Requirements Engineering

(Summer 2022)

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

https://github.com/nanniu/RE-Summer2022

Today's Menu

Friday (July 22)
RE research
ASN5 released

Friday (July 29)
ASN5 due

Monday (July 25):
RE Story presentations
Course summary

Tuesday (July 26):
ASN4 Grading

The End!

Today's RE Story Presentations

- 5-10 minutes per person & all the students are required to attend all the presentations
  - Hewei
  - Linfang
  - Wei
  - Wenying
  - Yingkai
  - Ting
  - Tianlong
  - Sihai
  - Yinghan

Let's play a game

- Scope: All you need to know about RE (Summer 2022)
- Go to https://kahoot.it (ideally/possibly from a *different* device than where you launched Zoom)
- Click "Play" (may be on top of the page)
- Enter the "Game PIN"
- Use *YOUR FULL NAME* to join the game

- Game rules:
  - Read each question via Zoom
  - Select one and only one correct answer in *Kahoot!* within 30 seconds per question

Podium

What does it take to be an expert?

A person needs to know about 50,000 chunks of information to be an expert in a field, where a chunk is any piece of knowledge that can be remembered rather than derived.

Steve McConnell

Body of Knowledge

Source: *http://www.stevemcconnell.com/psd/05-BodyOfKnowledge.pdf*

Where did we start with?

- Requirements = stakeholder needs & desires

- Requirements are important because
  - It's hard (*hardest*) to get them right.
  - It's common to get them wrong.
  - Getting them wrong is costly
  - *Doing RE right saves money.*

The meaning of requirements

P, C |- S

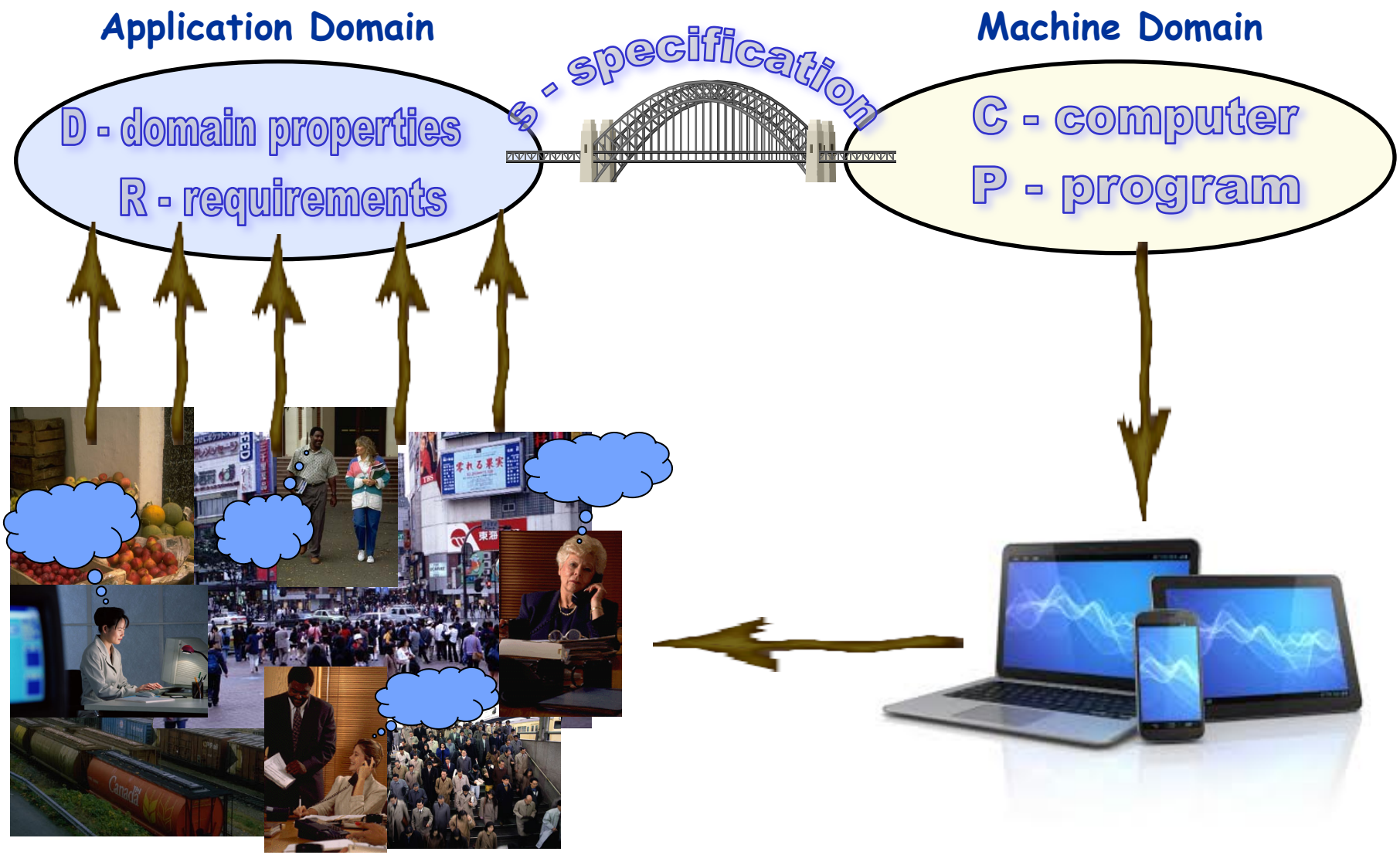
E, S |- R

("|-" means entailment)

RE is more concerned with this one

Requirements engineers are an agent of change.

Requirements Engineer: Agent of Change



Req.s Elicitation vs. Req.s Gathering?

→Requirements ≠ What the customer said

→Requirements ≠

Req.s Elicitation vs. Req.s Gathering?

→ Requirements elicitation ≠ "asking the right questions"

Because there's (1) no right question to ask, (2) no right stakeholder to ask the question, and (3) no right answer.

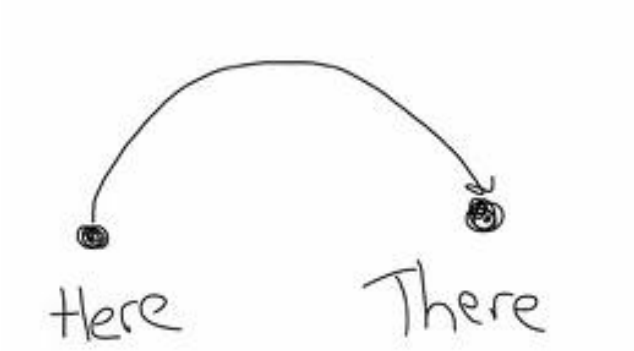
Elicitation Techniques

- Traditional techniques
  - Introspection
  - Reading existing documents
  - Analyzing hard data
  - Interviews
    - Open-ended
    - Structured
  - Surveys / Questionnaires
  - Meetings
- Collaborative techniques
  - Group techniques
    - Focus Groups
    - Brainstorming
  - JAD/RAD workshops
  - Prototyping
  - Participatory Design
- Cognitive techniques
  - Task Analysis
  - Protocol Analysis
  - Knowledge Acquisition Techniques
    - Card Sorting
    - Laddering
    - Repertory Grids
    - Proximity Scaling Techniques
- Contextual approaches
  - Ethnographic Techniques
    - Participant Observation
    - Ethnomethodology
  - Discourse Analysis
    - Conversation Analysis
    - Speech Act Analysis
  - Socio-technical Methods
    - Soft Systems Analysis

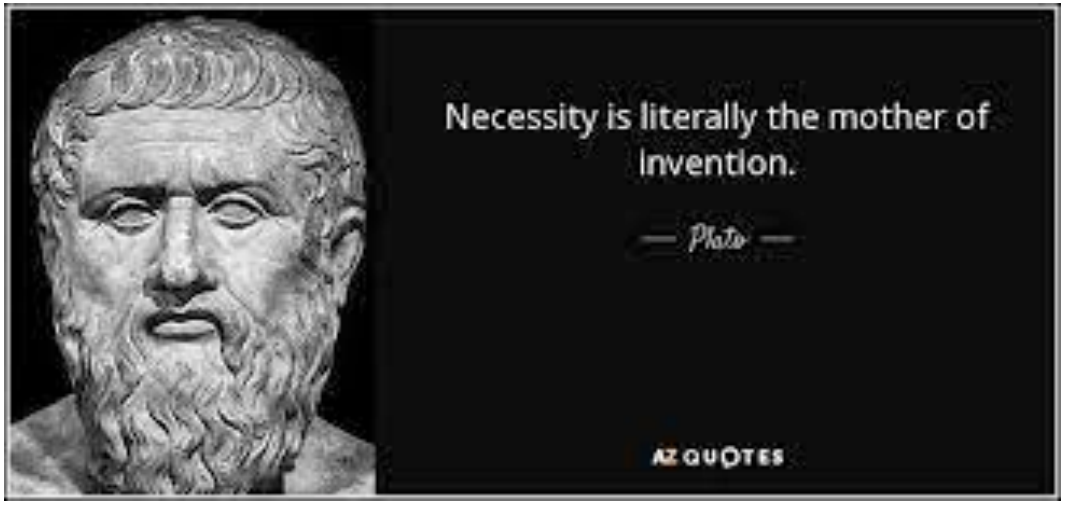
Starting Points of RE

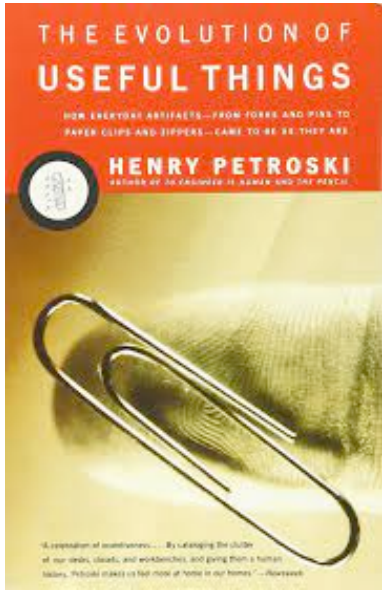
- Stakeholders
  - If the software (read: RE) fails, who will suffer?
- Boundaries
  - How do you scope the problem?
- Goals and Scenarios
  - A useful way to organize initial collection of information
- Feasibility
  - How to conduct a feasibility study?
  - How to choose which project to pursue?
- Risk
  - Continuous risk management
  - Identifying risks through hazard and fault analysis

What does requirement come from?



What's perceived ***What's desired***





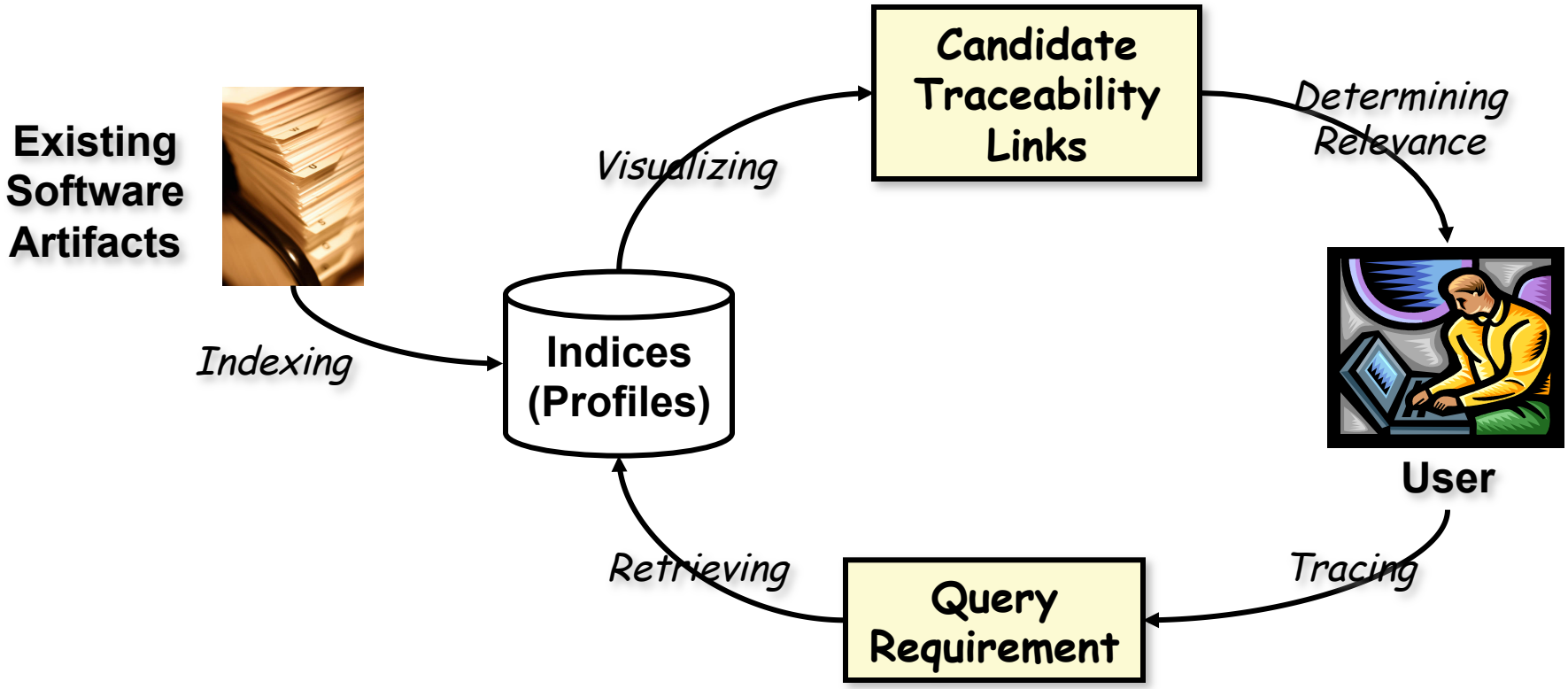
Source: *Google Images*

Modeling in RE

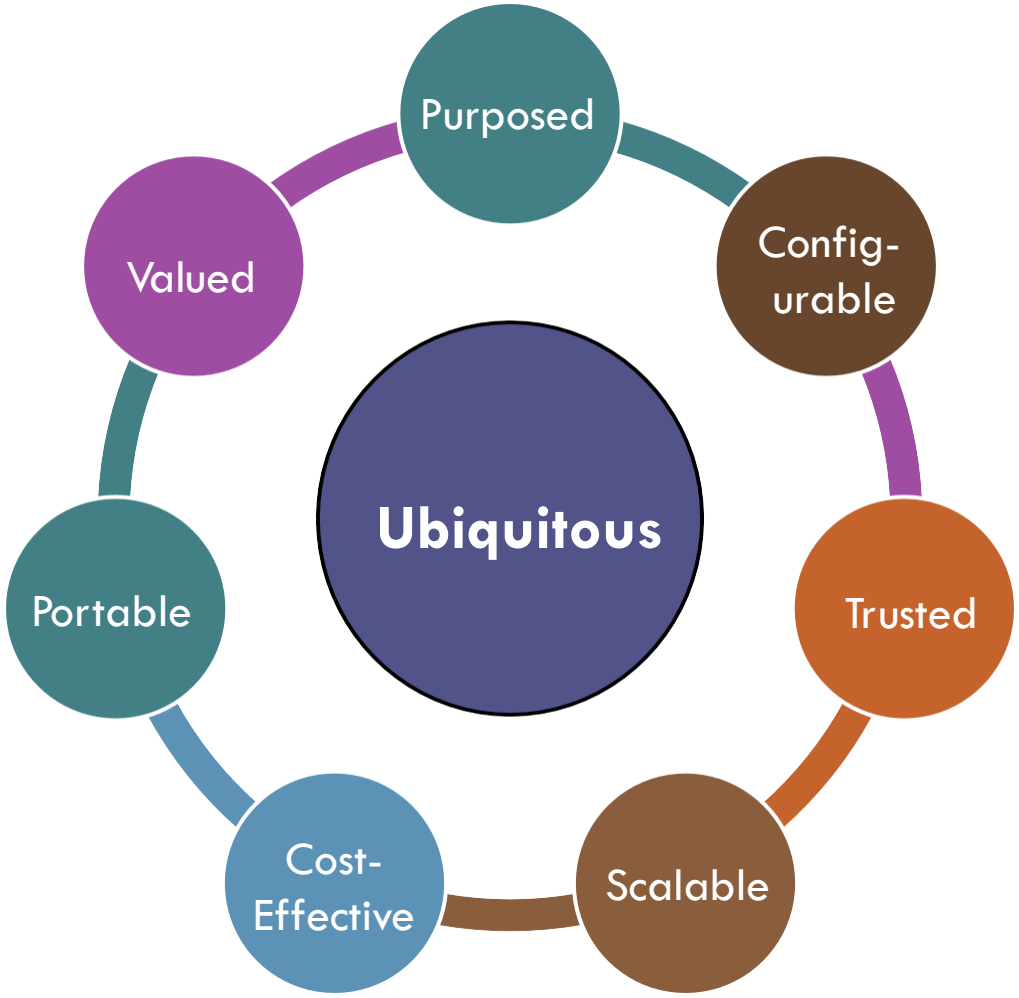
- Modeling with a purpose
  - Facilitate communication
  - Organize information
  - Uncover missing information
  - Uncover inconsistencies

- ASN5: goal model slice for feature interaction
  - Due: 11:59pm, Friday, July 29, 2022
  - Email the instructor (nan.niu@uc.edu) before the deadline

Requirements don't (and shouldn't) live independently



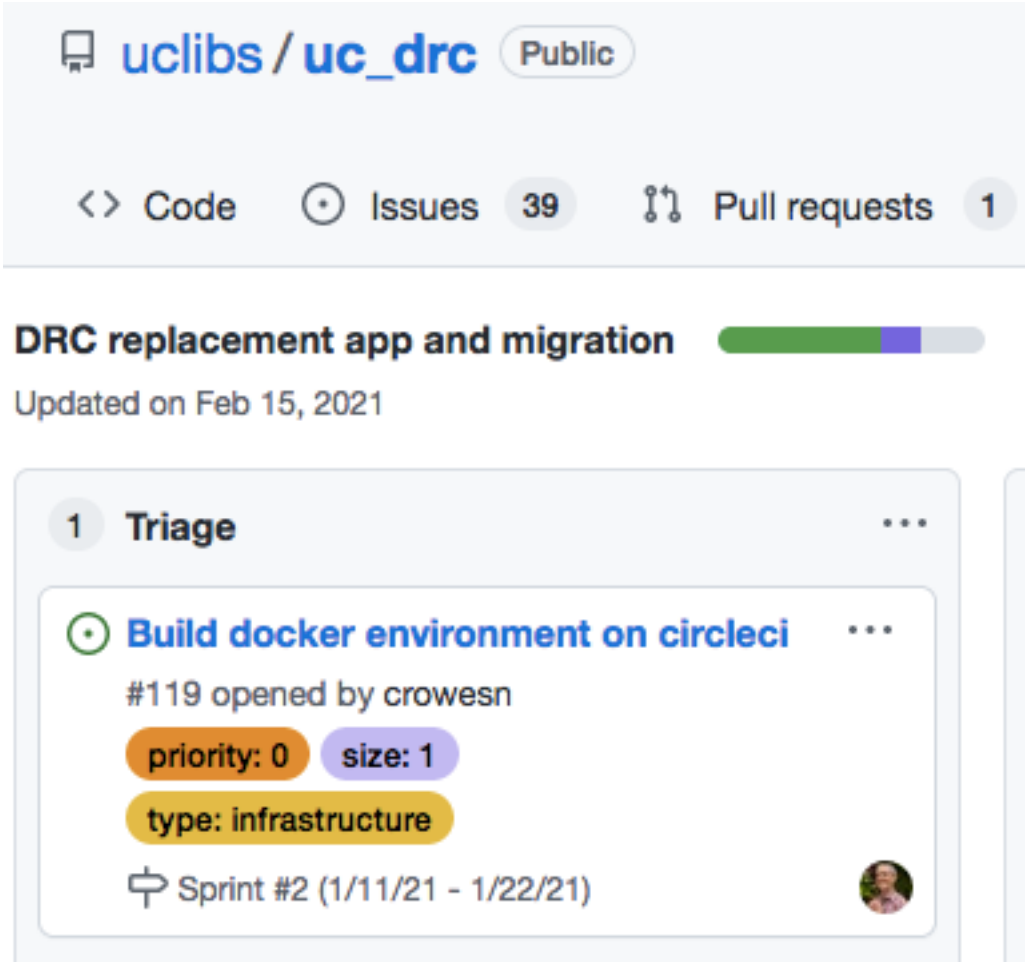
Goal-Oriented View

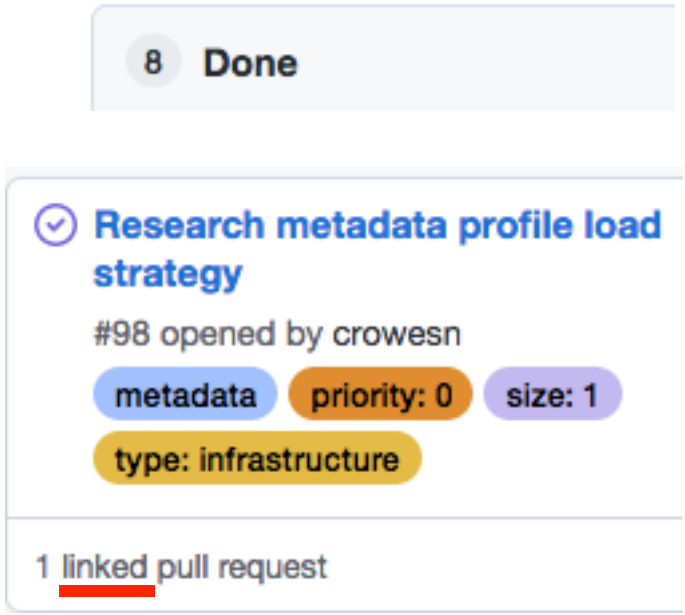


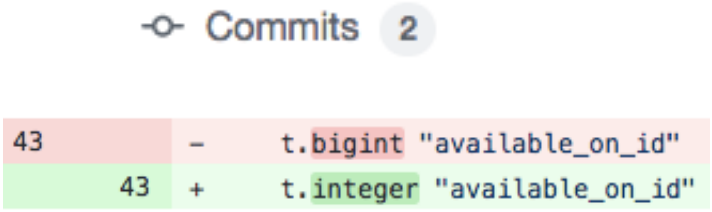
→ Traceability is always there… is neither consciously established nor sought; it is built-in and effortless.

It has effectively 'disappeared without a trace'.

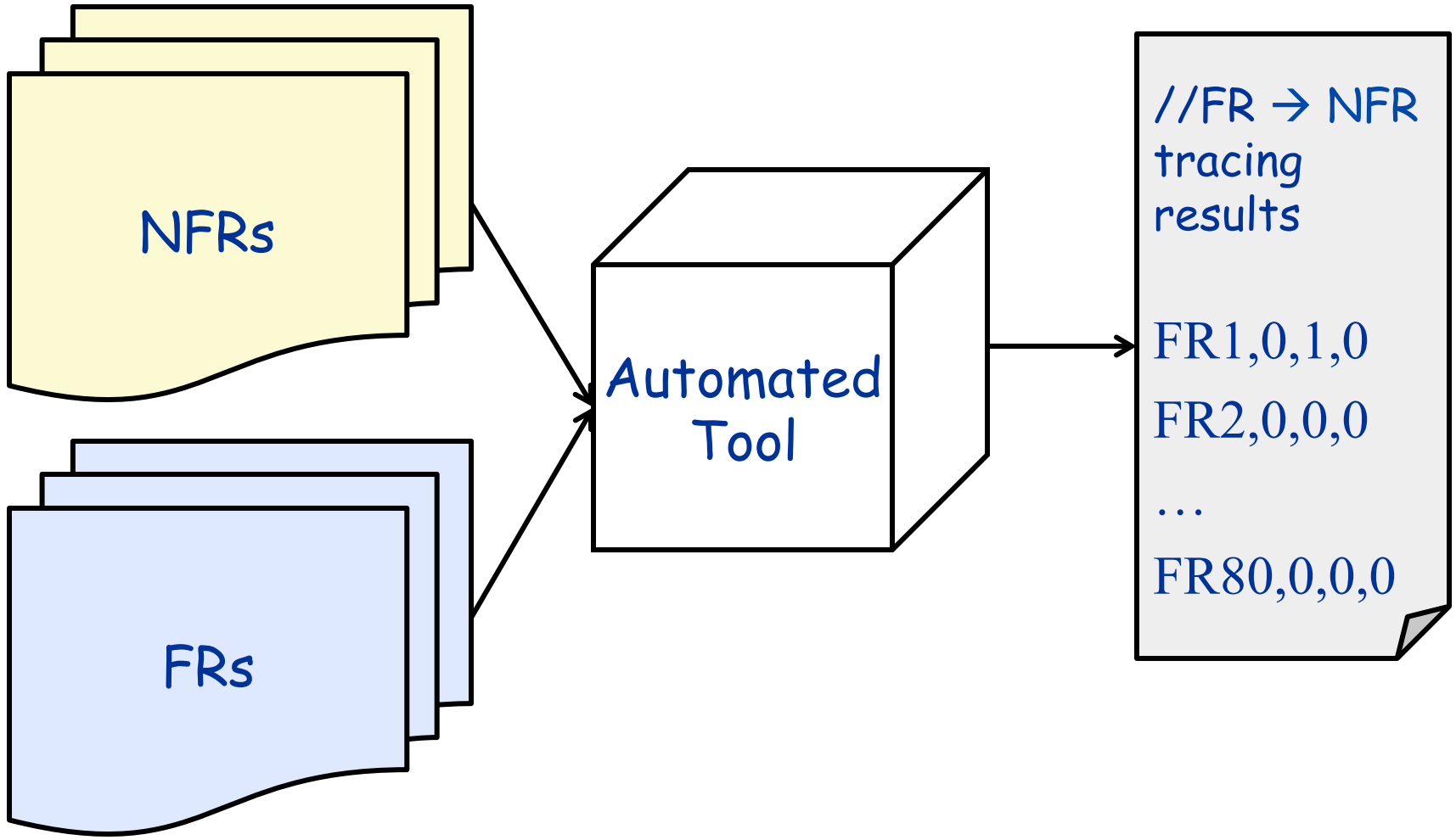
Process built-in; stakeholder buy-in







Linking NFRs and FRs



Let's help David to decide the threshold

Rank	Candidate FR	Relevant?	Recall	Precision	F2
1	FR9	1	1/20=0.05	1/1=1.00	0.062
2	FR5	0	1/20=0.05	1/2=0.50	0.061
3	FR11	1	2/20=0.10	2/3=0.67	0.121
4	FR47	1	3/20=0.15	3/4=0.75	0.179
5	FR76	0	3/20=0.15	3/5=0.60	0.176
6	FR52	1	4/20=0.20	4/6=0.67	0.233
7	FR65	1	5/20=0.25	5/7=0.71	0.287
8	FR80	0	5/20=0.25	5/8=0.63	0.284

Grading Your ASN4 Solution

- Your ASN4 solution will be run three times on Tuesday (July 26)
  - Run #1: 80 FRs and 3 NFRs
  - Run #2: 100 FRs and 3 NFRs
  - Run #3: 100 FRs and 4 NFRs
- Your ASN4 solution shall write the three outputs into three different .txt files
  - YourName_Run1_Output.txt
  - YourName_Run2_Output.txt
  - YourName_Run3_Output.txt
- You will be asked to email the three output files to the instructor (nan.niu@uc.edu) for grading

ASN4 Grading

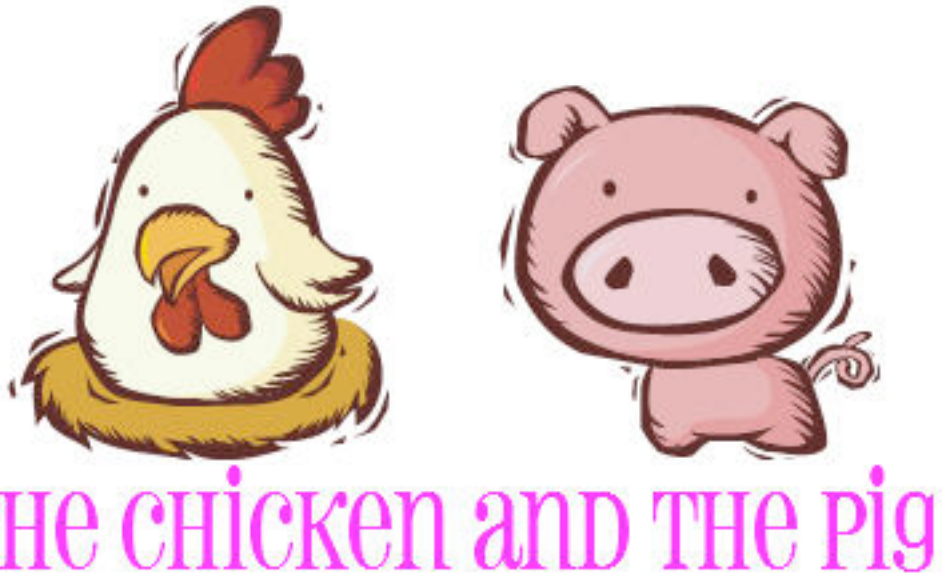
- If you belong to the odd number group {1, 3, 5, …, 17}, then please join Tuesday's grading session at ***9am***
- If you belong to the even number group {2, 4, 6, …, 18}, then please wait for the WeChat group message to join the class link on Tuesday. Note that your grading session will begin ***10am or later*** on Tuesday

1. Wei W.	2. Wei Z.
3. Handong	4. Hewei
5. Yanjia	6. Linfang
7. Zihan	8. Wenying
9. Hongxi	10. Yingkai
11. Liang	12. Ting
13. Mengting	14. Tianlong
15. Yuhui	16. Sihai
17. Xiaohuo	18. Yinghan

Final Remark: "Ham & Eggs"

→ You're not only building the things right, but also building the right (better: more intelligent, more secure, more sustainability, cheaper, faster …) things!

→ My favorite RE Story



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Great having you & keep in touch!