Information Processing -
A basic model of human cognition

Lesson I: Introduction
module 04

What is information?

- Abstract definition
  - Information is that which reduces uncertainty
  - The amount of information in a "message" is the difference between uncertainty before and after the "message" has been received
  - Measured in bits of information (binary)

- How is information relevant for cognition?
  - The external world contains information about the actions we should and should not perform
  - Visual perception tries to reduce uncertainty in numerous ways - which objects are in our environment (object recognition), are we headed for a collision with something (obstacle avoidance), etc.

Basic elements of information processing

- Stages of processing
  - Information has to be selected and encoded for further processing (attention, perception)
  - Information has to be further processed and stored for cognitive operations (short term memory)
  - Information has to be stored for long-term use and new information has to be linked to old information (knowledge, memory)

- General operations
  - Encoding and decoding of information
  - Transformation of information
  - Information storage and rehearsal
  - Retrieval of information
The Atkinson & Shiffrin (1968) stage model of information processing

The metaphor for information processing in the 70s and 80s has been the personal computer
- Hard drive: Long-term storage of information
- CPU: Information processing / transformation
- Bus: Processing bottleneck (limited capacity)
- RAM: Short term memory
- Serial processing: Processing stages

Neurally inspired view of information processing
- Highly parallel computation
- Large number of information processors: Neurons
- Integration of processing and memory
- Graceful degradation