

COMP 20090: Introduction to Cognitive Science.

Study Sheet: Representation

Representations differ in the detail they capture, the detail they ignore, and the kind of information that can be directly accessed, and what can be inferred.

Arabic numerals vs Roman numerals: what is the difference in terms of representational power and convenience?

Explicit knowledge must be represented in some form in the brain.

Semantic networks as a form of knowledge representation. Parsimony as a guiding principle.

What is the frame problem: the failure of AI programs with explicit knowledge representation to scale up to real environments and situations. Be ready to describe a 'blocks world' set up and show how it is unlike problems faced by real organisms in real environments.

In what way are mental images like real images? In what way are they different?

What do Shepard and Metzler's experiments on mental rotation demonstrate?

What is procedural knowledge? Have examples ready. How does it differ from explicit knowledge?

In what way do we use external knowledge repositories?

The Matrix (film) presents a view of cognition not unlike the old 'brain-in-a-vat', beloved of philosophers. What issues are at stake here?

Classical category theory relied on defining and typical features. What are the problems of this approach?

What does the feature comparison model predict with respect to category size? Why is this problematic for the classical category account?

How do prototype theory and exemplar theory attempt to improve on classical category theory? What is a prototype? What is an exemplar?

What is the uncanny valley? What are the implications for those who design robots?