Name: _____

Module C Review Exercise, 4/1/05

This exercise is to be done in groups of two students (unless otherwise directed) assigned at this time. You need to complete the exercise within 30 minutes, but at the same time, you need to use up the time so that you can come up with a response as informative and complete as possible. While both of you in a group must agree on the general ideas, you must write your own version of the response. That is, your writing must be in your own words and not a word-by-word copy of your partner. Now, choose one of the options listed below. If your example problem in the comprehensive exercise and/or mini research problem(s) is/are similar to one of these, avoid discussing the same subject. For example, if you analyzed vision or mind as your mini research problem, you can still choose Option 1, but focus on different aspects of the system.

Option 1: Human Being/Cat/Robot

First, analyze the functionality of a human being, cat, or robot (e.g., sensation/perception, cognition, emotion, behavior, physiology, kinesiology, etc.).

Option 2: Operating System

First, analyze the functionality of a hypothetical operating system (not including applications such as compilers, which have been discussed frequently).

Common procedure

Then, construct a modular system consisting of multiple interactive components. You can focus on the areas which you are most interested in; there will be no time to cover the entire system. But still try to include modules of different complexity. Also, try to represent the system schematically (i.e., with a diagram).

Next, for *each* component,

1. Analyze its task and clearly describe it as a computational problem, i.e., a language (if possible, in the set notation),
2. Using your heuristics, identify the class of minimal grammars or automata that would correspond to the problem (mainly consider the extended Chomsky hierarchy: non-TM-recognizable, TM-recognizable, decidable, context-free, deterministic context-free, regular; *exclude* context-sensitive), *and* justify your choice,
3. Describe the component's specification/operation at a reasonable level, and
4. [time permitting] Analyze the interface with other interacting modules, e.g., by comparing the input and the output of the interacting components.

Be prepared to informally present your response to the class [approx. 5 minutes per group].

// End