User Interaction: The Human

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INF 133 Fall 2010

Learning Objective:

To appreciate the limitations of the human and implications for U/I design

Memory

- Three types of memory which build on each other
  - Sensory Memory
  - Short-Term or Working Memory
  - Long-Term Memory

Sensory Memory

- Buffers for stimuli received through senses
  - iconic memory: visual stimuli
  - echoic memory: aural stimuli
  - haptic memory: tactile stimuli
- Examples
  - non cognitive recall
- Continuously overwritten

Short-Term Memory

- Scratch-pad for temporary recall
  - rapid access ~ 70ms
  - rapid decay ~ 200ms
  - limited capacity - 7± 2 chunks

Long-Term Memory

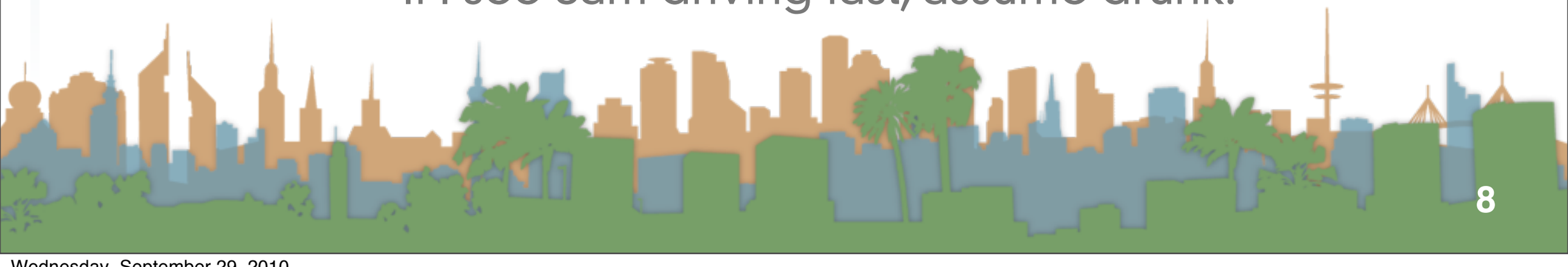
- Repository for all our knowledge
  - slow access ~ 1/10 second
  - slow decay, if any
  - huge or unlimited capacity
- Two types
  - episodic – serial memory of events
  - semantic – structured memory of facts,concepts, skills
  - semantic LTM derived from episodic LTM

Thinking

- Reasoning
  - Deduction
  - Induction
  - Abduction
- Problem Solving

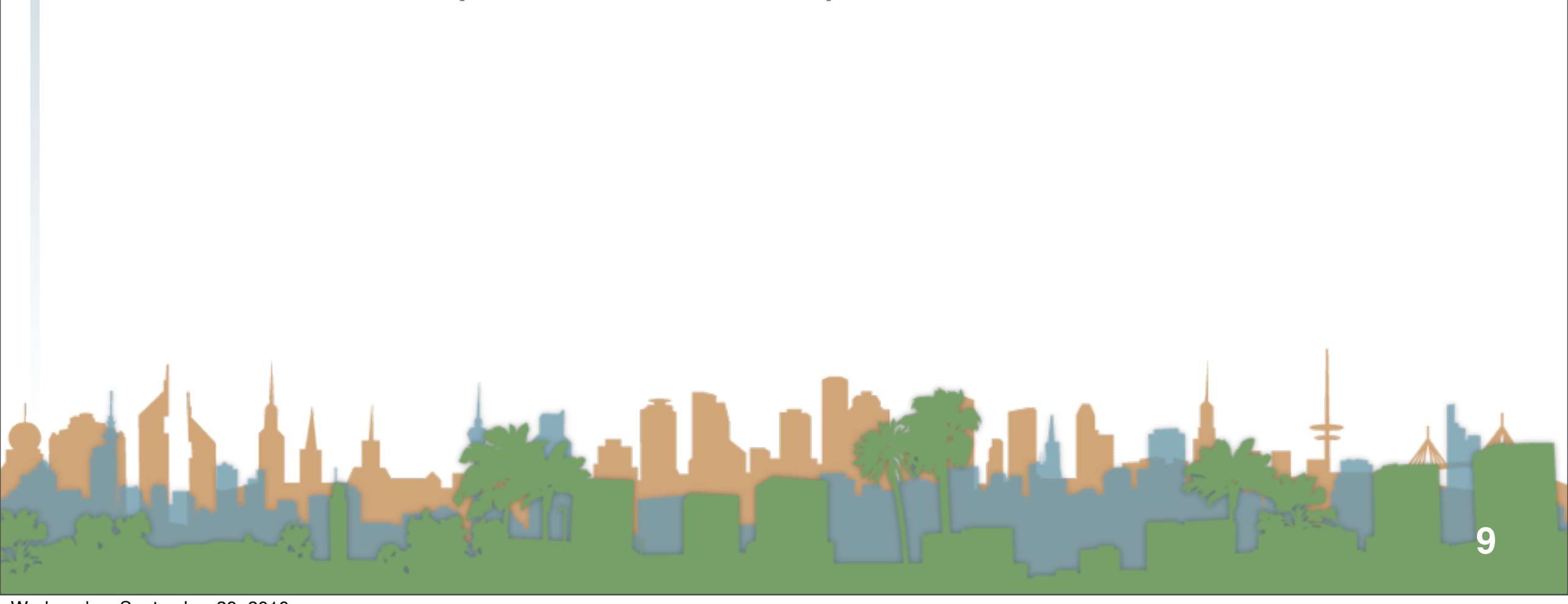
Thinking

- Reasoning
  - Deduction
    - derive logically necessary conclusion from given premises.
  - Induction
    - generalize from cases seen to cases unseen
- Abduction
  - reasoning from event to cause
    - Sam drives fast when drunk.
    - If I see Sam driving fast, assume drunk.



Thinking

- Problem Solving
  - Process of finding solution to unfamiliar task using knowledge.
  - Many theories of this process



Individuals vary in their abilities

- long term
  - gender, physical and intellectual abilities
- short term
  - effect of stress or fatigue
- changing
  - age

Will a particular design decision exclude a section of your user population?

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Font Size

Will a particular design decision exclude a section of your user population?

Screen Real Estate

Will a particular design decision exclude a section of your user population?

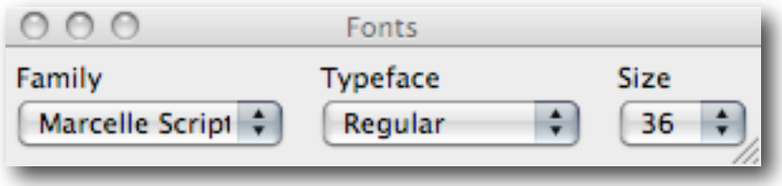
Color Choice

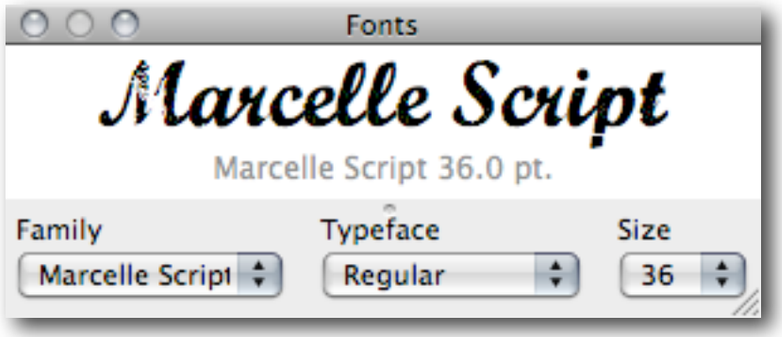
Will a particular design decision exclude a section of your user population?

Embedded Video

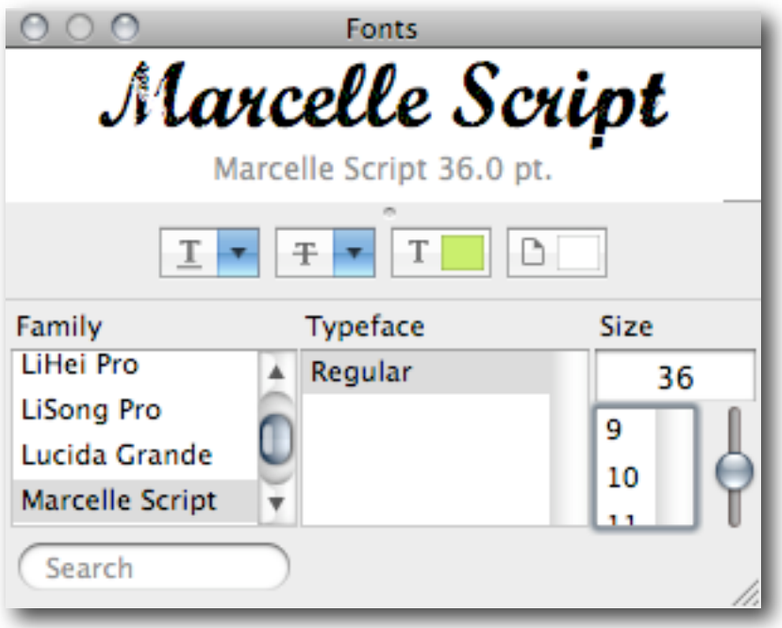
What are strategies for including more users?

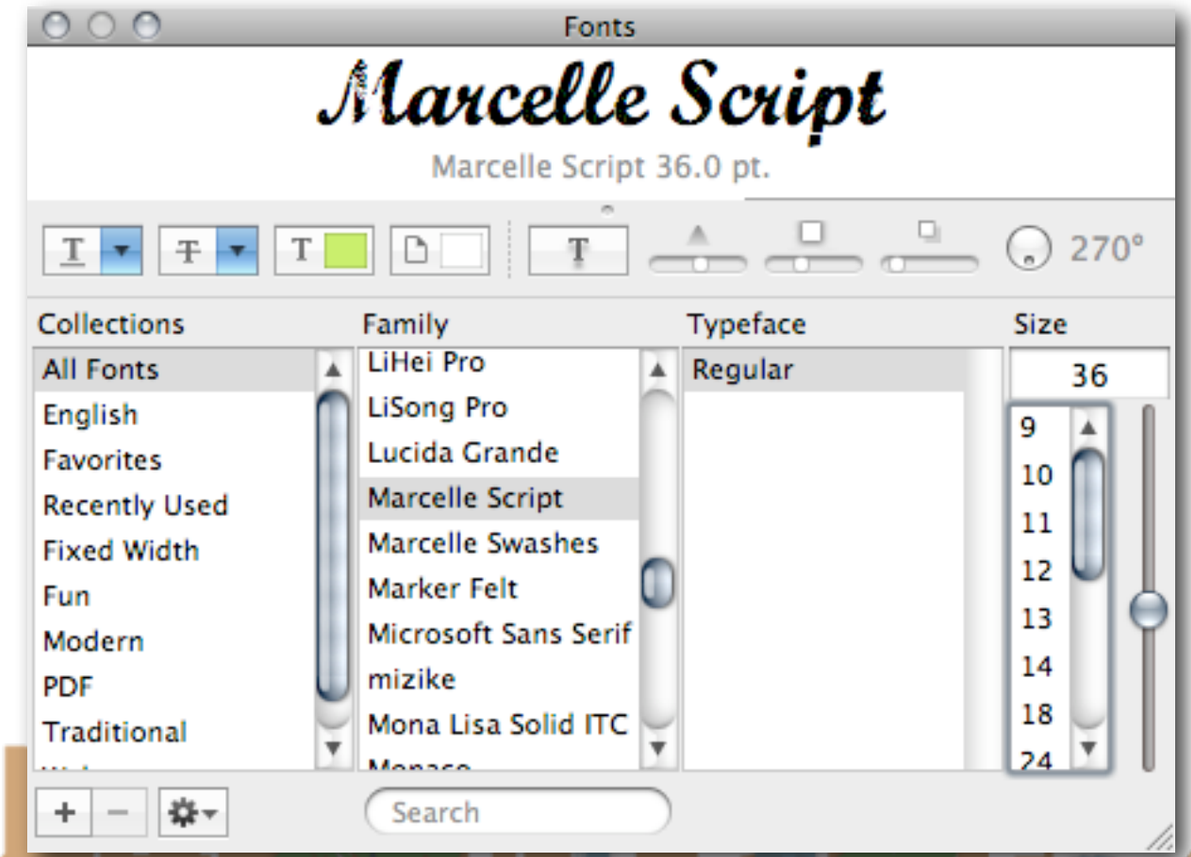
Addressing different skills and environments





- "Plasticity"
  - Adapting to different environments easily.
  - What environments?





Movement

- Time taken to respond to stimulus
  - reaction time + movement time
- Reaction time depends on stimulus
  - visual: ~200ms
  - auditory ~150ms
  - pain ~700ms
- Movement time depends on physiology

$$M_t = a + b \cdot log_2(\frac{distance}{size} + 1)$$

Movement - Fitts' Law

- Implications
  -

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Movement - Fitts' Law

- Implications
  - Putting frequently used items at the top of a list

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Movement - Fitts' Law

- Implications
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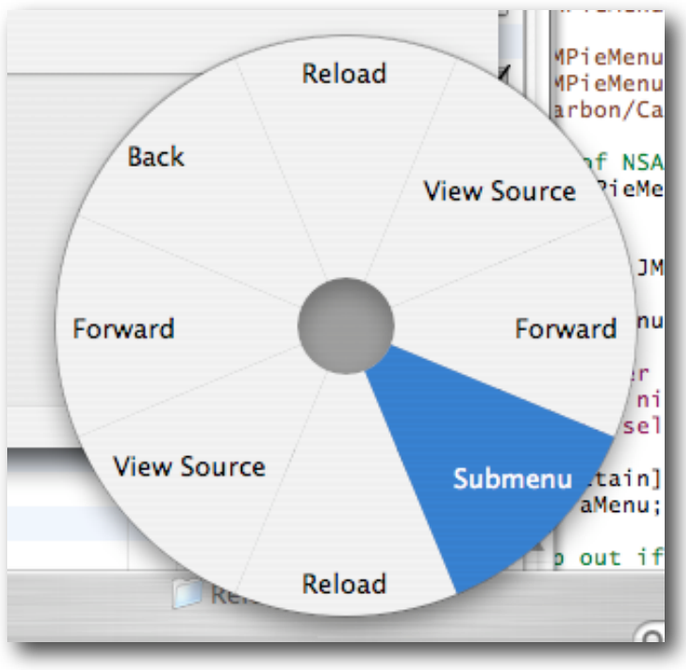
  - Pie menus are better than drop down menus



http://mobile.osnews.com/story.php/18893/pt.-IV-Fitts-Law/

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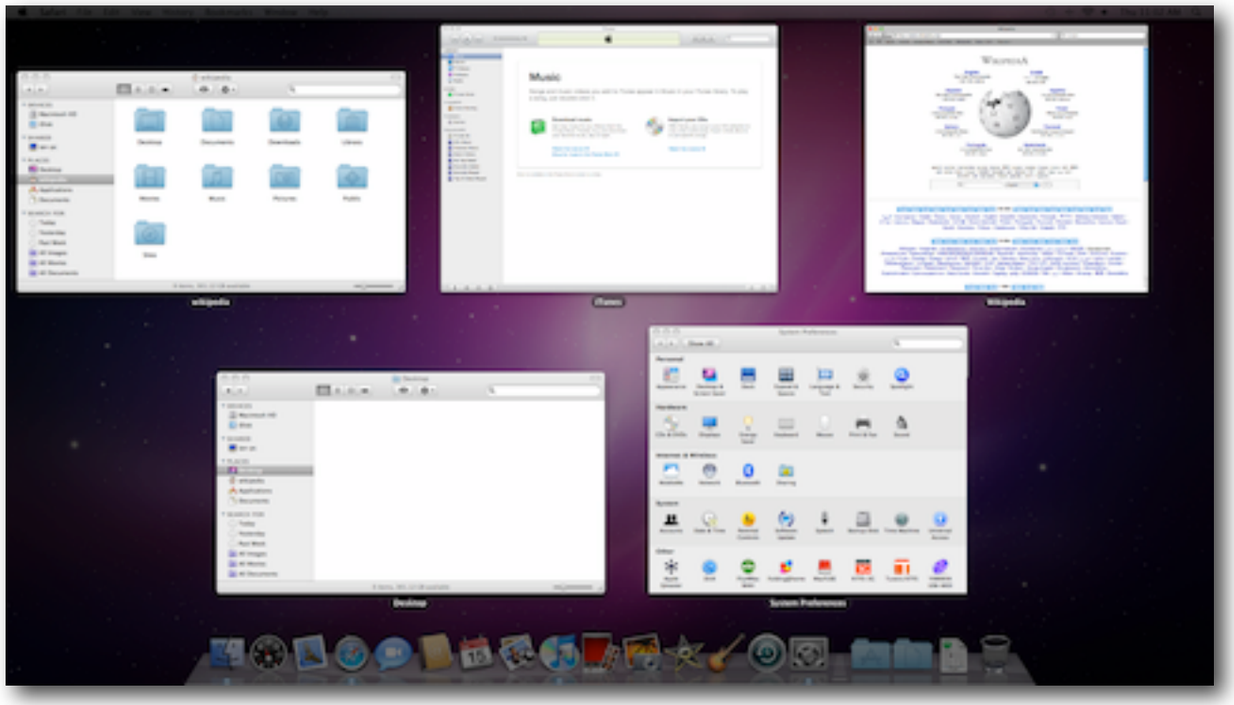
Movement - Fitts' Law

- Implications
  - Putting frequently used items at the top of a list
  - Pie menus are better than drop down menus
  - Exposé style interfaces are very efficient



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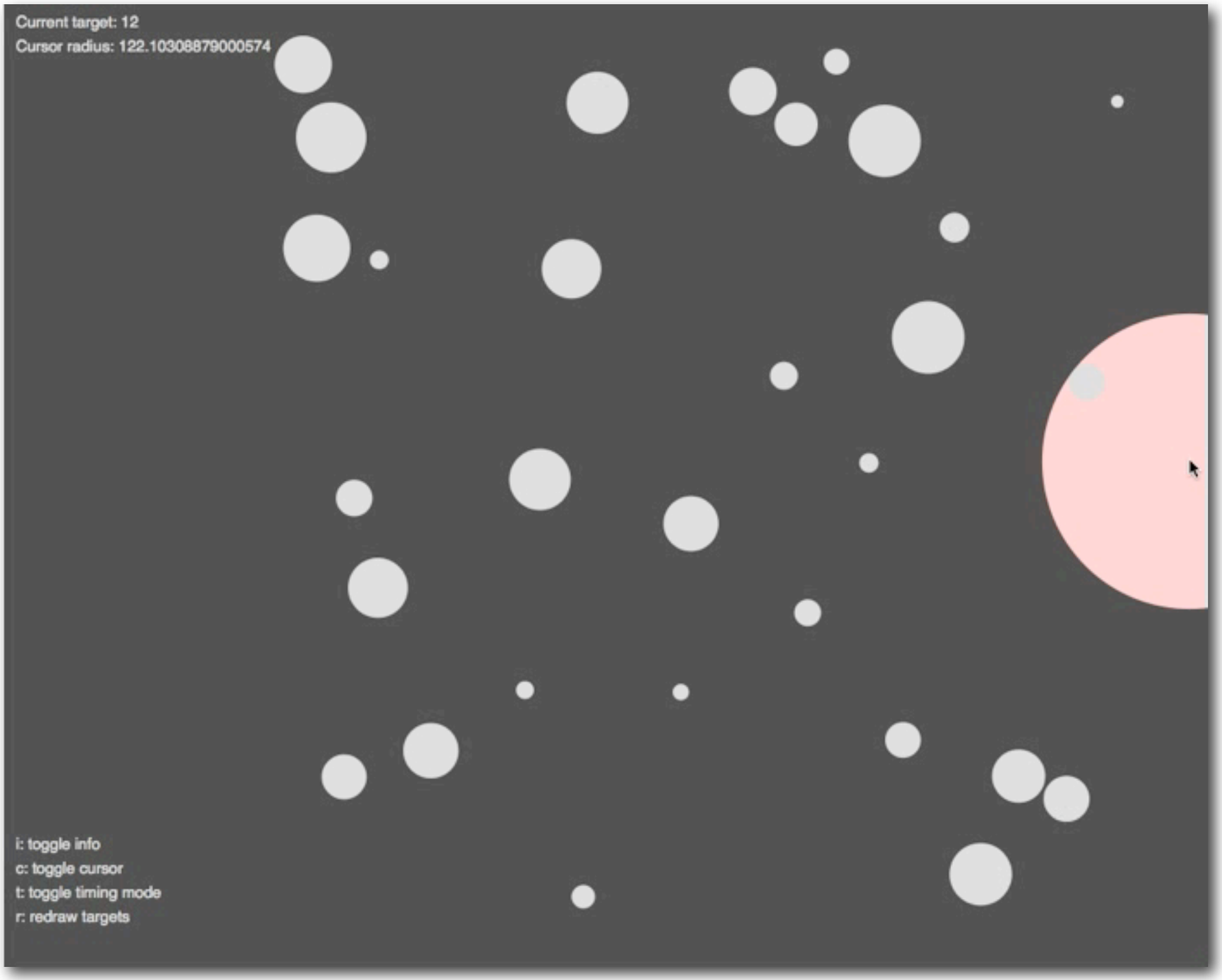
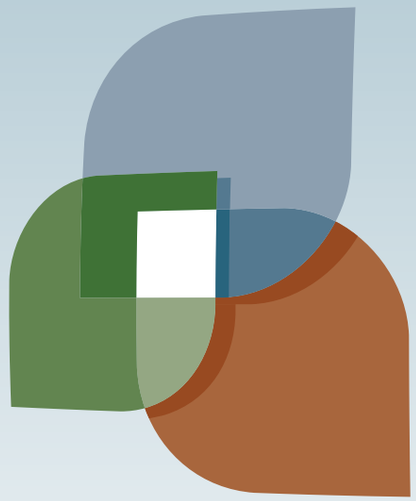
Movement - Fitts' Law

- Implications
  - Putting frequently used items at the top of a list
  - Pie menus are better than drop down menus
  - Exposé style interfaces are very efficient
  - Bubble Cursors are more efficient
    - Also help with dexterity issues



http://ieor.berkeley.edu/~anandk/bubbleCursor.html



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