Questions?

• Project #1
Human Information Processor
(Card, Moran, Newell)
Perceptual Processor

• Physical store from our senses: here sight
• Decoded for transfer to working memory
  – Progressive
    • Example: 10ms/letter
  – Selective
    • Spatial
    • Pre-attentive: color, direction...

• Capacity
  – Example: 17 letters
Pre-attentive perception: How many 3s?

85689726984689762689764358922659865986554897689269898
02462996874026557627986789045679232769285460986772098
90834579802790759047098279085790847729087590827908754
98709856749068975786259845690243790472190790709811450
85689726984689762689764458922659865986554897689269898

From Information Visualization, C. Ware
Pre-attentive perception: How many 3s?

From Information Visualization, C. Ware
Where are the cherries?

From Information Visualization, C. Ware
Where are the cherries?

From Information Visualization, C. Ware
Other examples of pre-attentive variables

From Information Visualization, C. Ware
Perceptual Processor

- Decay: 200ms
Perceptual Processor

- **Cycle time**
  - Quantum experience: 100ms
  - *Percept fusion*
  - *Causality*
Working Memory

• Access in chunks
  – Task dependent construct
  – 7 +/- 2 (Miller)

• Decay
  – Content dependant
  – Limit attention span
Long term memory

- Very large capacity
  - Semantic encoding

- Associative access
  - Fast read: 70ms
  - Expensive write: 10s
    - Several Rehearsal and/or recall,

- Context at the time of acquisition key for retrieval

- Noisy
Cognitive Processor

• Cycle time: 70ms
  – Can be modulated

• Typical matching time
  – Digits: 33ms
  – Colors: 38ms
  – Geometry: 50ms…

• Fundamentally serial
  – One locus of attention at a time
    • *Eastern 401, December 1972*
      – Crew focused on checking the landing gear indicator bulb,
      – Meanwhile the aircraft is loosing altitude (horn, warning indicator…),
      – Aircraft crashed in the Everglades
      – see “The Human Interface” by Raskin, p25

• *But what about driving and talking?*
Motor Processor

- Receive input from the cognitive processor
- Execute motor programs
  - Pianist: up to 16 finger movements per second
  - Point of no-return for muscle action