

COMP/MATH 3804 – Design and Analysis of Algorithms I

Background Survey

This is a survey in order to determine the general amount of background knowledge in the class. This survey will not contribute toward your final grade and it is not necessary to write your name or student number on the survey. All questions should be answered directly on the sheet.

1. Answer the following questions. No justification is required.
 - (a) How fast can n numbers be sorted using comparisons?
 - (b) How fast can a given integer be found in a sorted array of n integers?
 - (c) How fast can a given integer be found in a linked-list of n integers?
 - (d) How fast can an element be popped from a stack of size n ?
 - (e) How fast can an element be dequeued from a queue of size n ?
 - (f) How many subsets are there of a set of n elements?
 - (g) How many subsets of size 3 are there of a set of $n \geq 3$ elements?
 - (h) What is $\log_2 256$?
 - (i) What is $1 + 2 + 3 + \dots + 100$?
 - (j) What is the maximum number of edges that a simple graph with n vertices can have?
 - (k) How many edges does a tree on n vertices can have?
 - (l) What is the sum of all of the degrees of the vertices of a graph with n vertices and m edges?
 - (m) Suppose Algorithm \mathcal{A} runs in $O(n^{10})$ time and Algorithm \mathcal{B} runs in $O((1.01)^n)$ time. For large values of n , which algorithm is faster?
 - (n) Which is more powerful: a deterministic finite automaton (DFA) or a nondeterministic finite automaton (NFA)?
 - (o) Is it possible to write a program that can grade any student's source code for a programming assignment as correct or incorrect for any possible assignment question?
2. Which area(s) of computer science interest you the most?
3. How would you rate your mathematical knowledge?
4. What topic(s) of this course are you most looking forward to?
5. What are you topic(s) of this course are you least looking forward to?