Lecture Note 9

2024年3月27日 21:50

Ch.9 Requirements Modeling: Scenario-Based Methods

需求的模型

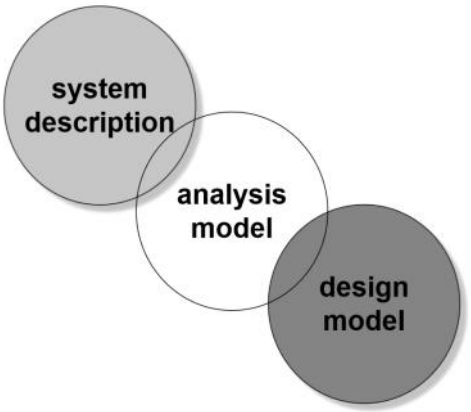
Requirements Analysis

- 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
- Requirements analysis 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.

做需求的细化

将用户嘴巴讲的变成计算机的模型

A Bridge



需求分析模型是连接用户的需求、系统描述，以及design model的中间环节。整个需求分析环节用户和开发者都能看明白

将抽象的东西进一步具象

Rules of Thumb

一些重要原则

Rules of Thumb

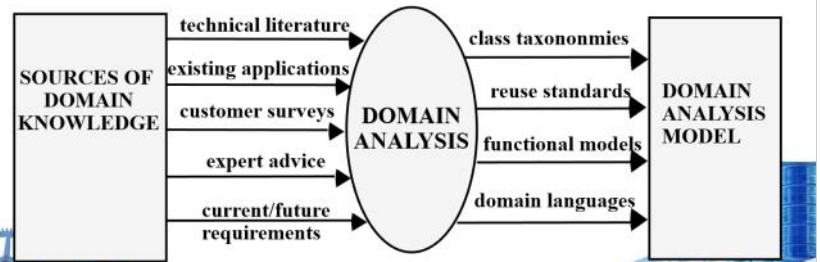
- The model should focus on requirements that are visible within the problem or business domain. The level of abstraction should be relatively high.
- Each element of the analysis model should add to an overall understanding of software requirements and provide insight into the information domain, function and behavior of the system.
- Delay consideration of infrastructure 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.

一些重要原则

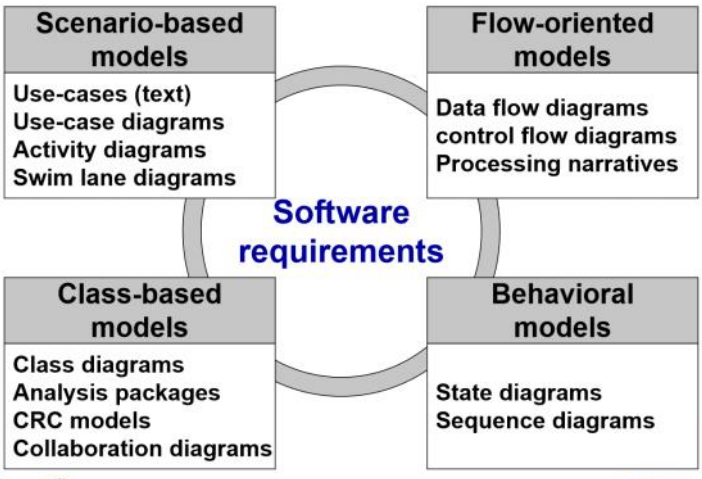
1、需求模型很多，一定要聚焦到问题的本质，抽象的层次要相对高，一定要看得懂
2、分析模型都是必要的，没用的东西都要干掉，任何模型对于刻画系统都有帮助
3、技术架构等细节要放到后面的设计环节
4、尽量模块化尽量简单，不要把简单问题复杂化

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 . . .



领域分析
每个领域差别都很大，教育、医疗、金融证券等等隔行如隔山，行话不一样
因此需求分析对于软件工程师来说要面向很多领域
领域分析对该领域的术语、知识做分析，关联好术语之间的关系。之后建立pattern、知识图谱
找到公共的东西（公共子图），减轻领域分析工作量，可以reuse



软件需求模型分为4块
1、基于场景的模型，包含用例、用例图、活动图、泳道图
2、基于类的模型，定义整个系统静态结构
3、面向流的模型，结构化分析方法，数据流、控制流图，过程描述语言进行描述
4、行为模型，状态图、序列图

Scenario-Based Modeling

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?

User-case图用的比较多
是一系列scenario集合的描述

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

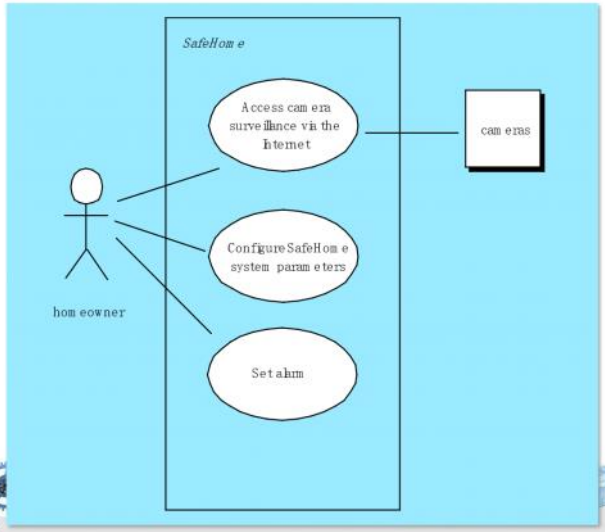
- What are the main tasks or functions that are performed by the actor?
- What system information will the actor acquire, produce or change?
- Will the actor have to inform the system about changes in the external environment?
- What information does the actor desire from the system?
- Does the actor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

Reviewing a Use-Case

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?

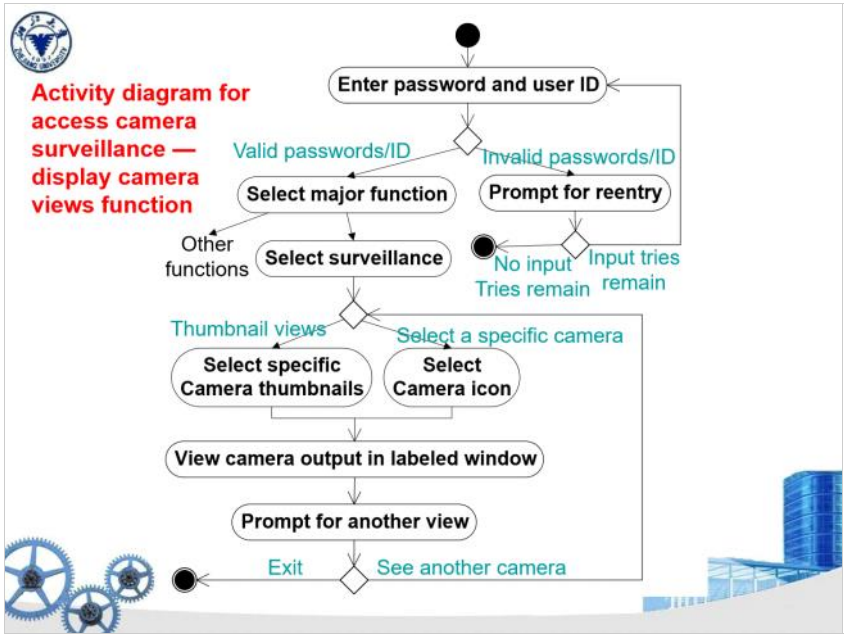
Use-Case Diagram



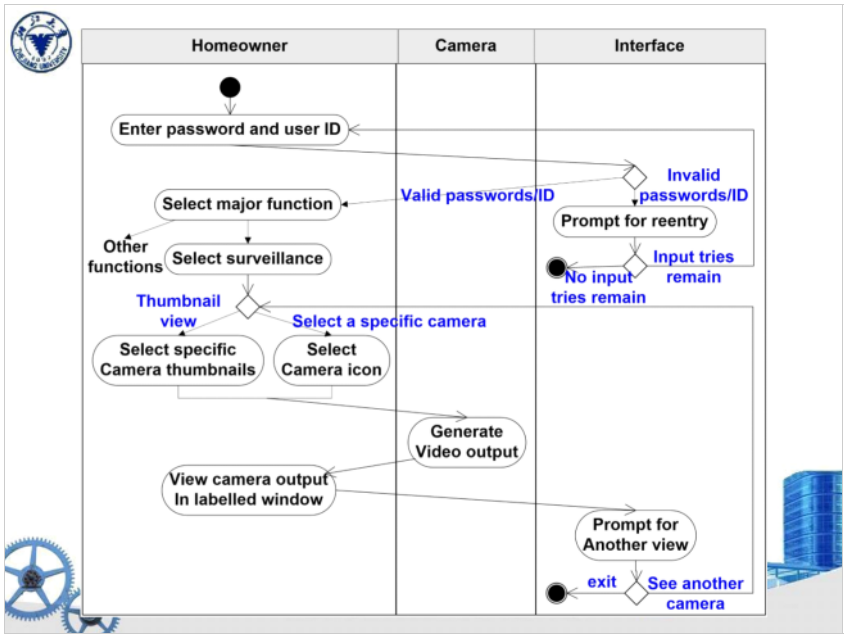
Activity and Swim Lane Diagrams

- 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

活动图是对user-case图的补充，每个功能的流程并没有讲清楚，因此使用活动图来对功能进行描述
活动图有点像流程图，从业务的逻辑角度来看。可以看出功能是如何实现的
泳道图在形状上做出了改变，流程仍然存在，但是每个角色是个泳道，先列出来，将活动图放到角色上去，可以清晰的看到每个人是干什么的，人和人之间如何进行协同。
活动图从全局角度来看，泳道图是同一个问题不同侧面的看法



活动图：用户需要通过互联网看监控视频。
一开始有个起点，之后每一步都是一个方框。第一步是输入用户名和密码，看是不是合法用户，如果是非法用户就retry，如果太多次就挂掉；如果密码通过就看到一个主界面，可以选择看监控视频，接下来可以选择看缩略图，然后选择一个摄像头。选完之后就会调出来看，之后问你要不要看其它的



泳道图按照角色来分，可以分成房东、摄像头、设备（手机或者图形界面）
这个过程和之前一样，但是会划分到不同角色上去