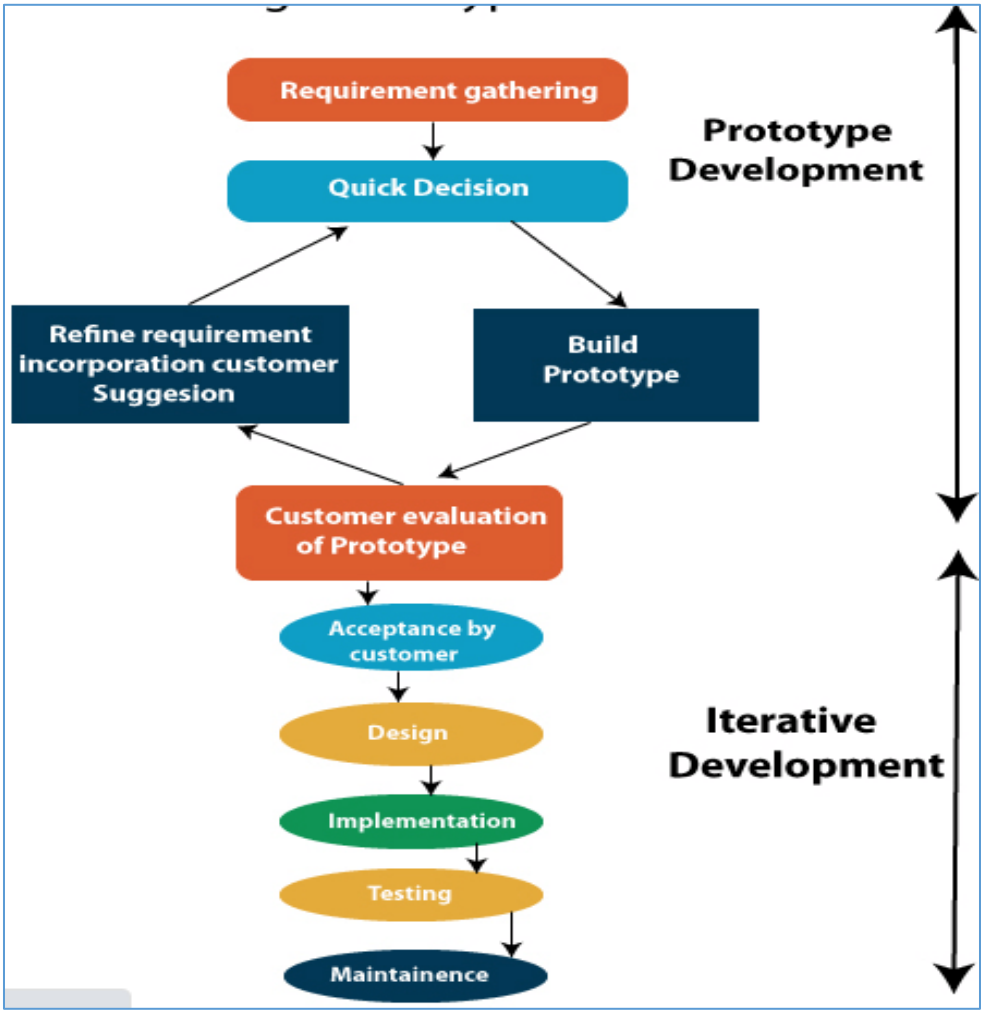
Topics:

1. Prototype Model
2. Big Bang Model
3. Agile

Prototype Model

The prototype model requires that before carrying out the development of actual software, a working prototype of the system should be built. A prototype is a toy implementation of the system. A prototype usually turns out to be a very crude version of the actual system, possible exhibiting limited functional capabilities, low reliability, and inefficient performance as compared to actual software. In many instances, the client only has a general view of what is expected from the software product. In such a scenario where there is an absence of detailed information regarding the input to the system, the processing needs, and the output requirement, the prototyping model may be employed.



Advantage of Prototype Model

- Demo working model: Customer get demo working model of actual product which help them to give a better understanding and attain a high level of satisfaction.
- New requirement: Based on the customer feedback, the requirements are redefined and the prototype is suitably modified till final approval.
- Missing functionality: can be easily established.
- Easy error detection: It saves time and cost in developing the prototype and enhance the quality of the final product.
- Flexibility: in the development phase.

Disadvantage of Prototype Model

- Time-consuming: As the prototype is being modified time to time according to customer requirement which usually increases the time of completion of the product.
- Complexity: Change in the requirement usually expand the scope of the product beyond its original plan and thus increase the complexity.
- Poor Documentation: Continous changing of requirement can lead to poor documentation.
- Unpredictability of no of iteration: It is difficult to determine the no of iteration required before the prototype is finally accepted by the customer.
- Confusion: Customer can confuse between the actual product and prototype.
- Difficult to know how long the project will last.
- Prototyping tools are expensive.
- Special tools & techniques are required to build a prototype.

Big Bang Model

In this model, developers do not follow any specific process. Development begins with the necessary funds and efforts in the form of inputs. And the result may or may not be as per the customer's requirement, because in this model, even the customer requirements are not defined.

This model is ideal for small projects like academic projects or practical projects. One or two developers can work together on this model.

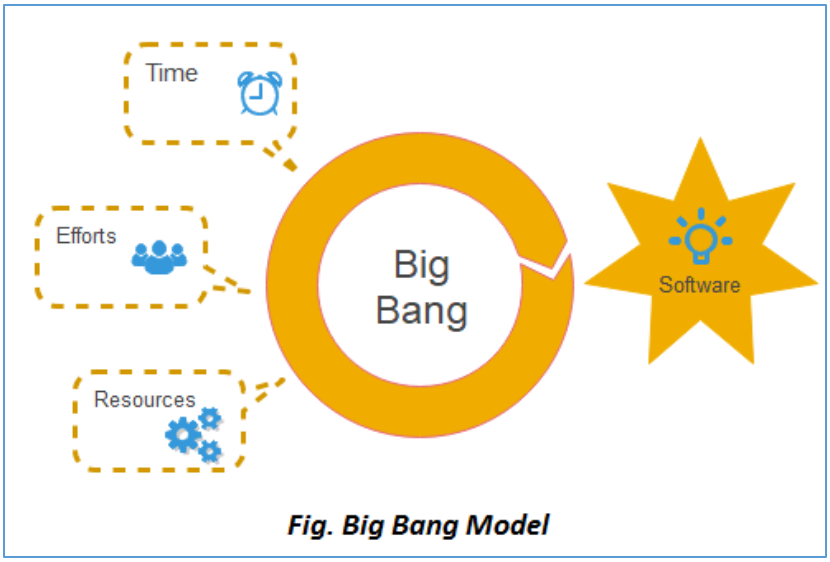


Fig. Big Bang Model

When to use Big Bang Model?

As we discussed above, this model is required when this project is small like an academic project or a practical project. This method is also used when the size of the developer team is small and when requirements are not defined, and the release date is not confirmed or given by the customer.

Advantage (Pros) of Big Bang Model:

- There is no planning required.
- Simple Model.
- Few resources required.
- Easy to manage.
- Flexible for developers.

Disadvantage (Cons) of Big Bang Model:

- There are high risk and uncertainty.
- Not acceptable for a large project.
- If requirements are not clear that can cause very expensive.

Agile:

Agile is a set of values and principles. It is an iterative and incremental method for developing high quality products. A big project are sub divided for reducing risk factor. It increase the satisfaction of stakeholders. When need frequent change in software then agile method is used.

Agile software development refers to a group of software development methodologies based on iterative development, where requirements and solutions evolve through collaboration between self-organizing cross-functional teams. Agile methods or Agile processes generally promote a disciplined project management process that encourages frequent inspection and adaptation, a leadership philosophy that encourages teamwork, self-organization and accountability, a set of engineering best practices intended to allow for rapid delivery of high-quality software, and a business approach that aligns development with customer needs and company goals. Agile development refers to any development process that is aligned with the concepts of the Agile Manifesto.

Agile Manifesto:

The agile software development emphasizes on four core values.

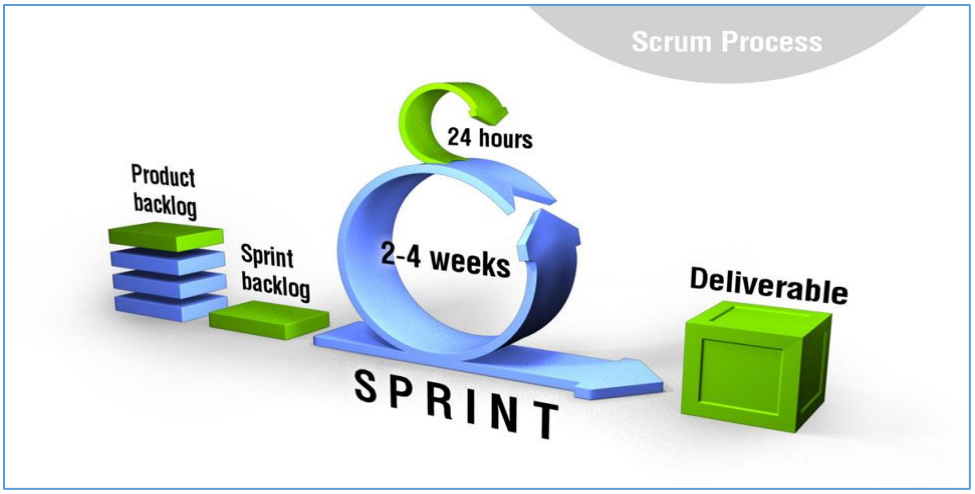
- Individual and team interactions over processes and tools
- Working software over comprehensive documentation
- Customer collaboration over contract negotiation
- Responding to change over following a plan

Some Agile Framework:

- Scrum
- XP (Extreme Programming)
- Lean Software Development (LSD).
- Kanban
- Crystal

Scrum:

Scrum is an agile development methodology used in the development of Software based on an iterative and incremental processes. Scrum is adaptable, fast, flexible and effective agile framework that is designed to deliver value to the customer throughout the development of the project. The primary objective of Scrum is to satisfy the customer's need through an environment of transparency in communication, collective responsibility and continuous progress



Each **Agile Development Scrum** team having three core scrum roles: Product Owner, Scrum Master & The Team.

1) ***Product Owner:*** The Product Owner is the person who represents the stakeholders and is the voice of the customer. Product owner writes the User Stories, ordered priorities and add in the Product Backlog. It is recommended that Agile Scrum Master should not mix with Product Owner; both members should be different as each member having its own responsibilities.

2) ***Scrum Master:*** The **Scrum Master** is a facilitative team leader who ensures that the team adheres to its chosen process and removes blocking issues to deliver the sprint deliverable/goal. Scrum Master is not a team leader but act as a shield for the team from external interference's & also removes barriers. Scrum Master facilitates the daily scrums.

3) ***The Team:*** The *scrum development* team is generally size of 5-9 peoples with self-organizing and cross-functional skills who do actual work like Analysis, Design, Development, Testing, Documentation etc.

Extreme Programming

- The Extreme Programming is commonly used agile process model.
- It uses the concept of object-oriented programming.
- A developer focuses on the framework activities like planning, design, coding and testing. XP has a set of rules and practices.

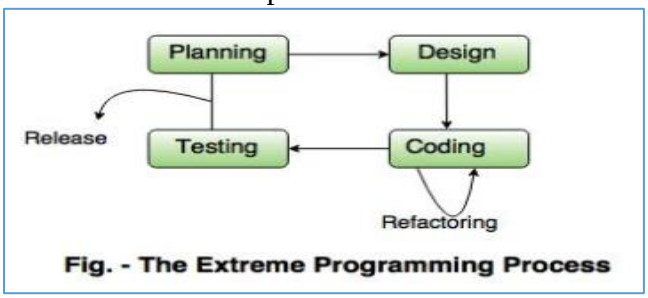


Fig. - The Extreme Programming Process