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
Perceptual Processor

- **Cycle time**
  - Quantum experience: 100ms
    - *Percept fusion*
    - *Causality*
Perceptual Processor

- Decay: 200ms
Working Memory

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

- Decay
  - Content dependant
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
Put it together: Fitts’ law (tapping task)
Put it together: Are A and B letters?
Hick’s law

- Cost of taking a decision

![Graph showing Hick's law relationship between reaction time and log2(n+1)]

![Graph showing stimulus information varied by number of alternatives, stimulus probabilities, and sequential dependencies]
Scope and Caveats
Questions?