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 (Friday 9/20):
NFRs *[to-be-continued]*

This Lecture (Monday 9/23):
NFRs + Modeling
ASN1 Grading

Next Lecture (Monday 9/27):
*i** Modeling
ASN2 Releasing

Reminders

- An assigned paper on "*i** modeling"
  - Quiz 5 due by 11:59pm, Wednesday (Sept 25)

- 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

A new initiative started on Sept 20

- Functional requirements describe **WHAT** the software does

- Nonfunctional requirements (NFRs) describe **HOW WELL** the software does it

- In-class **PARTICIPATION** bonus rewarded
  - security, usability, performance, accessibility …
  - testability, maintainability, reusability …

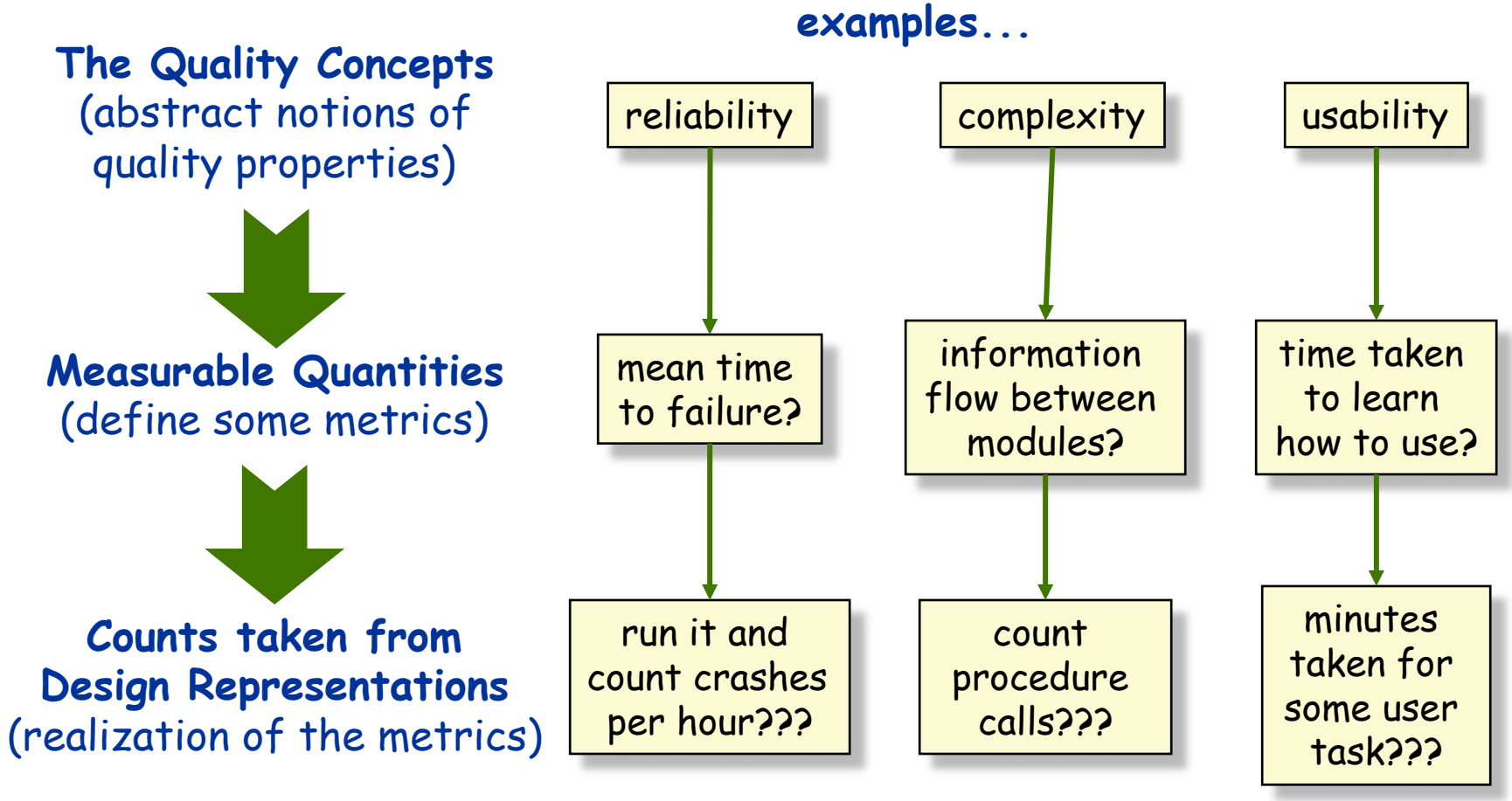
Challenges of NFRs

- Hard to be localized and often contradictory
- Hard to externalize (model)
  - Not directly supported in use cases, class diagrams, ERDs, sequence diagrams, statecharts, and other types of UML models
- Hard to make them measurable
  - You can't control what you can't measure
  - Difficult to evaluate for the customer prior to delivery

Making Requirements Measurable

Source: *Budgen, 1994, pp60-1*

→ We have to turn our vague ideas about quality into measurables



NFRs = Quality Attributes

Making Practical Use of Quality Attribute Information

Quality Attribute Workshop

Reasoning About Software Quality Attributes

Architecture Tradeoff Analysis Method

Communicating quality attribute req.s (QARs)

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

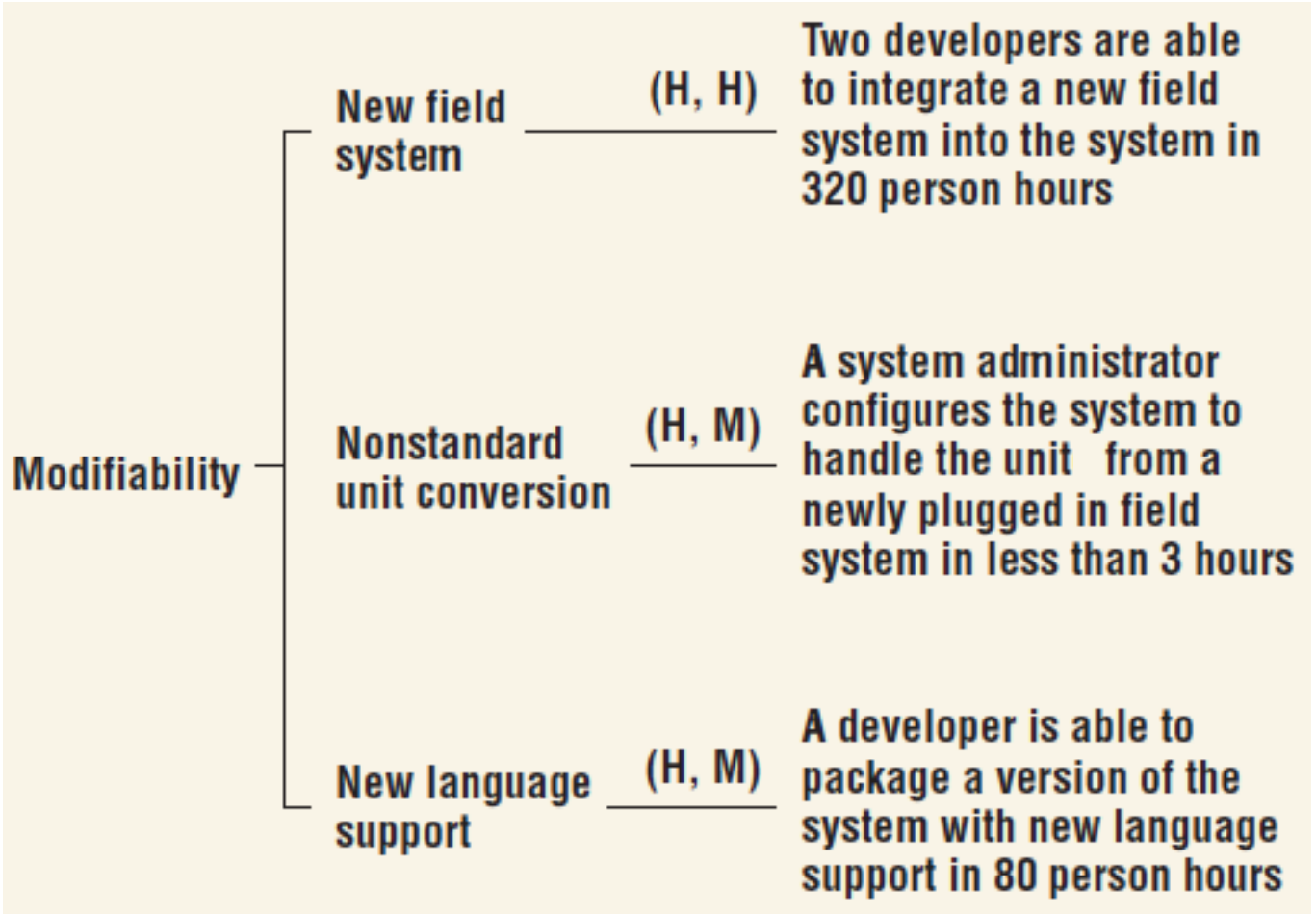
↳ More meaningful to cast the QAR as a scenario:

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.

Daniel Jackson

A meeting can result in consensus, but if the consensus is to implement requirements that are inconsistent or have unexpected consequences, little has been gained.

Scenarios as a way to clarify NFRs



↳The letters represent High, Medium, or Low priorities for the business and technical stakeholders, respectively.

AT&T 5G. Fast. Reliable. Secure.

Making Practical Use of Quality Attribute Information

Often, fewer than a dozen architecturally significant requirements drive or shape the architecture[2] as opposed to the hundreds of functional requirements.

Sources: https://doi.org/10.1109/MS.2008.39 *and* https://www.att.com

Another Example

BY MARCELO ARENAS AND PABLO BARCELÓ

Chile's New Interdisciplinary Institute for Foundational Research on Data

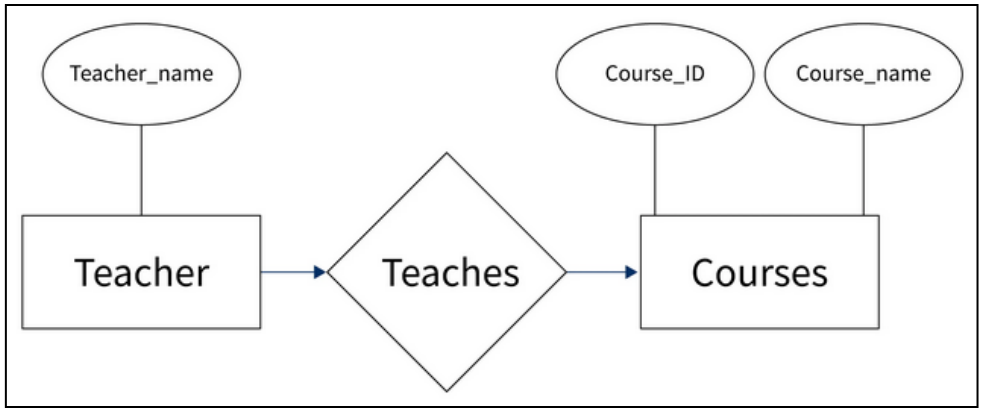
COMMUNICATIONS OF THE ACM

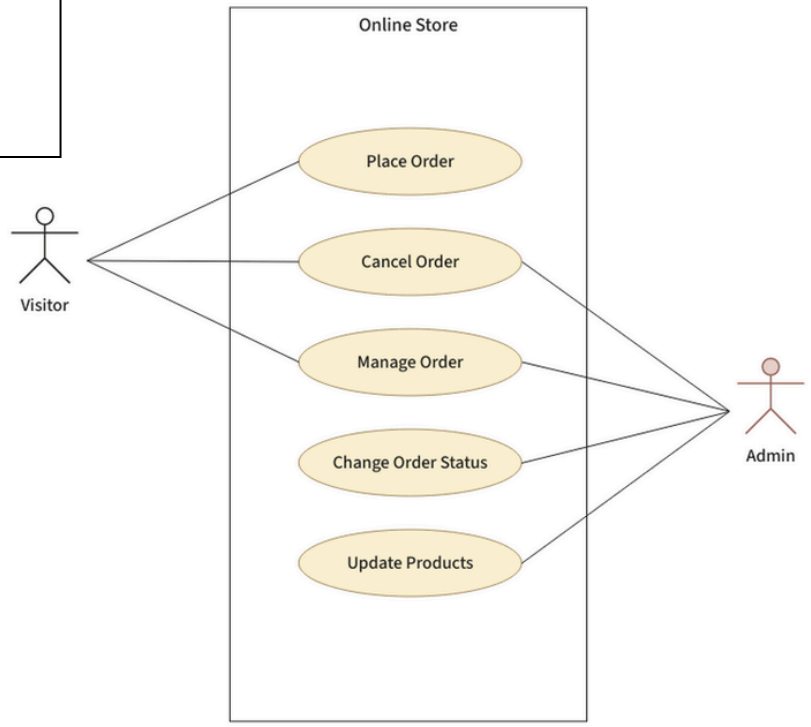
The ultimate goal of our project is to provide theoretical grounds for the next generation of database systems, trying to make them more flexible, scalable, secure, and robust. We have

Sources: https://doi.org/10.1145/3416975

Today's In-Class Participation

- Do you recognize these models & are they *req.s* models to you?

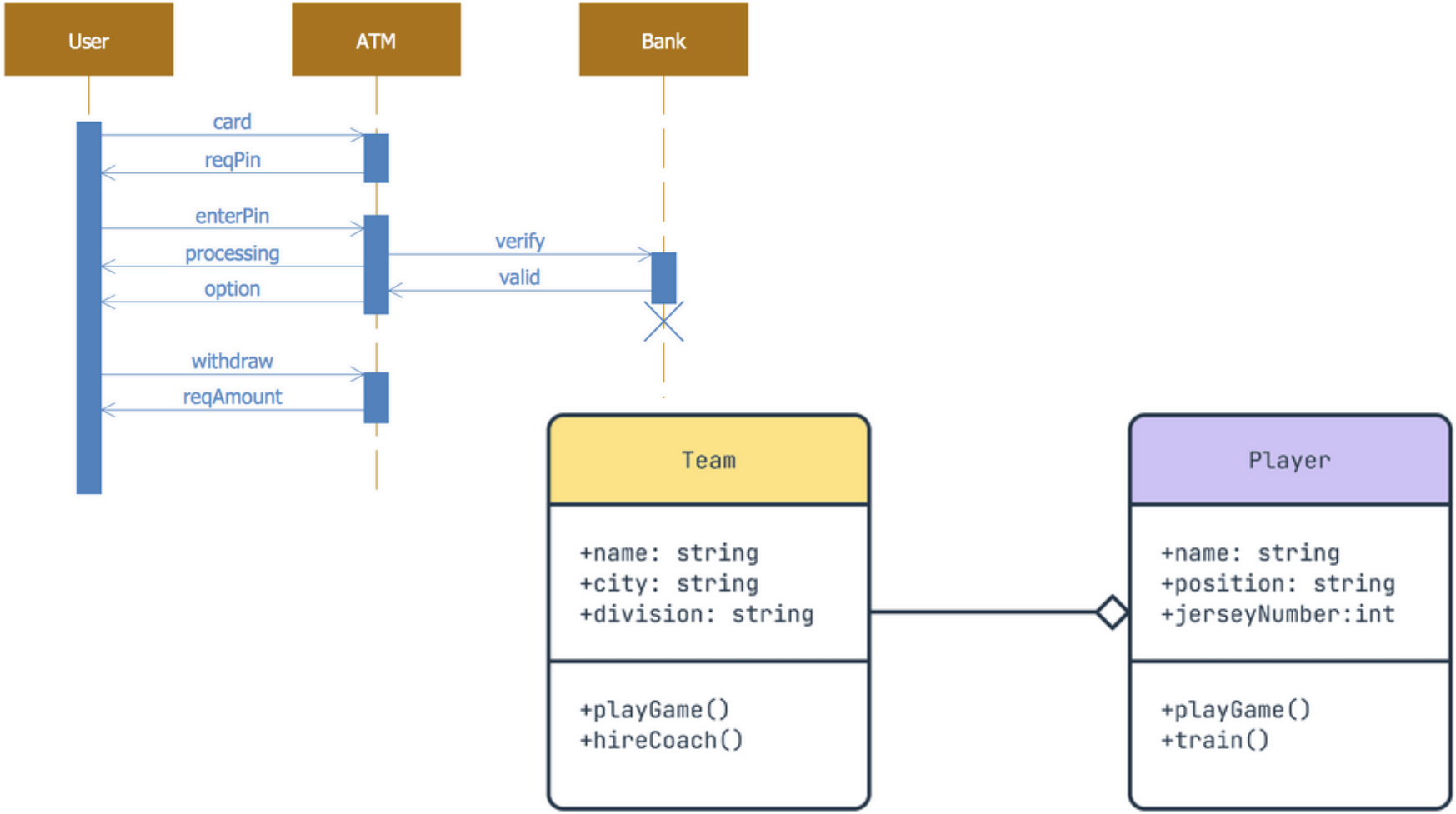




Sources: *Google Images*

Today's In-Class Participation *(Cont'd)*

- Do you recognize these models & are they ***req.s*** models to you?



Sources: *Google Images*

Today's In-Class Participation *(Cont'd)*

↳ Why ***modeling*** in RE?

Sources: *Google Images*

Today's In-Class Participation *(Cont'd)*

Why *modeling* in RE?

Elicitation Technique Selection: How Do Experts Do It?

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modeling was used as *the* elicitation technique, more and more analysts are now seeing modeling as a means to (a) facilitate communication, (b) uncover missing information, (c) organize information gathered from other elicitation techniques, and (d) uncover inconsistencies.

Sources: *https://doi.org/10.1109/ICRE.2003.1232748 and Quiz 3*

ASN1 Grading

- Congrats on those who earned 20 (out of 20)
- Coming to the classes & paying attention are important
- ChatGPT doesn't help much – *why?*
  - Less data & I manually do the grading
- Are you satisfying the req.s?
  - 3 features? file in PDF format?
  - No machine (Zoom) terms mentioned at all in R & E; R should NOT be a paraphrasing of F/S

ASN1 Grading (Cont'd)

- 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 <R, E> 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

Today's Take-Aways

- NFRs (cont'd)
  - challenging because broadly scoped, hard to measure …
  - quality attribute scenarios
- Modeling is an essential activity of RE
  - why modeling? existing modeling methods are geared more toward late-RE (i.e., design & implementation)
- To-do
  - Review today's slides
  - Read the "*i** modeling" paper
  - Complete Quiz5 ***before*** 11:59pm, Wednesday (9/25)
  - Attend the "*i**" lecture on Friday (9/27) where ASN2 will also be released