



**Department
Of
Software Engineering
(Ashulia Campus)**

SE-113 (Introduction to Software Engineering)



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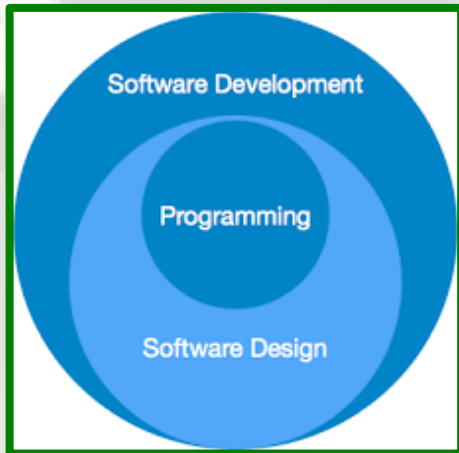
Software Engineering Department

Ashulia Smart City, Ashulia

The background of the slide features a repeating pattern of a man in a dark suit, white shirt, and dark tie. The image is faded and serves as a backdrop for the text.

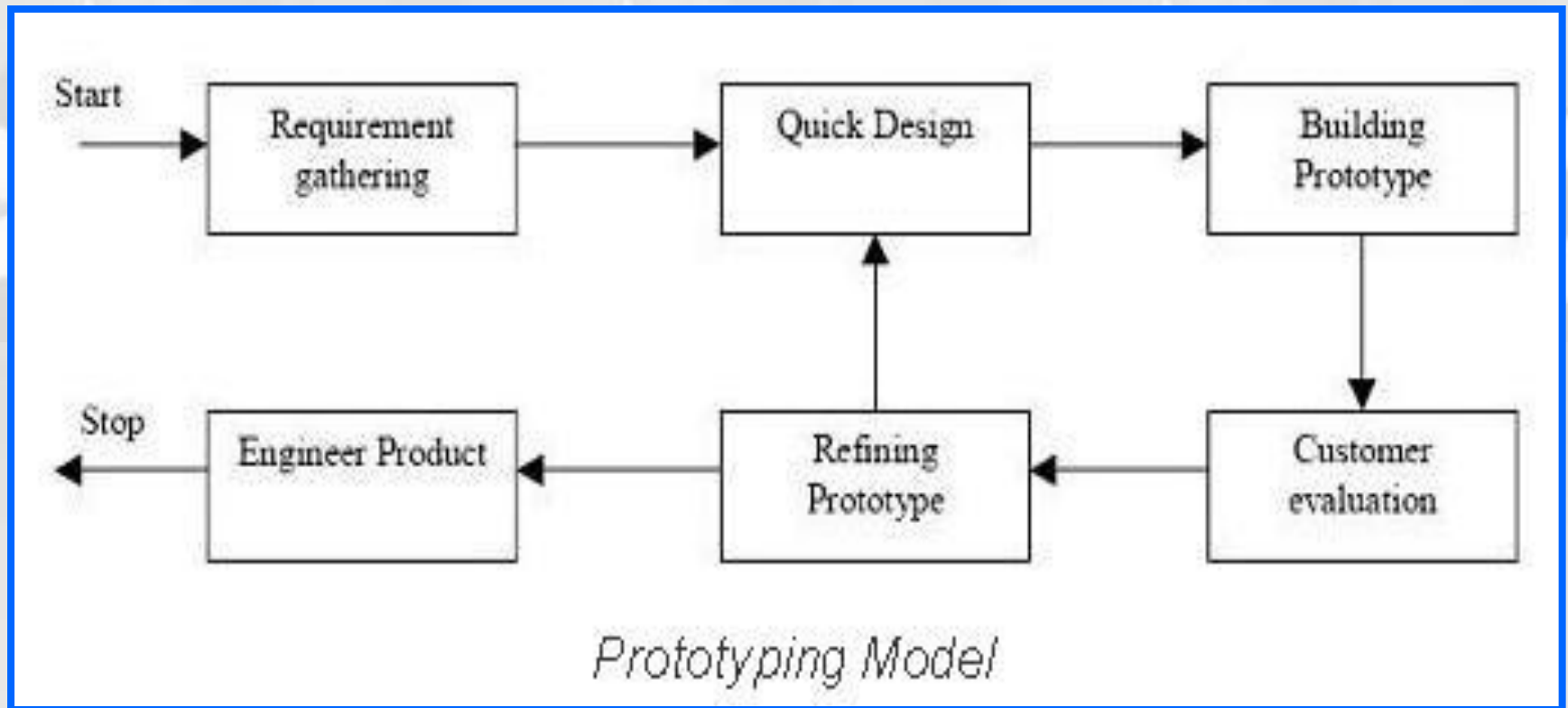
Software Model

Prototype Model

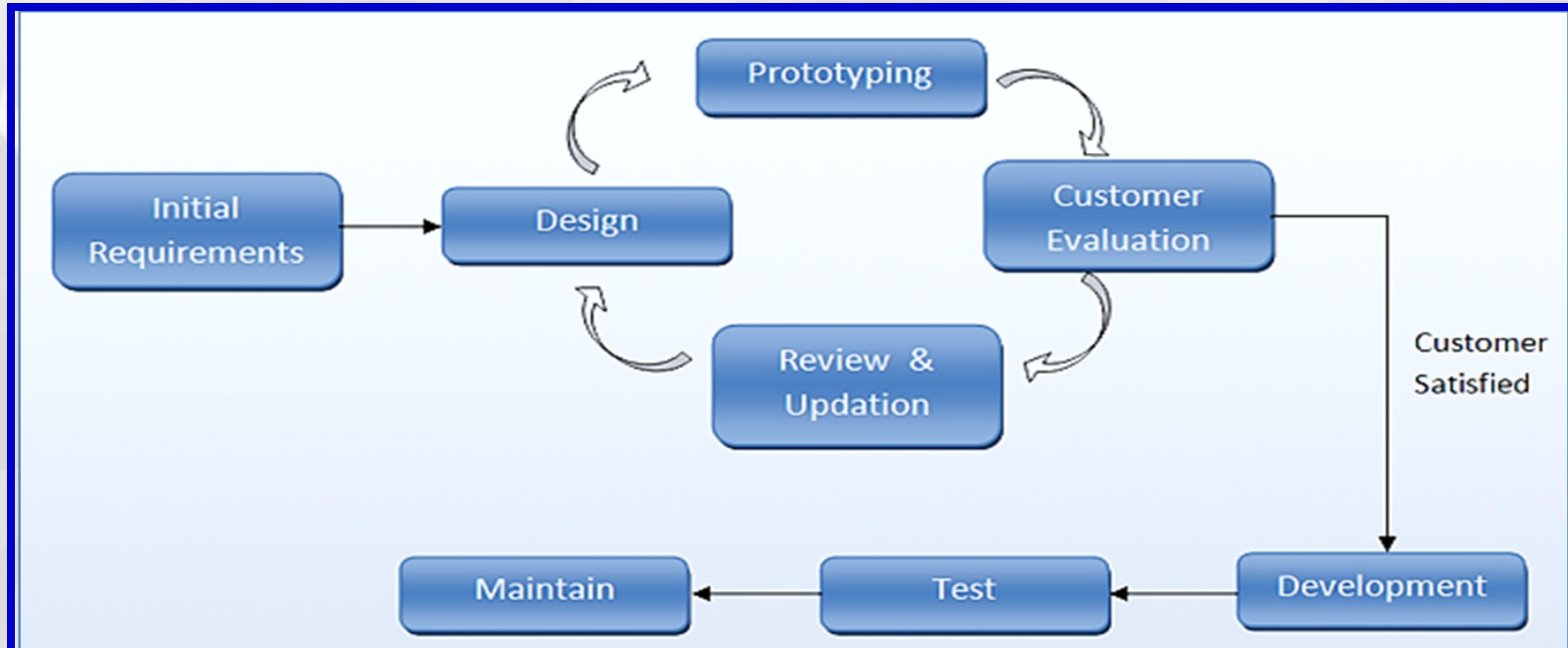


- ✚ The prototype are usually not complete systems. This prototype is developed based on the currently known requirements.
- ✚ the interactions with prototype can enable the client to better understand the requirements of the desired system.

Prototype Model



Prototype Model



- ☐ Provides a process to perfect the requirements definition.
- ☐ Provides a formal specification built in an operating replica.
- ☐ More enthusiastic and constructive end-user, customer participation in requirements activities.
- ☐ Greater level of user satisfaction with systems development due to better fitment.
- ☐ Users better prepared for later stages of development due to familiarity with prototype.
- ☐ Improved morale of end-users, customers & developers.
- ☐ Prototype may be easily changed and even discarded.
- ☐ Demonstrates progress at an early stage of development
- ☐ Provides Early Proof of Concept for the final product
- ☐ May provide early training for future users of the system.
- ☐ Produce some useful deliverables even if the project runs out of time or money.
- ☐ Allows productive work to proceed despite uncertainty.

Advantages of Prototype Model



- ◆ Users are actively involved in the development
- ◆ Since in this methodology a working model of the system is provided, the users get a better understanding of the system being developed.
- ◆ Errors can be detected much earlier.
- ◆ Quicker user feedback is available leading to better solutions.
- ◆ Missing functionality can be identified easily
- ◆ Confusing or difficult functions can be identified
- ◆ Requirements validation, Quick implementation of, incomplete, but functional, application.

Disadvantages of Prototype Model



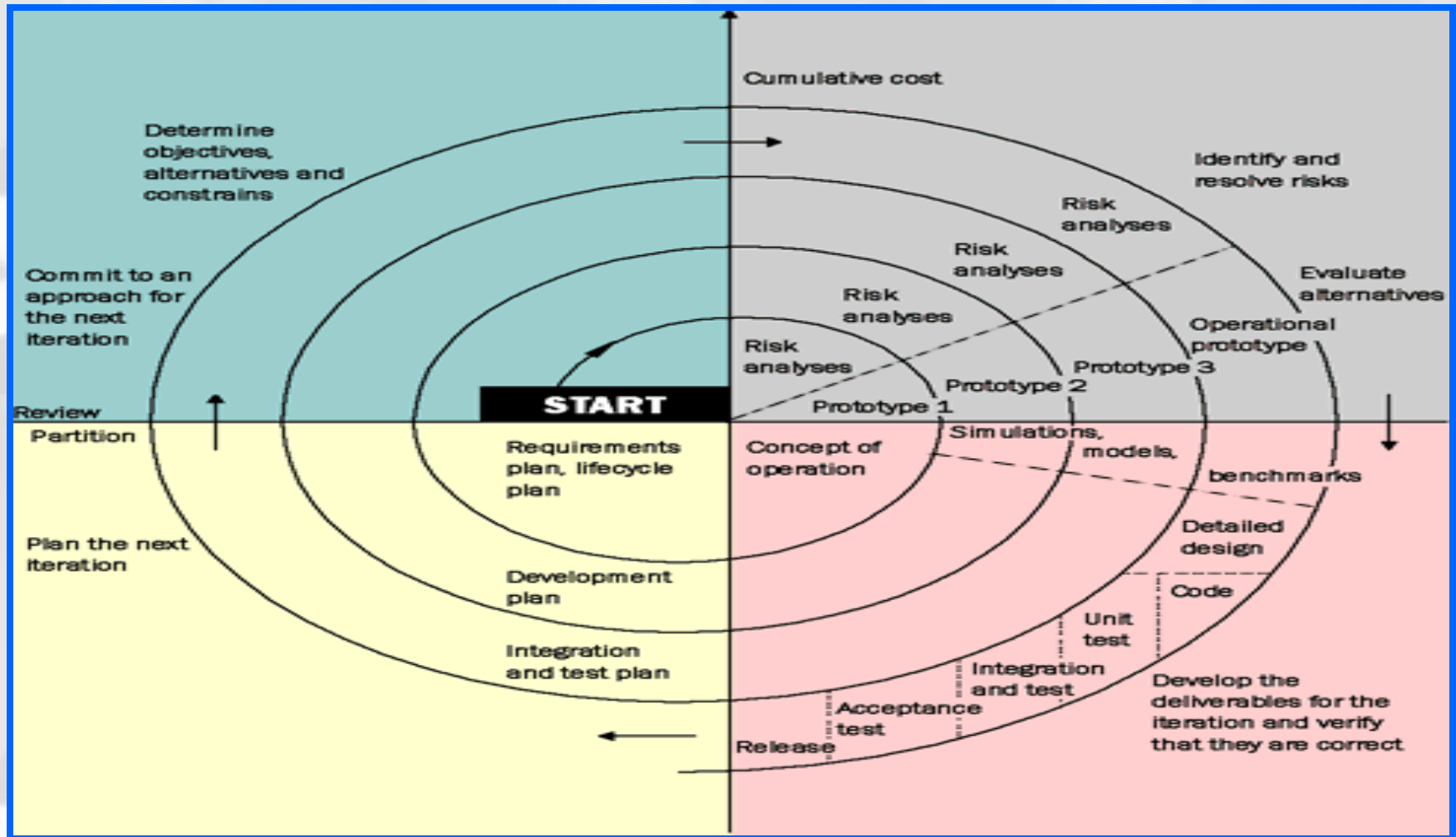
- ◆ Leads to implementing and then repairing way of building systems.
- ◆ Practically, this methodology may increase the complexity of the system as scope of the system may expand beyond original plans.
- ◆ Incomplete application may cause application not to be used as the full system was designed
Incomplete or inadequate problem analysis.

When to use Prototype Model



- ◆ Prototype model should be used when the desired system needs to have a lot of interaction with the end users.
- ◆ Typically, online systems, web interfaces have a very high amount of interaction with end users, are best suited for Prototype model. It might take a while for a system to be built that allows ease of use and needs minimal training for the end user.
- ◆ Prototyping ensures that the end users constantly work with the system and provide a feedback which is incorporated in the prototype to result in a useable system. They are excellent for designing good human computer interface systems.

Spiral Development Model



Spiral Development Model



- ◆ Each loop of a spiral model is split into four sectors:
 - ◆ Objectives setting.
 - ◆ Risk assessment and reduction
 - ◆ Development & Validation.
 - ◆ Planning

Advantages of Spiral Development Model



- ◆ **There is explicit consideration of risk in this model.**
- ◆ **Changing requirements can be accommodated.**
- ◆ **Allows for extensive use of prototypes**
- ◆ **Requirements can be captured more accurately.**
- ◆ **Users see the system early.**
- ◆ **Development can be divided into smaller parts and more risky parts can be developed earlier which helps better risk management.**

Disadvantages of Spiral Development Model



- There is no fixed phase such as specification and design
- Management is more complex.
- End of project may not be known early.
- Not suitable for small or low risk projects and could be expensive for small projects.
- Process is complex
- Spiral may go indefinitely.
- Large number of intermediate stages requires excessive documentation.

When to Use Spiral Development Model



- This model has been successfully used for the internal development of large systems and is especially useful when software reuse is a goal and when specific quality objectives can be incorporated
- When costs and risk evaluation is important
- Users are unsure of their needs
- Requirements are complex
- New product line
- Significant changes are expected (research and exploration)

Agile Software Development



- Agile software development is a conceptual framework for software engineering that promotes development iterations throughout the life-cycle of the project.
- Software developed during one unit of time is referred to as an iteration, which may last from one to four weeks.
- Agile methods also emphasize working software as the primary measure of progress.

Characteristics of Agile Software Development



- **Light Weighted methodology**
- **Small to medium sized teams**
- **vague and/or changing requirements**
- **vague and/or changing techniques**
- **Simple design**
- **Minimal system into production**

The benefits of being Agile



- **Reducing Risk – The benefits from improved control and improved communication lead to reduced risks. Examples of risks include:**
 - **Risk of building (or doing) the wrong thing. Did the sponsor get what they asked for but not what they actually wanted?**
 - **Risk of building the right thing poorly. For example, was the product poorly crafted. Was it thoroughly tested as a part of each iteration? Is the final produce extensible?**
 - **Risk of being placed into an endless cycle of design updates and reviews due to changing requirements or high levels of complexity.**

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The benefits of being Agile



- Relief from continual design revisions -- Agile Methods are of the most benefit when applied to projects where the requirements are either unclear or evolving
- Improved Control – Agile methods allow the Project Manager to their control over the project in high change environment. Utilizing less rigid, yet structured agile methodologies, control is through a number of mechanisms.
- Frequent delivery of working code allows progress to be objectively measured.
- Early and frequent stakeholder feedback allows the Project Manager to redirect project priorities when needed to ensure that real value is delivered.
- Misunderstandings are cleared up early in the project life-cycle.

Existing Agile Method



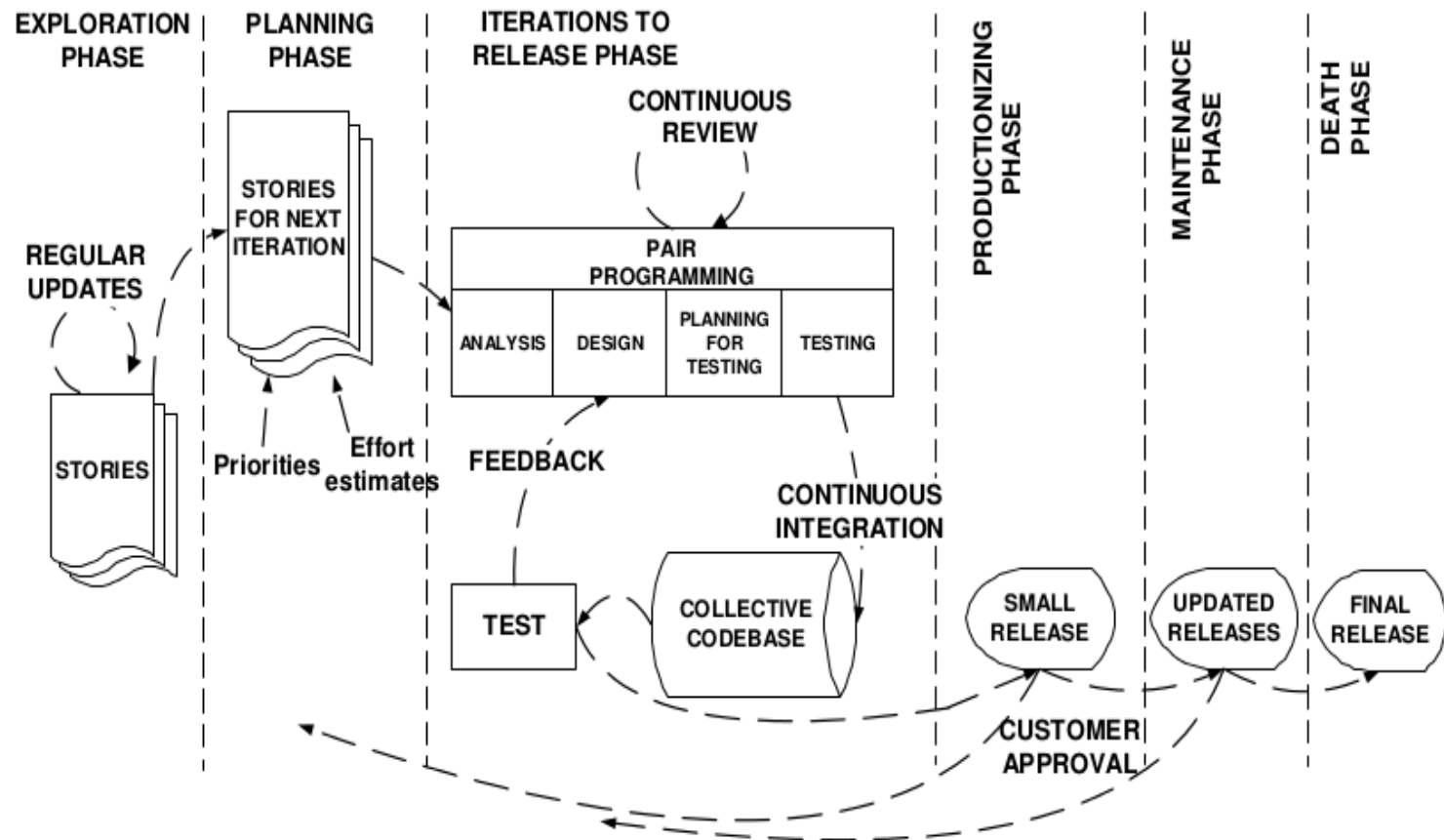
- Extreme Programming
- Scrum
- Crystal Methods
- Feature Driven Development
- Lean Development
- Dynamic Systems Development Methodology (DSDM)

Extreme Programming



- A system of practices that a community of software developers is evolving to address the problems of quickly delivering quality software, and then evolving it to meet changing business needs.

XP



SCRUM – AN AGILE PROCESS



- ◆ **SCRUM is an agile, lightweight process for managing and controlling software and product development in rapidly changing environments.**
- ◆ **Iterative, incremental process**
- ◆ **Team-based approach**
- ◆ **developing systems/ products with rapidly changing requirements**
- ◆ **Controls the chaos of conflicting interest and needs**
- ◆ **Improve communication and maximize cooperation**
- ◆ **Protecting the team form disruptions and impediments**
- ◆ **A way to maximize productivity**

Functionality of SCRUM

