

CS 216 Exam 1 – Spring 2003

Name: _____ Section: _____

Email Address: _____ Student ID # _____

This exam is closed note, closed book. You will have an hour and fifty minutes total to complete the exam. You may NOT use calculators.

It is an Honor Code violation to discuss this exam with ANYONE (including other students who have already taken it) until after 5:30pm Tuesday, Feb 25.

Good Luck!

	MAX	SCORE
TOTAL	103	

Write and sign pledge after taking the exam:

CS 216 Exam 1

1. (4 points) Complete the definition of big-Oh notation:

Definition: $T(N) = O(f(N))$ if _____

2. (4 points) Explain the definition above to a programmer who has never heard of it. Feel free to use diagrams.

3. (2 points) How does big-omega (Ω) differ from big-Oh?

4. (3 points) With respect to big-Oh notation, order the following rates of growth from fastest *rate of growth* to slowest *rate of growth*: $\log n$, 1000, $n \log n$, n^3 , 2^n , n

5. (4 points) Your friend proposes a data structure to represent the temperature in Fahrenheit. She wants to use 5 bits to do this. a) How many different temperatures can we represent? and b) What is the range of positive and negative integer temperatures we can represent in two's complement?
6. (4 points) In reality, temperatures we need to represent range from -10 F to 90 F. From cs216 we learned that biased notation can represent an asymmetrical range like this. a) What is the *minimum* number of bits we would need to represent this range, and b) What would the bias be, assuming that the temperature will NEVER go below -10 F, but might occasionally go above 90 F?
7. (4 points) Write the following infix expression as a prefix expression:
 $((a-g) + (e / b)) * c$