Schedule Updated (April 13)!

周次	教学内容	课时	课外作业	课外课时
1	Ch.0-1 The Nature of Software	2	习题集1	2
2	Ch.1-2 The Process	2	习题集2	2
3	Ch.3-4 The Process(2)	2	习题集3-4	2
4	Ch.31 Project Management；Ch.5 Agile；Ch.6 Human Aspects；	2	习题集31,5-6	2
5	Ch.7 Modeling Principles; Ch.8-9 Requirements: Concepts & Scenario(4.13)	2	习题集7-8-9, 布置需求报告	2
6	Ch.10-11 Requirements: Class & others (4.20)	2	习题集10-11	2
7	Ch.19 Quality Concepts；Ch.12 Design Concepts (4.26,周日，补清明节课)	2	习题集19-20	2
8	Ch.13 Architectural Design(4.27)	2	习题集13，收需求; 布置设计报告	2
9	Ch.17 WebApp Design；Ch.18 MobileApp Design；Ch.20-21 Review & SQA （5.4))	2	习题集17-18，20-21	2
10A	总体设计报告演讲（5.10,周日,补!)			
10B	Ch.14 Component-level Design；Ch.15 UI Design；Ch.16 Pattern-based Design （5.11)	2	习题集14-16，布置设计模式研究报告	2
11	Ch.29 Configuration Management；Ch.22 Testing Strategies （5.18)	2	习题集12，29, 布置测试报告	2
12	Ch.23-24 Testing Conventional & OO Apps （5.25)	2	习题集23-24，布置v1.0；收设计模式研究报告	2
13	Ch.25-26 Testing for WebApp & Mobile App （6.1)	2	习题集25-26，收测试	2
14	Ch.27 Security Engineering；Ch.28 Formal Methods*；Ch.36 Maintenance （6.8)	2	习题集27-28，36；收v1.0; 布置v2.0	2
15	Ch.34 Scheduling；Ch.35 Risk；Ch.30 Product Metrics （6.15)	2	习题集34-35，30，进行Web Speech演讲	2
16	Ch.32 Project Process Metrics；Ch.33 Estimation （6.22)	2	习题集5， 32-33；收v2.0；布置合并版	2

Ch.6 Human Aspects of Software Engineering (Cont.)

April 13, 2015

6.8 Collaboration Tools

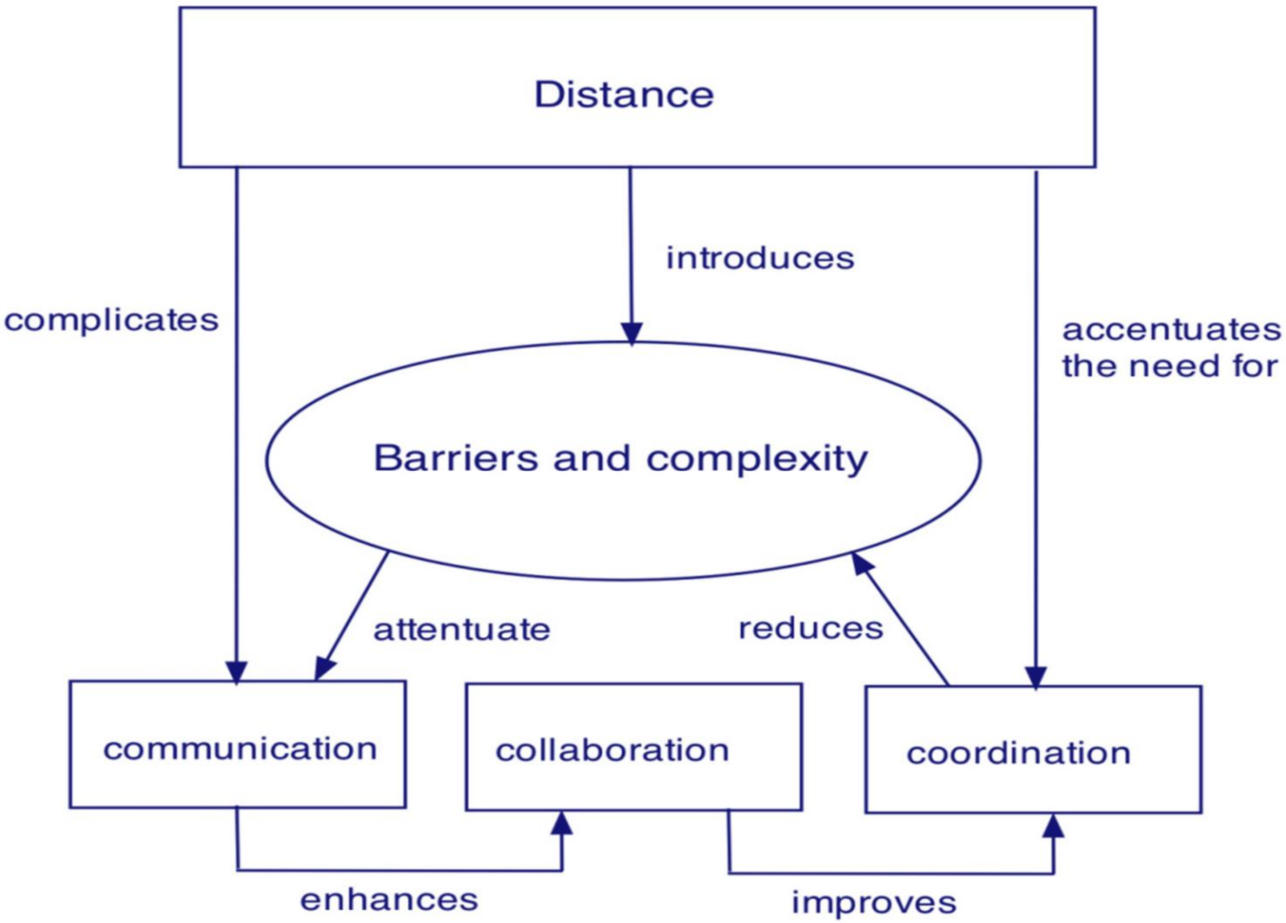
- Services of Collaborative Development Environments(CDEs)
  - Namespace that allows secure, private storage or work products
  - Calendar for coordinating project events
  - Templates that allow team members to create artifacts that have common look and feel
  - Metrics support to allow quantitative assessment of each team member's contributions
  - Communication analysis to track messages and isolates patterns that may imply issues to resolve
  - Artifact clustering showing work product dependencies

6.9 Global Teams

- Team Decisions Making Complications
  - Problem complexity;
  - Uncertainty and risk associated with the decision;
  - Work associated with decision has unintended effect on another project object (law of unintended consequences);
  - Different views of the problem lead to different conclusions about the way forward;
  - Global software teams face additional challenges associated with collaboration, coordination, and coordination difficulties

6.9 Global Teams

- Factors Affecting Global Software Development Team



Ch.7 Principles that Guide Practice

- **Software Engineering Knowledge**

  - You often hear people say that software development knowledge has a 3-year half-life: half of what you need to know today will be obsoleted within 3 years. In the domain of technology-related knowledge, that's probably about right. But there is another kind of software development knowledge—a kind that I think of as "software engineering principles"—that does not have a three-year half-life. These software engineering principles are likely to serve a professional programmer throughout his or her career.

Steve McConnell

Kinds of Principles

- Principles that Guide Process (8);
- Principles that Guide Practice(8);
- Communication Principles(10); ******
- Planning Principles(10);

- Modeling Principles (10);
- ---Agile Modeling Principles(10);******

  ---Requirements Modeling Principles(5);

  ---Design Modeling Principles(10);

  ---Living Modeling Principles(8); ******

- Construction Principles:

  ---Coding Principles(9);

  ---Preparation Principles(5);

  ---Validation Principles(3);

  ---Testing Principles(9);

- Deployment Principles(5);
- Work Practices (10)

- **Principles that Guide Process - I**
  - *Principle #1. Be agile.* Whether the process model you choose is prescriptive or agile, the basic tenets(原则) of agile development should govern your approach.
  - *Principle #2. Focus on quality at every step.* The exit condition for every process activity, action, and task should focus on the quality of the work product that has been produced.
  - *Principle #3. Be ready to adapt.* Process is not a religious experience and dogma has no place in it. When necessary, adapt your approach to constraints imposed by the problem, the people, and the project itself.
  - *Principle #4. Build an effective team.* Software engineering process and practice are important, but the bottom line is people. Build a self-organizing team that has mutual trust and respect.

- **Principles that Guide Process - II**
  - *Principle #5. Establish mechanisms for communication and coordination.* Projects fail because important information falls into the cracks and/or stakeholders fail to coordinate their efforts to create a successful end product.
  - *Principle #6. Manage change. Focus on quality at every step.* The approach may be either formal or informal, but mechanisms must be established to manage the way changes are requested, assessed, approved and implemented.
  - *Principle #7. Assess risk.* Lots of things can go wrong as software is being developed. It’s essential that you establish contingency plans.
  - *Principle #8. Create work products that provide value for others.* Create only those work products that provide value for other process activities, actions or tasks.

- **Principles that Guide Practice - I**

  - *Principle #1. Divide and conquer.* Stated in a more technical manner, analysis and design should always emphasize separation of concerns (SoC).
  - *Principle #2. Understand the use of abstraction.* At it core, an abstraction is a simplification of some complex element of a system used to communication meaning in a single phrase.
  - *Principle #3. Strive for consistency.* A familiar context makes software easier to use.
  - *Principle #4. Focus on the transfer of information.* Pay special attention to the analysis, design, construction, and testing of interfaces.

- **Principles that Guide Practice - II**

  - *Principle #5. Build software that exhibits effective modularity.* Separation of concerns (Principle #1) establishes a philosophy for software. Modularity provides a mechanism for realizing the philosophy.
  - *Principle #6. Look for patterns.* Brad Appleton [App00] suggests that: "The goal of patterns within the software community is to create a body of literature to help software developers resolve recurring problems encountered throughout all of software development.
  - *Principle #7. When possible, represent the problem and its solution from a number of different perspectives.*
  - *Principle #8. Remember that someone will maintain the software.*

- **Communication Principles - I**

  - *Principle #1. Listen.* Try to focus on the speaker's words, rather than formulating your response to those words.
  - *Principle # 2. Prepare before you communicate.* Spend the time to understand the problem before you meet with others.
  - *Principle # 3. Someone should facilitate the activity.* Every communication meeting should have a leader (a facilitator) to keep the conversation moving in a productive direction; (2) to mediate any conflict that does occur, and (3) to ensure than other principles are followed.
  - *Principle #4. Face-to-face communication is best.* But it usually works better when some other representation of the relevant information is present.

• Communication Principles - II

- *Principle # 5. Take notes and document decisions.* Someone participating in the communication should serve as a “recorder” and write down all important points and decisions.
- *Principle # 6. Strive for collaboration.* Collaboration and consensus occur when the collective knowledge of members of the team is combined …
- *Principle # 7. Stay focused, modularize your discussion.* The more people involved in any communication, the more likely that discussion will bounce from one topic to the next.
- *Principle # 8. If something is unclear, draw a picture.*
- *Principle # 9. (a) Once you agree to something, move on; (b) If you can’t agree to something, move on; (c) If a feature or function is unclear and cannot be clarified at the moment, move on.*
- *Principle # 10. Negotiation is not a contest or a game. It works best when both parties win.*

- **Planning Principles - I**
  - *Principle #1. Understand the scope of the project.* It's impossible to use a roadmap if you don't know where you're going. Scope provides the software team with a destination.
  - *Principle #2. Involve the customer in the planning activity.* The customer defines priorities and establishes project constraints.
  - *Principle #3. Recognize that planning is iterative.* A project plan is never engraved in stone. As work begins, it very likely that things will change.
  - *Principle #4. Estimate based on what you know.* The intent of estimation is to provide an indication of effort, cost, and task duration, based on the team's current understanding of the work to be done.

- **Planning Principles - II**
  - *Principle #5. Consider risk as you define the plan.* If you have identified risks that have high impact and high probability, contingency planning is necessary.
  - *Principle #6. Be realistic.* People don't work 100 percent of every day.
  - *Principle #7. Adjust granularity as you define the plan.* Granularity refers to the level of detail that is introduced as a project plan is developed.
  - *Principle #8. Define how you intend to ensure quality.* The plan should identify how the software team intends to ensure quality.
  - *Principle #9. Describe how you intend to accommodate change.* Even the best planning can be obviated by uncontrolled change.
  - *Principle #10. Track the plan frequently and make adjustments as required.* Software projects fall behind schedule one day at a time.

- **Modeling Principles**

  - *In software engineering work, two classes of models can be created:*

    - *Requirements models (also called analysis models)* represent the **customer** requirements by depicting the software in three different domains: the information domain, the functional domain, and the behavioral domain.

    - *Design models* represent characteristics of the software that help **practitioners** to construct it effectively: the architecture, the user interface, and component-level detail.

- **Agile Modeling Principles - I**
  - Principle #1. The primary goal of the software team is to build software not create models.
  - Principle #2. Travel light – don't create more models than you need.
  - Principle #3. Strive to produce the simplest model that will describe the problem or the software.
  - Principle #4. Build models in a way that makes them amenable to change.
  - Principle #5. Be able to state an explicit purpose for each model that is created.

• Agile Modeling Principles - II

- Principle #6. Adapt the models you create to the system at hand.
- Principle #7. Try to build useful models, forget abut building perfect models.
- Principle #8. Don't become dogmatic about model syntax. Successful communication is key.
- Principle #9. If your instincts tell you a paper model isn't right you may have a reason to be concerned.
- Principle #10. Get feedback as soon as you can.

Requirements Modeling Principles

- Principle #1. The information domain of a problem must be represented and understood.
- Principle #2. The functions that the software performs must be defined.
- Principle #3. The behavior of the software (as a consequence of external events) must be represented.
- Principle #4. The models that depict information, function, and behavior must be partitioned in a manner that uncovers detail in a layered (or hierarchical) fashion.
- Principle #5. The analysis task should move from essential information toward implementation detail.

Design Modeling Principles - I

- Principle #1. Design should be traceable to the requirements model.
- Principle #2. Always consider the architecture of the system to be built.
- Principle #3. Design of data is as important as design of processing functions.
- Principle #4. Interfaces (both internal and external) must be designed with care.
- Principle #5. User interface design should be tuned to the needs of the end-user. Stress ease of use.

- **Design Modeling Principles - II**
  - Principle #6. Component-level design should be functionally independent.
  - Principle #7. Components should be loosely coupled to each other than the environment.
  - Principle #8. Design representations (models) should be easily understandable.
  - Principle #9. The design should be developed iteratively.
  - Principle #10. Creation of a design model does not preclude
  - using an agile approach.

- **Living Modeling Principles - I**

  - Principle #1. Stakeholder-centric models should target specific stakeholders and their tasks.
  - Principle #2. Models and code should be closely coupled.
  - Principle #3. Bidirectional information flow should be established between models and code.
  - Principle #4. A common system view should be created.

- **Living Modeling Principles - II**
  - Principle #5. Model information should be persistent to allow tracking system changes.
  - Principle #6. Information consistency across all model levels must be verified.
  - Principle #7. Each model element has assigned stakeholder rights and responsibilities.
  - Principle #8. The states of various model elements should be represented.

- **Construction Principles**

  - The construction activity encompasses a set of coding and testing tasks that lead to operational software that is ready for delivery to the customer or end-user.

  - *Coding principles and concepts* are closely aligned programming style, programming languages, and programming methods.

  - *Testing principles and concepts* lead to the design of tests that systematically uncover different classes of errors and to do so with a minimum amount of time and effort.

- **Preparation Principles**

  - *Before you write one line of code, be sure you:*

    - Understand of the problem you're trying to solve.
    - Understand basic design principles and concepts.
    - Pick a programming language that meets the needs of the software to be built and the environment in which it will operate.
    - Select a programming environment that provides tools that will make your work easier.
    - Create a set of unit tests that will be applied once the component you code is completed.

- **Coding Principles**
  - *As you begin writing code, be sure you:*
    - Constrain your algorithms by following structured programming [Boh00] practice.
    - Consider the use of pair programming
    - Select data structures that will meet the needs of the design.
    - Understand the software architecture and create interfaces that are consistent with it.
    - Keep conditional logic as simple as possible.
    - Create nested loops in a way that makes them easily testable.
    - Select meaningful variable names and follow other local coding standards.
    - Write code that is self-documenting.
    - Create a visual layout (e.g., indentation and blank lines) that aids understanding.

- **Validation Principles**

  - *After you've completed your first coding pass, be sure you:*

    - Conduct a code walkthrough when appropriate.
    - Perform unit tests and correct errors you've uncovered.
    - Refactor the code.

- **Testing Principles - I**
- *Al Davis [Dav95] suggests the following:*
  - Principle #1. All tests should be traceable to customer requirements.
  - Principle #2. Tests should be planned long before testing begins.
  - Principle #3. The Pareto principle applies to software testing.
  - Principle #4. Testing should begin “in the small” and progress toward testing “in the large.”

- **Testing Principles - II**
  - *Al Davis [Dav95] suggests the following:*
    - Principle #5. Exhaustive testing is not possible.
    - Principle #6. Testing effort for each system module commensurate to expected fault density.
    - Principle #7. Static testing can yield high results.
    - Principle #8. Track defects and look for patterns in defects uncovered by testing.
    - Principle #9. Include test cases that demonstrate software is behaving correctly.

- **Deployment Principles**

  - Principle #1. Customer expectations for the software must be managed.
  - Principle #2. A complete delivery package should be assembled and tested.
  - Principle #3. A support regime must be established before the software is delivered.
  - Principle #4. Appropriate instructional materials must be provided to end-users.
  - Principle #5. Buggy software should be fixed first, delivered later.

Ch.8 Understanding Requirements

8.1 Requirements Engineering (7 Tasks)

1. **Inception (起始)**— ask a set of questions that establish
   - basic understanding of the problem
   - the people who want a solution
   - the nature of the solution that is desired, and
   - the effectiveness of preliminary communication and collaboration between the customer and the developer
2. **Elicitation（导出）**— elicit requirements from all stakeholders
3. **Elaboration（精化）** — create an analysis model that identifies *data*, *function* and *behavioral* requirements
4. **Negotiation （协商）**— agree on a deliverable system that is realistic for developers and customers

Requirements Engineering Tasks (2)

5. **Specification** — can be any one (or more) of the following
   - A written document
   - A set of models
   - A formal mathematical
   - A collection of user scenarios (use-cases)
   - A prototype
6. **Validation(确认)** — a review mechanism that looks for
   - errors in content or interpretation
   - areas where clarification（说明） may be required
   - missing information
   - inconsistencies (a major problem when large products or systems are engineered)
   - conflicting or unrealistic (unachievable) requirements.
7. **Requirements management** — identify, control, and track requirements and changes to requirements at any time

8.2 Establishing the Groundwork

- **Identify stakeholders**
  - "who else do you think I should talk to?"

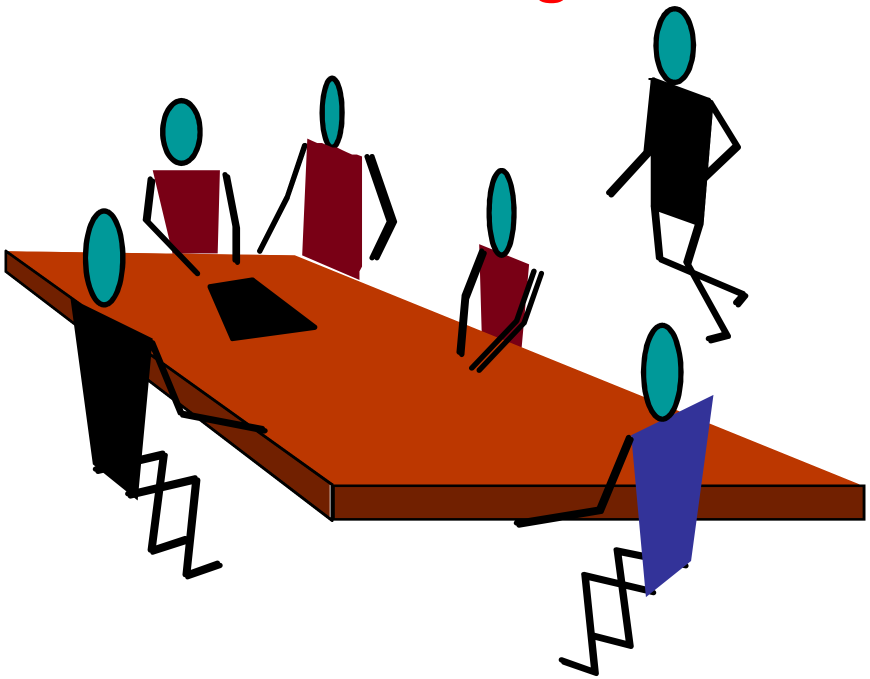
- **Recognize multiple points of view**

- **Working toward collaboration**

- **The first set of context-free questions**
  - Who is behind the request for this work?
  - Who will use the solution?
  - What will be the economic benefit of a successful solution?
  - Is there another source for the solution that you need?

8.3 Eliciting Requirements

- **Collaborative Requirements Gathering**



Goal:

- Identify the problem
- Propose elements of the solution
- Negotiate different approaches
- Specify a preliminary set of solution requirements

8.3 Eliciting Requirements(B)

- **Meetings** are conducted and attended by both software engineers and customers
- **Rules** for preparation and participation are established
- An **agenda**（议事日程） is suggested
- A **facilitator** (主持人，can be a customer, a developer, or an outsider) controls the meeting
- A **definition mechanism** (can be work sheets, flip charts（活动挂图）, or wall stickers or an electronic bulletin board, chat room or virtual forum) is used

8.3 Eliciting Requirements (C)

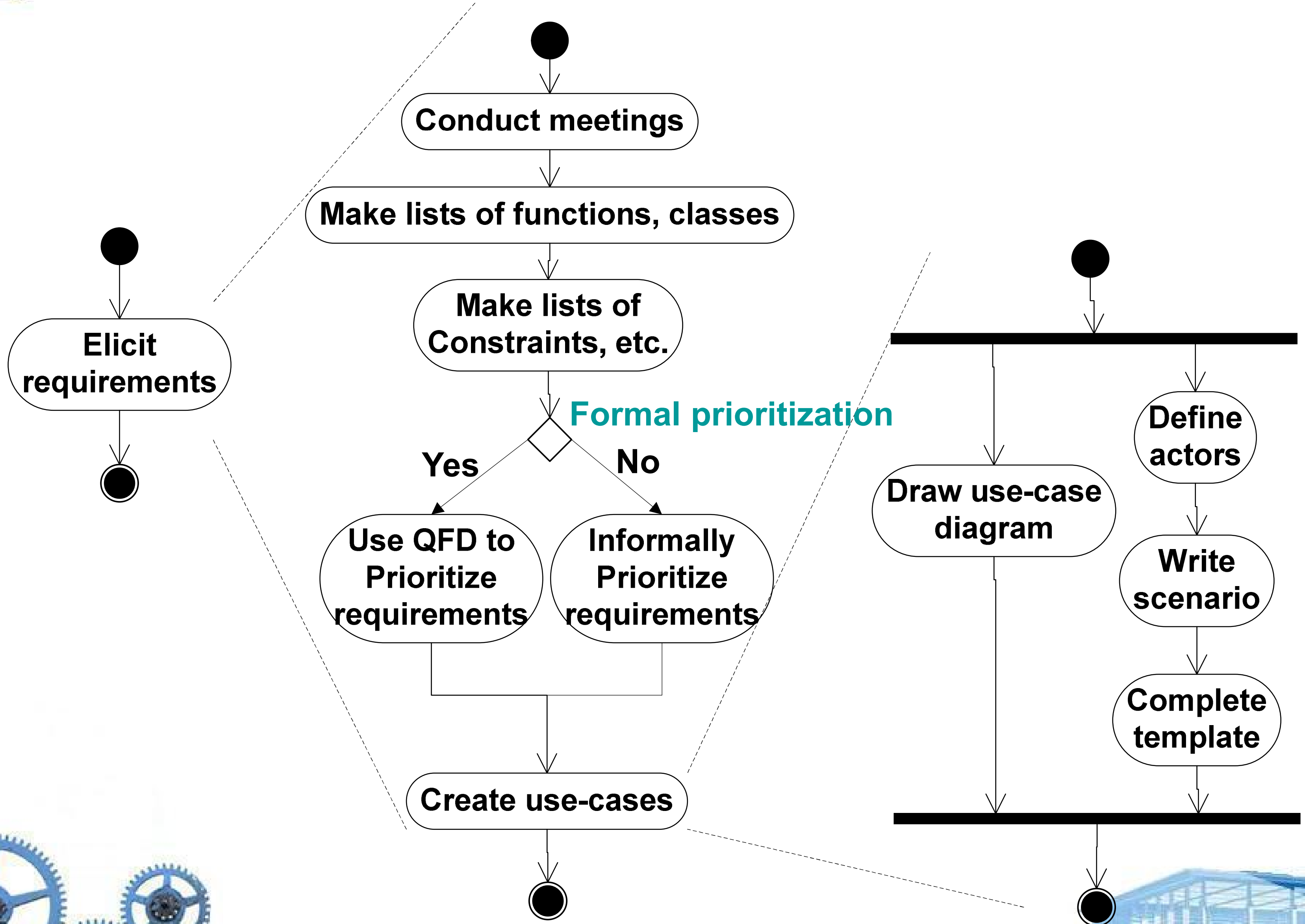
- a "definition mechanism" (can be work sheets, flip charts, or wall stickers or an electronic bulletin board, chat room or virtual forum) is used
-

The hardest single part of building a software system is deciding what to build

- Problem of scope
- Problem of understanding
- Problem of volatility （挥发性）

specify a preliminary set of solution requirements

8.3 Eliciting Requirements (C)



8.3 Eliciting Requirements (D)

- **Quality Function Deployment (QFD)**

  — *Translate the needs of the customer into technical requirements for software. **Maximize customer satisfaction** from the software engineering process.*

- **Function deployment** determines the ***value*** of each function required of the system
- **Information deployment** identifies data objects and events
- **Task deployment** examines the behavior of the system
- **Value analysis** determines the relative priority of requirements

➡ **Normal**, **Expected**, and **Exciting** requirements

8.3 Eliciting Requirements (E)

- Non-Functional Requirements (NFR)

--- quality attribute, performance attribute, security attribute, or general system constraint. A two phase process is used to determine which NFR's are compatible:

  - **The first phase is to create a matrix using each NFR as a column heading and the system SE guidelines a row labels**
  - **The second phase is for the team to prioritize each NFR using a set of decision rules to decide which to implement by classifying each NFR and guideline pair as complementary, overlapping, conflicting, or independent**

A Example -- SafeHome

Our research indicates that the market for home security systems is growing at a rate of 40% per year. We would like to enter this market by building a microprocessor-based home security system that would protect against and/or recognize a variety of undesirable situations such as illegal entry, fire, flooding, and others. The product will use appropriate sensors to detect each situation, can be programmed by the homeowner, and will automatically telephone a monitoring agency when a situation is detected.

8.3 Eliciting Requirements(F)

- **User Scenarios** (Use-cases) — identify a thread of usage （e.g. SafeHome）
- **Elicitation Work Products**

➢ a statement of **need and feasibility**.

➢ a bounded statement of **scope** for the system or product

➢ a list of customers, users, and other **stakeholders** who participated in requirements elicitation

➢ a description of the system's **technical environment**

➢ a list of requirements (preferably organized by **function**) and the domain **constraints** that apply to each

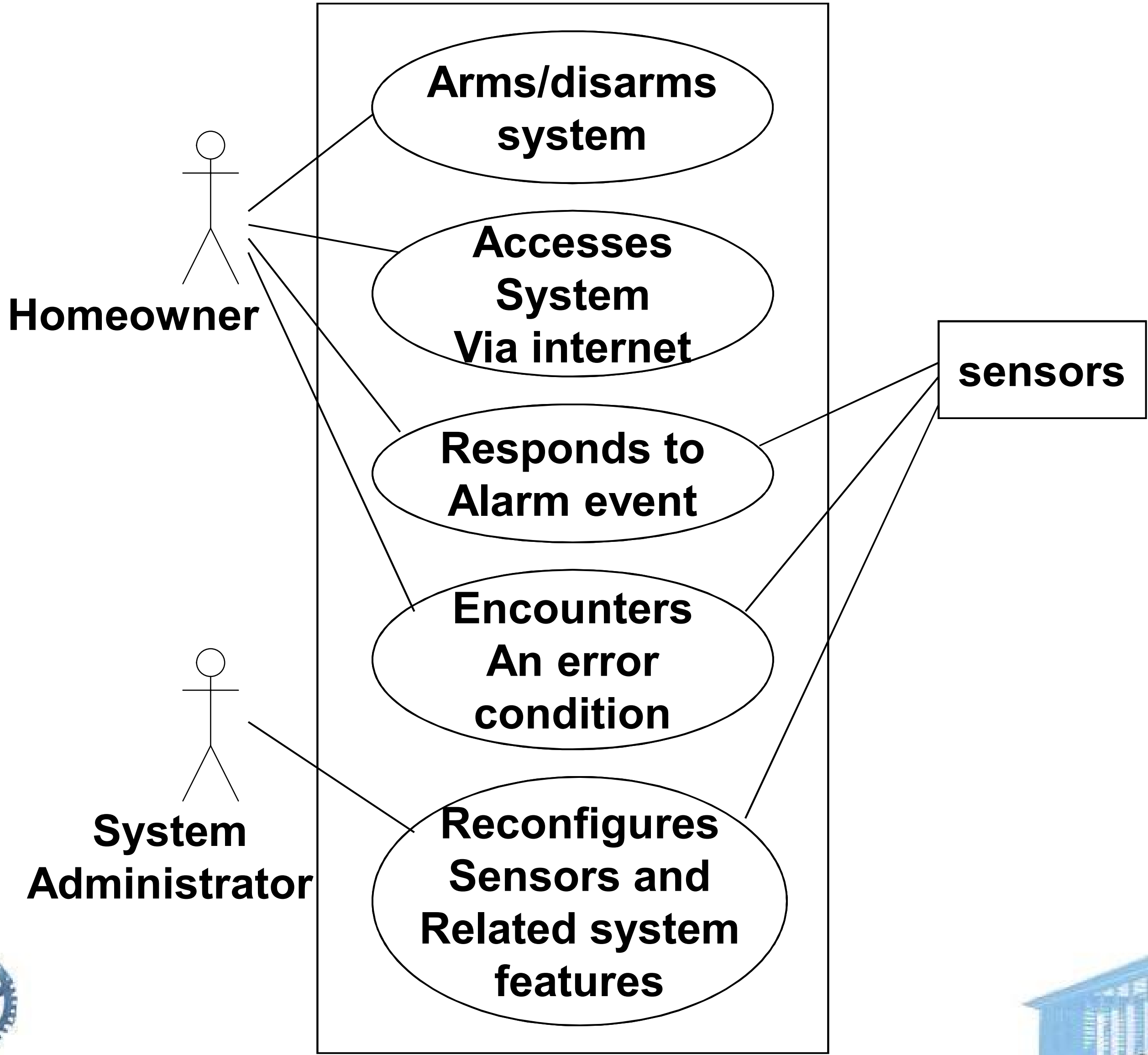
➢ a set of usage **scenarios** that provide insight into the use of the system or product under different operating conditions.

➢ any **prototypes** developed to better define requirements

8.4 Developing Use-Cases

- **Actor** — a person or device that interacts with the software
- **Each scenario answers the following questions:**
  - **Who** is the primary actor, the secondary actor(s)?
  - What are the actor's **goals**?
  - What **preconditions** should exist before the story begins?
  - What main tasks or **functions** are performed by the actor?
  - What **exceptions** might be considered as the story is described?
  - What **variations** in the actor's interaction are possible?
  - What are **the main tasks or functions** that are performed by the actor?
  - What system information will the actor **acquire, produce, or change**?
  - Will the actor have to inform the system about changes in the **external** environment?
  - What information does the actor **desire** from the system?
  - Does the actor wish to be informed about **unexpected** changes?

Use-Case Diagram



8.5 Building the Analysis Model

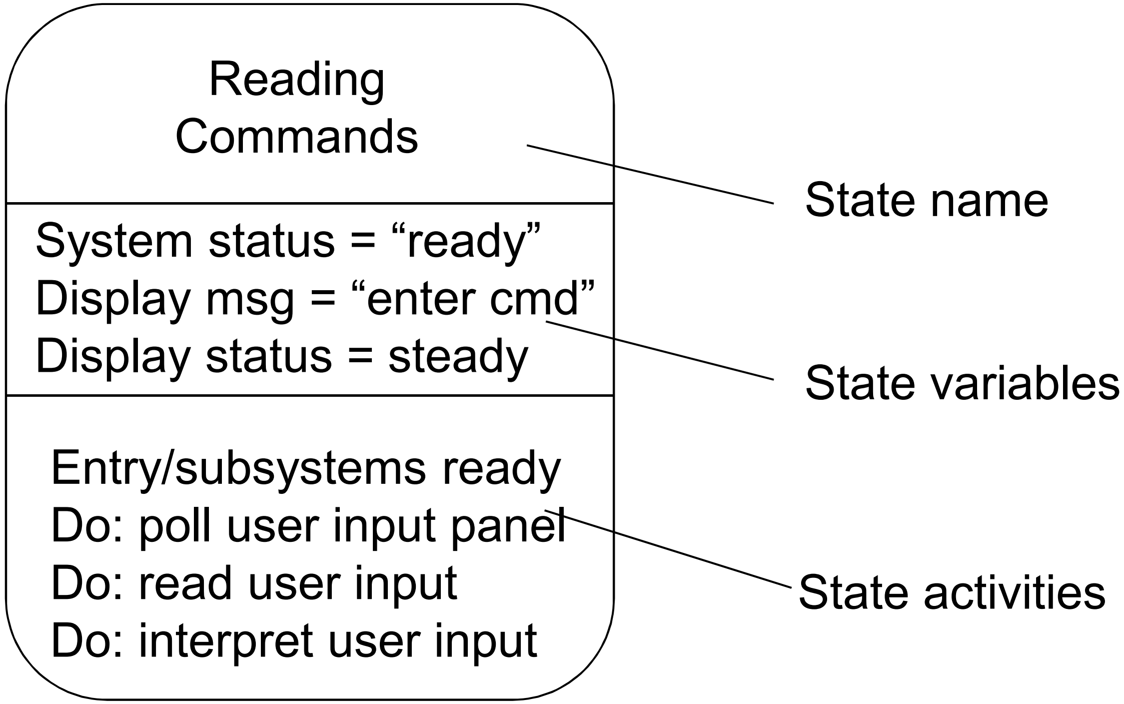
- **Elements of the analysis model**
  - *Scenario-based elements*
    - Use-case and **user-case diagram**
    - Sequence of **activities** within certain context
  - *Class-based elements*
    - **Class diagram**
  - *Behavioral elements*
    - **State diagram**
  - *Flow-oriented elements*
    - **Data flow diagram**

Class Diagram

From the *SafeHome* system …

Sensor
name/id type location area characteristics
identify() enable() disable() reconfigure()

State Diagram



State Diagram

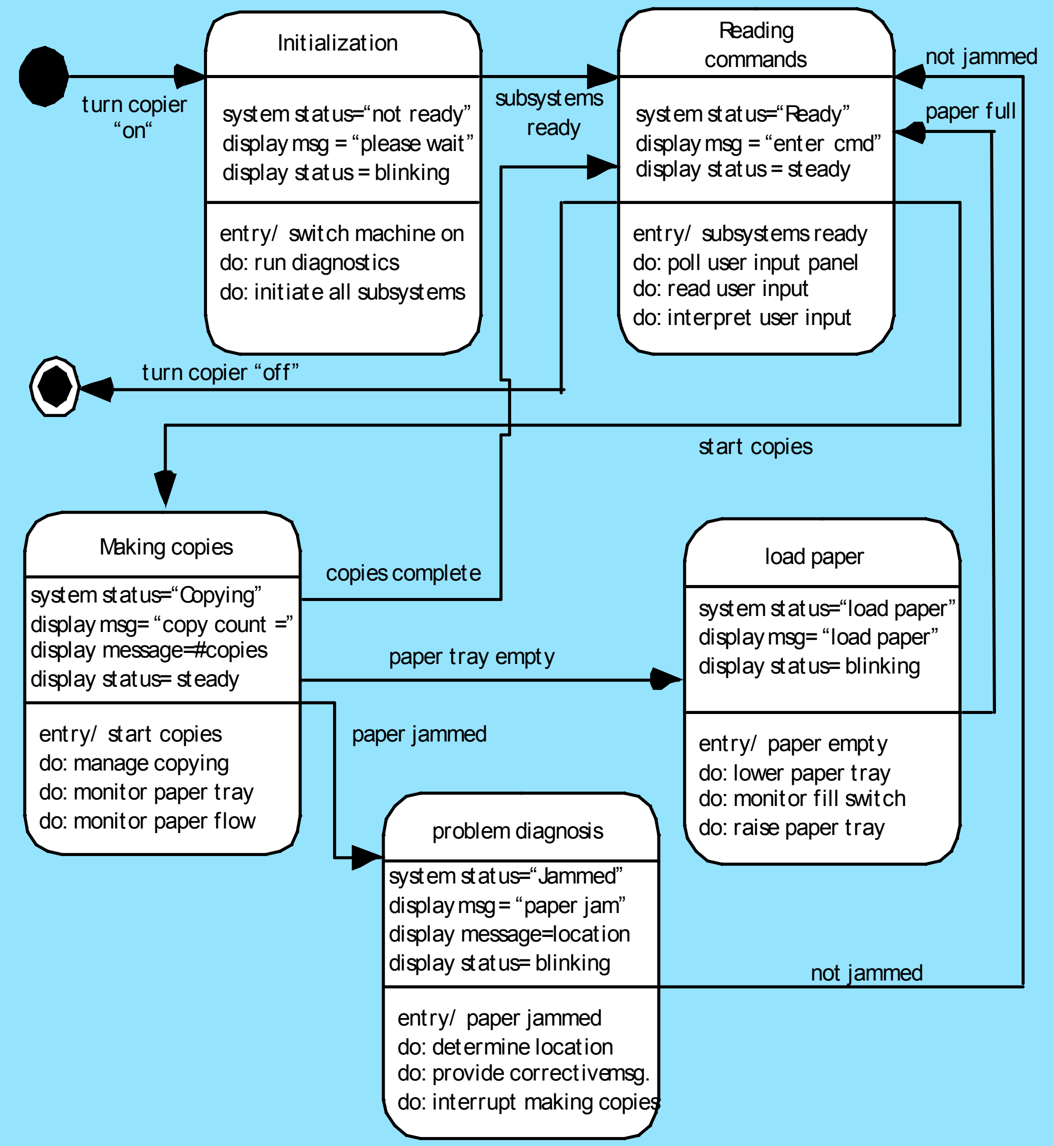


Figure 7.6 Preliminary UML state diagram for a photocopier

Analysis Patterns

Pattern name: A descriptor that captures the essence of the pattern.

Intent: Describes what the pattern accomplishes or represents

Motivation: A scenario that illustrates how the pattern can be used to address the problem.

Forces and context: A description of external issues (forces) that can affect how the pattern is used and also the external issues that will be resolved when the pattern is applied.

Solution: A description of how the pattern is applied to solve the problem with an emphasis on structural and behavioral issues.

Consequences: Addresses what happens when the pattern is applied and what trade-offs exist during its application.

Design: Discusses how the analysis pattern can be achieved through the use of known design patterns.

Known uses: Examples of uses within actual systems.

Related patterns: One or more analysis patterns that are related to the named pattern because (1) it is commonly used with the named pattern; (2) it is structurally similar to the named pattern; (3) it is a variation of the named pattern.

8.6 Negotiating Requirements

- **Identify the key stakeholders**
  - These are the people who will be involved in the negotiation
- **Determine each of the stakeholders' *win conditions***
  - Win conditions are not always obvious
- **Negotiate**
  - Work toward a set of requirements that lead to ***win-win***

8.6 Negotiating Requirements

- **Identify the key stak...**
  - – ...n the
- **...win**
  - – Win co... ...ways obvious
- **Negotiate**
  - – Work toward a set of requirements that lead to ***win-win***

If different customers/users cannot agree on requirements, the risk of failure is very high.

8.6 Negotiating Requirements(2)

- **The Art of Negotiation**

☞ **It is not a competition**

☞ **Map out a strategy**

☞ **Listen**

☞ **Focus on the other party's interest**

☞ **Don't let it get personal**

☞ **Be creative**

☞ **Be ready to commit (承诺)**

8.7 Requirements Monitoring

Especially needs in incremental development

- **Distributed debugging – uncovers errors and determines their cause**
- **Run-time verification – determines whether software matches its specification**
- **Run-time validation – assesses whether evolving software meets user goals**
- **Business activity monitoring – evaluates whether a system satisfies business goals**
- **Evolution and codesign – provides information to stakeholders as the system evolves**

8.8 Validating Requirements

- **Is each requirement bounded and unambiguous?**
- **Does each requirement have attribution? That is, is a source (generally, a specific individual) noted for each requirement?**
- **Do any requirements conflict with other requirements?**
- **Is each requirement achievable in the technical environment that will house the system or product?**
- **Is each requirement testable, once implemented?**

8.8 Validating Requirements(2)

- Is each requirement consistent with the overall objective for the system/product?
- Have all requirements been specified at the proper level of abstraction? That is, do some requirements provide a level of technical detail that is inappropriate at this stage?
- Is the requirement really necessary or does it represent an add-on feature that may not be essential to the objective of the system?

8.8Validating Requirements (3)

- Does the requirements model properly reflect the information, function and behavior of the system to be built.

- Has the requirements model been “partitioned” in a way that exposes progressively more detailed information about the system.

- Have requirements patterns been used to simplify the requirements model. Have all patterns been properly validated? Are all patterns consistent with customer requirements?

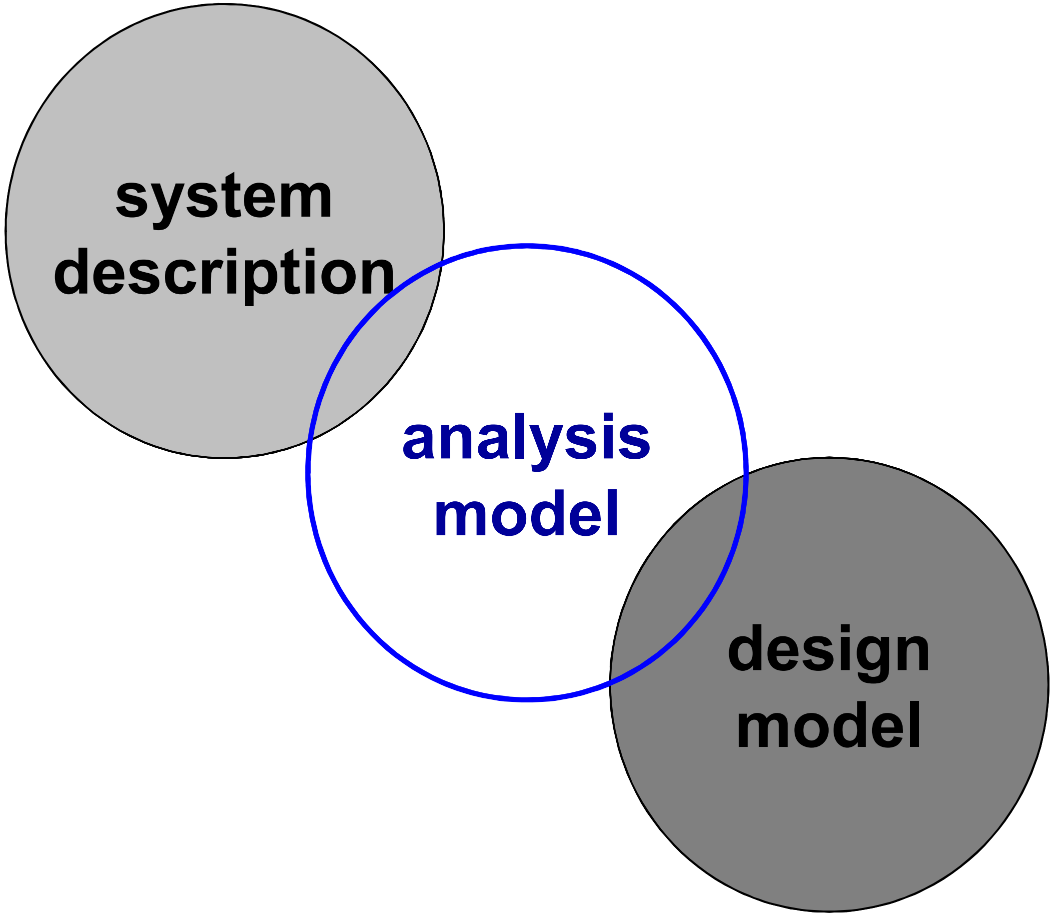
Ch.9 Requirements Modeling：Scenario-Based Methods

9.1 Requirements Analysis

- **Objectives**
  - Describe what the customer requires
  - Establish a basis for the creation of a software design
  - Define a set of requirements that can be validated
- **Allows the software engineer (called an *analyst* or *modeler* in this role) to:**
  - elaborate on basic requirements established during earlier requirement engineering tasks
  - build models that depict
    - ✓ user scenarios
    - ✓ functional activities
    - ✓ problem classes and their relationships
    - ✓ system and class behavior
    - ✓ the flow of data as it is transformed
    - ✓ constraints that software must meet

9.1 Requirements Analysis

- **A Bridge**

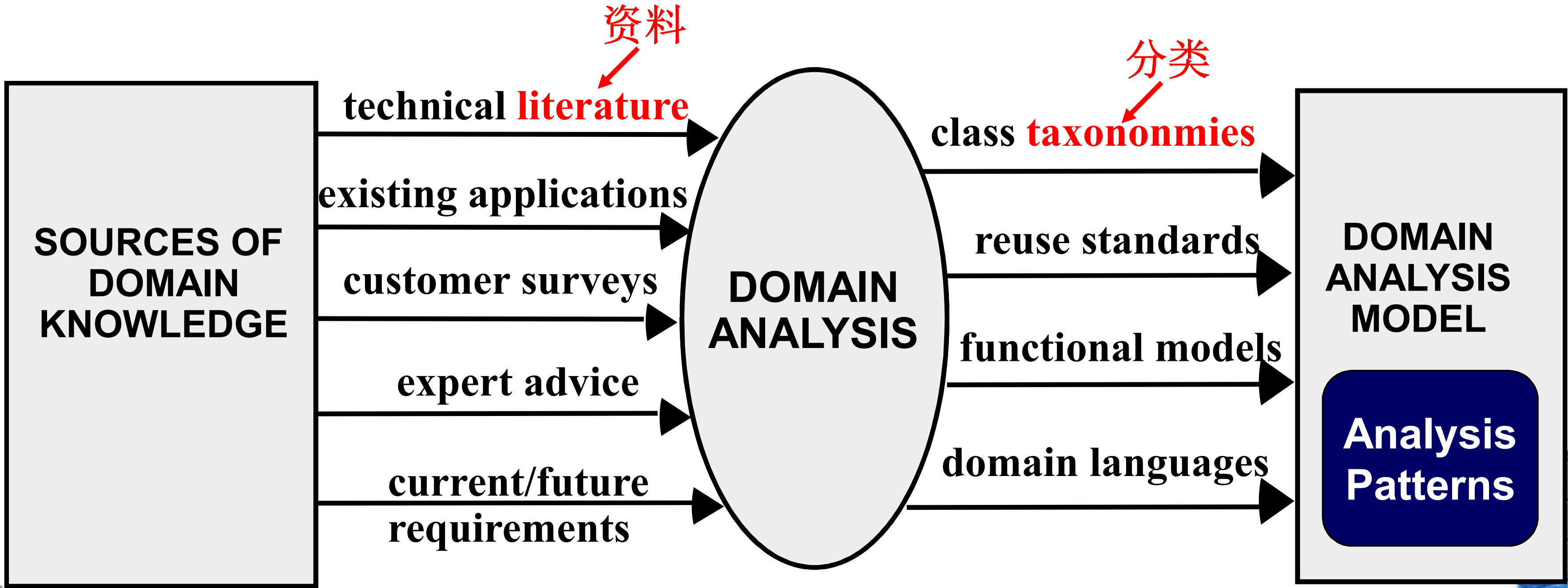


9.1 Requirements Analysis

- **Rules of Thumb**
  - Focus on business domain. ***Don't get bogged down in details*.**
  - Each element of the analysis model should ***add to an overall understanding*** of software requirements and provide insight into the information domain, function and behavior of the system.
  - ***Delay*** consideration of infrastructure(基础结构) and other non-functional models until design.
  - ***Minimize coupling*** throughout the system.
  - Be certain that the analysis model ***provides value*** to all stakeholders.
  - Keep the model as ***simple*** as it can be.

• Domain Analysis

Goal: Software domain analysis is the identification, analysis, and specification of common requirements from a specific application domain, typically for ***reuse*** on multiple projects within that application domain.



Elements of Analysis Modeling

Software requirements

Scenario-based models
- Use-cases (text)
- Use-case diagrams
- Activity diagrams
- Swim lane diagrams

Flow-oriented models
- Data flow diagrams
- control flow diagrams
- Processing narratives

Class-based models
- Class diagrams
- Analysis packages
- CRC models
- Collaboration diagrams

Behavioral models
- State diagrams
- Sequence diagrams

Class Responsibility Collaborator--**Index card**

Scenario-Based Modeling

Use-cases **are simply an aid to defining what exists outside the system (actors) and what should be performed by the system**

(1) What should we write about?

(2) How much should we write about it?

(3) How detailed should we make our description?

(4) How should we organize the description?

Use-Cases

- a scenario that describes a "thread of usage" for a system
- *actors* represent roles people or devices play as the system functions
- *users* can play a number of different roles for a given scenario

Developing a Use-Case

- What are the main tasks or functions that are performed by the actor?
- What system information will the actor acquire, produce or change?
- Will the actor have to inform the system about changes in the external environment?
- What information does the actor desire from the system?
- Does the actor wish to be informed about unexpected changes? (For more, see pp.8-10)

Reviewing a Use-Case

- Use-cases are written first in narrative form and mapped to a template if formality is needed

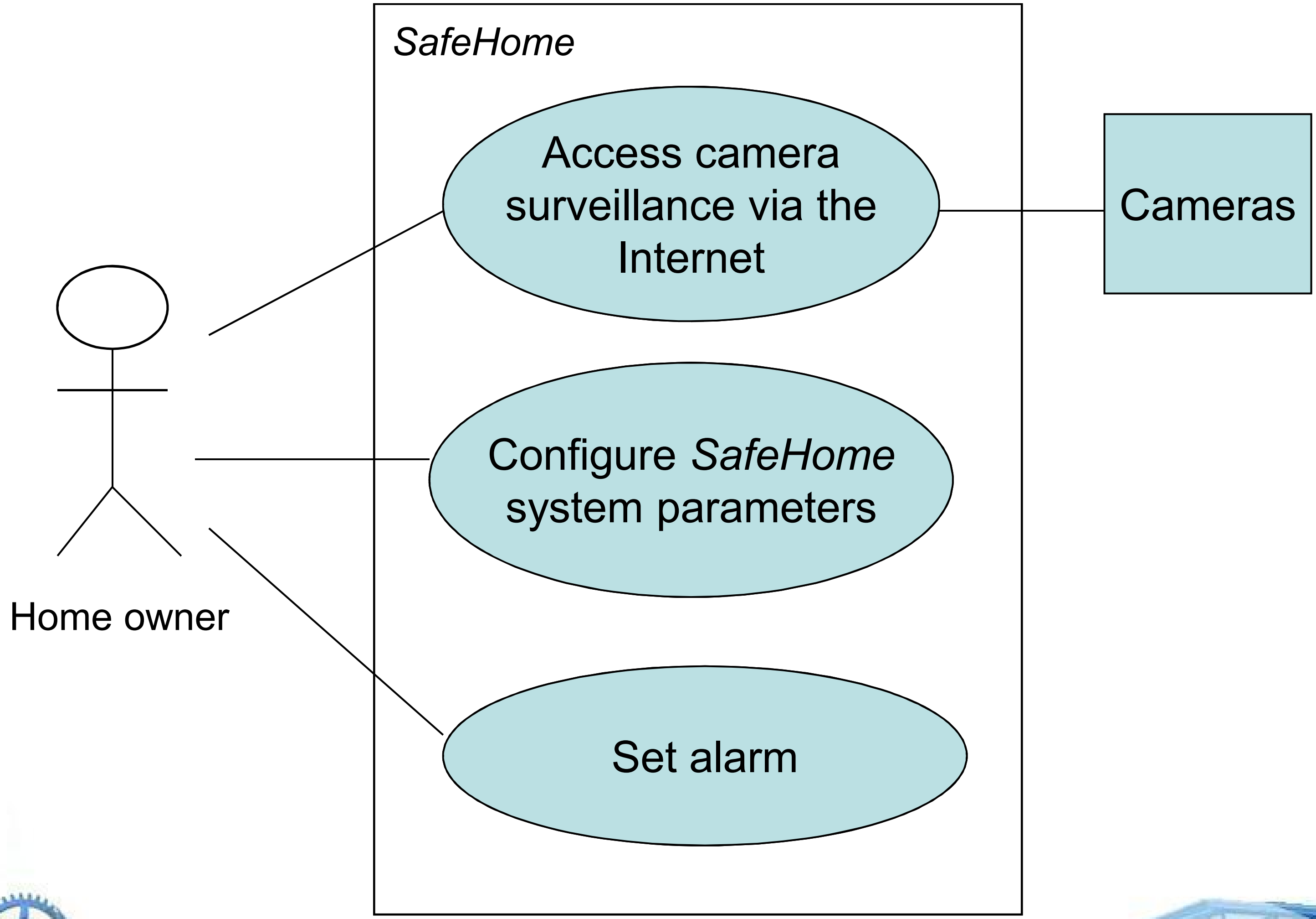
- Each primary scenario should be reviewed and refined to see if alternative interactions are possible

  – Can the actor take some other action at this point?

  – Is it possible that the actor will encounter an error condition at some point? If so, what?

  – Is it possible that the actor will encounter some other behavior at some point? If so, what?

Use-Case Diagram

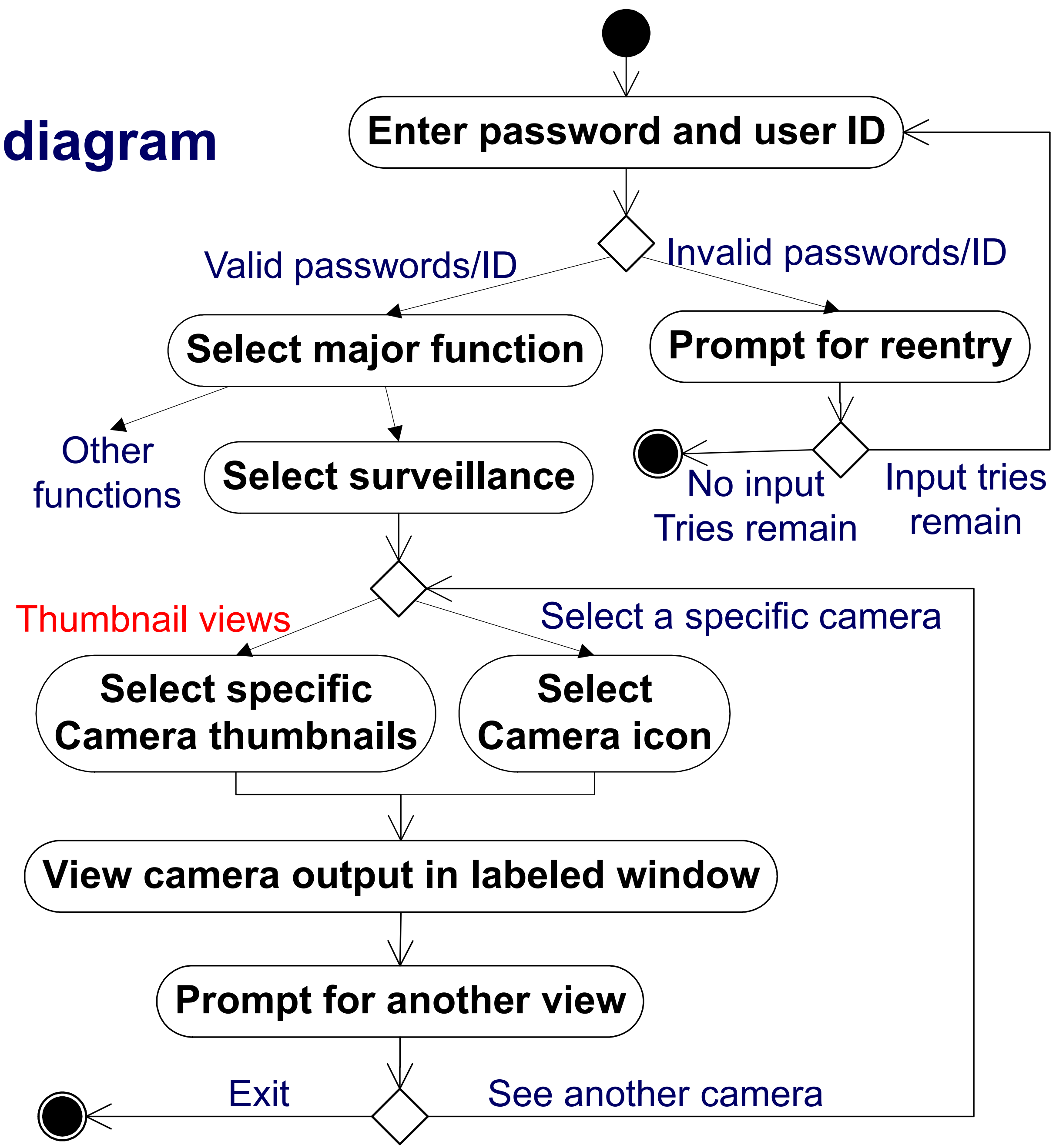


Activity and Swim Lane Diagrams

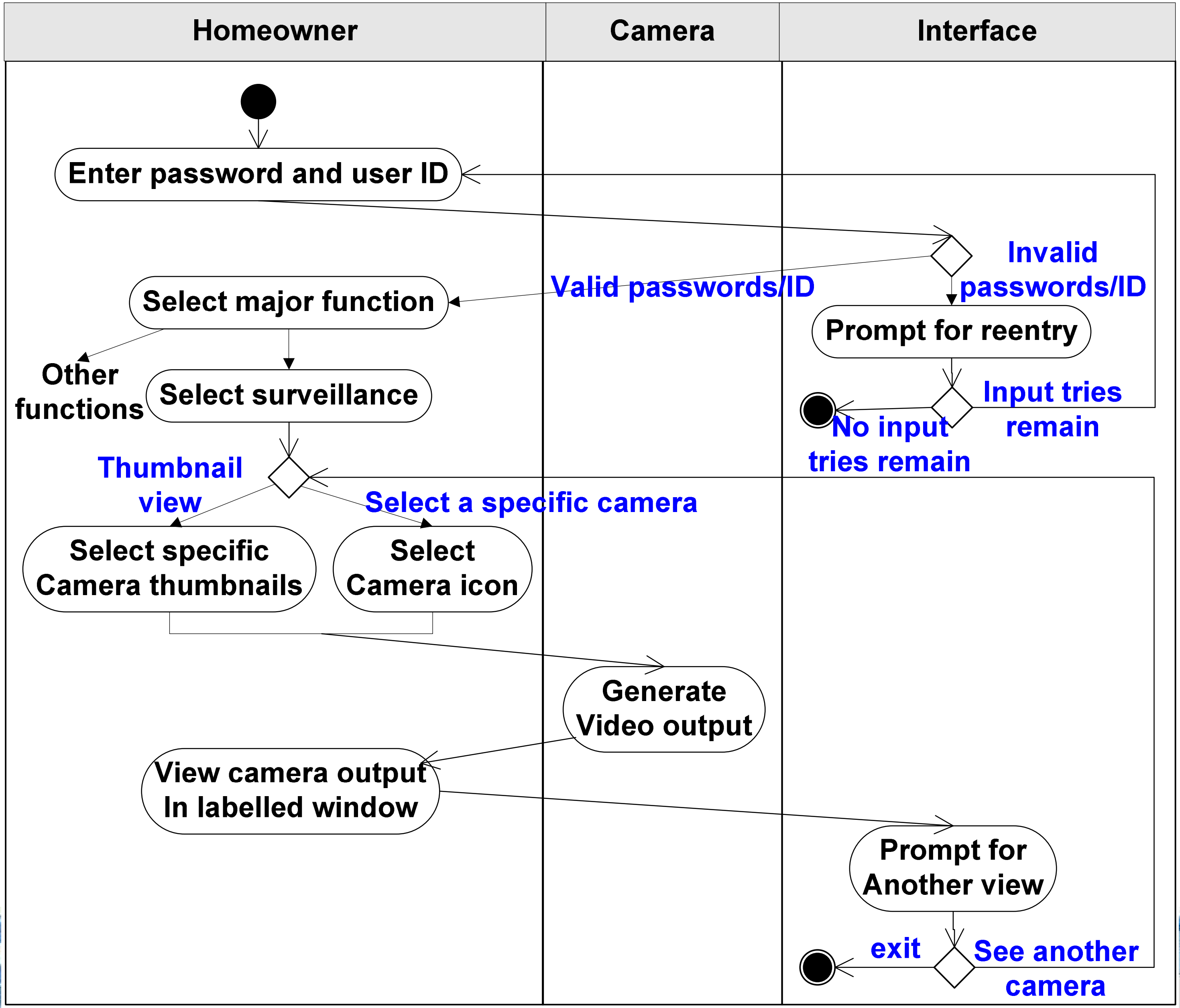
- **Activity diagram** supplements the use-case by providing a diagrammatic representation of procedural flow

- **Swim lane diagram** allows the modeler to represent the flow of activities described by the use-case and at the same time indicate which actor (if there are **multiple actors** involved in a specific use-case) or analysis class has **responsibility** for the action described by an activity rectangle

- **Activity diagram**



• Swimlane diagram



Task

- **Review** Ch. 6~9
- **Finish** “Problems and points to ponder” in Ch. 6~9
- **Preview** Ch. 10,11
- **Submit Requirement Report due April 27 !!**