

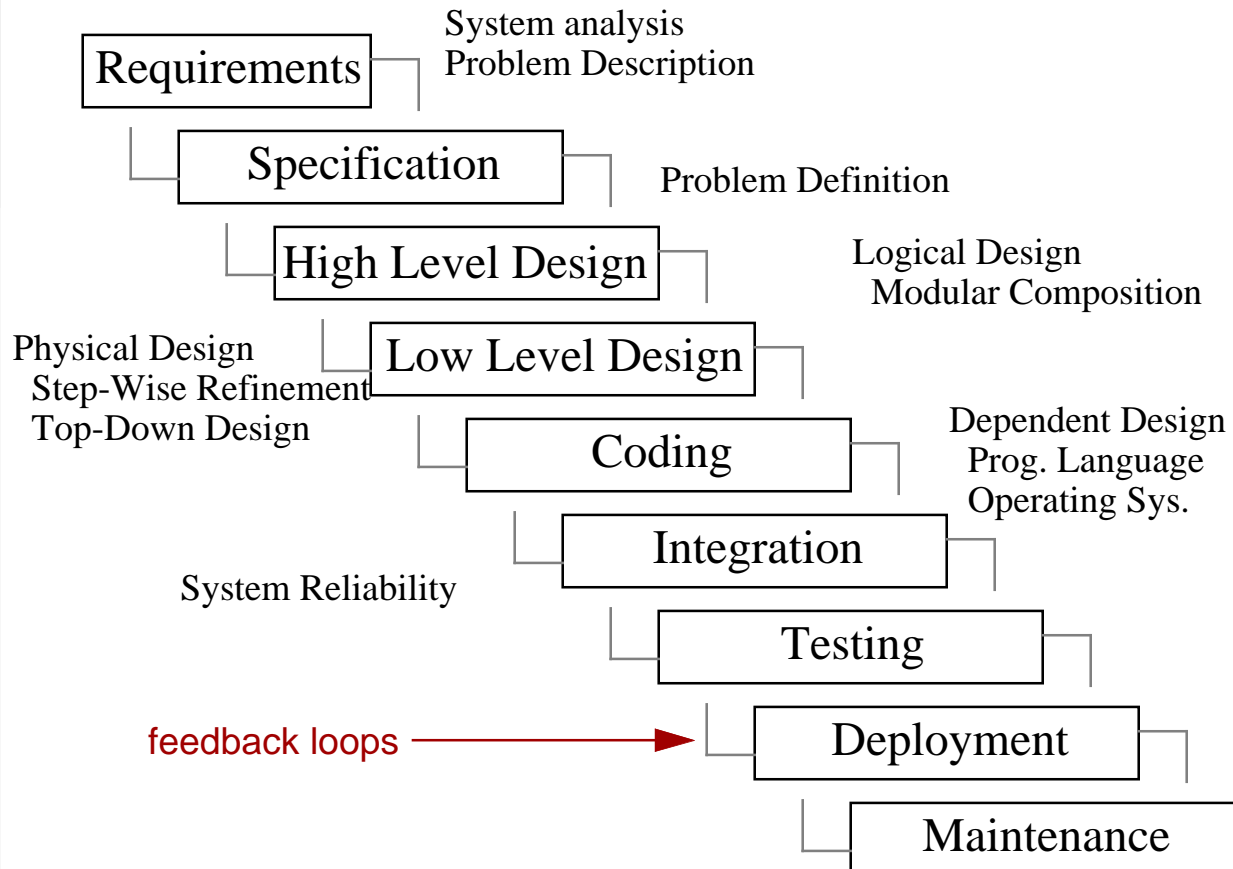
# Software Process Models

## ◆ Table of Contents

- Waterfall Model
- Waterfall Model Phases
- Waterfall Model Phases (cont)
- Waterfall Model Phases (cont)
- Waterfall Model Phases (cont)
- Spiral Model
- Spiral Model (cont)

# Waterfall Model

## ◆ Phases



## ◆ Advantages / Disadvantages

- Most-widely used process model
- Controls schedules, budgets & documentation
- Tends to favor well-understood system aspects over poorly understood system components
- Does not detect development areas behind schedule early in the lifecycle stages.

## ◆ Document-driven process

- Deliverables: documents produced at the end of each phase, usually in accordance to contract deadlines

## Waterfall Model: Phases

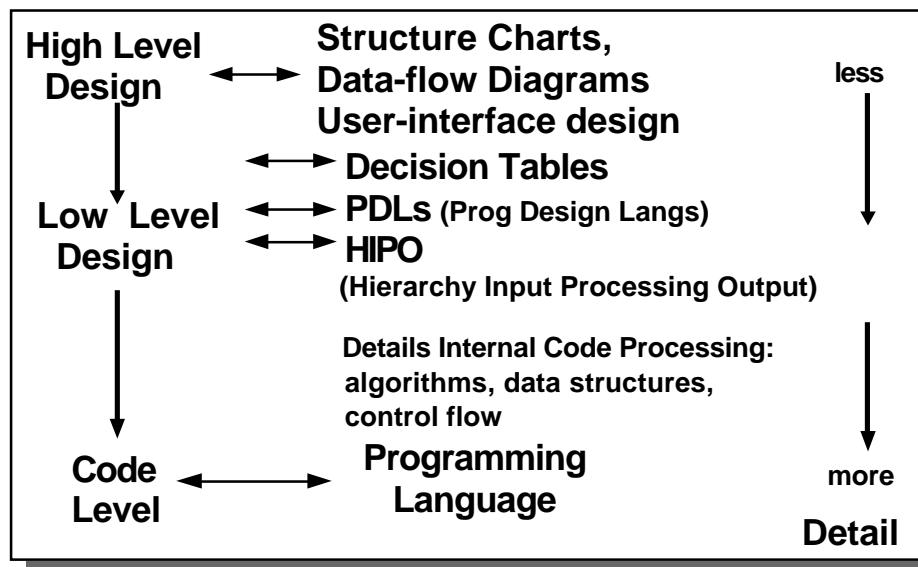
### ◆ Requirements

- A statement of the functions and behavior of the system required by its users & operators
- General Requirements
  - † Defines broad & detailed objectives of the system
  - † e.g., reliable, correct, efficient, user-friendly, expandable
- Gives relationship of Qualitative & Quantitative System Goals

### ◆ Specification

- Listing of specific, **measurable** behavioral system constraints that satisfy system requirements
- Clearly communicates system operations with end user(s)
  - † complete, unambiguous, minimal, understandable, testable
- Cross-reference indexed to requirement items
- Defines the design validation & final system testing criteria
- Provides chief mechanism for estimating the project's progress

### ◆ Design: Representation or model of a system



## Waterfall Model: Phases (cont)

- ◆ Coding and Debugging (implementation)
  - Translation of design into a programming language
  - Indispensable Programmer Phenomena
  - Program Unit Notebooks
    1. Documents programmer's work activities
    2. Maintains current unit (module) documentation
    3. Passed from programmer to programmer during development

Unit Name: \_\_\_\_\_ Programmer: \_\_\_\_\_

Routines Included: \_\_\_\_\_

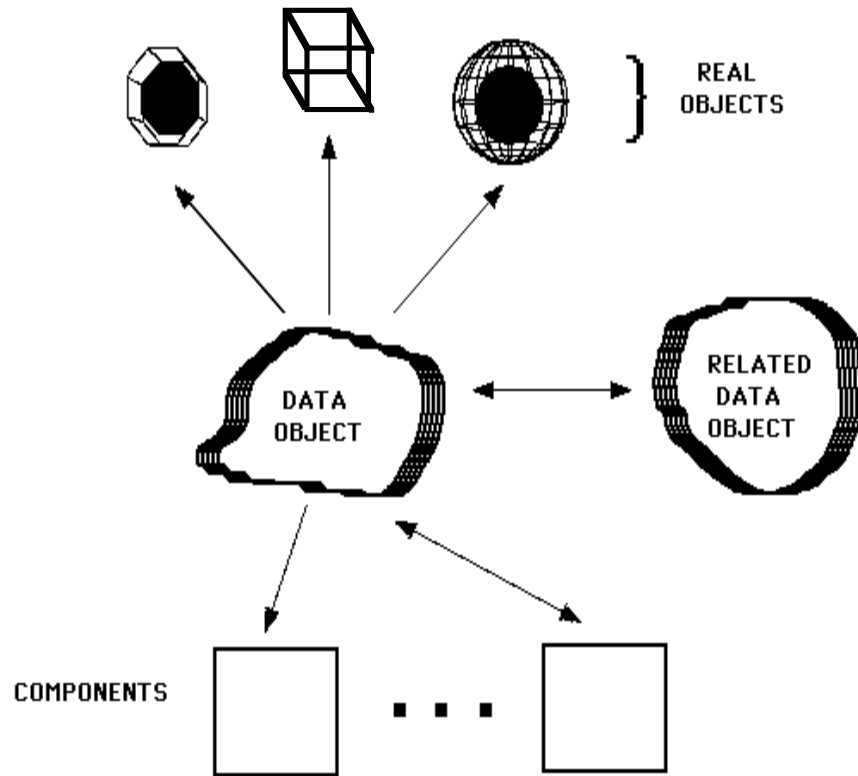
SECTION	CONTENTS	DUE DATE	COMPLETED DATE	REVIEWER/DATE
1.	RQMTS.			
2.	ARCH. DESIGN			
3.	DETAIL DESIGN			
4.	TEST PLAN			
5.	TEST RESULTS			
6.	CHANGE REQUESTS			
7.	SOURCE CODE			
8.	NOTES			

RELEASE APPROVAL: \_\_\_\_\_ DATE: \_\_\_\_\_

## Waterfall Model: Phases (cont)

### ◆ Coding and Debugging (implementation)

- Data Dictionary: records information and physical format details of all structures, variables, files . . .



- Data Dictionary performs documentation mapping

Data Objects	==>	System Structures
“ ”	==>	Parent Objects
“ ”	==>	Module Routines

- Data Dictionary Entry

Name:	from the data-flow diagram or structure chart	
Routine Usage:	routines that access the object	
Purpose:	explanation	
Derivation:	where the data that the items holds comes from ex. files, user, other entries . . .	
Subitems:	Record components	Notes: comments

## Waterfall Model: Phases (cont)

### ◆ Integration and Testing

- Unit testing: individual modules (FNs) are tested separate from other modules
- Integration testing: system modules are tested together

### ◆ Deployment & Maintenance

- Requires previous phases to be repeated
- Makes up **70%-90%** of total system cost
- Majority of maintenance time (50%) spent on system understanding -> system documentation
- Maintenance Tasks
  - † collection, analysis and prioritization of user trouble reports
  - † new system release installations
  - † documentation (user's manuals) changes
  - † configuration control issues



## Spiral Model (cont)

### ◆ Prototype Based

- Prototype: a limited, semi-functional, task restricted, partially operational system
  - † Analogous to a model or mockup that allows evaluation of development alternatives before commitment
- Rapid Prototyping Systems
  - † Authoring/scripting (multimedia) systems used to quickly develop multiple interfaces for user evaluation, cannot serve as a kernel for future **iterative** system prototype development
  - † Users tend to view prototypes as final versions of the system

### ◆ Mimic

- Risk analysis produces a risk-resolution strategy
  - † Feasibility Study: determination of a strategy achieving set goals and requirements within stated constraints.
    - † Address development factors of expertise, experience, resources and motivation
  - † Extension of cost/benefit analysis
    - † cost & benefits are estimated for best & worst case outcomes which are multiplied by their probability of occurrence giving an expected value.
    - † Decisions on strategies are made to minimize cost and maximize benefits
- Cycles are modified to concentrate on different areas of system development driven by the risk-resolution plan
- Spiral model tends to behave like other process models due to differing cycles