

### Lecture: 3 Incremental and Prototype Model

#### Incremental Process Model:

- Incremental process model is also known as **successive version model**.
- First, a simple working system implementing only a few basic features is built and then that is delivered to the customer. Then, thereafter many successive iterations/ versions are implemented and delivered to the customer until the desired system is released.
- In this model, requirements are divided into multiple standalone modules of the software development life cycle.
  - At any time, the plan is made just for the next increment and not for any kind of long term plans.
    - Development team first undertakes to develop core features (i.e. those which do not need services from other features) of the system.
  - Each model goes through the requirements, design, implementation and testing phases.
  - Every subsequent release of the module adds function to the previous release.
  - The process continues until the complete system is achieved.

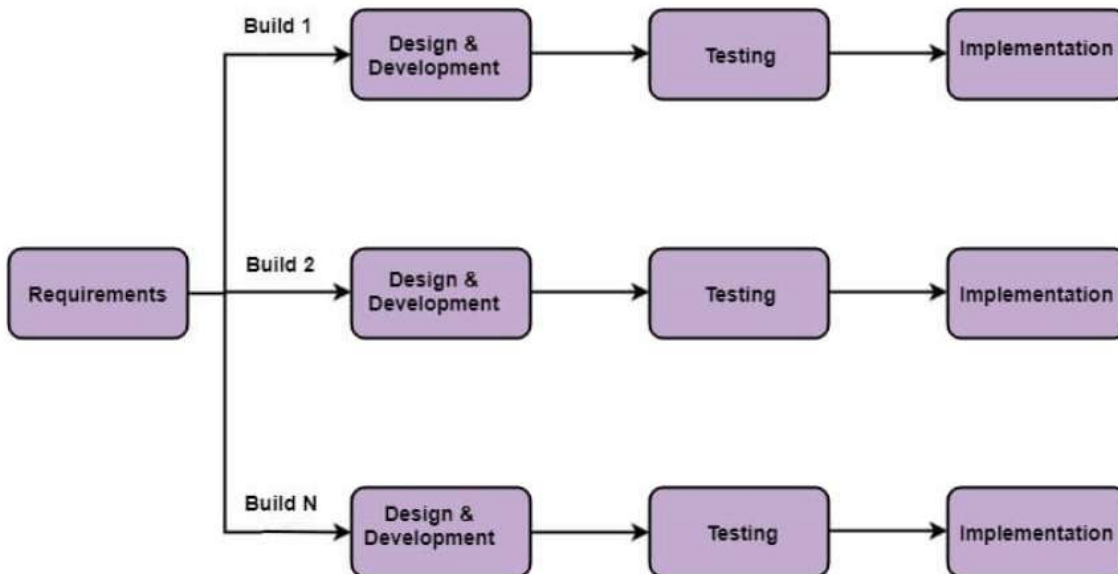


Fig: Incremental Model

### **When to use the Incremental Model?**

- When the requirements are superior i.e. are known up-front.
- When there is some funding schedule, risk, program complexity or need for early realization of benefits.
- When projects having lengthy developments schedules.
- Projects with new technology.

### **Advantages:**

- Error reduction (core modules are used by the customer from the beginning of the phase and then these are tested thoroughly)
- Uses divide and conquer for breakdown of tasks.
- Lowers initial delivery cost.
- Incremental Resource deployment.

### **Disadvantages:**

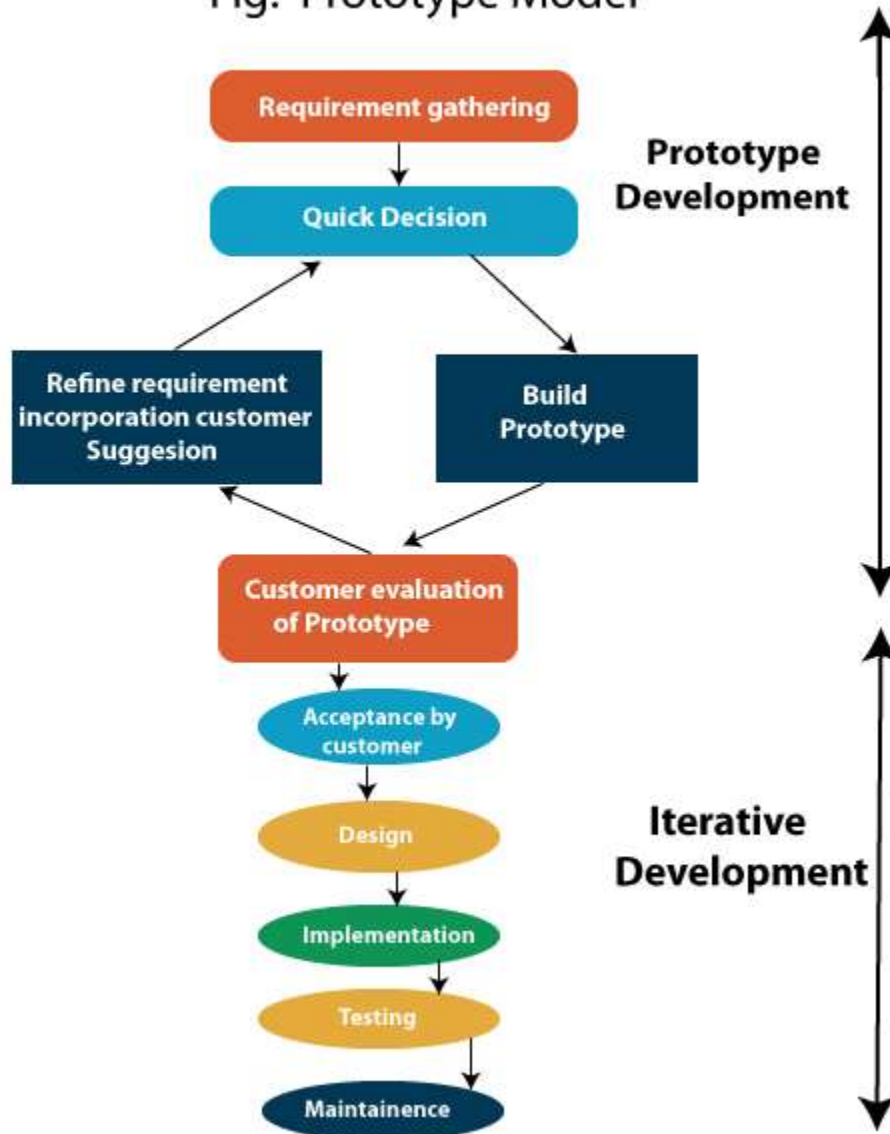
- Requires good planning and design.
- Total cost is not lower.
- Well defined module interfaces are required.

### **Prototype Model:**

- The prototype model requires that **before carrying out the development of actual software, a working prototype of the system should be built.**
- Prototyping is **defined as the process of developing a working replication of a product or system that has to be engineered.**
- In this model, a prototype of the end product is first developed, tested and refined as per customer feedback repeatedly till a final acceptable prototype is achieved which form the basis for developing the final product.
- **This model is used when the customers do not know the exact project requirements beforehand.**
- In this process model:
  - the system is partially implemented before or during the analysis phase thereby giving the customers an opportunity to see the product early in the life cycle.
  - the process starts by interviewing the customers and developing the incomplete high-level paper model.
  - this document is used to build the initial prototype supporting only the basic functionality as desired by the customer.

- Once the customer figures out the problems, the prototype is further refined to eliminate them.
- The process continues until the user approves the prototype and finds the working model to be satisfactory.

Fig: Prototype Model



- **Four types of model:**

- **Rapid Throwaway Prototyping:**

- This technique offers a useful method of exploring ideas and getting customer feedback for each of them.
- In this method, a developed prototype need not necessarily be a part of the ultimately accepted prototype.

- **Evolutionary Prototyping:**
  - In this method, the prototype developed initially is incrementally refined on the basis of customer feedback till it finally gets accepted.
- **Incremental Prototyping:**
  - In this type, the final expected product is broken into different small pieces of prototypes and being developed individually.
  - In the end, when all individual pieces are properly developed, then the different prototypes are collectively merged into a single final product in their predefined order.
- **Extreme Prototyping:**
  - This method is mainly used for web development. It consists of three sequential independent phases:
    - In the 1<sup>st</sup> phase, a basic prototype with all the existing static pages are presented in the HTML format.
    - In the 2<sup>nd</sup> phase, functional screens are made with a simulate data process using a prototype services layer.
    - In the final step, all the services are implemented and associated with the final prototype.

#### **Advantages of Prototype Model:**

- Reduce the risk of incorrect user requirement.
- Good where requirement are changing/ uncommitted.
- Errors can be detected much earlier as the system is made side by side.
- Flexibility in design.
- The customers get to see the partial product early in the life cycle. This ensures a greater level of customer satisfaction and comfort.

#### **Disadvantage of Prototype Model:**

- Costly with respect to time as well as money.
- There may be **too much variation in requirements each time** the prototype is evaluated by the customer.
- **Poor documentation** due to continuously changing customer requirements.
- Developers in a hurry to build prototypes may **end up with sub-optimal solutions.**
- The **customer might lose interest** in the product if he/she is not satisfied with the initial prototype.