COGS 105 Study Guide for Exam 2

The exam will be **entirely multiple choice questions**. However, to help focus your study, I include a list of key questions that you should be able to explain to a friend or family member if they were curious about cognitive science methods. I will be drawing questions from these topics in a similar spirit to these queries.

Note: Exam 2 will be shorter because it is based on less material than Exam 1.

Exam 2 focus: Basic Data and Computation

- What does "**big data**" refer to?
- Briefly describe the data that went into the **Culturomics** data set in **Google Ngram**.
- What are the **four V's** of big data?
- What is the idea of the "**macroscope**"?
- What are **n-grams**?
- Briefly describe how the Culturomics study used **sampling** to assess the size of the English lexicon.
- What are **some big-data dangers**?
- Briefly describe **Neurosynth**.
- Briefly describe the difference between **forward and reverse inference** in Neurosynth, as explained in lecture and in the reading.
- Briefly describe what a **classifier** is, and how it was applied in Neurosynth.
- **Contrast experimental and observational** research.
- In simple terms, how does **LSA** compare words to assess similarity in meaning?
- As described in the reading on LSA, why is **dimensionality reduction** considered so important?
- How can we use LSA to simply quantify the "**meaning of a sentence**"?
- Briefly described the **limitations of LSA** as described in lecture.
- **Contrast quantitative and qualitative** research.
- Briefly describe how **LIWC** works.
- How does **LIWC mix qualitative and quantitative** aspects of research?
- **Why are pronouns so interesting** in some of the results that LIWC has found? The reading from Pennebaker can also help.
- How can LIWC be considered a kind of "**forensic device**"?
- What is **computational research** in cognitive science?
- Contrast engineering and scientific approaches using neural networks. The Yoshimi reading #2 is an excellent resource.
- How are **neural networks quite different in the kind of "representations"** they use compared to CRUM ideas? What does "distributed" mean?
- Have a basic understanding of the relationship between **input, connection weights, activation, and output in an artificial neuron.**
- What **benefits do neural networks** have for exploring the mind? What features give them some strengths?
- What does a **hidden layer** do for a neural network?
- Brief describe **backpropagation**, in fundamental terms.
- Why is **error important in a supervised** neural network model?
- What are some basic ideas underlying the new "**deep learning**" approach to neural networks?