Systems Analysis and Design With UML 2.0

An Object-Oriented Approach, Second Edition

Chapter 1: Introduction to Systems Analysis and Design

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INTRODUCTION

Chapter 1

Key Ideas

- Many failed systems were abandoned because analysts tried to build wonderful systems without understanding the organization.
- The primarily goal is to create value for the organization.

Key Ideas

- The systems analyst is a key person analyzing the business, identifying opportunities for improvement, and designing information systems to implement these ideas.
- It is important to understand and develop through practice the skills needed to successfully design and implement new information systems.

THE SYSTEMS DEVELOPMENT LIFE CYCLE

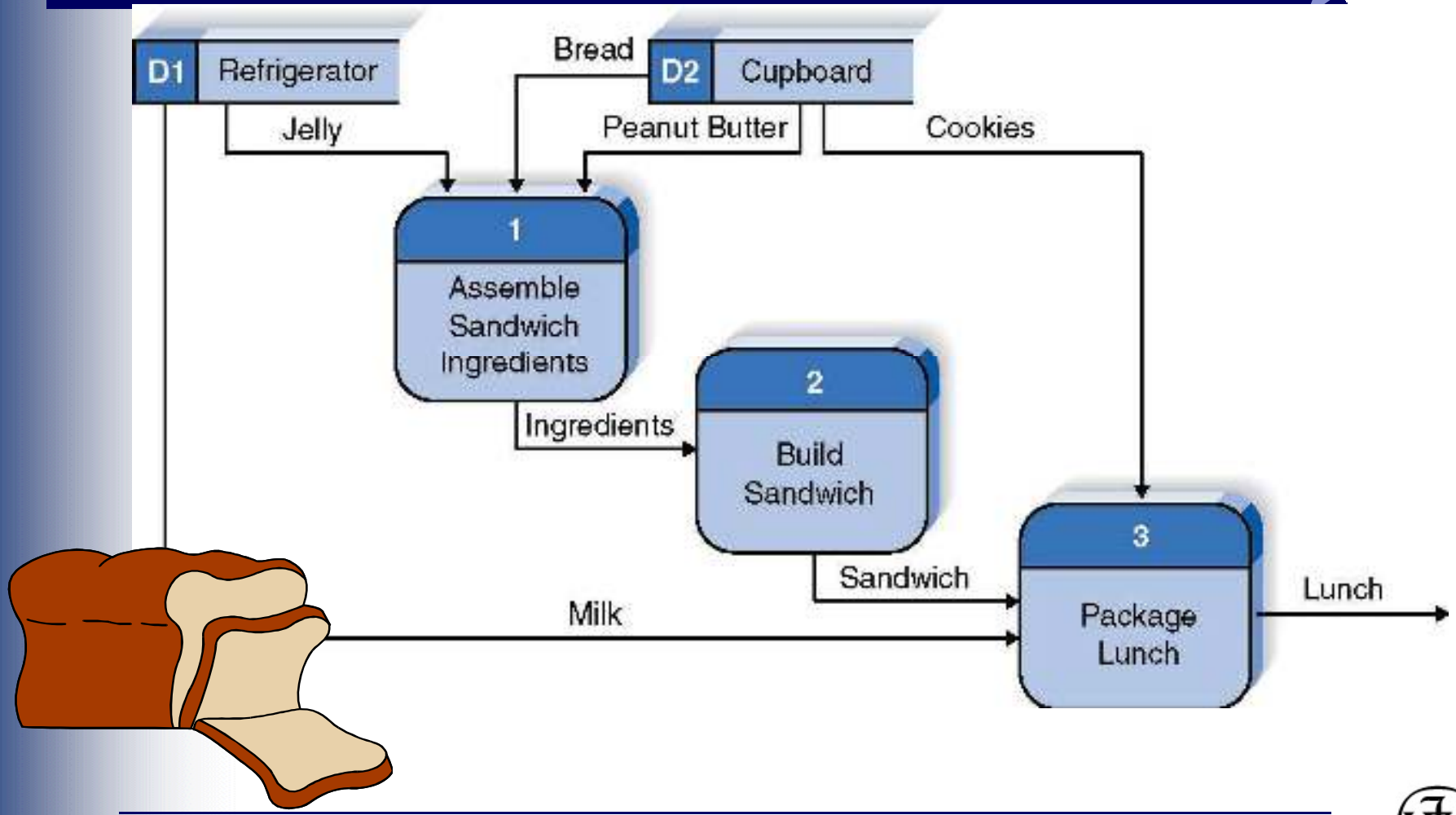
Major Attributes of the Lifecycle

- The project
  - Moves systematically through phases where each phase has a standard set of outputs
  - Produces project deliverables
  - Uses deliverables in implementation
  - Results in actual information system
  - Uses *gradual refinement*

Project Phases

- **Planning**
  - Why build the system?
- **Analysis**
  - Who, what, when, where will the system be?
- **Design**
  - How will the system work?
- **Implementation**
  - System delivery

A "Simple" Process for Making Lunch



Planning

- Identifying business value
- Analyze feasibility
- Develop work plan
- Staff the project
- Control and direct project

Analysis

- Analysis
- Information gathering
- Process modeling
- Data modeling

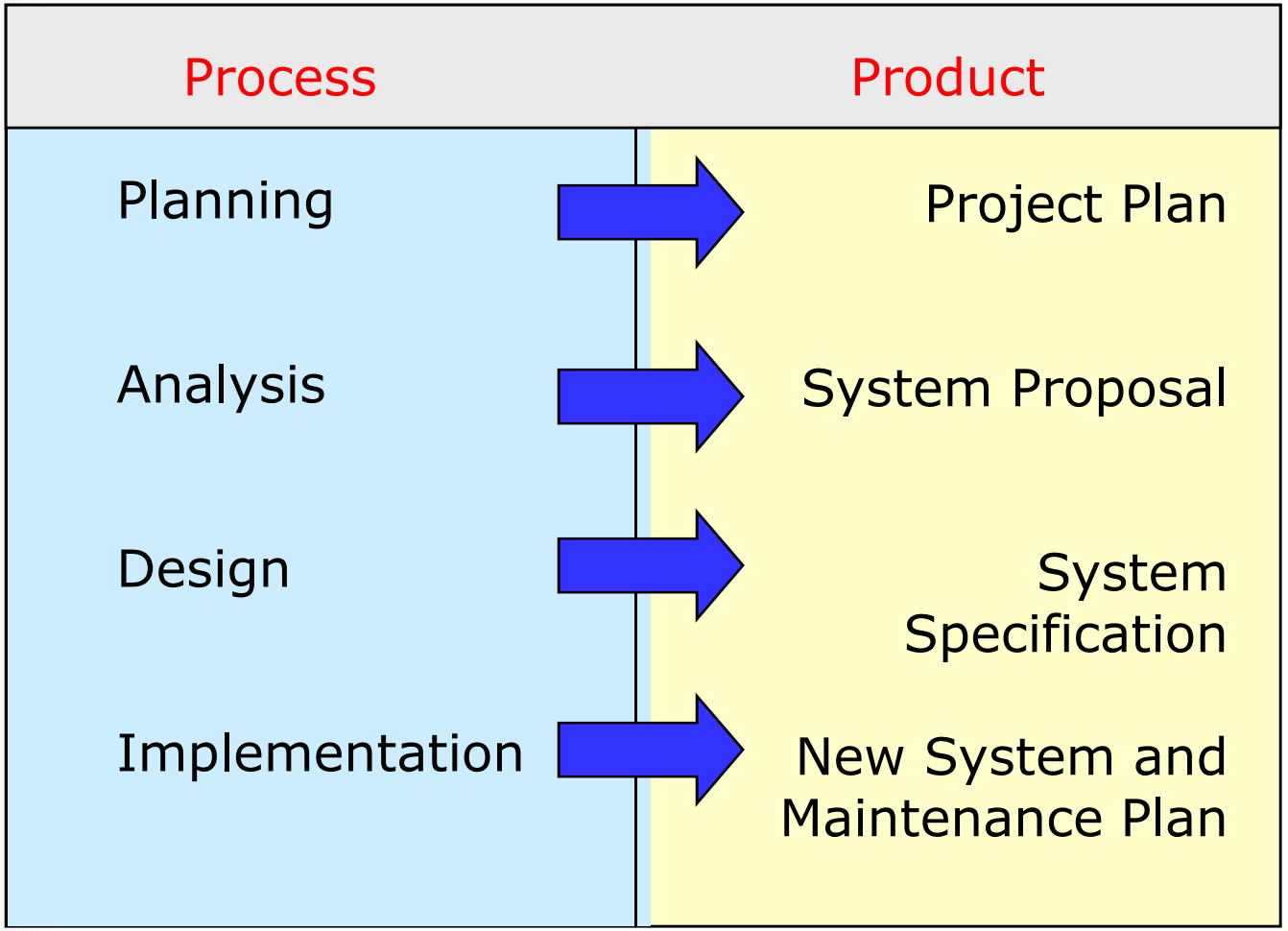
Design

- Physical design
- Architectural design
- Interface design
- Database and file design
- Program design

Implementation

- Construction
- Installation

Processes and Deliverables



SYSTEM DEVELOPMENT
Methodologies

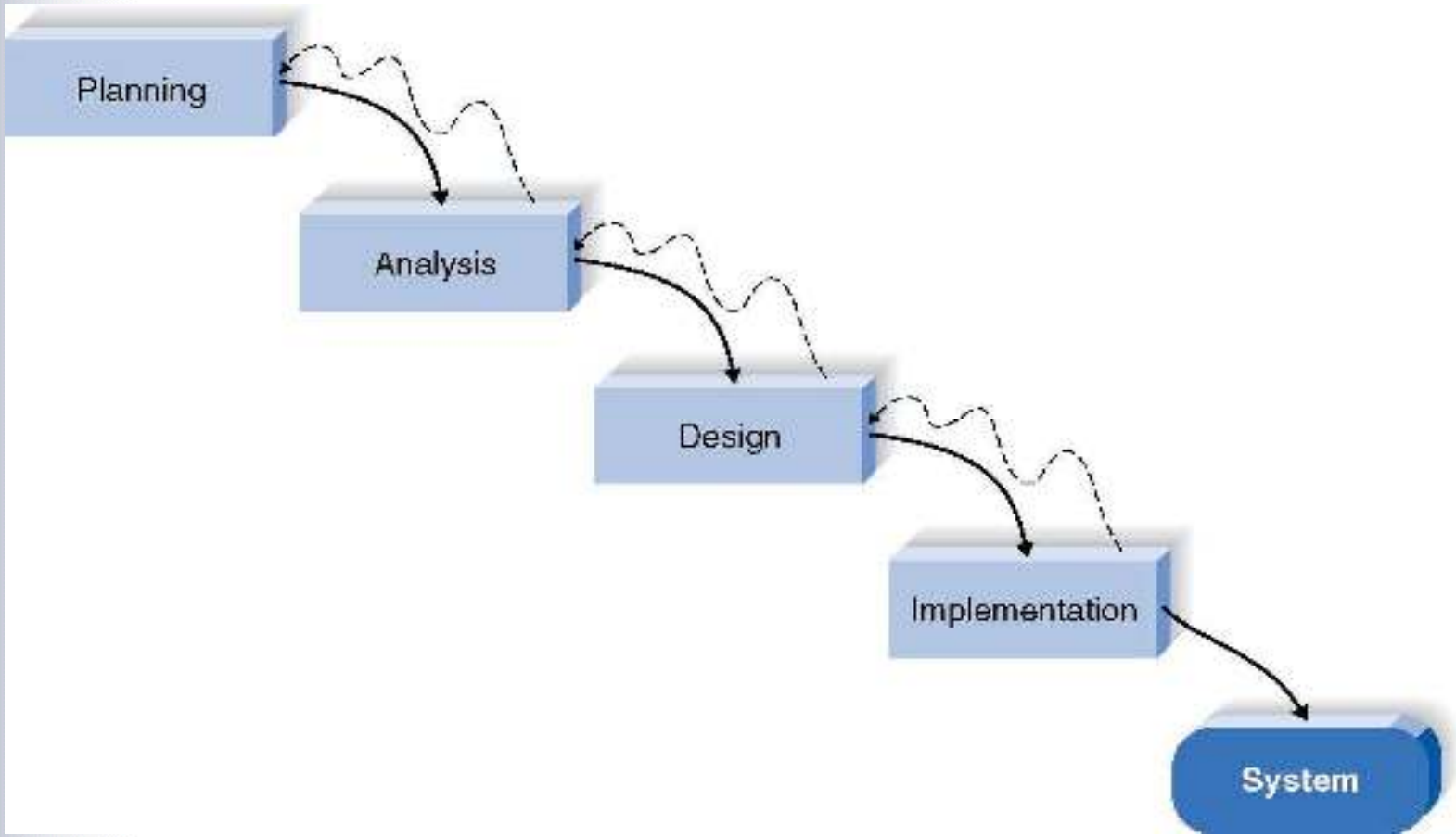
What Is a Methodology?

- A formalized approach or series of steps
- *Writing code without a well-thought-out system request may work for small programs, but rarely works for large ones.*

Structured Design

- *Projects move methodically from one to the next step*
- *Generally, a step is finished before the next one begins*

Waterfall Development Method



Pros and Cons of the Waterfall Method

Pros	Cons
Identifies systems requirements long before programming begins	Design must be specified on paper before programming begins
	Long time between system proposal and delivery of new system

Parallel Development

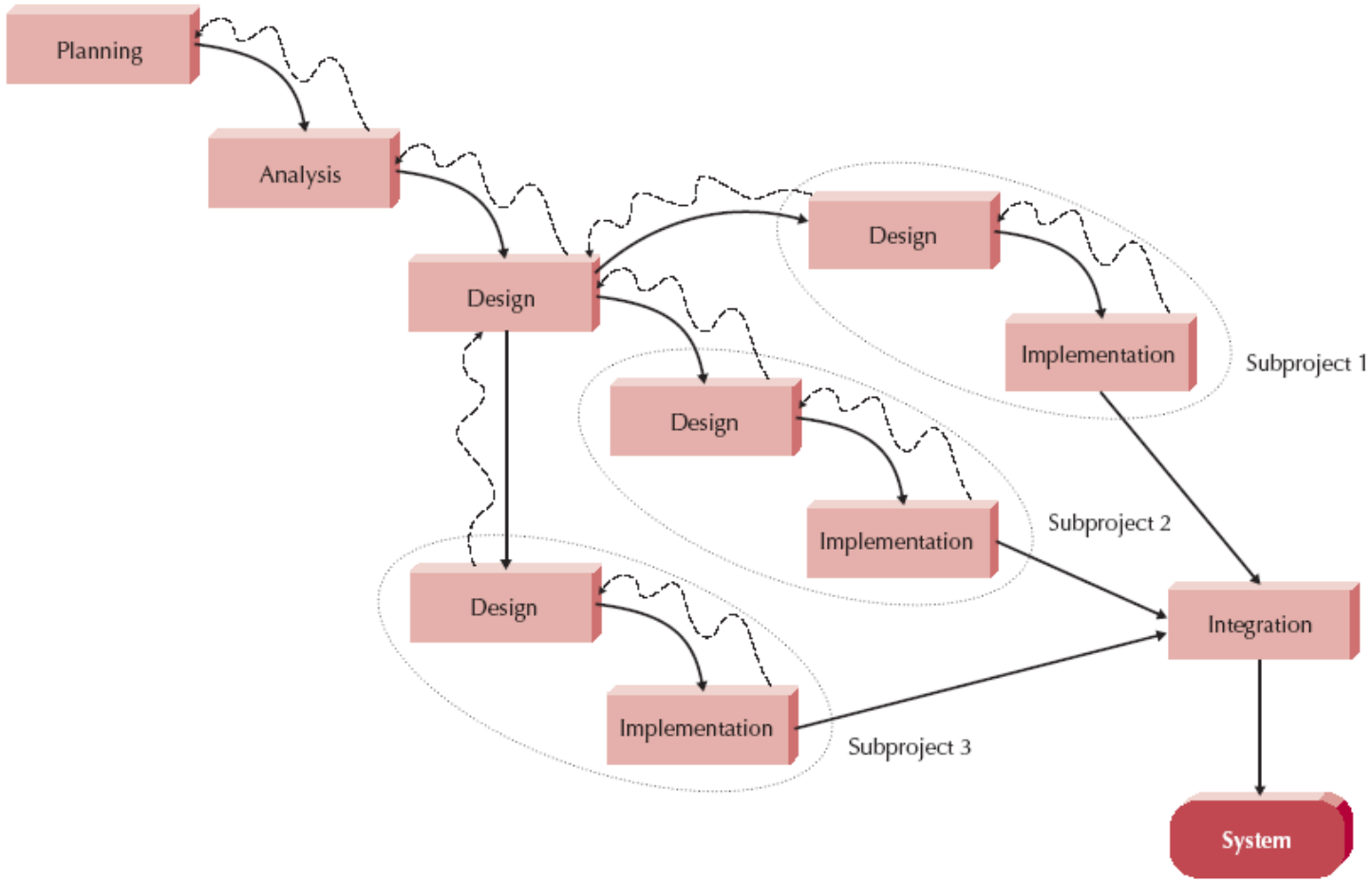


FIGURE 1-3 A Parallel Development-based Methodology

Alternatives to the SDLC

- Rapid Application Development (RAD)
- Phased Development
- Prototyping
- Throw-Away Prototyping

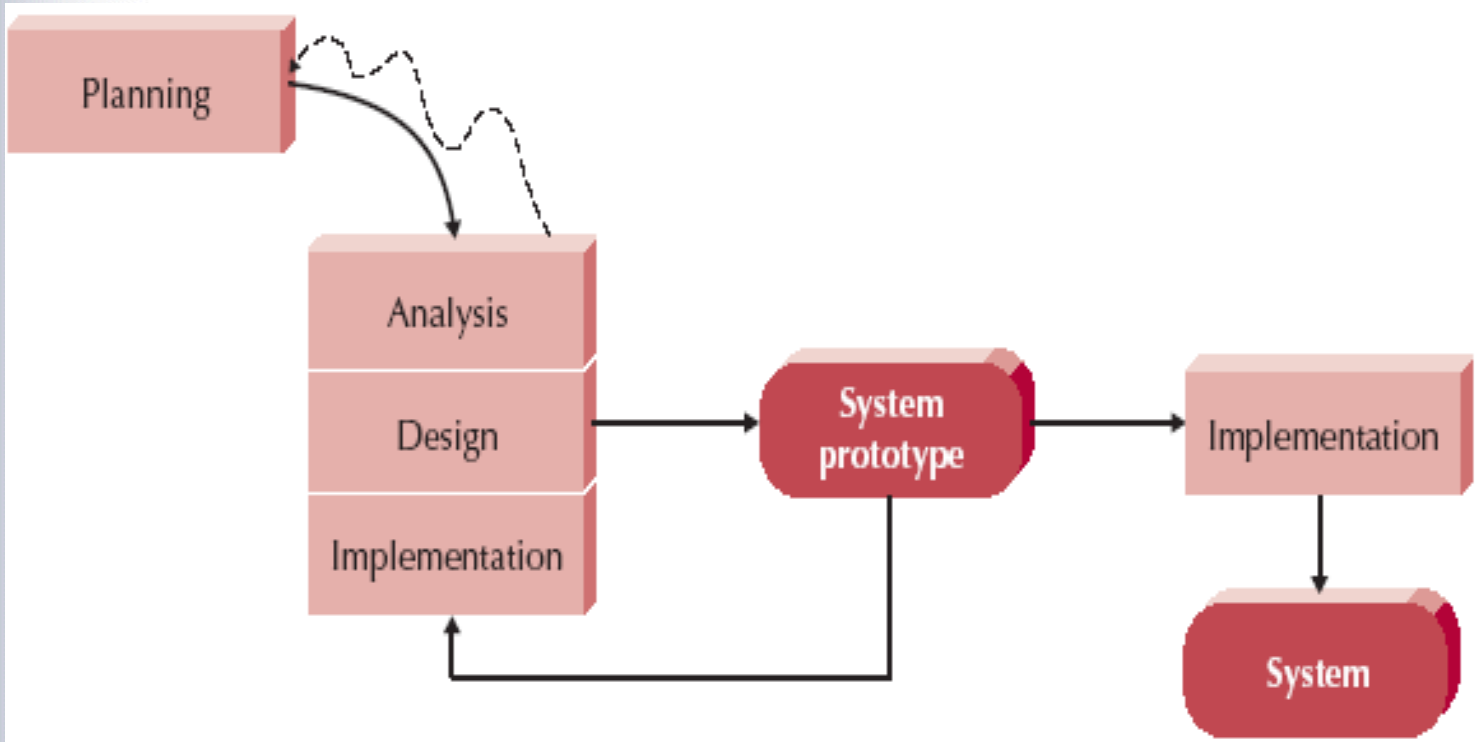
Rapid Application Development

- Critical elements
  - CASE tools
  - JAD sessions
  - Fourth generation/visualization programming languages
  - Code generators

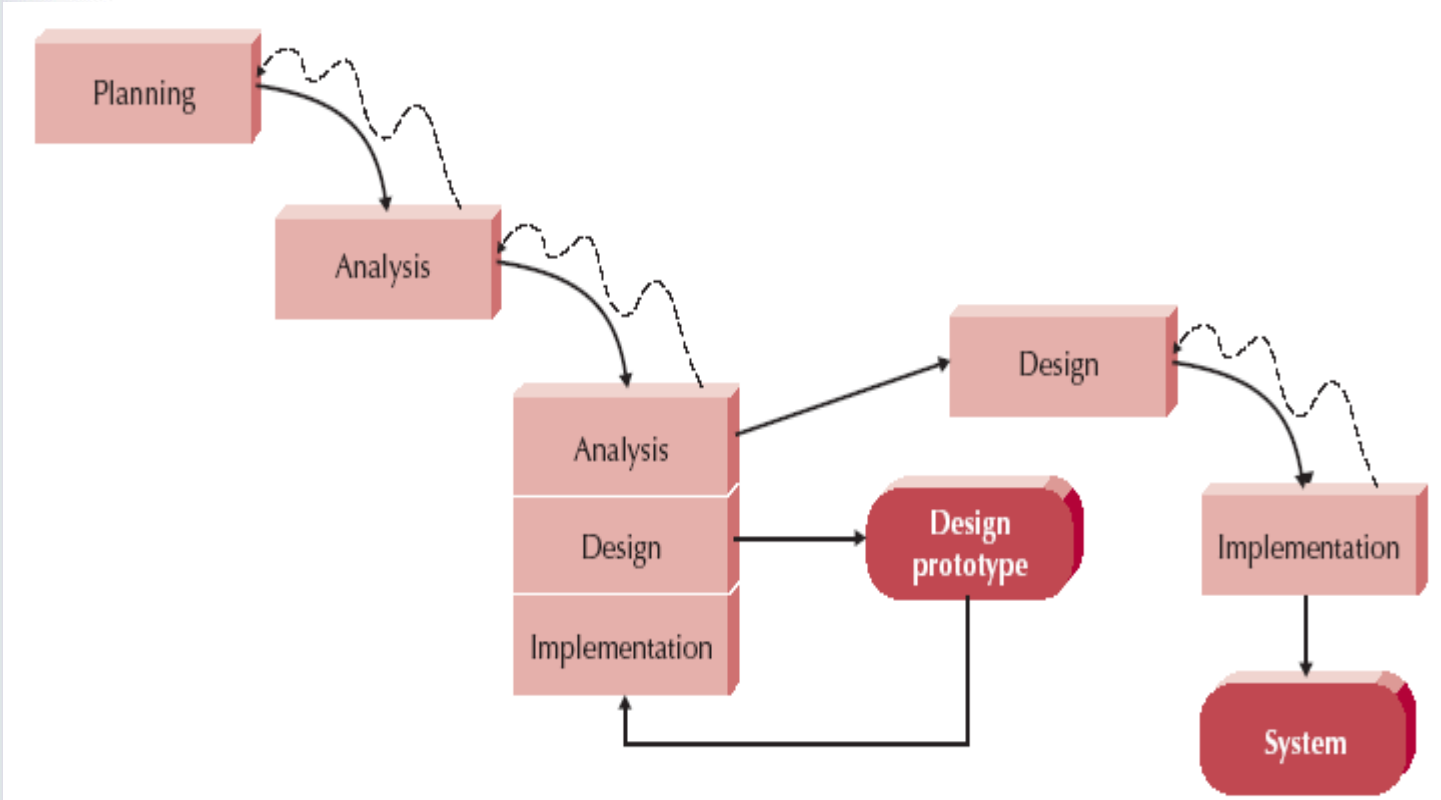
Rapid Application Development Categories

- Phased development
  - A series of versions
- Prototyping
  - System prototyping
- Throw-away prototyping
  - Design prototyping
- Agile Development
- Extreme Development

How Prototyping Works



Throwaway Prototyping



Selecting the Appropriate Methodology

- Clarity of User Requirements
- Familiarity with Technology
- System Complexity
- System Reliability
- Short Time Schedules
- Schedule Visibility

Criteria for Selecting a Methodology

Ability to Develop Systems	Structured Methodologies			RAD Methodologies		Agile Methodologies
	Waterfall	Parallel	Phased	Prototyping	Throwaway Prototyping	XP
with Unclear User Requirements	Poor	Poor	Good	Excellent	Excellent	Excellent
with Unfamiliar Technology	Poor	Poor	Good	Poor	Excellent	Poor
that are Complex	Good	Good	Good	Poor	Excellent	Poor
that are Reliable	Good	Good	Good	Poor	Excellent	Good
with a Short Time Schedule	Poor	Good	Excellent	Excellent	Good	Excellent
with Schedule Visibility	Poor	Poor	Excellent	Excellent	Good	Good

FIGURE 1-8 Criteria for Selecting a Methodology

Project Team Roles and Skills

Information Systems Roles

- Business analyst
- System analyst
- Infrastructure analyst
- Change management analyst
- Project manager

Project Team Roles

Role	Responsibilities
Business analyst	Analyzing the key business aspects of the system Identifying how the system will provide business value Designing the new business processes and policies
Systems analyst	Identifying how technology can improve business processes Designing the new business processes Designing the information system Ensuring that the system conforms to information systems standards
Infrastructure analyst	Ensuring the system conforms to infrastructure standards Identifying infrastructure changes needed to support the system
Change management analyst	Developing and executing a change management plan Developing and executing a user training plan
Project manager	Managing the team of analysts, programmers, technical writers, and other specialists Developing and monitoring the project plan Assigning resources Serving as the primary point of contact for the project

Summary -- Part 1

- *The Systems Development Lifecycle* consists of four stages: Planning, Analysis, Design, and Implementation
- The *major development methodologies*:
  - Structured design
    - the waterfall method
    - Parallel development
  - RAD development
    - Prototyping (regular and throwaway)
  - Agile development
    - XP streamline SDLC

Summary -- Part 2

- There are five *major team roles*: business analyst, systems analyst, infrastructure analyst, change management analyst and project manager.