Computational Theory of Mind

1. The brain is a naturally occurring computer.
2. Mental representations are realized by symbols in the brain.
3. Cognitive processes realized by the brain performing computational operations over these symbols.

Computer

Core idea:
A computer that functions to processes information by manipulating symbols.

Definition:
A computer is a system that functions to perform systematic transitions between information states by manipulating symbols according to an algorithm.

Symbols

Symbols are physical objects or patterns of physical activity that are used to carry information.

Algorithm

An **algorithm** is a *procedure* for manipulating symbols such that:
1. The procedure can be divided into finitely many steps.
2. The transition from one step to another is completely determinate.

Mental representation

Mental representations are internal states of an organism that have **content**: they are *of* or *about* something.

Cognition

Cognition is the ability to **rationally transition** between **mental representation**.

Correlation Hypothesis

For every *mental* state or event, there is a correlated state or event in the *brain*.

The Chinese Room Argument

1. If computationalism is true, then Zak must understand Chinese.
2. Zak doesn't understand Chinese.
3. Therefore: **computationalism is false**.

Emergence

A property is **emergent** if a complex system has that property, but its parts do not have the same type of property.

Externalism

Rough idea: The mind emerges from the brain and its interactions with the external world.

Slightly less rough idea:
For states of the brain to realize meaningful mental states, they must function to be reliably and causally related to states of the external world. In other words: they must function to carry information about the external world.

Examples of cognition from class and readings

- Ant navigation
  - Skylight compass
  - Step counter
  - Path integrator
- Rational decision making
- Motor control (bipedal walking)
- Vision (from light registration to categorization)
- Solving a mathematical problem

Study Questions and Concepts

Mind-Brain Correlations
- What is meant by the idea that there are correlations between brain states and mental states?
- What is a clear example of (or evidence for) correlation between a brain state and a mental state?

Computers
- What is a computer, in the most general sense?
- By this definition, must all computers be made in factories?
- What is the function of a computer?
- What are symbols? Can you give some examples?
- What are some examples of symbols used by computers? (Or hypothetical examples of symbols that might be used by computers?)
- What is an algorithm? What would be an example?

Cognition
- What are mental representations? What are some clear examples?
- What is the "content" of a mental representation?
- What is cognition? What are some clear examples?
- Can you explain examples of cognition related to…
  - Ant navigation?
  - Human decision making?
  - Vision?
  - Something else— real or hypothetical?

Computational Theory of Mind
- What is the computational theory of mind? Can you explain its key components?
- What is meant by a "naturally occurring computer?"
- What is meant by the idea that mental representations are realized by symbols in the brain? Can you give real or hypothetical examples?
- What is meant by the idea that cognition is realized by symbol processing in the brain? Can you give real or hypothetical examples?
- How would the computationalist view the examples given above (Ant navigation, human decision making, etc.)

Chinese Room Argument
- Chinese Room Argument
- What is the setup of the Chinese Room Argument?
- How does the argument go, in your own words?
- What are the premises of the argument?
- What is the argument or support for *each* premise?

Systems Reply
- What is the Systems Reply? What premise does it take issue with?
- How is this related to the idea of emergence?
- What is an example of emergence?
- What is some evidence or support for the systems reply?
- What are some considerations against the systems reply?

Robot Reply
- What is the Systems Reply? What premise does it take issue with?
- How is this related to the idea of externalism?
- What is externalism? What is information-semantics?
- What is some evidence or support for the Robot Reply?
- What are some considerations against the Systems Reply?

Evaluation
- Do you think CTM is likely to be true?
- What do you think are the biggest challenges for CTM, as a theory?
- Do you think the Chinese Room Argument succeeds?
- If the argument fails, why not? What's wrong with it?
- If the argument succeeds, then what kind of view do you favor?
- Do you think the Systems Reply is on the right track? Why or why not?
- Do you think the Robot Reply is on the right track? Why or why not?
- After all this discussion, where do you stand on the question of dualism and physicalism, and why?

Sample AI prompt for studying

"I'm taking a philosophy of mind course at UCLA. We are studying the computational theory of mind. I'd like you to play the role of my philosophy professor, and evaluate my answers to the study questions. Please suggest improvements to my answers, both at a conceptual level, and also at the level of writing and presentation. I've attached a list of all the study questions and relevant definitions. Let's proceed through the questions one by one. You prompt me with a question, then I'll reply, then you'll give me feedback. We'll then discuss the feedback until I understand and we agree. Then, when I'm ready, I'll indicate that you should give me the next question."