

Who is Taller?
CS 2104 Extra Credit Assignment 2
September 19, 2008
30 points

The Problem. There is a class of verbal problems that is about ordering things. Here is an example:

Gloria is taller than Richard, and Doug is shorter than Alice. Doug is shorter than Richard. Is Alice taller than Richard?

Such a problem allows the solver to draw a diagram of the order relations spelled out in the problem and to determine whether a question, which we might paraphrase as “Is x greater than y ?”, can be answered by examining the diagram.

The problem to be addressed in this assignment is to take an ordering problem and to determine whether *all* questions of the form “Is x greater than y ?” can be answered. In the example above, it is not possible to answer the question “Is Alice taller than (greater than) Richard?” It is also not possible to answer “Is Gloria taller than Alice?” You are to work towards a method (an algorithm) for determining whether all questions can be answered.

The Assignment. This assignment is optional, that is, for extra credit. It is to be done by a group of two to four students. Grading will be based on group insights into the problem solving process and the quality of the written submission. It is possible for a particularly insightful submission to receive full points, even if it does not fully solve the original problem.

Here are some thoughts to help group discussions.

1. If there are n objects being compared, how many questions are there to be answered?
2. Develop some notation and terminology for talking about the problem and its solution.
3. What properties do you see in a diagram from which all questions can be answered?
4. How can you encode an instance for computer solution?

Do not feel constrained by this list. Use your creativity!

Submission. The submission for this assignment must be a prose document that carefully describes the group insights towards a solution to the problem. It is important to reveal the thought processes that the group went through. Your written solution must be uploaded to Blackboard (learn.vt.edu) by 11:00 PM on Friday, October 10, 2008, as a PDF file. Follow the submission guidelines listed below:

1. Each pair of students must submit one PDF file.
2. The name of the file should be labeled:

`last-name-of-student-1_last-name-of-student-2_assignment-n.pdf`.

For example, for a submission by John Smith and Jane Doe for this assignment, the file name should be `Smith_Doe_extracredit-2.pdf`.

3. Inside the file you should include full names of both partners.
4. Make sure you include the honor pledge.