جامعة المستقبل
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كلية العلوم
قسم الانظمة الطبية الذكية

المحاضرة الثامنة

Software engineering

المادة : Software engineering
المرحلة : الثالثة
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C- Evolutionary development model

- Evolves an initial implementation with user feedback → ***multiple versions until the Final version*** (**see Figure 8.1**).

- This model is based on the idea of rapidly developing initial software implementation from very abstract specifications.

- Each program version **inherits** the best features from earlier versions. Each version is refined based upon **feedback** from the user to produce a system which satisfies the customer needs. At this point, the system may be **delivered** or it may be **re-implemented** using a more structured approach to enhance **robustness** and **maintainability**.

- ***Specification***, ***development*** and ***validation*** activities are concurrent with strong feedback between each.

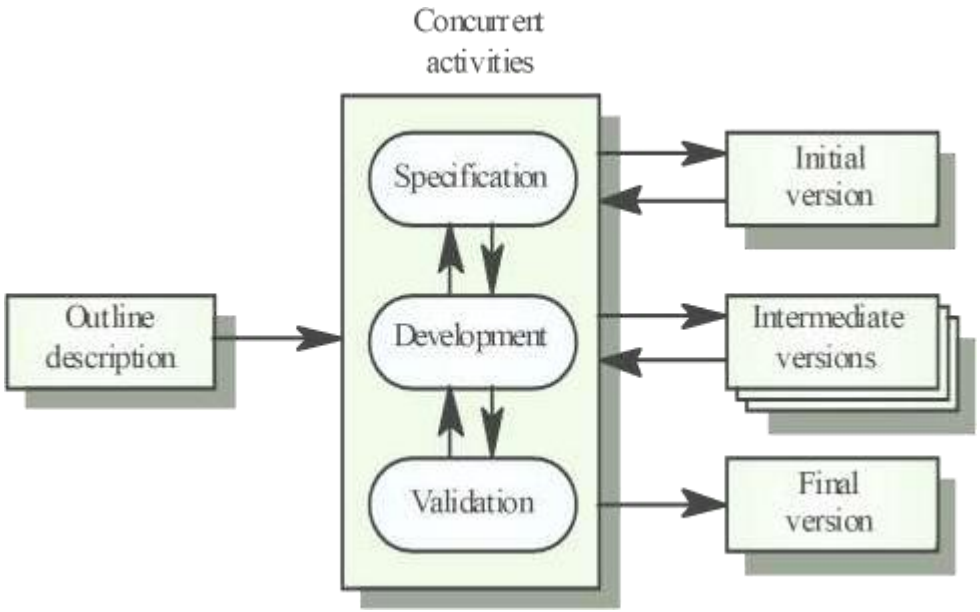

Figure 8.1: The Evolutionary Development Life Cycle.

➢ Two fundamental types:

1. Evolutionary Prototyping:

- Objective is to work with customers and to evolve a final system from an initial outline specification.

- Should starts with well-understood requirements and add new features as proposed by the customer (iterative incorporation of user feedback) as shown in **Figure 8.2.**

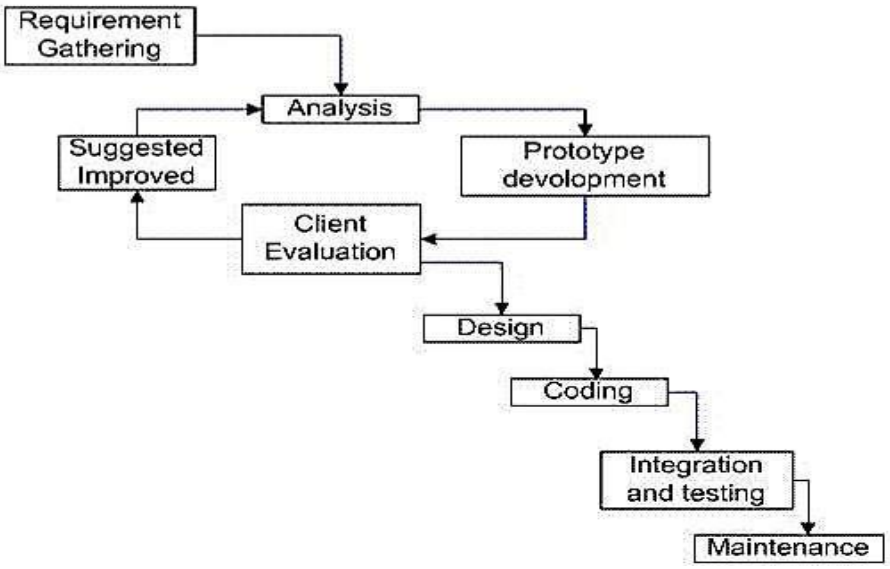

Figure 8.2: Evolutionary Prototyping Model.

2. Throw-away Prototyping:

- Objective is to understand the system requirements and develop a better requirement definition for the system.
- Should starts with poorly understood requirements to clarify what is really needed.
- **Prototypes** that are eventually discarded rather than becoming a part of the finally delivered software. (see Figure 8.3)

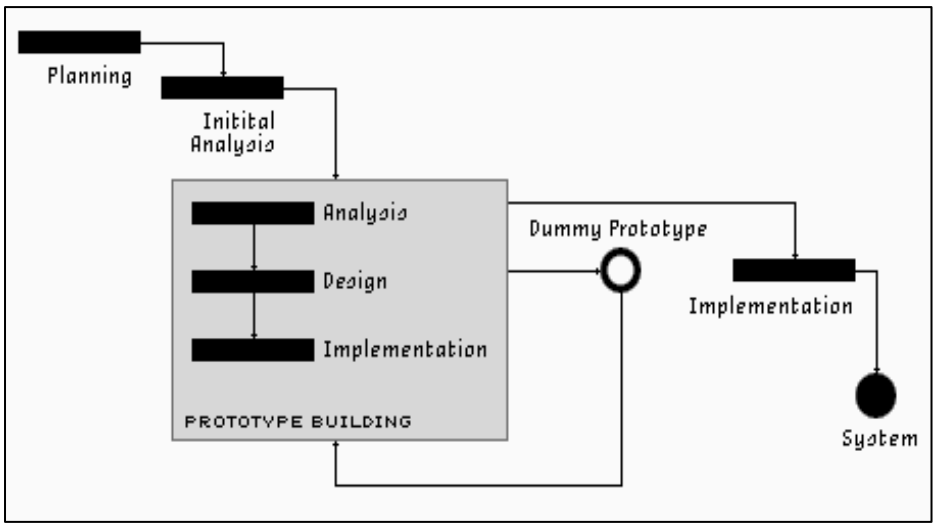

Figure 8.3: Throw-away Prototyping Model.

Advantages of Evolutionary Model:

1. Customer involvement in the process to meet the user requirement.
2. Improved and increased user involvement.
3. Reduced time and costs, but this can be a disadvantage if the developer loses time in developing the prototypes.
4. Early and frequent testing to identify problems and lower risk.
5. Applicable for :
- small or medium-size interactive systems;
- parts of large systems (e.g. the user interface);

Evolutionary Model Problems:

1. Lack of process visibility.
2. It is difficult to measure progress and produce documentation reflecting every version of the system as it evolves.
3. Insufficient analysis. User confusion of prototype and finished system.
4. Developer misunderstanding of user objectives.
5. Excessive development time of the prototype.
6. Production of good quality software requires highly skilled and motivated programmers.
7. It is costly to implement the prototypes

When to use the Evolutionary model

1- It used to visualize some component of the software to limit the gap of misunderstanding the customer requirements by the development team.

2- It used when you are developing a system has user interactions.

3- It used in "short- lifetime" systems.