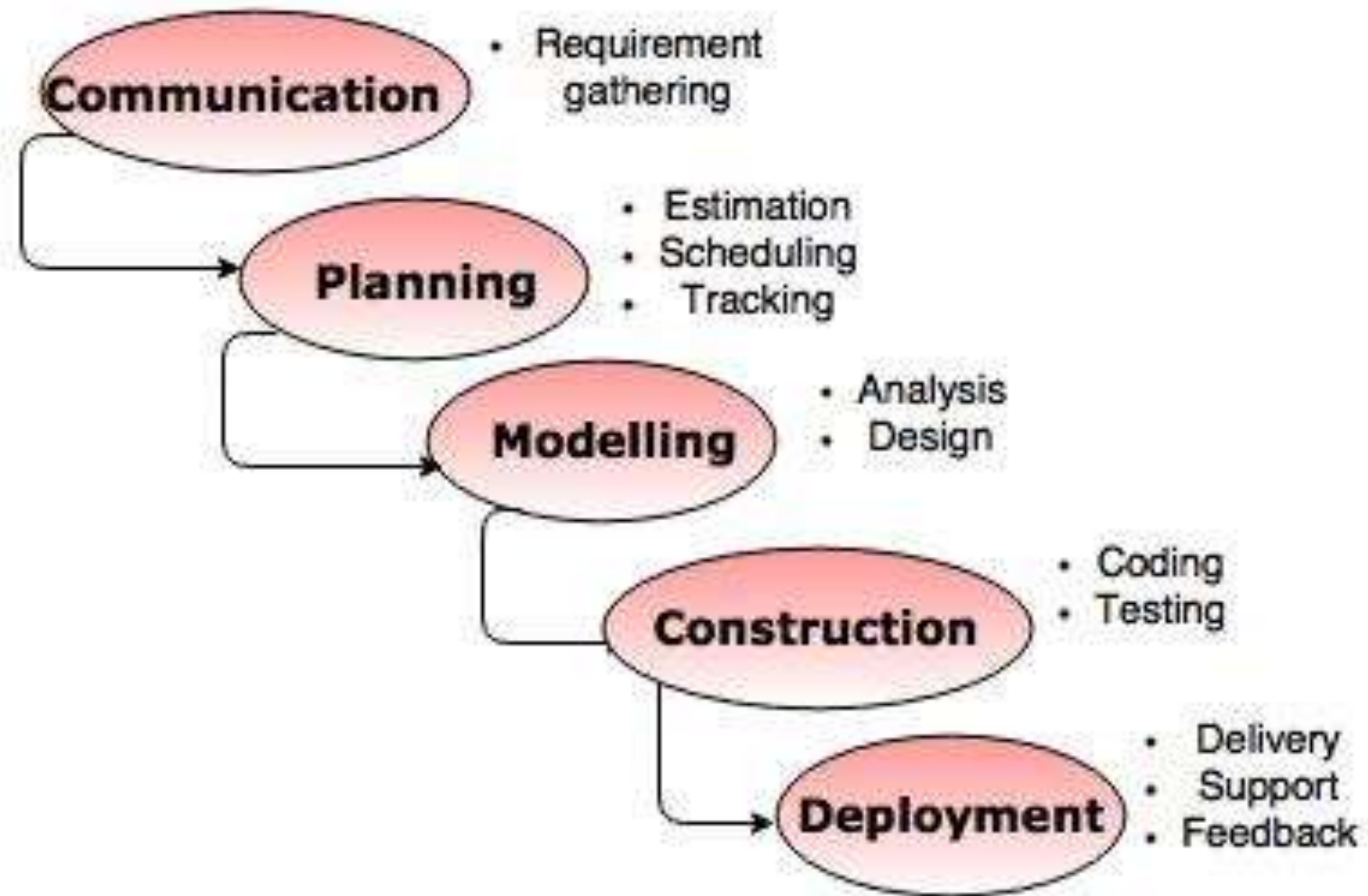- Testing part starts only after the development is complete.

Waterfall Model

Fig. - The Waterfall model

Waterfall Model

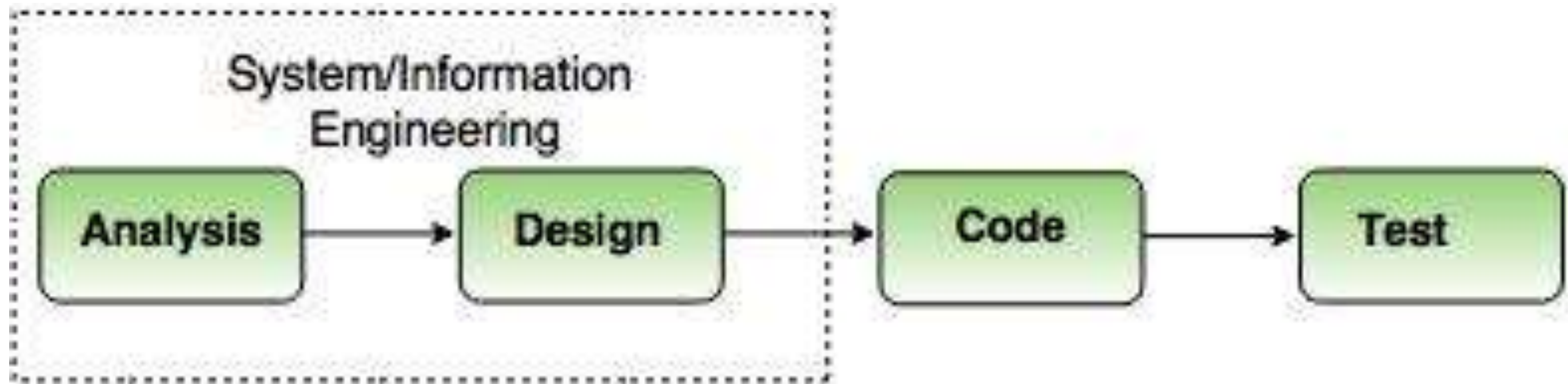**An alternative design for 'linear sequential model' is as follows:**

Fig. - The linear sequential model

Waterfall Model

Advantages of waterfall model

• The waterfall model is simple and easy to understand, implement, and use.

• All the requirements are known at the beginning of the project, hence it is easy to manage.

• It avoids overlapping of phases because each phase is completed at once.

• This model works for small projects because the requirements are understood very well.

• This model is preferred for those projects where the quality is more important as compared to the cost of the project.

Waterfall Model

Disadvantages of the waterfall model

• This model is not good for complex and object-oriented projects.

• It is a poor model for long projects.

• The problems with this model are uncovered, until the software testing.

• The amount of risk is high.

Incremental Model

•The incremental model combines the elements of waterfall model, and they are applied in an iterative fashion.

•The first increment in this model is generally a core product.

•Each increment builds the product and submits it to the customer for any suggested modifications.

•The next increment implements on the customer's suggestions and add additional requirements in the previous increment.

•This process is repeated until the product is finished.

For example, the word-processing software is developed using the incremental model.
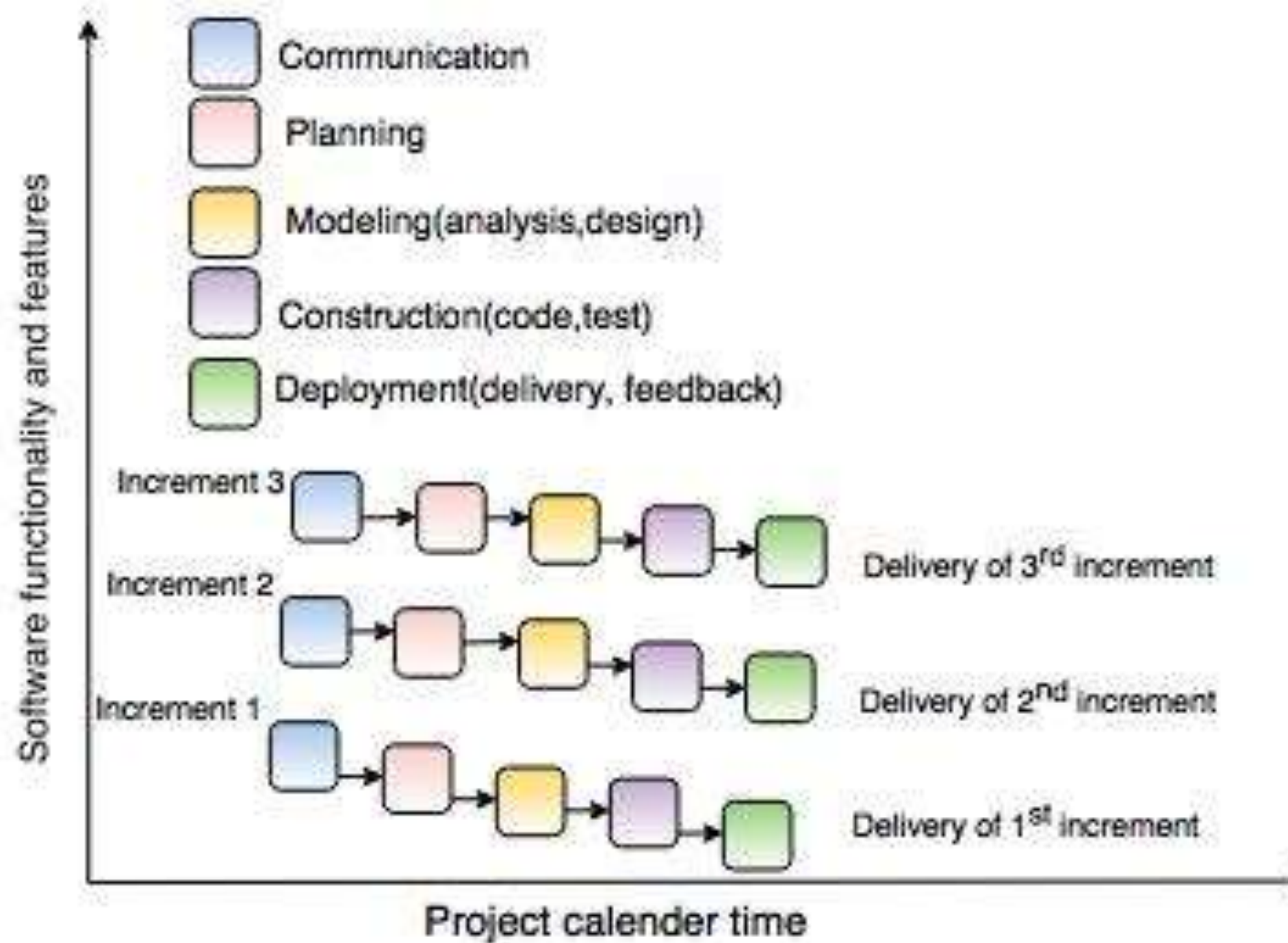
Incremental Model

Fig. - Incremental Process Model

Incremental Model

Advantages of incremental model

• This model is flexible because the cost of development is low and initial product delivery is faster.

• It is easier to test and debug during the smaller iteration.

• The working software generates quickly and early during the software life cycle.

• The customers can respond to its functionalities after every increment.

Incremental Model

Disadvantages of the incremental model

•The cost of the final product may cross the cost estimated initially.

•This model requires a very clear and complete planning.

•The planning of design is required before the whole system is broken into small increments.

•The demands of customer for the additional functionalities after every increment causes problem during the system architecture.

RAD model

- RAD is a **Rapid Application Development model.**

- Using the RAD model, software product is developed in a short period of time.

- The initial activity starts with the communication between customer and developer.

- Planning depends upon the initial requirements and then the requirements are divided into groups.

- Planning is more important to work together on different modules.

RAD model

The RAD model consist of following phases:

1. Business Modelling

•Business modelling consist of the flow of information between various functions in the project.

•For example, what type of information is produced by every function, and which are the functions to handle that information.

•A complete business analysis should be performed to get the essential business information.

2. Data modeling

•The information in the business modeling phase is refined into the set of objects and it is essential for the business.

•The attributes of each object are identified and define the relationship between objects.

RAD model

3. Process modeling

• The data objects defined in the data modeling phase are changed to fulfil the information flow to implement the business model.

• The process description is created for adding, modifying, deleting or retrieving a data object.

4. Application generation

• In the application generation phase, the actual system is built.

• To construct the software the automated tools are used.

5. Testing and turnover.

- The prototypes are independently tested after each iteration so that the overall testing time is reduced.

- The data flow and the interfaces between all the components are fully tested. Hence, most of the programming components are already tested.
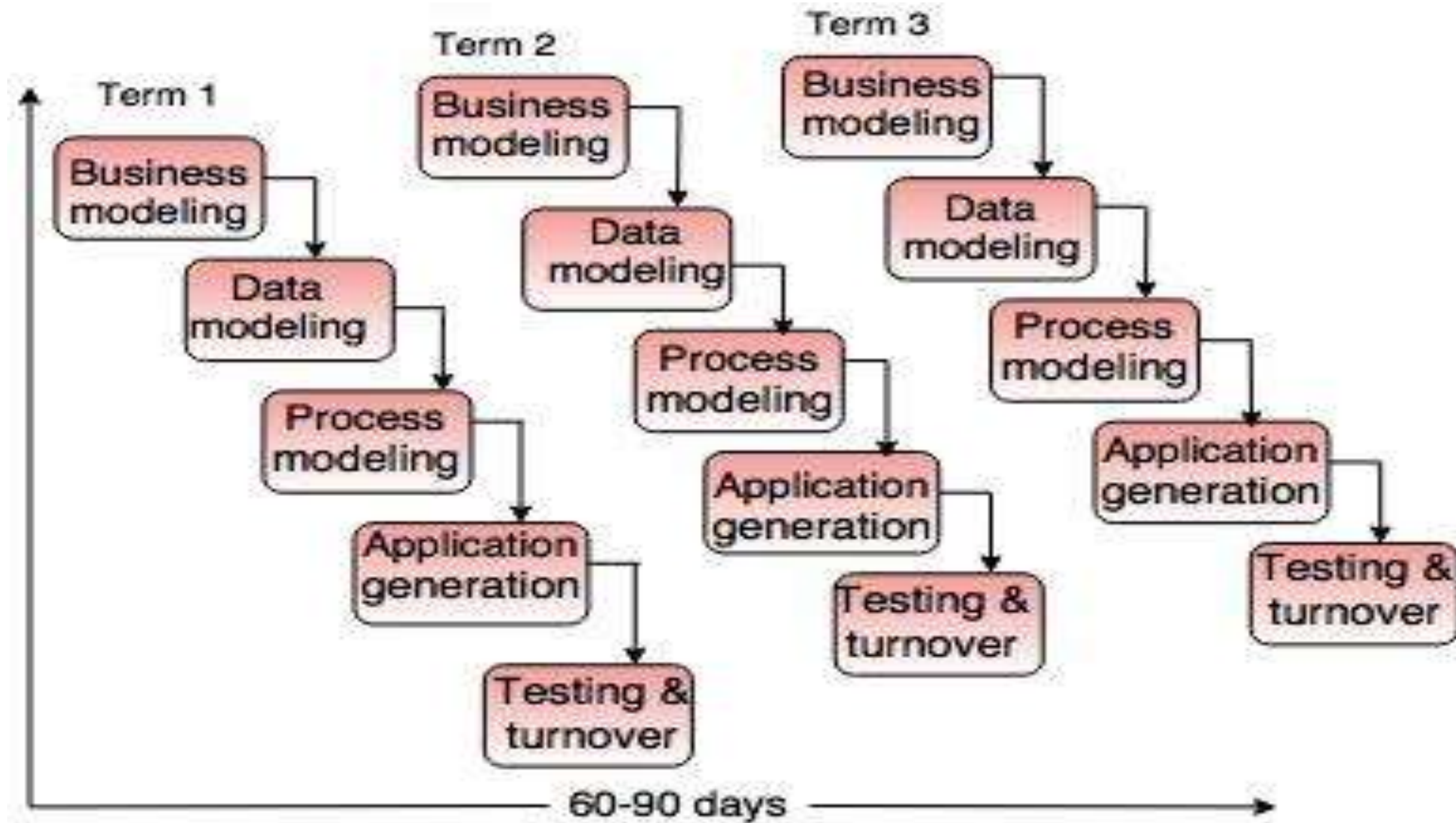
RAD Model

Fig. - RAD Model

When to use RAD Model

- When the system should need to create the project that modularizes in a short span time (2-3 months).

- When the requirements are well-known.

- When the technical risk is limited.

- When there's a necessity to make a system, which modularized in 2-3 months of period.

- It should be used only if the budget allows the use of automatic code generating tools.

Advantages

- This model is flexible for change.

- In this model, changes are adoptable.

- Each phase in RAD brings highest priority functionality to the customer.

- It reduced development time.

- It increases the reusability of features.

Disadvantages

- It required highly skilled designers.

- All application is not compatible with RAD.

- For smaller projects, we cannot use the RAD model.

- On the high technical risk, it's not suitable.

- Required user involvement.

Assessment 1

1. What is Software Development Process Model?

Ans : _____

2. Outline about prescriptive process model?

Ans : _____

References

1.Roger S.Pressman, Software engineering- A practitioner's Approach, 10th Edition, McGraw-Hill, 2017.

2.Ken Schawber, Mike "Agile Software Development with Scrum" Pearson Education, 2nd Edition, 2015.

Thank You