

PSYCHOLOGY 452 FINAL EXAM
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Part I: Choose any *TEN* of the following terms, and write a short (2-3 sentence) definition for each. The definition should indicate what the term means, and should also indicate why the term is important to or of interest to cognitive science. Remember, *ONLY 10 DEFINITIONS* are required. Each definition is marked out of 3 points.

"Band" Of A Value Unit	Converged Network	Local Representation
Hidden Unit Space	Synthetic Psychology	Parable of the Ant
Mathematical Model	Coarse Coding	Perceptron Paradox
Hidden Unit	Jittered Density Plot	Thoughtless Walker

Part II: Choose any one of the following questions, and write a short answer (3-4 pages) for it. Make sure that your answer is clear and concise, and also make sure that you deal with the question directly. Your answer will be marked out of 35 points.

1. In Dawson's *Minds and Machines*, an argument is made to distinguish mathematical models from computer simulations. However, some might argue that artificial neural networks are not different from mathematical models in any substantial way. Explore this argument – why it might be made, its implications, and its validity – using appropriate examples from class.
2. Discuss the process of interpreting artificial neural networks in the context of the following quote, illustrating your answer with relevant examples: "If the purpose of simulation modeling is to clarify existing theoretical constructs, then connectionism looks like exactly the wrong way to go. Connectionist models do not clarify ideas, they obscure them" (Seidenberg, 1993).
3. Valentino Braitenberg has argued that the synthetic approach will yield simpler theories than will the more traditional analytic approach in cognitive science: "It is much more difficult to start from the outside and try to guess internal structure just from the observation of the data. [...] A psychological consequence of this is the following: when we analyze a mechanism, we tend to overestimate its complexity". Some connectionists agree with this sentiment, and use their networks to conduct synthetic psychology. In the context of Braitenberg's quote, what are the problems with this approach? How can connectionists deal with these problems? How does this affect their notion that their research is synthetic in nature?