Lecture from 22.11.2018

*UML - Modeling language*

Jim Rumbaugh Ivan Jacobson created the UML

UML

* What is UML
  + Uniform notation
    - UML is **not** method or process
* Why a Graphical Modeling Language?
  + Software projects are carried out in a team
  + Team members need to communicate
    - … sometimes even with end users
  + “One picture conveys a thousand words”

Why UML?

* Reduces **risks** by documenting assumptions
  + Domain models, requirements, architecture, design. implementation…
* Represents industry standard
  + more tool support, more people understand your diagrams, less education
* Is reasonably **well-defined** 
  + Although there are interpretations and dialects
* Is **open** 
  + Stereotypes, tags and constraints to extend basics

Class diagrams

*Class diagrams show* ***generic*** *descriptions or possible systems, and object diagrams show* ***particular*** *interactions of system and their behavior.* Attributes and operations are also collectively called ***features***.

**Danger**: class diagrams risk turning into data models.

Be sure to focus on **behavior**!

Attributes and operators

Associations represents structural relationships between objects

* Usually *binary*
* Optional name and direction
* (unique) role names

Aggregation is denoted by a diamond and indicates a *part-whole dependency*

An association may be an instance of a an association class.

A qualified association uses a special qualifier value to identify the object at the other end of the association.

NB: Qualifiers are part of association, not the class.

A subclass specializes its superclass

What is inheritance for?

* New software often builds on old software by imitation, refinement or combination.
* Similarly, classes may be extensions, specializations or combinations
* Conceptual hierarchy
* Polymorphism
* Software reuse
  + Related classes may share interfaces, data structures or behavior
* The different ways for inheritance:
  + Is-a
  + Polymorphism (Figure, rectangle, square)
  + Reuse (Rectangle is square)