**Cognitive Science – Midterm Review Guide**

In addition to these topics, any information covered in the discussion assignments and weekly quizzes could appear on the midterm exam.

***Chapter 1***

Behaviorism and the turn against behaviorism in psychology:

Is there anything correct about the behaviorist paradigm?

What can cognitive scientists learn from behaviorism?

What are the major arguments/results that lead us to believe that behaviorism is false?

What replaced behaviorism (if anything)? Describe.

What is conditioning? What is association? What is reinforcement?

What is an unconditioned stimulus? What is a conditioned stimulus?

What is a “Skinner Box” and how is it relevant to behaviorism?

What is latent learning and what does it show about behaviorism (if anything)?

What is the distinction between place learning and response learning?

What is the main conclusion from Tolman’s spatial learning experiments?

What is a cognitive map and how is it related to representation?

What is the hypothesis of subconscious information processing?

What is the hypothesis of task analysis?

Computation and Algorithm

What is an algorithm?

What is a Turing machine? Be sure you are able to describe how it works and label a diagram.

What is a Universal Turing machine?

What does (very generally) the Church-Turing thesis state?

Linguistics

What is syntax?

Distinguish between the deep structure and surface structure of a sentence.

What is the basic goal of transformational grammar and what does it tell us about cognition?

How are the rules of transformational grammar examples of algorithms?

What does transformational grammar tell us about the organization of cognitive ability?

Information Processing

What is an information channel?

How are sensory modalities (like vision) akin to information channels?

What is a channel capacity? What is an information-processing bottleneck?

What is chunking?

What is selective attention? Describe one such example.

What do the Broadbent dichotic listening experiments show?

***Chapter 2***

Language and Micro-Worlds

Why would it be accurate to say that chatterbots do not understand language?

How is SHRDLU an advancement over a chatterbot?

What is a micro-world?

Why is SHRDLU an important development in cognitive science?

What is it to represent knowledge procedurally?

What view does SHRDLU provide of linguistic understanding?

Mental Imagery

What were the main findings of Shepard and Metzler in their mental rotation experiments?

What is a bit? What is a byte?

Why are the results of the mental rotation experiments taken to be evidence against digital encoding?

What is an imagistic representation?

What are the main findings of the Kosslyn experiments described in the text?

What is the significance of the mental imagery and rotation experiments for cognitive science?

Models of Vision

What is reverse engineering?

What is the distinction between a top-down and a bottom-up approach to cognitive science?

Describe the computational level of analysis in cognitive science and give at least one example.

Describe the algorithmic level of analysis in cognitive science and give at least one example.

Describe the implementational level of analysis in cognitive science and give at least one example.

What are the two conclusions that Marr drew from Warrington’s experiments?

Describe each: the primal sketch, the 2.5-D sketch, and the 3-D sketch.

***Chapter 3***

Functional Systems

What is multiple realizability and why is it important to cognitive science? Provide at least one example.

What are some reasons why someone would think that cognitive systems are functional systems?

The Two Visual Systems Hypothesis

Why is the Two Visual Systems hypothesis important for cognitive science?

What is the ventral route? What is the dorsal route?

What is the function (general) of the ventral pathway?

What is the function (general) of the dorsal pathway?

What is a cross-lesion disconnection experiment?

Computational Modeling

What is computational modeling? Why is it important for cognitive science?

Why might abstracting away from neural implementation to study cognitive science be a bad idea?

What does it mean to say that cognitive abilities degrade gracefully?

What is a connectionist or artificial neural network?

What is parallel processing? What is serial processing? Give an example of each.

Describe a connectionist network generally (including descriptions of nodes and levels).

What is weighting in a connectionist network? What is backpropagation?

How is a connectionist network similar to human brain? How is it different?

Mapping Lexical Processing

What is semantic information?

What is the neurological model of lexical processing? Is it serial or parallel? Describe.

What is the cognitive model of lexical processing? Is it serial or parallel? Describe.

What do the results from Petersen et al. suggest about lexical processing? Describe.

***Chapter 4***

Interdisciplinarity

What are the nodes of the Sloan diagram? Why might it be a misleading representation of cog. sci.?

What is the difference in disciplinary organization between psychology and neuroscience (per text)?

(Generally) What are the different levels of organization in neuroscience?

What is the integration challenge? Describe.

Be able to describe (generally) the space of cognitive science (figure 4.5).

Evolutionary Psychology and the Psychology of Reasoning

What is the difference between probabilistic reasoning and logical (deductive) reasoning?

What is a conditional statement? What is the antecedent of a conditional statement? What is the consequent of a conditional statement?

What does it mean to say that an inference is domain-general? Domain-specific?

What is the Wason selection task? Describe.

What does the Wason selection task tell us about conditional reasoning?

What is Cosmides and Tooby’s cheater detection module? What evidence do they give for such a module? Is it domain-specific or domain-general? Explain.

What is the prisoner’s dilemma? What is TIT FOR TAT? Explain.

What does the prisoner’s dilemma (and the experimental results discussed in the text) show us about conditional reasoning? Explain.

Neural Activity – the BOLD signal

What is the difference between PET and fMRI (i.e., what does each measure)?

Explain (generally) the BOLD contrast.

How is the discussion of the BOLD contrast an example of integration?

***Chapter 5***

Intertheoretic Reduction

How is the integration challenge in cog. sci. a part of the general problem of the unity of science?

What is the problem of the unity of science?

What is reduction (in science)? Provide one example.

What is commensurability in science? Explain.

What is a bridge law? Explain.

What is intertheoretic reduction? Why is intertheoretic reduction in cog. sci. more difficult (in principle) than in other sciences?

Why are effects not explanations?

What is functional decomposition? What is an example of functional decomposition?

What is double dissociation?

Marr’s Tri-Level Hypothesis

What is Marr’s Tri-Level hypothesis?

What is the difference between modular and non-modular systems?

What is the frame problem?

What is the modularity hypothesis?