Requirements Elicitation
Requirements Elicitation - Discovery

- A **conversation** between stakeholders, users, and software engineers about requirements
- A **negotiation** to achieve mutual understanding and consensus
- A **documentation** of joint understanding and agreements

*Build relationships*

*Users are ignorant and misguided; developers know best*

*Users know best and should dictate design*
A Catalog of Elicitation Techniques

- Interviews
- Surveys
- Apprenticing
- Ethnographic studies
- Visual modeling

- Requirements workshops
- Brainstorming
- Literature and competition research
- Document archeology

Apply the 5W+H Heuristic – who, what, where, when, why, (how)
Interviewing Synopsis

- Common, **natural**, but may have **limitations**
- Model as a **decision tree** – problem, question, answer, decision, repeat to understand requirements
- What can possibly go wrong?
  - Wrong questions, wrong order, side branches
  - Ambiguity
  - Interviewees may not know or communicate well
  - Interviewer’s conformation bias and intuition
- Create an interview plan!
- An Example (Separate slide set)
Interviewing Synopsis (cont)

- **Prepare** questions **but refine** as you learn
- Types of questions – user oriented, more general; ask **“why”**, get to the essence
- **Avoid leading questions**; e.g., **“would feature X be useful?”**
- **Encourage story telling**, discourage design
- The interview process
  - Introductions, **setup**, put the user at ease
  - **Ask** questions, **listen**, **feedback** understanding
  - Monitor **group dynamics**
  - **Document** responses, analyze, determine next steps
Advantages of Face-to-Face Communication

- The interviewer is in control, can direct focus
- Observe verbal and non-verbal emotions and behaviors
- Reinforces memory by repetition
- Minimizes ambiguity by repetition
Confirmation Bias

- **Tendency** to confirm one's preexisting beliefs or hypotheses
- **Interpret ambiguous evidence** as supporting their existing position
- **Biased search for information**: the phrasing of a question can significantly change the answer.
- **Biased interpretation of information**: versus in a neutral objective manner.
- **Biased memory**: may still remember evidence selectively to reinforce their expectations.
Surveys Versus Interviews

- Surveys can be an alternative or supplement to interviews
  - Large number of stakeholders/users
  - Difficult to meet stakeholders in person
  - Not a more reliable source of data available

- Surveys seem inexpensive and easy but...
  - Often require follow-up clarification that adds time and cost
  - Reliability and value of information collected is variable even with follow up
  - Everyone suffers from survey fatigue
Surveys Summary

- **Advantages:**
  - Reach a large number of people
  - Easy to do, provides quantifiable data

- **Cautions:**
  - Survey fatigue … so
  - Risk of low response rate, extremes bias, unreliable data
  - No follow up

- **Plan the survey**
  - Identify the questions and data to be collected
  - Identify target population and sampling groups
  - Set a deadline, keep it simple
  - On-line tool
  - How will the data be analyzed; follow up?
Apprenticing

“Nobody can talk better about what they do and why they do it than they can while in the middle of doing it.”

– Beyer and Holtzblatt, *Contextual Design: Defining Customer-Centered Systems*

- **Serve as an apprentice to the user to learn their job** (assuming existing or similar system)
- **Observe**, ask **questions**, do some of the work
- **Normal** and **exceptional** behavior
- Tour work environment
- Observe and participate over time and multiple users
- **Caution** – observers presence may impact user’s behavior
Ethnographic Studies

- The methodical study of *group behavior* in the context of *cultural* group settings
  - Culture – pattern of human interaction, beliefs, values, social behavior, material status
- A combination of observation, interviewing, experiments, and survey techniques
- **Real** (work setting) and **contrived** situations
- Often employed by marketing and usability (human factors) organizations to study what people think about or interact with products and services
  - **Focus study groups** – “this pizza tastes like cardboard”; examples?
  - Source of data for defining personas
Visual Requirements Modeling

- Graphical description of system functionality
- Communicate and validate functionality with stakeholders
- Visual, intuitive
- Explore user/system interaction and usability issues
- Storyboards, Wireframes, Prototypes
- Exploratory or evolutionary

*DON’T OVERSELL – STAKEHOLDERS TEND TO SEE PROTOTYPES AS FINAL SOLUTIONS TOO SOON*
Requirements Workshops
(Structured Conversations)

- **Structured collaborative meetings** to elicit requirements
- The goal – define and agree on **system requirements** in the context of a **business domain process** model
- Workshop agenda – elicit and **analyze system events** and the **corresponding business workflow responses**
- Key stakeholders and users, meeting agenda and roles, users walkthrough workflow steps to respond to an event
The Business (Domain) Process Model

**Trigger event:**
(Incoming information, event, or point in time)
(Initiated by the user or external system)

- User tasks
- System steps
- External systems I/F
- Exception conditions

Yields functional and non-functional requirements

Work and information flow response
"Scenarios"
Brainstorming – Idea Generation

- **Use the group effect to generate good ideas for innovation and to solve problems**
  - “The Wisdom of Crowds” – diverse, independent, aggregation
  - But – “Decades of research have consistently shown that brainstorming groups think of far fewer ideas than the same number of people who work alone and later pool their ideas.”

- **Rapidly generate as many ideas as possible**
  - Don’t interrupt the creative flow
    - Suspend judgment, evaluation, and criticism
    - Don’t stop to clarify or seek clarification
  - Okay if some ideas are wild, crazy or impractical
After the Brainstorming Session

- **Evaluate ideas**
  - Some worthless, but they will have served their purpose by seeding other, more practical, ideas
  - Keep the best and (if feasible) turn them into requirements
  - As a group vote on or score ideas

- **Merge ideas**
  - Merge half-formed ideas into an invention

- **Evolve half-formed ideas** into true requirements

- **Investigate ideas** with additional elicitation techniques
Requirements from Market Research, Document Archeology, etc.

- Literature reviews
  - Business domain
  - Competing products – use them, reviews
  - Technology
    - State-of-the-art
    - Search patent databases – ideas, conflicts, new IP opportunities
- Legacy system and document archeology
  - Existing specifications, manuals, help, FAQ, etc.
  - Reverse engineer engineering artifacts

Same kinds of questions you would ask if interviewing stakeholders
Capture Requirements Electronically

- Use computer technology to discover, capture, discuss, and validate requirements
  - Web searching, social networking, email, on-line surveys, …
- **Manage** the flood of requirements/search results by organizing via some convention using a tool…
- Multi-media is an effective record of elicitation sessions
  - Aids recall and sharing
  - Be aware of participant self consciousness at first

**No matter what format you use, WRITE IT DOWN!**