

# CS 349 19 Users

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Slides mostly by Michael Terry

# Characterizing Users

- Users have *goals*
  - The tasks they wish to accomplish
- Each user has a unique collection of skills and knowledge
  - Skills: What they know how to do
  - Knowledge: What they know

# Users and User Interface

- A good user interface will
  - Provide tools to accomplish a wide range goals
  - Build upon users' existing skills and knowledge
- Where are these goals in conflict?

# Problem Solving

- How do people solve real problems?
- For example, writing software...
- Implications?
  - what we build
  - how we build it

# Designing for Problem Solving

- Design interface to communicate a set of affordances
  - Suggest what can, cannot be done
  - Guide user in problem solving process
  - Provide feedback throughout process
- How far can an interface's affordances affect our behavior?
  - Can we design in ways of doing work?
  - Can we design in business models?
  - Can we design in politics?

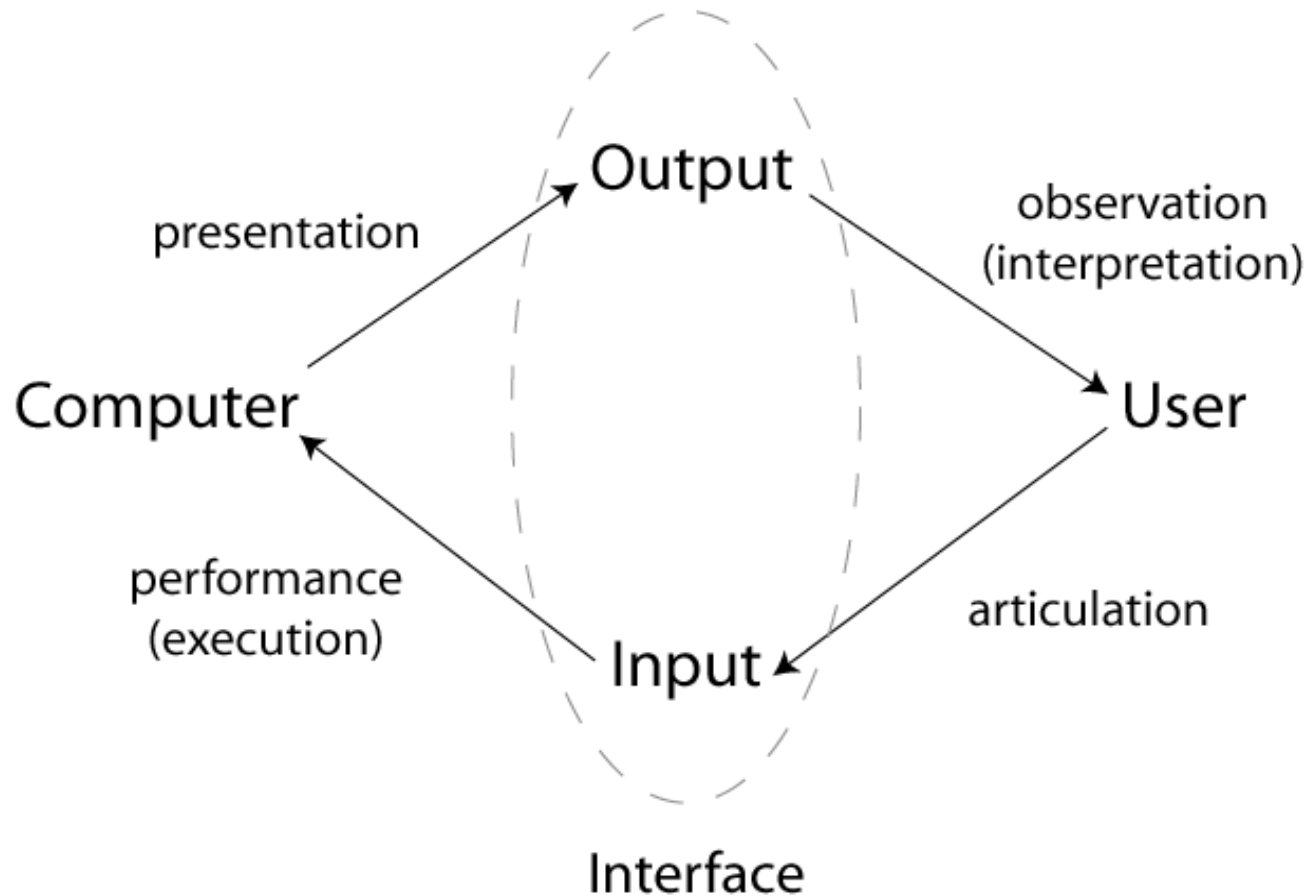
# Gulf of Execution

- When user's intentions aren't met by interface's offerings, can result in a *Gulf of Execution*
  - From Don Norman's *Design of Everyday Things*
  - A gap between what user wishes to accomplish and the capabilities/affordances of the interface
- Goal is to lessen Gulf of Execution
  - Provide affordances in a form close to user's way of thinking of task and how it should be solved
- Example
  - Microsoft Paint (entry-level tool) and Photoshop (pro-level tool) both have Gulfs of Execution. Explain.

# Gulf of Evaluation

- Amount of effort required to interpret the current state of the system; determine if goals have been met and if not, what to do next.
  - Also due to Donald Norman
- Examples:
  - Movie projector
  - Video tape
  - Printing
  - Compilation errors

# Gulfs in Interactive Cycle





# Cognition

- Users have goals
- Form plans on how to meet those goals
- Rely on cognitive resources
- Cognition
  - “the act or process of knowing including both awareness and judgment; *a/so* : a product of this act” (Merriam-Webster Online)
- Can consider cognition at various levels

# Conscious Cognition

- Our locus of attention
- Serial processor
  - Can attend to only one thing at a time
  - Attention can be easily shifted
- Low bandwidth
  - Limited amount of information that can be processed at a time
- Short-term memory
  - Limited capacity
  - 7 +/- 2 items (chunks) (More modern research says 3-4 chunks)
- Implications for interface design?

# 22-July-09 Announcements

- Mid-term remarks available from Byron (after class)
- Marks updated on-line.
- Agenda:
  - Guest lectures by Matt and Jaime regarding their research.

# 27-July-09 Announcements

- A4:
  - Will post sample solution(s)
  - Available???
- Agenda:
  - Finish discussing Users
  - TA performance discussion
  - A5 Demos
  - Final exam overview

# Unconscious Cognition

- Parallel processing
  - Ability to do many things simultaneously
  - “Walk and chew gum” at same time
- Higher bandwidth
  - Can process lots of information at same time
  - Think about all the information processed when walking
- Long-term memory
  - Long-term storage of *lots* of information
- Lots of resources to draw upon

# Cognition

Property	Conscious	Unconscious
Engaged by	Novelty, emergencies, danger	Repetition, expected events, safety
Used in	New circumstances	Routine situations
Can handle	Decisions	Non-branching tasks
Operates	Sequentially	Simultaneously
Controls	Volition	Habits
Capacity	Tiny	Huge
Persists for	Tenths of seconds	Decades (lifelong)

# Learning

- As we learn new things, they are pushed down from our conscious to unconscious levels of cognition
  - Things become “automatic”
- Examples?

# Learning

- Novel actions must be explicitly guided by conscious effort and feedback
- Over time, actions become automatic, “ballistic”
  - Once you start an action, it executes to completion
  - Not under conscious control
  - Not as much feedback required by interface



# Returning to Writing Software...

- What is the process of writing software?
- On a spectrum, what aspects of it are under conscious, cognitive control, and which are “ballistic”?

# Writing Software Example...

- Decide on general approach
  - Conscious
- Decide to search API for related functionality
  - Conscious
  - Though draws upon long-term memory
- Use mouse, keyboard to navigate API
  - Motor actions are ballistic
- What happens if keyboard layout is Dvorak?

# Implications for Interfaces

- We cannot stop habits from forming
- What are implications for interface design?

# Implications for Interfaces

- Need to be careful what habits we encourage
  - Confirmation dialogs with options in same place will lead to people automatically dismissing them
  - In what situations is this undesirable, and how do designers work around this problem?
- Consistency and congruency in interfaces help draw upon unconscious cognition
  - Help reduce cognitive effort required for learning

# Finishing Details

- TA Performance
- Newsgroup
- A5 Demos
- A5 Discussion
- Final Exam

# Final Exam

- Coverage:
  - One question from material covered by midterm 1; similar for midterm 2
  - Remaining questions from material after Midterm 2
- Time: 7:30-10:00pm, Saturday, Aug. 15, in RCH 307
- Office Hours
  - 11-5 on Saturday, Aug. 15
  - Most of one of Aug. {12, 13, 14}. To be announced.