

Key Contents to Review



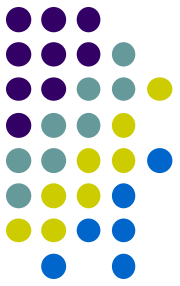
Chapter 1

- Characteristics of software systems
- Definition of software engineering (SE)
 - Modeling + Problem Solving + Knowledge Acquisition + Rationale-driven
- SE concepts (Figure 1-1)
- SE methodologies

Chapter 2

- What is UML?
- Five basic UML diagrams
 - Functional modeling: Use case diagram
 - Object modeling: Class diagram
 - Dynamic modeling: Sequence diagram, state machine diagram, activity diagram

Key Contents to Review (Cont.)



Chapter 3

- Project model (Figure 3-1)
- Project organization (Figure 3-3)
- Role, task, work product, activity
- Communication event (Planned, Unplanned)
- Communication mechanisms (Synchronous, Asynchronous)

Chapter 4

- Software lifecycle used in this course
- Types of requirements, Greenfield/Re-/Interface Engineering
- Scenarios (As-is, Visionary)
- Use case
 - Essentials of use case (6 basic parts)
 - Relationships among use cases: <<include>>, <<extend>>, inheritance

Key Contents to Review (Cont.)



Chapter 5

- Object modeling
 - Entity/Interface/Control object, stereotype
 - Object identification: Syntactic approach (Abbot's techniques)
 - Steps in generating class diagrams
- Dynamic modeling
 - Sequence diagram: Impact on object model, layout/access, fork vs. stair
 - State machine diagram: state/event, action vs. activity, superstates, concurrency, navigation path
- Validation vs. Verification
 - Requirements validation: correctness, completeness, consistency, unambiguity, realism
 - Syntactical problems: different spellings/omissions
- Model dominance
- RAD (Requirement Analysis Document)

Key Contents to Review (Cont.)



Chapter 6

- Design goal (stakeholders, trade-offs)
- Subsystem decomposition
 - Layers vs. Partitions, Opaque layering vs. Transparent layering, Coupling vs. Coherence
- Architectural style
 - Client/Server, Peer-to-Peer, Repository, Model-View-Controller

Chapter 7

- Concurrency: Synchronization of threads
- Hardware/Software Mapping: Component/Deployment diagram
- Persistent Data Management: File system vs. Database
- Global Resource Handling: Access matrix, Table with triples, Access control list, Capabilities
- Software Control: Centralized/Decentralized
- Boundary Conditions: Initialization/Termination/Failure, Boundary use case

Key Contents to Review (Cont.)



Chapter 8

- Reuse
 - Application domain objects vs. Solution domain objects
 - Specification inheritance vs. Implementation inheritance
 - Delegation: An alternative to implementation inheritance
 - Frameworks: Infrastructure/Middleware/Enterprise frameworks, whitebox/blackbox frameworks, class libraries vs. frameworks, components vs. frameworks
- Design Patterns
 - What is design pattern?
 - Composite pattern
 - Adapter pattern
 - Bridge pattern (relationships with adapter pattern)
 - Façade pattern

Key Contents to Review (Cont.)



Chapter 9

- Class user, Class implementer, Class extender
- Add visibility information: Public (+), Protected (#), Private (-)
- Add type signature information: Operation input/output
- Add contracts: Invariant, Precondition, Postcondition
- OCL (Object Constraint Language)
 - Local/directly related class/indirectly related class
 - Only the “local” case is required for examination

Chapter 10

- Four mapping concepts
 - Model transformation, Refactoring, Forward engineering, Backward engineering
- Typical techniques
 - Optimizing the class models, Mapping associations to collections, Mapping contracts to exceptions, Mapping class model to storage schemas (not required for examination)

On Final Examination



Time: Jan. 12, 14:00-16:00

Location: Teaching Building 4, Room 203

Type: Closed-book (闭卷考试)

Q&A: Computer Building, Room 522 (Jan. 11, 14:00-16:30)

题型分布

判断题 ($1 \times 10 = 10$ 分)

选择题 ($1 \times 10 = 10$ 分)

简答题 (10分)

问答题 ($2 \times 10 + 2 \times 15 + 1 \times 20 = 70$ 分)

以理解为主

以记忆为辅