Course Description

This course is an introduction to the philosophy of cognitive science. The focus of the course is the computational foundations of cognitive science. First we cover the rudiments of the theory of computation, including finite state machines, non-determinacy, context free grammars, Turing machines, and undecidable languages. Then we turn to explore how these ideas have been used to advance computational theories of cognition. In addition to considering general questions—such as the kinds of processes and states that have been advanced for computational theories of cognition, what counts as an explanation within the cognitive sciences, and the relationship between machine intelligence and human intelligence—we will also consider a specific topic, judgment and decision-making. Finally, we will consider some recent proposals that which challenge the centrality of computational theories of cognition.

Readings


Additional Reading: Articles available online

Grading

Two Problem Sets: 30%
Final Paper Outline: 30%
Final Paper (4000 - 5000 words): 40%

You are allowed to discuss the problem sets with your classmates in attempting to solve the exercises, but each student must write up independent answers. If you collaborate with another student in solving a particular exercise, you must identify who that student is and note which problems you collaborated on. Failure to note collaboration or copying answers verbatim constitutes academic dishonesty.
Course Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Readings</th>
<th>Assignments</th>
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<tbody>
<tr>
<td>10/8</td>
<td>Introduction Finite State Machines</td>
<td>Sipser, Ch 1 §1.1-1.2 Haugeland 1981</td>
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<tr>
<td>15/4</td>
<td>Non-determinism Regular Expressions &amp; Pumping Lemma</td>
<td>Sipser, Ch 1 §1.2-1.4</td>
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<td>22/4</td>
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<tr>
<td>29/4</td>
<td>Context Free Languages &amp; Push Down Automata</td>
<td>Sipser, Ch 2 §2.1-2.2</td>
<td>Exercise 1 DUE</td>
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<td>06/5</td>
<td>Turing Machines</td>
<td>Sipser, Ch 3 §3.1-3.2</td>
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<td>13/5</td>
<td>Church-Turing Thesis &amp; Decidable/Undecidable Languages</td>
<td>Sipser, Ch 3 §3.1-3.2</td>
<td>Exercise 2 DUE</td>
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<td>20/5</td>
<td>Minds and Machines</td>
<td>Putnam 1960; Turing 1950; Hayes &amp; Ford 1995</td>
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<td>03/6</td>
<td>Connectionism I</td>
<td>McClelland et al. 1986 Churchland 1990</td>
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<tr>
<td>10/6</td>
<td>Connectionism II</td>
<td>Fodor and Pylyshyn 1988 Johnson 2004</td>
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<td>24/6</td>
<td>Bounded Rationality I: Biases and Heuristics</td>
<td>Simon 1956; Tversky &amp; Kahneman 1974 Gigerenzer 1996</td>
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References


