PhD Qualifying Examination

Spring 2003

Algorithms I

Question I (100 pts)

For each problem below, a solution in plain English should be given first, followed by a pseducode. Explain clearly why your solution is linear.

- **Celebrity Problem**: A person is a celebrity if he/she does not know anyone, while everyone else knows him/her. Find a linear solution to determine a celebrity (if any) in a given group. The solution consists of a sequence of questions: do you know him/her?
- **Elite Group Problem**: A person belongs to an elite group (which is a subset of a given set of persons) if everyone knows him/her but he/she knows only the persons in the elite group. Suppose it is known that up to two persons could belong to an elite group. Find a linear solution to determine an elite group (if any) in the given set of persons.