



CS5127/6027: Requirements Engineering (Fall 2024)

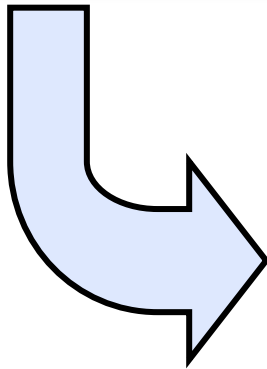
Prof. Nan Niu (nan.niu@uc.edu)

Office Hours: 10am-11am, Mondays, Rhodes 832

Today's Menu

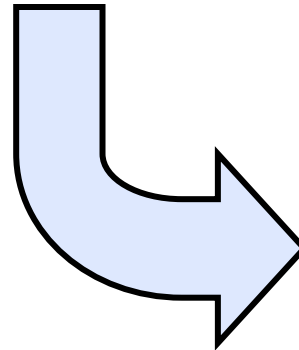
Last Lecture (Monday 9/23):

NFRs + Modeling
ASN1 Grading



This Lecture (Friday 9/27):

i^* Modeling
ASN2 Releasing



Next Lecture (Monday 9/30):

NFRs [cont'd]



Last Chance for ASN1 Re-Do

Today (Sept 27) 12:30-1:30pm

→ If you didn't receive a satisfying ASN1 grade

↳ There will be BONUS opportunities, including in-class participations, which are independent of the following

↳ There will be in-person, designated time periods throughout this week (see course website on Canvas) - first come, first serve

- Each student will be given 2-3 minutes to come up with a tuple $\langle R, E \rangle$ for a given F/S
- No matter what, your ASN1 grade will change - either going up or going down
- Each student will have at most ONE chance - showing up for more than one time will decrease your ASN1 grade
- Each student shall present UC ID card



Reminder

→ For graduate students only

↪ Determining whether you'll carry out the course research project individually or in a group

↪ Due by 11:59pm, Monday (Sept 30)

↪ Every graduate student must submit



Quiz5: Questions 1—3

Requirements are usually understood as stating what a system is supposed to do, as opposed to how it should do it. However, understanding the organizational context and rationales (the “Whys”) that lead up to systems requirements can be just as important for the ongoing success of the system. Requirements modelling techniques

commitments. Actors depend on each other for goals to be achieved, tasks to be performed, and resources to be furnished. By depending on others, an actor may be able

terms of intentional relationships among agents, instead of the flow of entities among activities. This allows analysis

Quiz5: Questions 4—6

amounts of effort. These qualitative criteria are modelled as softgoals. These would be used to evaluate (and also

is not viable. Note that a routine which is not viable from one actor's perspective may be viable from another actor's perspective. For example, the existing way of arranging

Q6: What does i^* stand for? [*class participation: 1st correct*]

⁵Hence the name i^* .

Distributed intentionality.

Why i^* ?

→ Early-RE

- ↳ because many modeling methods focus on late-RE:
design, implementation ...
- ↳ actors, their dependencies, their rationalities,
software-to-be's opportunities and vulnerabilities
...
- ↳ NFRs are treated as a first-class citizen ← in i^* ,
softgoals



Year	Category of Paper	Authors	Title of Paper
2007		Eric Yu	Towards Modelling and Reasoning Support for Early-Phase Requirements Engineering



*i** (one of the prominent goal modeling methods)

Two views (SD & SR)

Five nodes (actors, goals, softgoals, tasks, resources)

Three edges (dependency, decomposition, softgoal contribution)

Practical Impacts of i^*

→ International standard

↳ User Requirements Notation (URN)

➤ Goal Requirements Language (GRL) www.itu.int/rec/T-REC-Z.151/en

↳ Initiated from the telecom industry

↳ ITU-T Recommendation Z.151



→ Real-world applications

↳ Air traffic control

➤ N. Maiden *et al.* “Model-Driven Requirements Engineering: Synchronising Models in an Air Traffic Management Case Stud”, CAiSE, 2004.

↳ Food safety

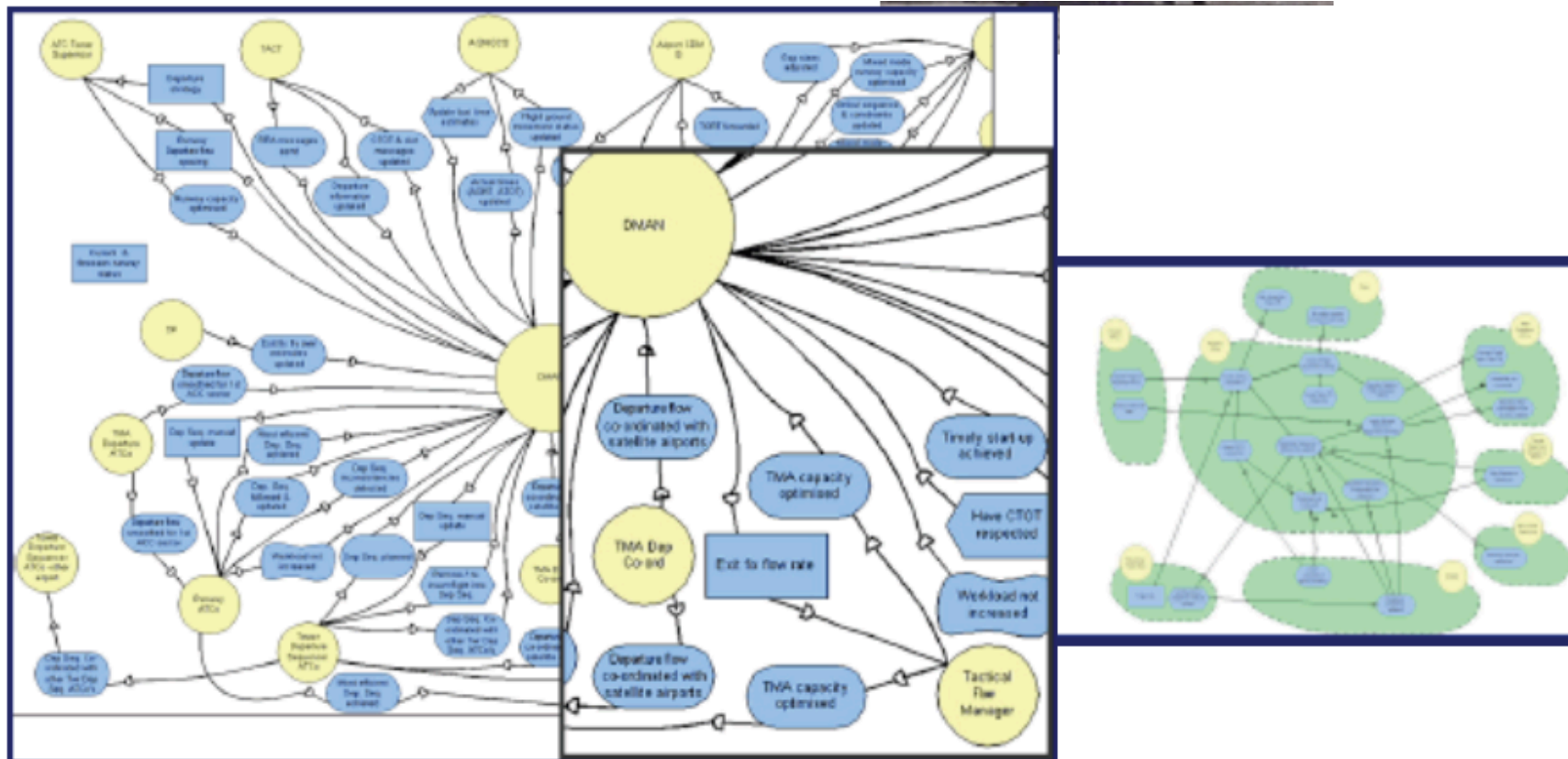
➤ A. Perini and A. Susi. “Designing a Decision Support System for Integrated Production in Agriculture: An Agent-Oriented Approach”, Environmental Modelling and Software Journal, 19(9), September 2004.

↳ Hospital wards

➤ S. Kethers *et al.* “Modelling Trust Relationships In A Healthcare Network: Experiences With The TCD Framework”, ECIS 2005.



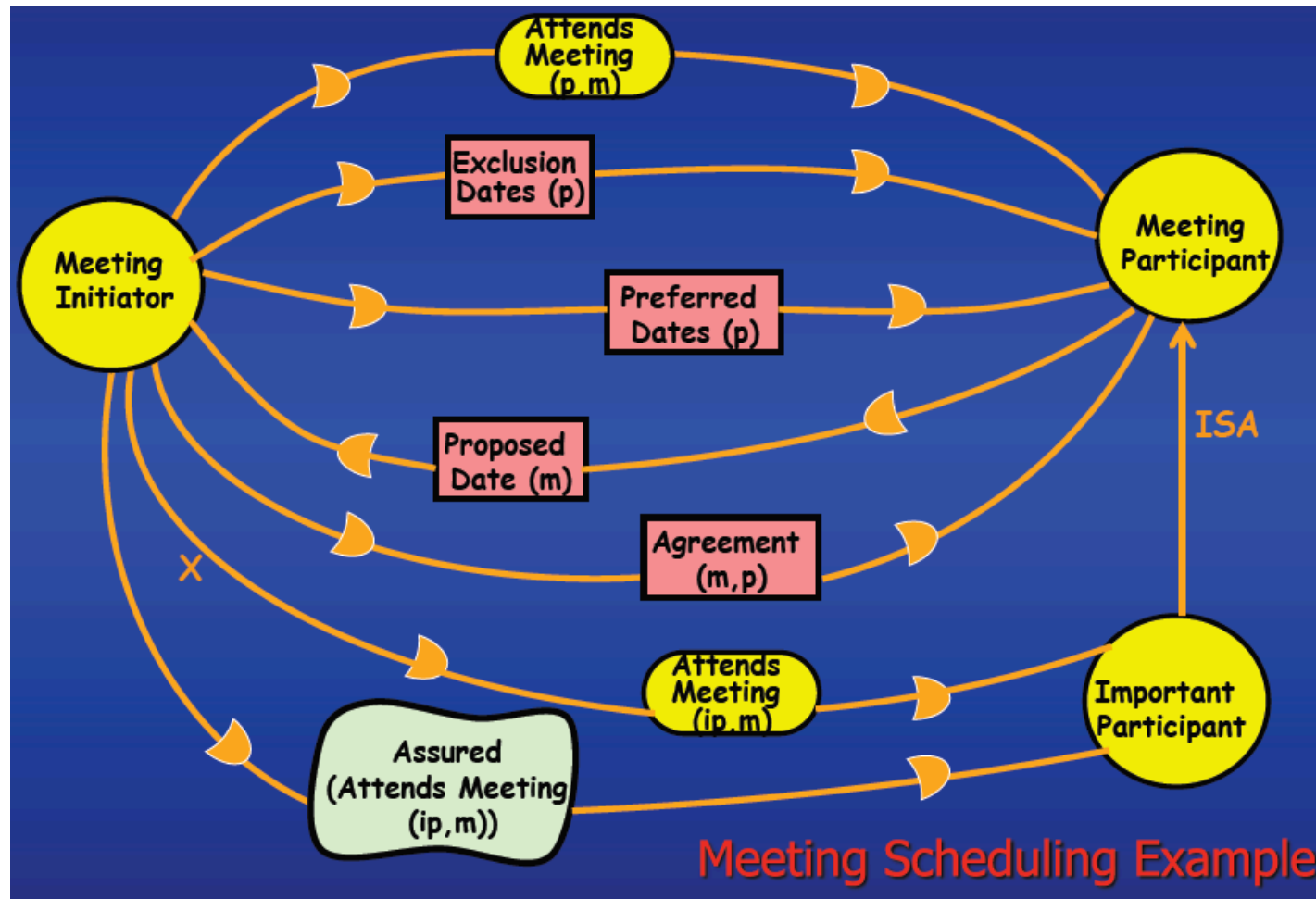
Air Traffic Control



Air Traffic Control

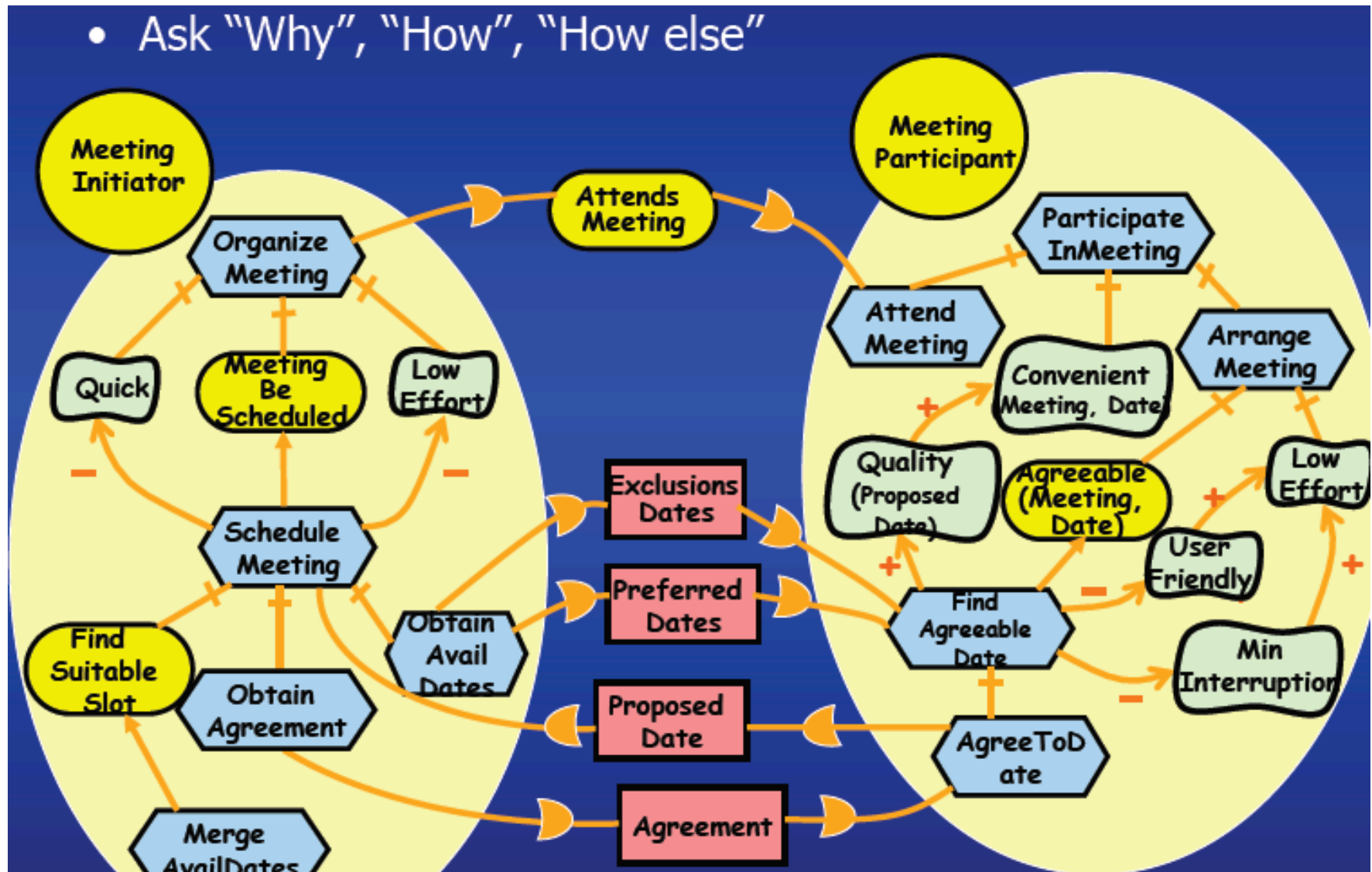


Strategic Dependency (SD)



Strategic Rationale (SR)

- Ask "Why", "How", "How else"



Class Exercise - i^* Modeling

→ Let's model our course

- ↪ Who're the key stakeholders/actors?
- ↪ How're they depended on each other?
- ↪ What're their goals?
- ↪ How to decompose the goals?
- ↪ What're the means and/or alternatives to achieve the goals?
- ↪ Are there any softgoals?
- ↪ How're the softgoals supported or hindered?
- ↪ Does software-intensive system play any role here?

Goal Analysis

→ Goal Elaboration:

- ↳ “Why” questions explore higher goals (context)
- ↳ “How” questions explore lower goals (operations)
- ↳ “How else” questions explore alternatives

→ Relationships between goals:

- ↳ One goal **helps** achieve another (+)
- ↳ One goal **hurts** achievement of another (-)
- ↳ One goal **makes** another (++)
 - Achievement of one goal guarantees achievement of another
- ↳ One goal **breaks** another (--)
 - Achievement of one goal prevents achievement of another
- ↳ Precedence ordering (must achieve goals in a certain order)

→ Obstacle Analysis:

- ↳ Can this goal be obstructed, if so how?
- ↳ What are the consequences of obstructing it?

Softgoals as Stakeholder Concerns



What're (high-level) softgoals of BART?





ASN2: 9/27–10/16

- Choose an LLM (or some LLMs)
- Study the relevant NFRs (at least 3 NFRs)
 - ↳ Req.s elicitation & modeling
- Build a softgoal interdependence graph (SIG)
- Create quality attribute scenarios
- Submit your report (one PDF file) before
10/16



Quality attribute scenarios

→ It's meaningless to say a system is "modifiable".

↳ More meaningful to cast the QAR as a scenario:

A developer wishes to add an input field to the UI code at design time; modification is made with no side effect in three hours.

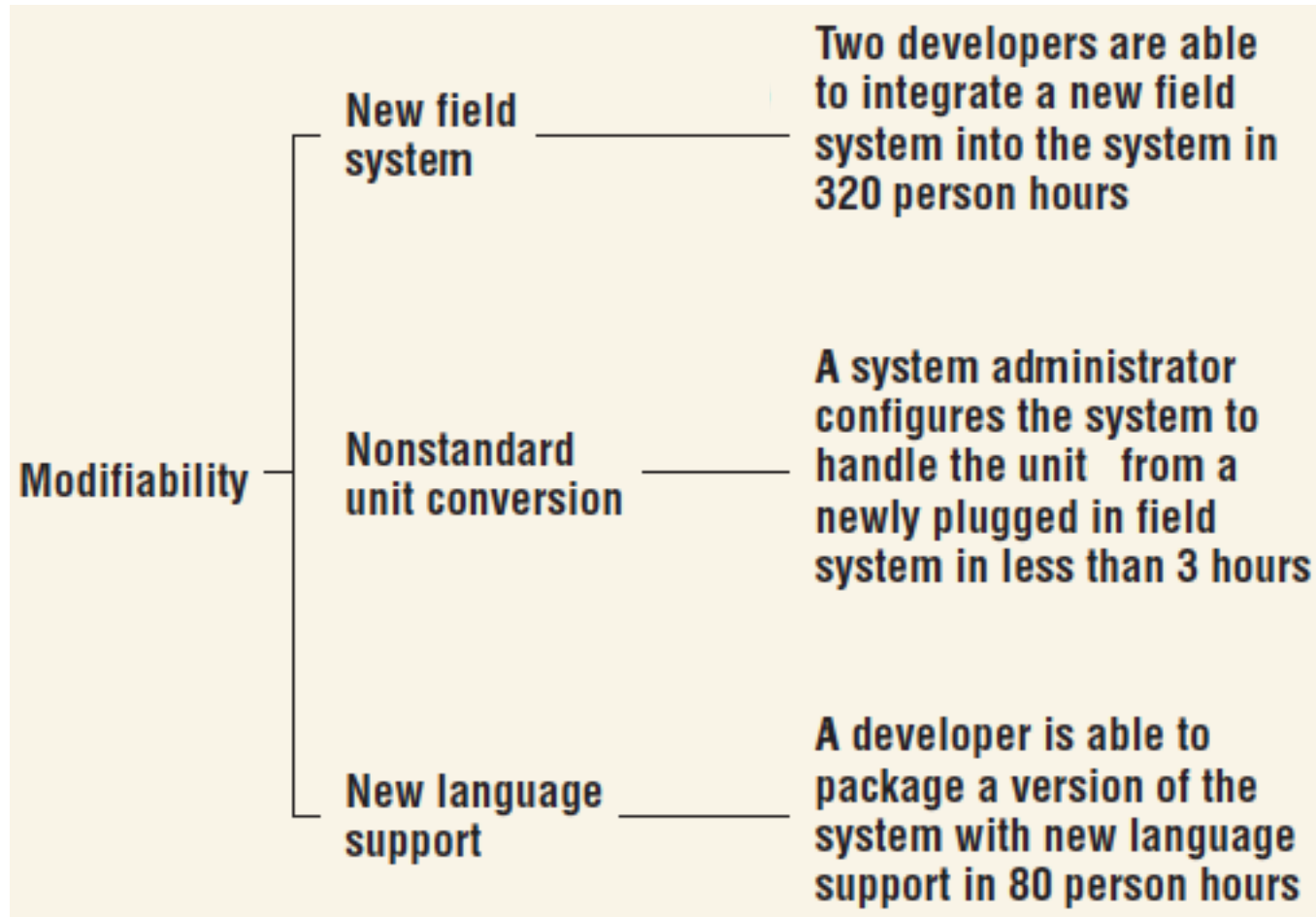
Making Practical Use of Quality Attribute Information

Ipek Ozkaya, Len Bass, and Robert L. Nord, *Software Engineering Institute*

Raghvinder S. Sangwan, *Pennsylvania State University*



Scenarios to qualify / quantify NFRs





Today's Take-Aways

→ Syntax and semantics of i^*

↳ Softgoal interdependence graph (SIG)

→ To-do

↳ Review today's slides & clear Quiz5 questions

↳ Begin doing ASN2 (due by Wednesday, Oct 16)

↳ Attend next Monday's class (9/30)

➤ Two more examples of SIG

➤ Another method to handle NFRs