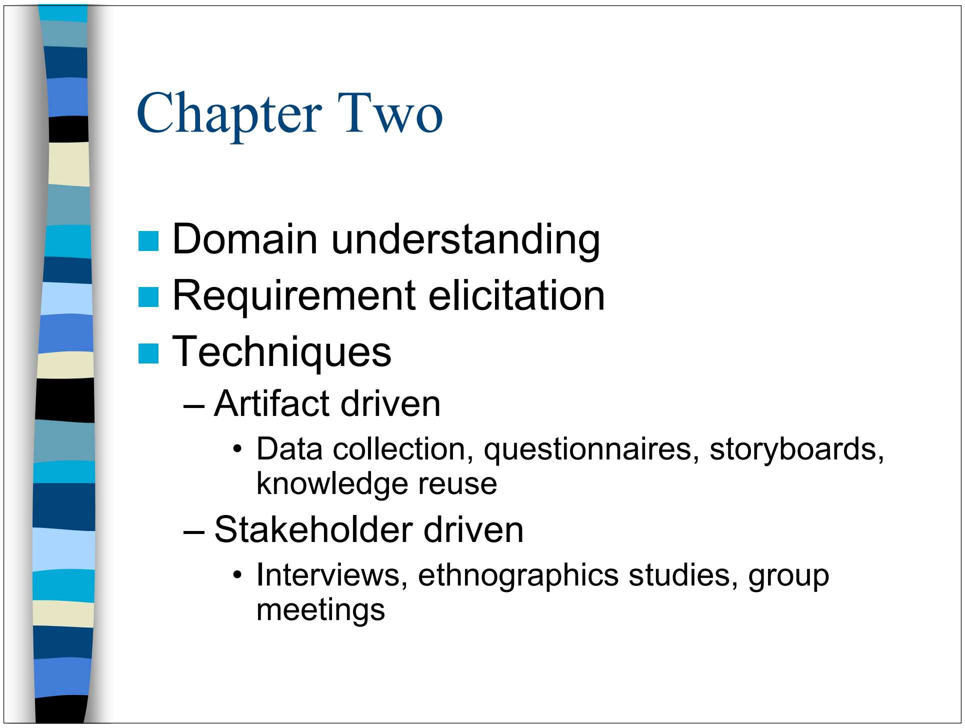
Course Review

Informatics 113

March 10, 2011

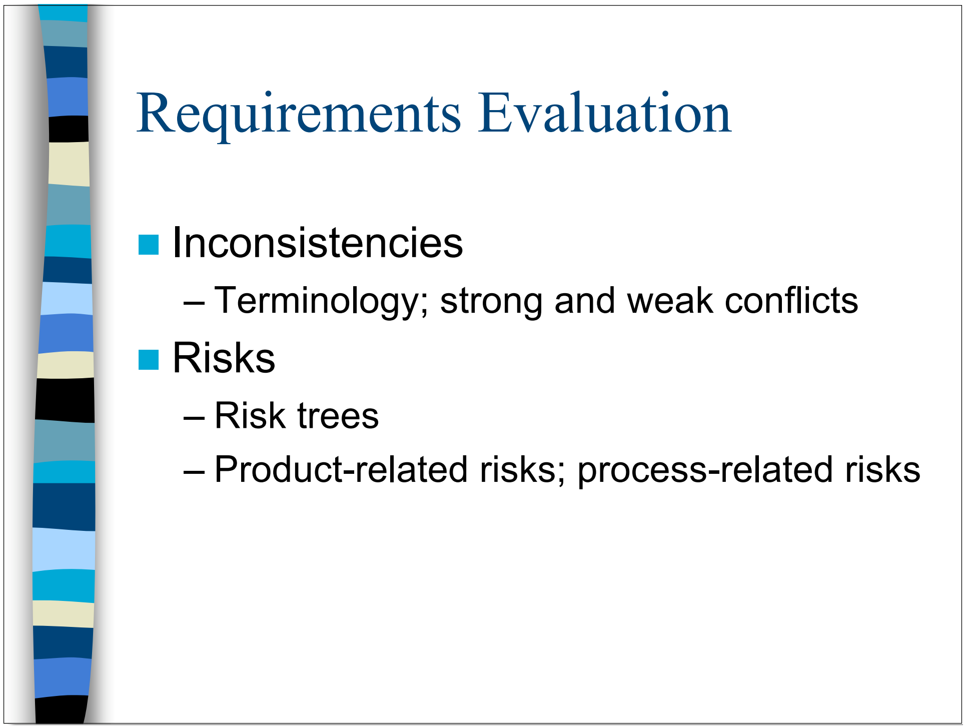
Week One

- Architecture, Design, and Requirements
- RE Fundamentals
  - System-as-is, and the system-to-be
  - Who, what, why, how
  - Roles, processes, constraints, assumptions
  - Statements:
    - Requirements: prescriptive statements
    - Domain properties: descriptive statements
    - Assumptions/Expectations: expected behavior



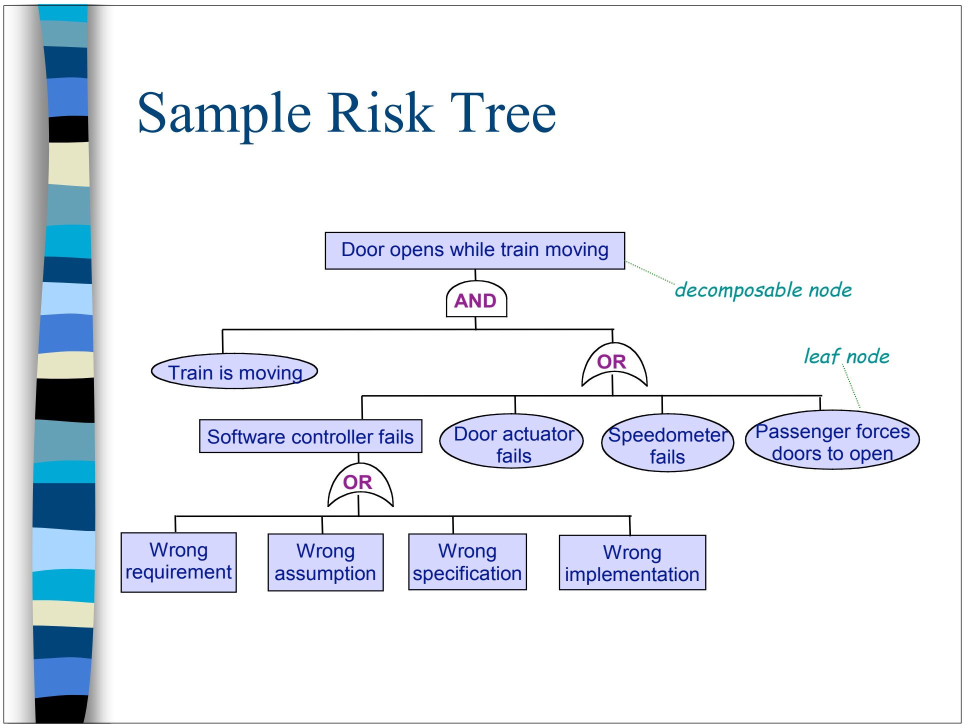
Chapter Two

- Domain understanding
- Requirement elicitation
- Techniques
  - – Artifact driven
    - Data collection, questionnaires, storyboards, knowledge reuse
  - – Stakeholder driven
    - Interviews, ethnographics studies, group meetings



Requirements Evaluation

- Inconsistencies
  - – Terminology; strong and weak conflicts
- Risks
  - – Risk trees
  - – Product-related risks; process-related risks



Sample Risk Tree

Door opens while train moving

decomposable node

AND

Train is moving

OR

leaf node

Software controller fails

Door actuator fails

Speedometer fails

Passenger forces doors to open

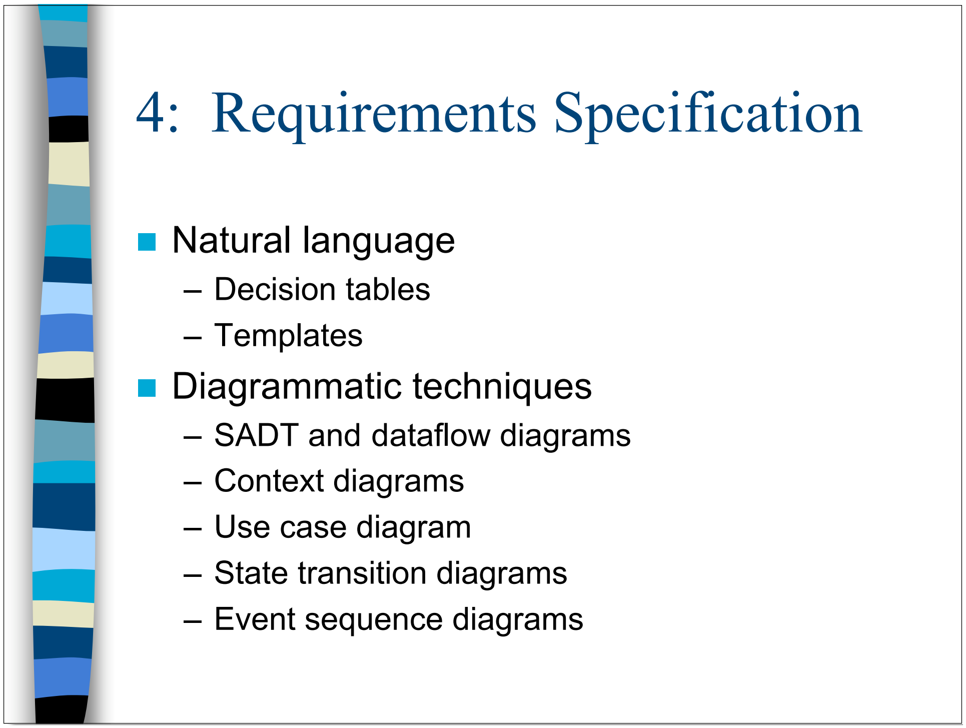
OR

Wrong requirement

Wrong assumption

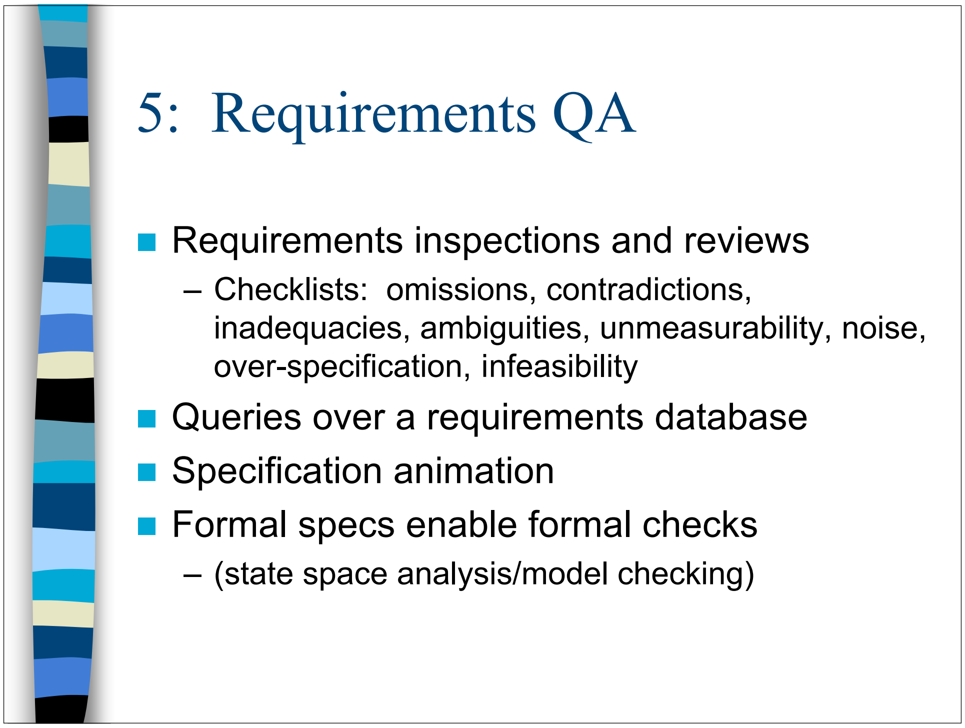
Wrong specification

Wrong implementation



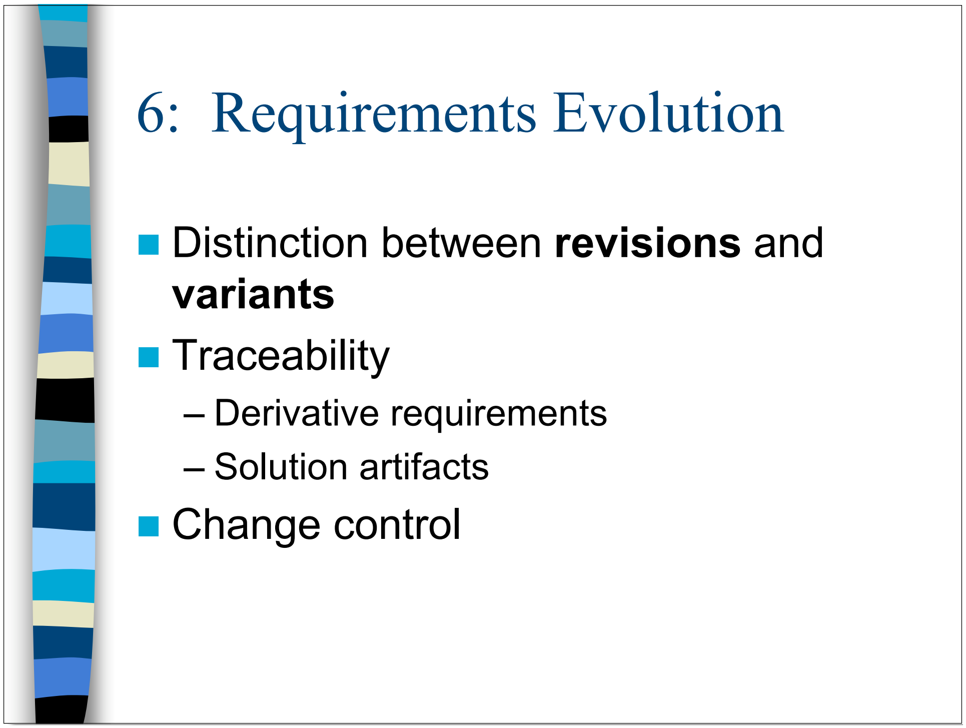
4: Requirements Specification

- Natural language
  - Decision tables
  - Templates
- Diagrammatic techniques
  - SADT and dataflow diagrams
  - Context diagrams
  - Use case diagram
  - State transition diagrams
  - Event sequence diagrams



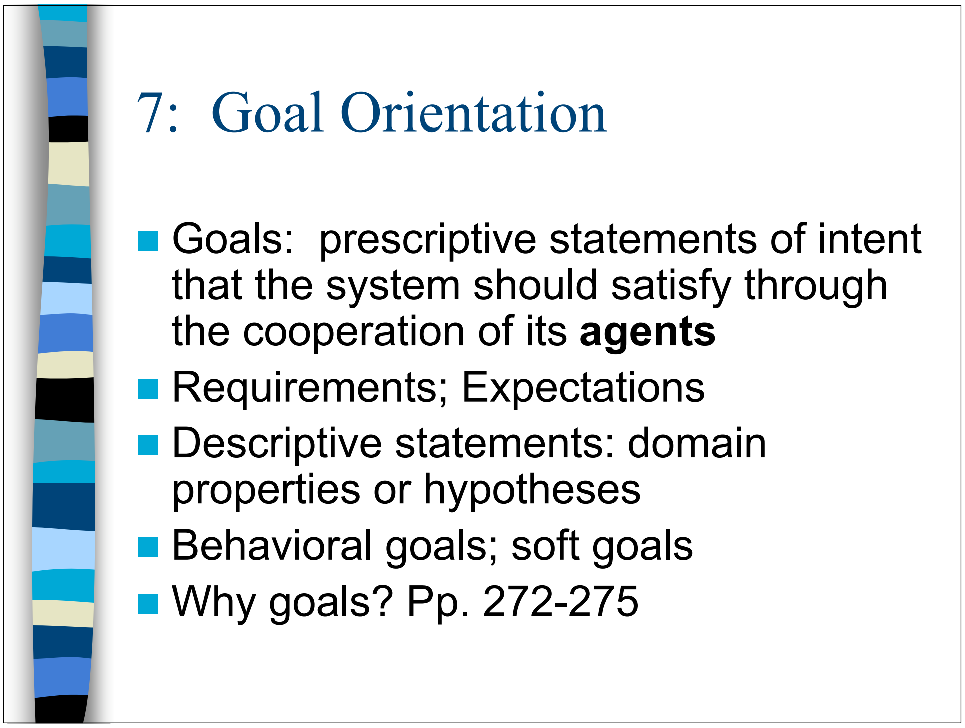
5: Requirements QA

- Requirements inspections and reviews
  - Checklists: omissions, contradictions, inadequacies, ambiguities, unmeasurability, noise, over-specification, infeasibility
- Queries over a requirements database
- Specification animation
- Formal specs enable formal checks
  - (state space analysis/model checking)



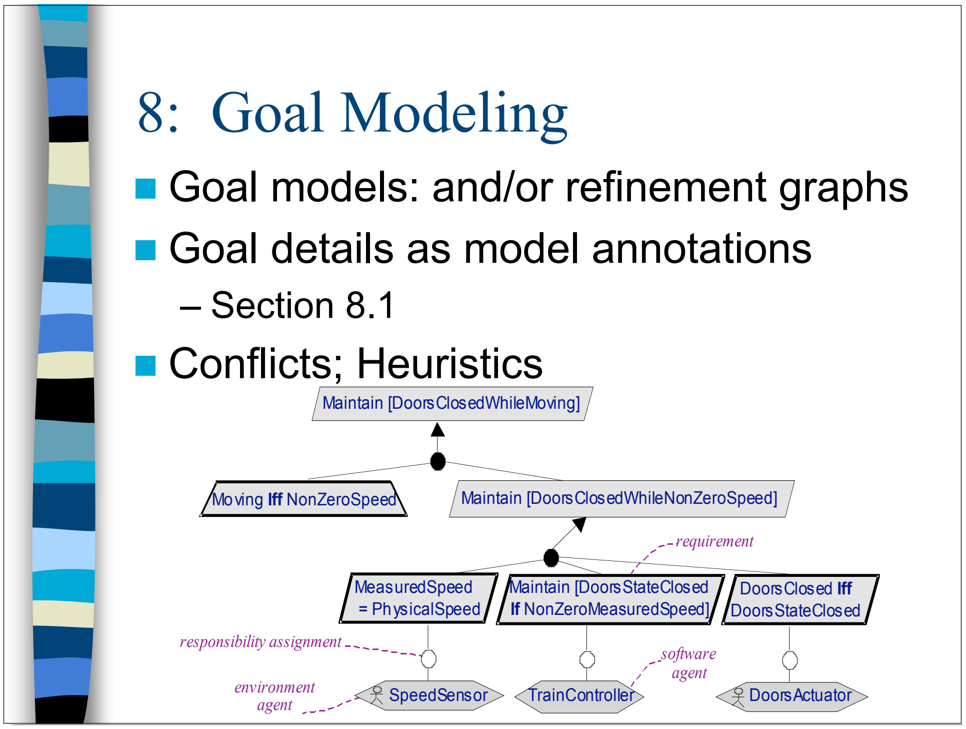
6: Requirements Evolution

- Distinction between **revisions** and **variants**
- Traceability
  - Derivative requirements
  - Solution artifacts
- Change control



7: Goal Orientation

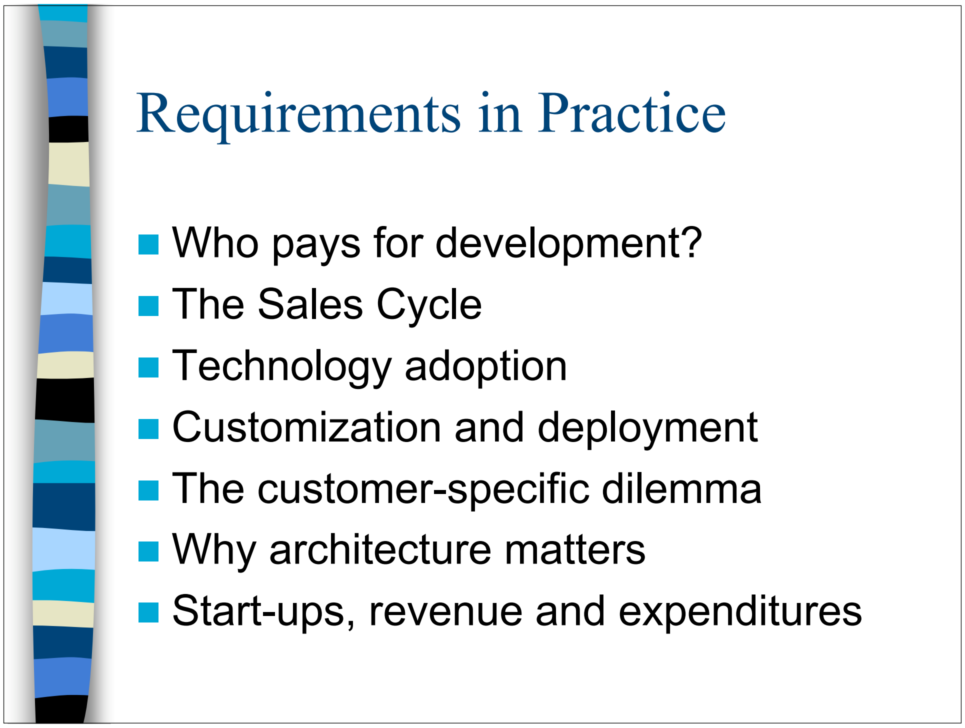
- Goals: prescriptive statements of intent that the system should satisfy through the cooperation of its **agents**
- Requirements; Expectations
- Descriptive statements: domain properties or hypotheses
- Behavioral goals; soft goals
- Why goals? Pp. 272-275



8: Goal Modeling

- Goal models: and/or refinement graphs
- Goal details as model annotations
  - Section 8.1
- Conflicts; Heuristics

Maintain [DoorsClosedWhileMoving]
Moving **Iff** NonZeroSpeed
Maintain [DoorsClosedWhileNonZeroSpeed]
requirement
MeasuredSpeed = PhysicalSpeed
Maintain [DoorsStateClosed **If** NonZeroMeasuredSpeed]
DoorsClosed **Iff** DoorsStateClosed
responsibility assignment
software agent
environment agent
SpeedSensor
TrainController
DoorsActuator



Requirements in Practice

- Who pays for development?
- The Sales Cycle
- Technology adoption
- Customization and deployment
- The customer-specific dilemma
- Why architecture matters
- Start-ups, revenue and expenditures