Requirements Engineering

(Summer 2019)

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http://homepages.uc.edu/~niunn/courses
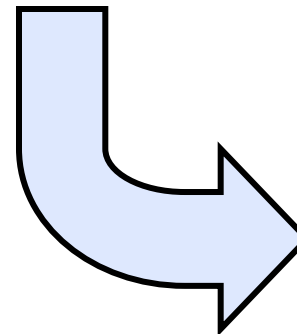
Today's Menu

Last Seminar:
Meaning of Req.s
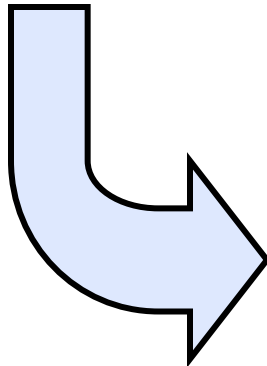
This Seminar:
Req.s Elicitation

Next Seminar:
Goal Modeling
Assignment 1

Requirements Elicitation

→ **Elicit**

- Evoke or draw out (a response, answer, or fact) from someone in reaction to one's own actions or questions

- Draw forth (something that is latent or potential) into existence

→ **Gather**

- Bring together and take in from scattered places or sources

→ **Collect**

- Bring or gather together (things, typically when scattered or widespread)

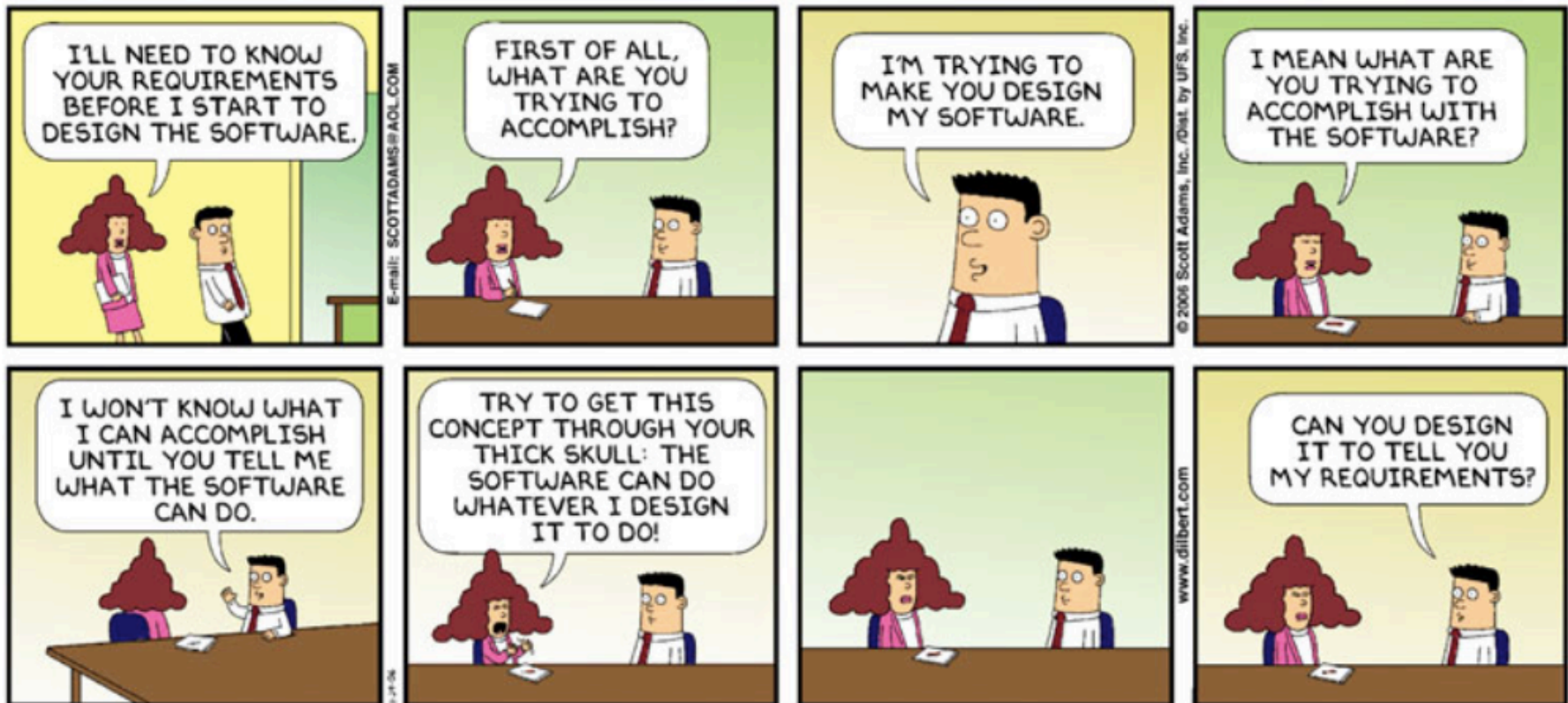→ *???*

Requirements ≠ Butterflies

requirements elicitation ≠ asking the right questions

… because there's no right QUESTION *to ask*

© Scott Adams, Inc./Dist. by UFS, Inc.

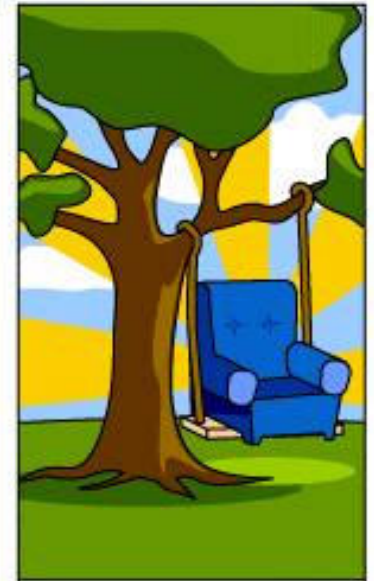How the customer explained it

How the Project Leader understood it

How the Analyst designed it

How the Programmer wrote it

How the Business Consultant described it
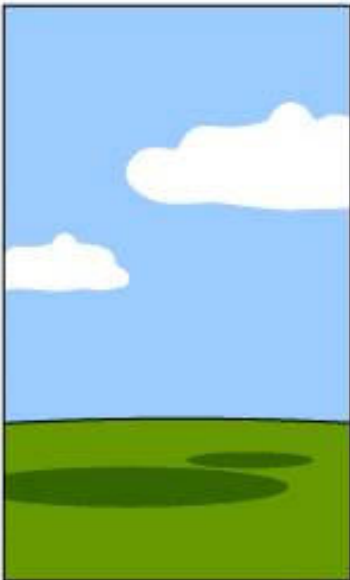
How the project was documented
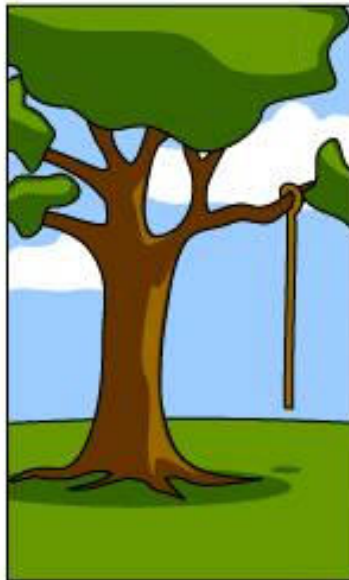
What operations installed

How the customer was billed
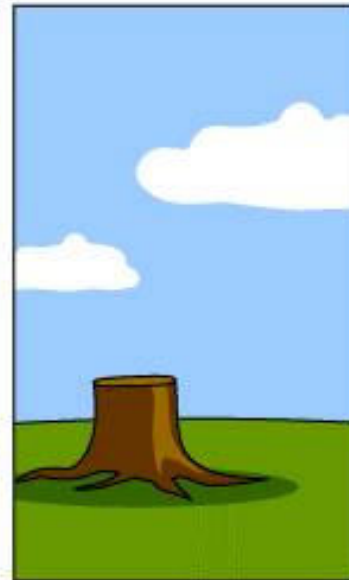
How it was supported

What the customer really needed

... because there's no right ANSWER
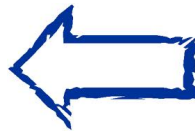
How the customer explained it

What the customer really needed

... because there's no right person to ASK

Nan's cell phone in 2009 versus today

"People don't know what they want until you show it to them."

– Steve Jobs
en.wikiquote.org/Steve_Jobs

Difficulties of Elicitation

→ **Thin spread of domain knowledge**
- ↪ **The knowledge might be distributed across many sources**
  - ➤ It is rarely available in an explicit form (i.e. not written down)
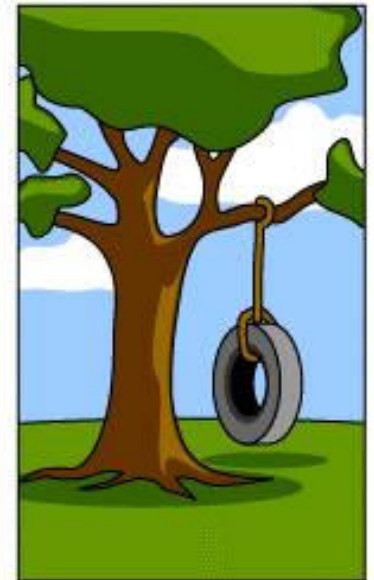- ↪ **There will be conflicts between knowledge from different sources**
  - ➤ People have conflicting goals
  - ➤ People have different understandings of the problem

→ **Tacit knowledge (The "say-do" problem)**
- ↪ **People find it hard to describe knowledge they regularly use**
  - ➤ Descriptions may be inaccurate rationalizations of expert behavior

→ **Limited observability**
- ↪ **The problem owners might be too busy solving it using the existing system**
- ↪ **Presence of an observer may change the problem**
  - ➤ E.g. the Probe Effect and the Hawthorne Effect

Example

→ **The problem area:**

   ↳ Loan approval department in a large bank

   ↳ The analyst is trying to elicit the rules and procedures for approving a loan

→ **Why this might be difficult:**

   ↳ **Implicit knowledge:**

      ➢ There is no document in which the rules for approving loans are written down

   ↳ **Conflicting information:**

      ➢ Different members of the department have different ideas about what the rules are

   ↳ **Say-do problem:**

      ➢ The loan approval process described to you by the loan approval officers is quite different from your observations of what they actually do

   ↳ **Probe effect:**

      ➢ The loan approval process used by the officers while you are observing is different from the one they normally use

Bias in Requirements Elicitation

→ **Bias**

↳ People may **not be free** to tell you what you need to know
  ➢ Political climate & organizational factors matter

↳ People may not **want** to tell you what you need to know
  ➢ The outcome will affect them, so they may try to influence you (hidden agendas)

→ **referring to the previous example**

↳ Bias:
  ➢ The loan approval officers fear that your job is to computerize their jobs out of existence, so they are deliberately emphasizing the need for case-by-case discretion (to convince you it has to be done by a human!)

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**

Interviews

→ **Types:**
  - ↳ Structured - agenda of fairly open questions
  - ↳ Open-ended - no pre-set agenda

→ **Advantages**
  - ↳ Rich collection of information
    - ➤ Good for uncovering opinions, feelings, goals, as well as hard facts
  - ↳ Can probe in depth & adapt follow-up questions to what the person tells you

→ **Disadvantages**
  - ↳ Large amount of qualitative data can be hard to analyze
  - ↳ Hard to compare different respondents
  - ↳ Interviewing is a difficult skill to master

→ **Watch for**
  - ↳ Unanswerable questions ("how do you tie your shoelaces?")
  - ↳ Tacit knowledge (and post-hoc rationalizations)
  - ↳ Removal from context
  - ↳ Interviewer's attitude may cause bias (e.g. variable attentiveness)

Interviewing Tips

→ **Starting off...**
  - ↳ Begin the interview with an innocuous topic to set people at ease
    - ➢ e.g. the weather, the score in last weekend's football game
    - ➢ e.g. comment on an object on the person's desk: "My,... what a beautiful photograph! Did you take that?"

→ **Ask if you can record the interview**
  - ↳ but put tape recorder in front of person
  - ↳ say that they can turn it off any time

→ **Ask easy questions first**
  - ↳ perhaps personal information
    - ➢ e.g. "How long have you worked in your present position?"

→ **Follow up interesting leads**
  - ↳ E.g. if you hear something that indicates your plan of action may be wrong,
    - ➢ e.g.,"Could we pursue what you just said a little further?"

→ **Ask open-ended questions last**
  - ➢ e.g. "Is there anything else you would like to add?"

Speaking about photos...

www.youtube.com/watch?v=W4dyXK4VOpQ

#1 Interviewing Tip

INTERVIEW

1 2 3 4 5

DRESS APPROPRIATELY   **ARRIVE IN GOOD TIME**   **BODY LANGUAGE**   **EXPECT THE UNEXPECTED**   **ASK QUESTIONS**

#1 Interviewing Tip

Surveys and Questionnaires

→ **Advantages**
  - ↪ Can quickly collect info from large numbers of people
  - ↪ Can be administered remotely
  - ↪ Can collect attitudes, beliefs, characteristics

→ **Disadvantages**
  - ↪ Simplistic (presupposed) categories provide very little context
    - ➢ No room for users to convey their real needs

→ **Watch for:**
  - ↪ Bias in sample selection
  - ↪ Bias in self-selecting respondents
  - ↪ Small sample size (lack of statistical significance)
  - ↪ Open ended questions (very hard to analyze!)
  - ↪ Leading questions (*"have you stopped beating your wife?"*)
  - ↪ Appropriation (*"What is this a picture of?"*)
  - ↪ Ambiguous questions (i.e., not everyone is answering the same question)

Questionnaires MUST be prototyped and tested!

Meetings

→**Used for summarization and feedback**
  - ↪ **E.g. meet with stakeholders towards the end of each stage:**
    - ➢ **to discuss the results of the information gathering stage**
    - ➢ **to conclude on a set of requirements**
    - ➢ **to agree on a design etc.**
  - ↪ **Use the meeting to confirm what has been learned, talk about findings**

→**Meetings are an important managerial tool**
  - ↪ **Used to move a system development project forward.**
  - ↪ **Need to determine objectives for the meeting:**
    - ➢ **E.g. presentation, problem solving, conflict resolution, progress analysis, gathering and merging of facts, training, planning,...**
  - ↪ **Plan the meeting carefully:**
    - ➢ **Schedule the meeting and arrange for facilities**
    - ➢ **Prepare an agenda and distribute it well in advance**
    - ➢ **Keep track of time and agenda during the meeting**
    - ➢ **Follow up with a written summary to be distributed to meeting participants**
    - ➢ **Special rules apply for formal presentations, walkthroughs, brainstorming, etc.**

Meetings (Cont'd)

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.
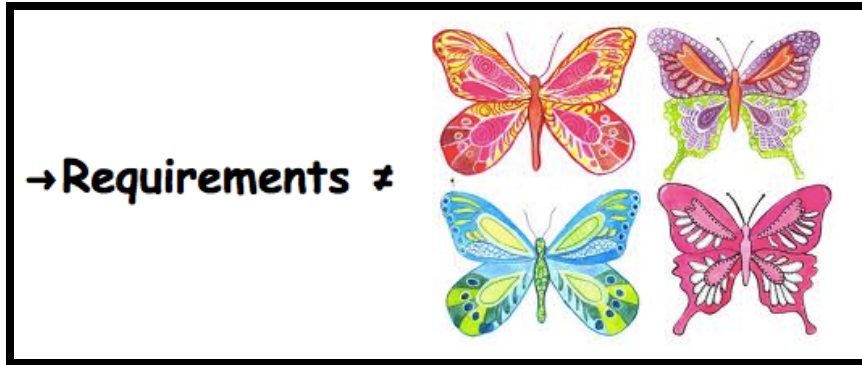
Daniel Jackson

Michael Jackson

Summary

→ Requirements ≠

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  - ➢ Soft Systems Analysis

Assignment 1

→ **Dataset available on the course website**

⇨ **http://homepages.uc.edu/~niunn/courses/**

→ **Objectives**

⇨ **Use the given set of functional requirements (FRs) to build an _i*_ model**

➢ _i*_ **modeling will be introduced next**

⇨ **Use your _i*_ model to make the FRs more complete**