CSC460 (Spring 2005) Module D Evaluation Form

Name	Self-evaluation (A, B, C possibly with +/–)	
	Adjustment by the instructor	

Evaluation Materials (Portfolio)

Your evaluation materials (referred to as "**portfolio**," and to be placed in the provided manila folder) consist of the following **Items**:

1. This form (must be filled out; see the instructions below)
2. Word-processed **supporting notes** responding to the instructions in this form (except for the materials completed during the evaluation workshop)
3. Take-home **exercises** (including the comprehensive exercise), chronologically ordered
4. Materials completed during the **evaluation workshop** (to be explained in class)

Learning Goals Checklist (the goals not pursued in this module are "grayed")

In your **supporting notes**, clearly identify the criteria, e.g., **C1*a*** (for Content Goal 1 Criterion *a*), **P5*b*** (for Performance Goal 5 Criterion *b*), referring to the labels below.

Content Goals

1. Practical problems can often be transformed into research and computational problems. Every problem is associated with cost/significance, which is relative to the evaluator. Computational problems can be represented as a set, readily available as the input to computational processing. [**problem**] ---- [not in this module]
2. A theory is a potentially infinite, consistent body of knowledge which can be systematically derived from a small number of abstract principles. The gap between the principles and the entire information is the source of the theory's predictive power. Also being abstract, a theory can be applied to a broad range of phenomena, which might appear distinct. [**theory**] ---- [not in this module]
3. Interactive computation subsumes algorithmic computation, but not vice versa. That is, there is a qualitative difference between these two modes of computation. [**interactive computation**]
   - *a.* Understood the effects (and limitations) of parallel computation with respect to the three subareas of the traditional Theory of Computation (in a sense as a preliminary to interactivity). ---- ☐
   - *b.* Understood what kind of problems can*not* be adequately represented by TMs. ---- ☐
   - *c.* Understood the basics of super-Turing computation (more "powerful" than TMs) including its significance. ---- ☐
   - *d.* Was able to speculate where the theoretical underpinning of computer science should be heading, in order to offer robust analyses of a variety of computational problems. ---- ☐
4. The algorithmic notion of computation can be represented in a variety of equivalent forms, which define a bounded class of sets. That is, there is a limit to algorithmic computation. [**computability**] [not in this module]
5. The computable class of sets contain a hierarchy of proper subsets which can be characterized by distinct grammars and automata. [**formal languages and automata**] ---- [not in this module]
6. The practicality of an algorithm depends on its complexity relative to the input data size. [**complexity**]
   - *a.* Reviewed how to interpret the big *O* notation [game-theoretically and using the on-line graphing tool (http://www.tcnj.edu/~komagata/Graphing)]. ---- ☐
   - *b.* Understood that exponential growth with respect to the input data size (time complexity) is considered impractical ("intractable"), through examples. ---- ☐
   - *c.* Understood the class of "nondeterministic polynomial" (NP) problems, through examples. Also understood (i) why there are so many NP problems and (ii) why NP problems are essential for computer security. ---- ☐
   - *d.* Understood the notion of "polynomial time reducibility" and its impact on relating problems. ---- ☐
   - *e.* Understood the class of "nondeterministic polynomial complete" (NPC) problems, through examples. Also understood (i) the basics of how to show that a problem is in NPC and (ii) why this class is important. ---- ☐
   - *f.* Understood the essential difference between time and space complexity, as well as the hierarchy involving various time/space complexity classes. ---- ☐
   - *g.* Could explain (i.e., teach) this goal to CS students outside this class. ---- ☐

7. Power set, also encompassing the distinction between determinism and nondeterminism, can introduce discontinuity with respect to computability and complexity. [**power set**]
   a. Understood that power set introduces exponential growth, which could lead to intractability. ☐
   b. Gained insight into the meaning of power set (in contrast to just knowing the formal definition), which is reflected in all three subareas of the traditional Theory of Computation (and also in reality). ☐

Performance Goals

1. Identify real-world problems which are relevant to the student's life and can be tackled by computational means. [**awareness**] [combined with other goals]
2. Transform real-world problems into research problems, and then into computational problems, along with the analysis of the cost/significance of a problem. [**transformation**] [not in this module]
3. Analyze computational problems with respect to interactivity, computability, language/automata hierarchy, and complexity hierarchy. Then, evaluate the analysis with respect to its usefulness, correctness, and accuracy. [**analysis/evaluation**] [combined with content goals]
4. Respect, analyze, and give constructive criticisms to the ideas in the literature and those expressed by other people. [**critical attitude**]
   a. *Critically* analyzed the usefulness of the "complexity" area of the (traditional) Theory of Computation, i.e., Content Goal 6. ☐
   b. *Critically* analyzed other students' practicum presentation, esp. in connection to aspects relevant to the Theory of Computation. [**to be assessed by the instructor on 4/27/05; no need to write**]
5. Express ideas orally and in writing, in a manner clearly understood by other students (with equivalent background). Explain your own ideas orally and in writing, clearly and logically. Revise the ideas, reflecting the feedback from other students and the instructor. [**communication**]
   a. Completed all the exercises on time (take-home and in-class). In particular, clearly articulated the understanding of the Theory of Computation in the mini research paper [Comprehensive Exercise]. ☐
6. Take initiative in both independent and group activities. Also extend the domain of theoretical inquiry beyond the scope prepared by the instructor. [**initiative**]
   a. Continued to analyze your own problem and mini research project, by applying the notion of "complexity," i.e., Content Goal 6. ☐
   b. A symbol (form) can mean different things (content) to different people, depending on the context [ref. Unit A2]. An analogous idea applies to a course as well. For example, this course could mean different things to different people; a positive attitude might lead to a positive outcome. What kind of initiative did you take to make your experience in this course positive? ☐
7. Reflect upon the student's own thinking process and assess the student's own performance relative to the content and performance goals. [**reflection**]
   a. Was able to reflect upon your experience in this module through the activities during the evaluation workshop. [during the eval workshop]
   b. Self-evaluated your achievements *accurately*. [during the eval workshop]

Self-Evaluation Criteria

At the end of the module evaluation workshop, propose your grade based on the following scheme (possible qualification with +/–):

- Grade A: Achieved all the learning goals relevant to the module
- Grade B: Achieved almost all the learning goals (except for one or two evaluation criteria) relevant to the module
- Grade C/Pass: Achieved most of the learning goals relevant to the module

// End