

Software Development Process (2)

Team Teaching Software Engineering Course
Department of Information Technology
State Polytechnic of Malang

Outline

- Coping with Change
- Software prototyping
- Model Prototyping
- Boehm's spiral model

Purpose

- Understand Activities in the software development process using prototyping and spiral models
- Understand the use of prototyping and spiral models

Coping with Change

Changes are inevitable in all software projects, especially large ones.

- Business changes → System requirements changes
- New technologies → improve implementation
- Platform changes → App changes

Changes cause rework to be made

Change costs include the cost of rework (e.g. re-analysing requirements) as well as the cost of implementing new functionality

Reduce rework costs

- Avoiding change: Anticipate possible changes before significant rework is required.
- Example: Creating a Prototype to show the main features to the customer.

Software prototyping

Prototype: An early version of the system is used to demonstrate the concept or working process of the system

Proptotype : Not Final Product

Protorype can be used on:

- *requirements engineering*
- *design processes*
- *design processes*

Benefits of prototyping



Improved system usability.



A closer match to users' real needs.



Improved design quality.



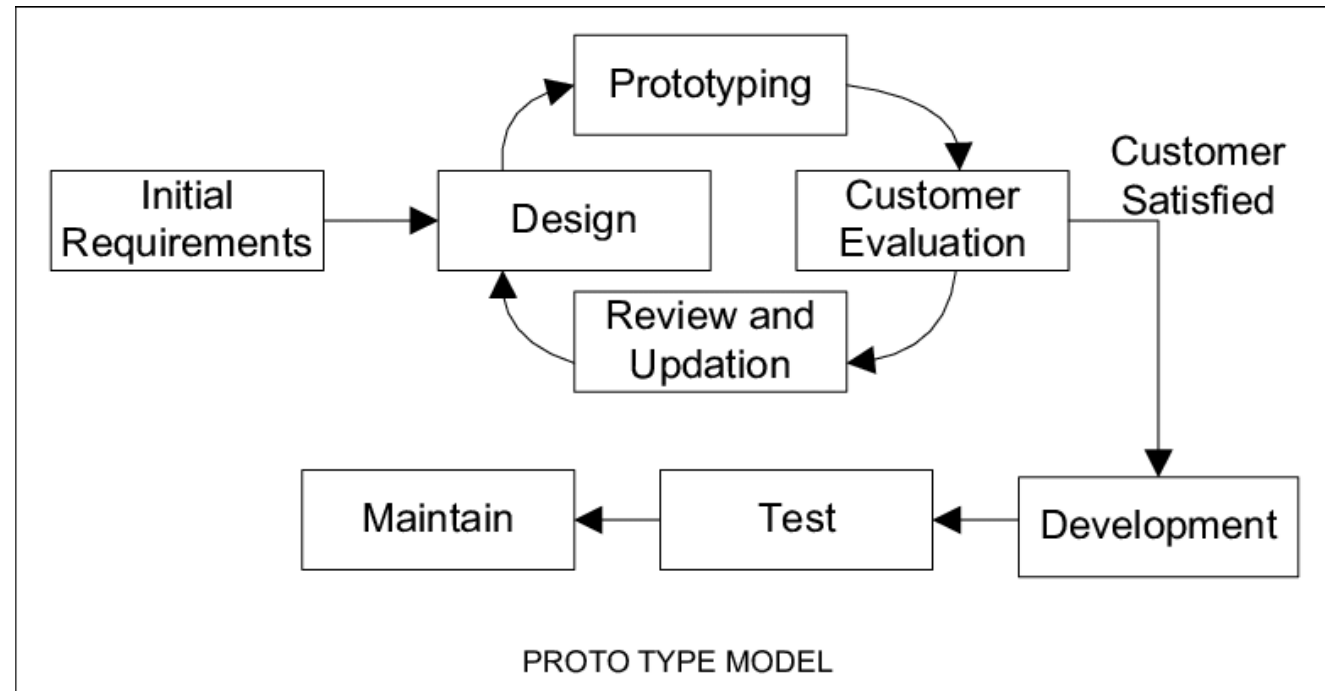
Improved maintainability.



Reduced development effort.

Model Prototyping

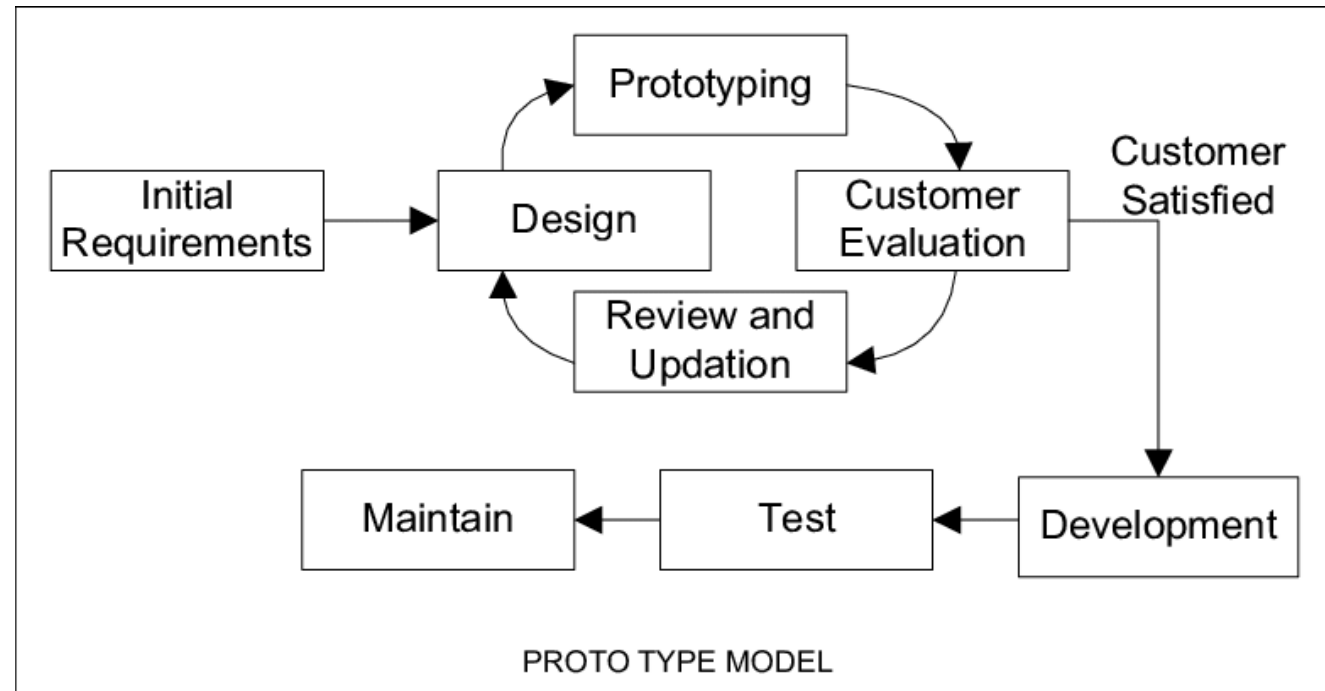
An approach that directly demonstrates how a piece of software will work in its environment before the actual construction phase is undertaken.



Stages - Model Prototyping

Initial Requirements

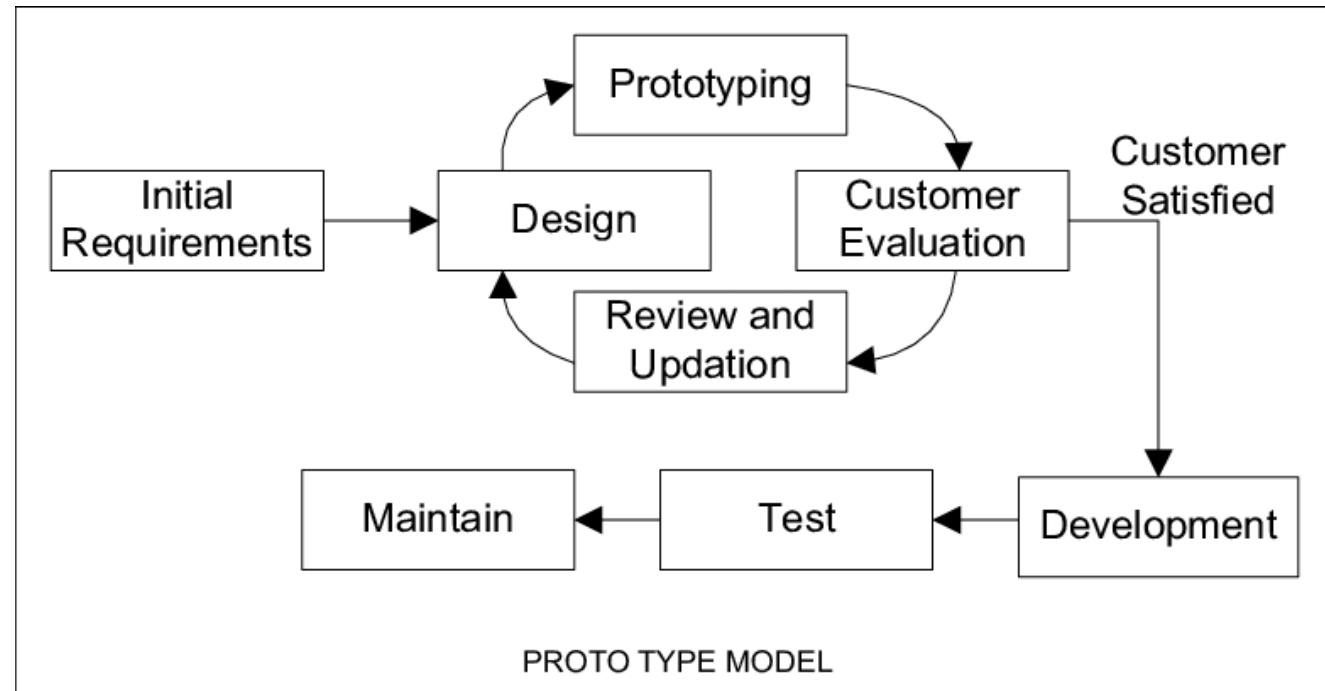
- **The client and developer jointly define the format of the entire software, identify all requirements, and outline the system to be created.**



Stages - Model Prototyping

2.Design

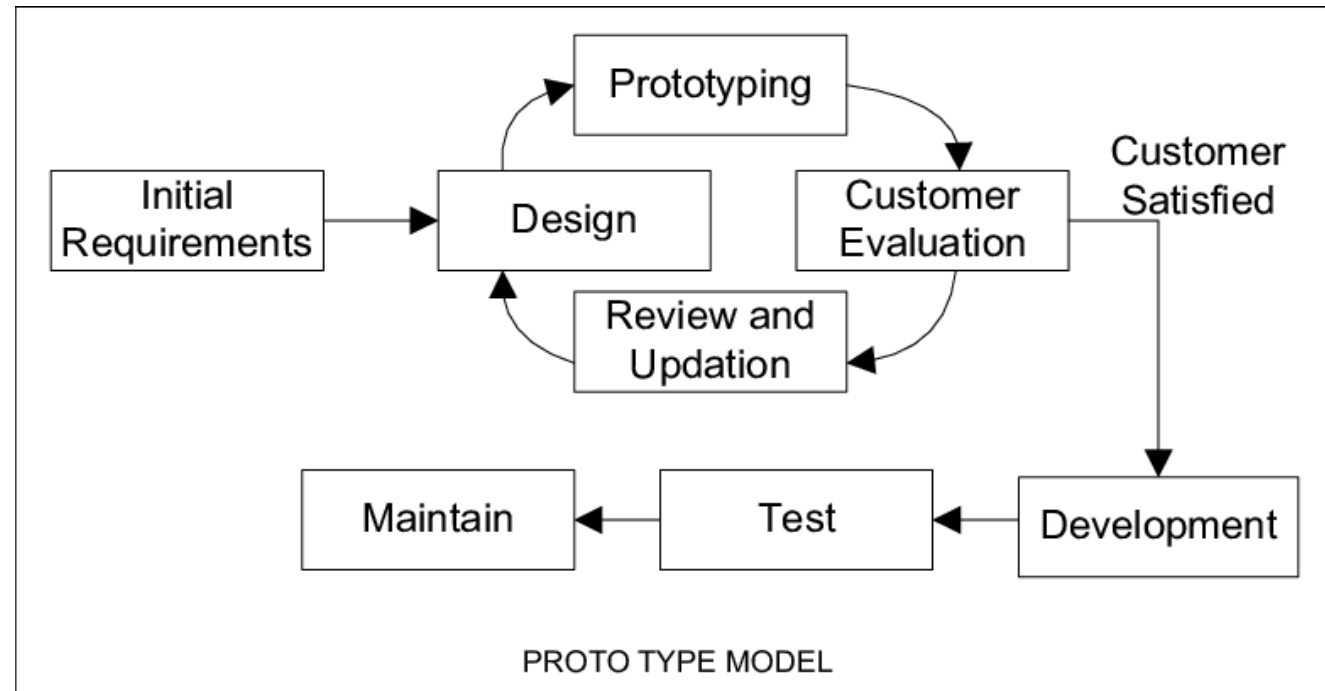
- At this stage is carried out the translation of the requirements or data that has been analyzed into a form that is easy to understand by the user.



Stages - Model Prototyping

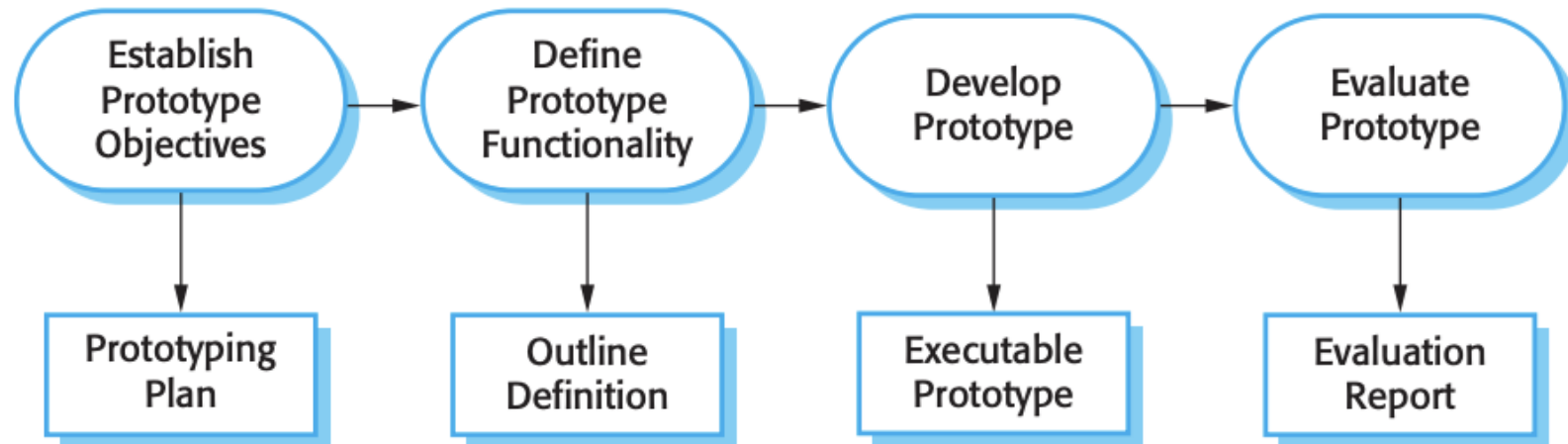
3. Prototyping

- Build prototyping by creating temporary designs that focus on presenting to the client, for example by creating inputs and output formats.



Stages - Model Prototyping

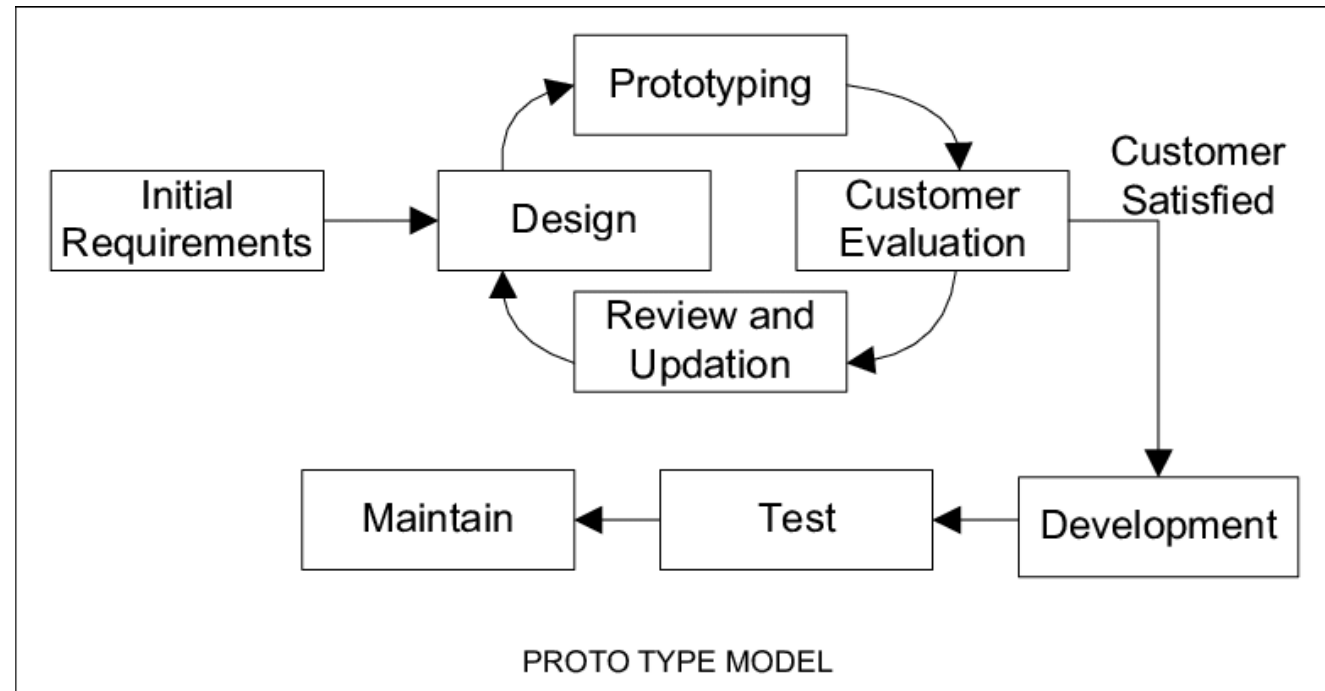
3. *Proses pengembangan Prototype*



Stages - Model Prototyping

4. Customer Evaluation

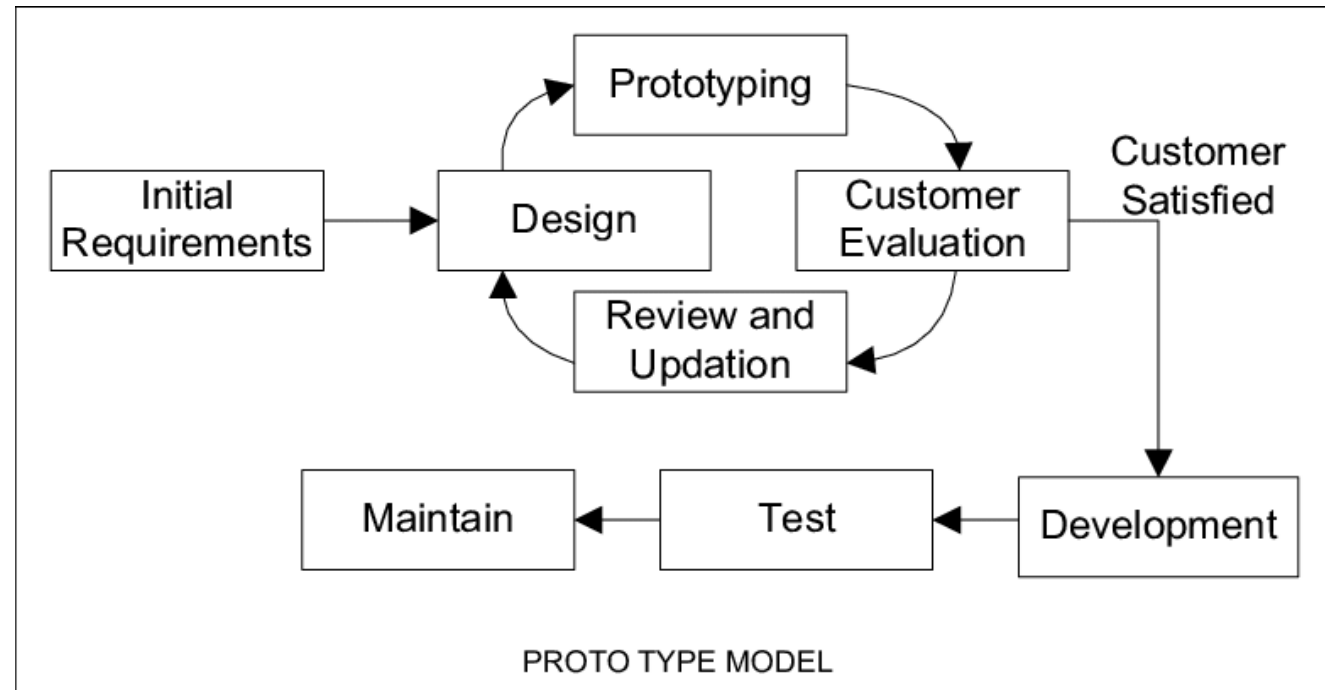
- This evaluation is carried out by the client, whether the prototyping that has been built is in accordance with the client's wishes. If it is appropriate, then the process proceeds to the next stage. But if not, prototyping is revised by repeating the previous steps.



Stages - Model Prototyping

5. Development

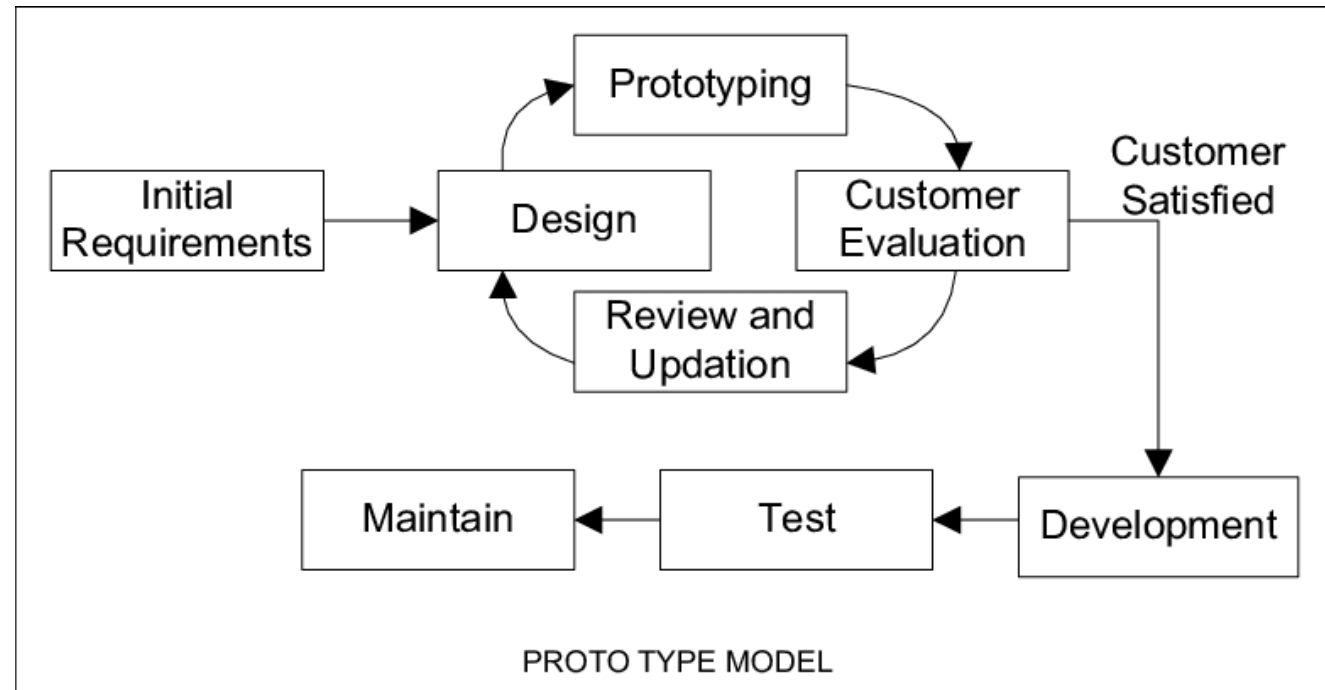
- At this stage, the agreed prototyping is translated into the appropriate programming language.



Stages - Model Prototyping

6. Test

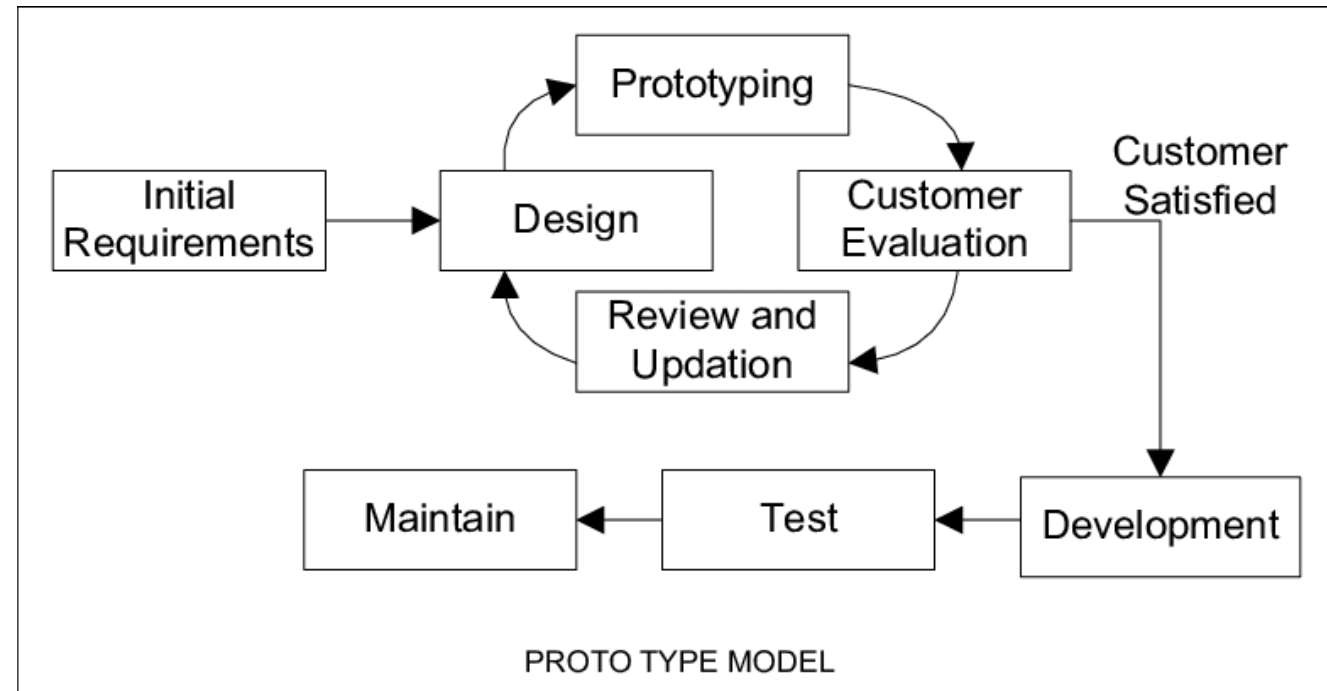
- After the system has become a ready-to-use software, then the testing process is carried out.



Stages - Model Prototyping

7. *Maintain*

- Software that has been tested and received by customers is ready to use, in addition to maintenance that includes fixing errors not found in the previous step.



Advantages & Disadvantages of Prototyping Models

Advantage

- Increase user engagement.
- Reduce time and cost.
- Errors that occur in prototyping can be detected early.
- Implementation becomes easier because the user knows what to expect.

Lack

- The analysis and design process is too short.
- The cost of prototyping is quite high.
- Usually less flexible in dealing with change.

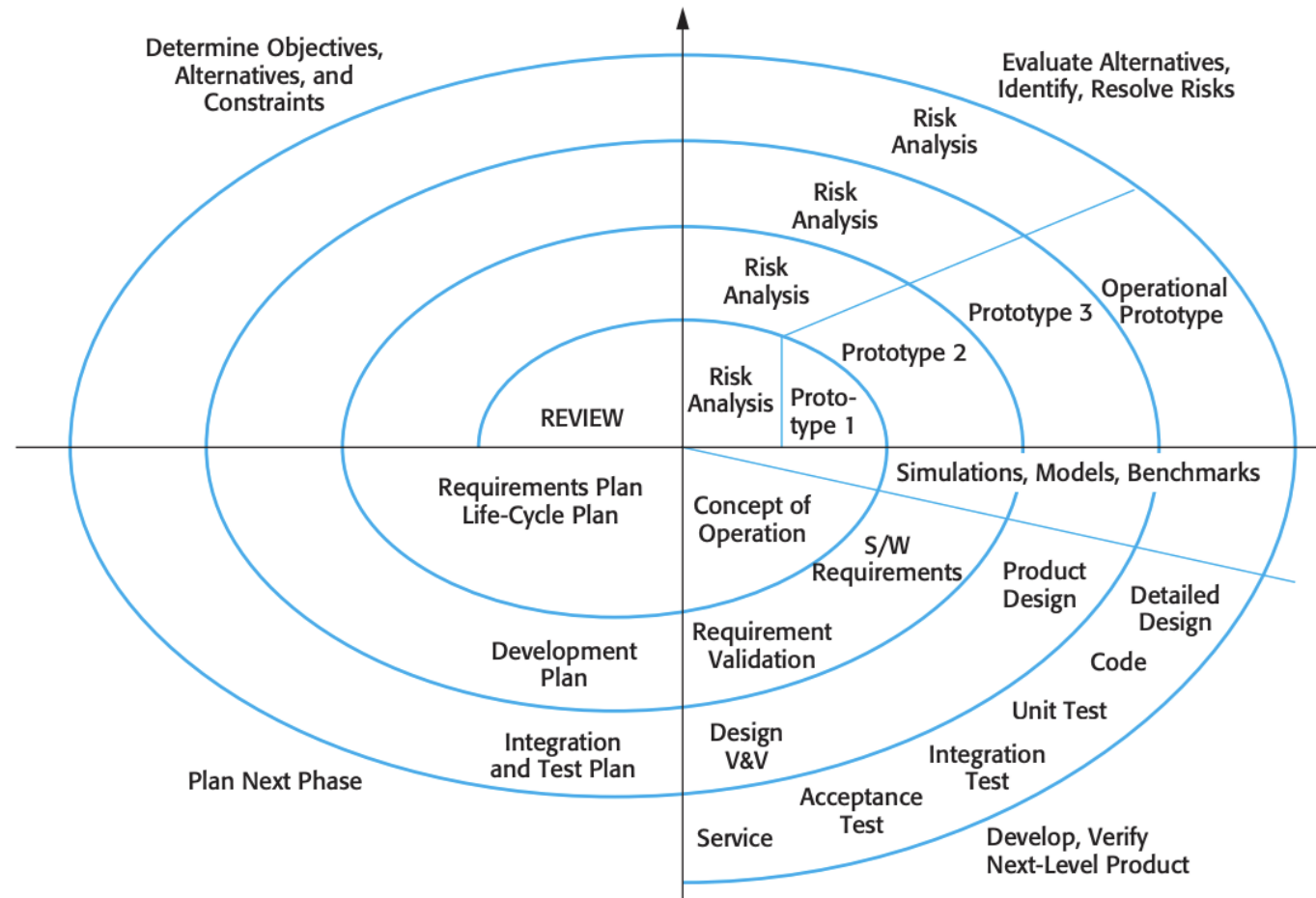
Model Prototyping Use Situations

- The prototyping method is suitable for projects that require a short time and users know how the process of creating a project to how to implement the project because between developers and users good communication is established

Boehm's spiral model

- Processes are represented as spirals rather than as sequences of activities
- Each loop in a spiral represents a phase in the process.
- There is no fixed phase like specification or design - loops in the spiral are selected depending on what is needed.
- Risks are explicitly assessed and resolved throughout the process.

Boehm's spiral model



Boehm's spiral model

- Each loop in the spiral is divided into four sectors
- Objective setting: Specific objectives for the phase are identified.
- Risk assessment and reduction: Analyze risk both technically and managerially
- Development and validation: Selection of a development model for the system, for example: if the interface risk is more dominant ? use the prototyping model, if the risk of sub system integration is more dominant ? use the waterfall model
- Planning: The project is reviewed and plans the next phase.

Advantages and Disadvantages

Advantage :

Users and developers can understand well the software built.

Estimates (estimates) become more realistic as the project progresses as problems are discovered as soon as possible.

Software engineers can work faster.

Lack :

It takes a long time and costs a lot.

Requires a good long-term plan.

Mempunyai resiko yang harus dipertimbangkan ulang oleh klien dan developer.

Spiral Model Use Situations

The spiral model is suitable for developing large-scale software systems because it has a risk analysis process that can greatly minimize possible risks and with time and cost targets that are not too binding.

The spiral model allows developers to use prototypes at each stage to reduce risk.

Any questions?