

Exam 2

Out: 20 April 2006
 Due: Monday, 24 April, 11:01AM

Name: _____

Scores

1	2	3	4	5	6	7	8	9	Total
10	10	10	10	10	5	10	10	10	85

Directions

Work alone. You may not discuss these problems or anything related to the material covered by this exam with anyone except for the course staff between receiving this exam and class Monday.

Closed web. You may not search the web to attempt to find answers to the questions on this exam. You may use web pages linked from the CS216 web site, but may not do web searches to attempt to find specific answers.

Open other resources. You may use any books you want, lecture notes and slides, your notes, and problem sets. If you use anything other than the course books and notes, cite what you used. You may not use other people.

Open tools. You *may* run any program you want, including a Python interpreter, C compiler, Java compilers, Java VM, and x86 assembler for this exam. You are not expected to need to do this, and will not lose points for minor syntactic mistakes.

Answer well. Write your answers on this exam. You should not need more space than is provided to write good answers, but if you want more space you may attach extra sheets. If you do, make sure the answers are clearly marked.

This exam has 10 questions, the last of which is non-credit. The questions are not necessarily in order of increasing difficulty, so if you get stuck on one question you should continue on to the next question. There is no time limit on this exam, but it should not take a well-prepared student more than a few hours to complete.

Full credit depends on the clarity and elegance of your answer, not just correctness. Your answers should be as short and simple as possible, but not simpler.

Huffman Encoding

1. (10) Consider the following frequency distribution:

Symbol:	A	B	C	D	E	F	G
Count:	5	3	2	3	6	2	4

How many different *optimal* prefix encodings are there for the given frequency distribution? Your answer should include a clear explanation of why it is correct.

Number Representations

2. (10) In Class 16, we saw that the floating point imprecision in representing 0.1 led to an error of 0.0034 seconds per hour in the Patriot missile time calculations. What clock tick unit would maximize the error accumulated per hour? What is the error?