Homework 5: NP - The Job Interview
50 Points

This is a role-playing assignment. You are playing the role of interviewing for a job at one of the leading technology companies (Alphabet/Google, Facebook, Amazon, YouTube, Lyft, Uber, ...) or a Government Agency (NASA, NSA, DARPA, ...) and you think you have done well. You have answered some pretty technical questions on data structures, algorithms, and graphs. You have been careful not to pretend to know things you don't (a common trap in tech interviews). You want this job! The interview is winding up with a final series of questions.

Question. We have discussed your programming skills, a variety of algorithms, and some general topics in asymptotic runtime and runspace. One last topic we'd like you to talk about is intractability. Can you briefly describe your concept of intractability, NP-Hardness, and NP-Completeness? (Please answer in general terms.)

(Your answer in no more than 3 paragraphs - one for "intractable", one for "NP Hard", and one for "NP Complete". Keep in mind, this is a job interview and you have no access to resources other than what's in your head ...)

Follow-Up #1. What is an example of an NP Complete problem that you find surprising?

(Your answer in no more than 2 paragraphs - one to frame and state the problem and one to explain why you find it surprising.)

Follow-Up #2. OK, that's all well and good, but how does this whole mess of intractability affect the practical issues facing algorithm design and implementation?

(Your answer in no more than 1 paragraph.)

Don't get long-winded, especially trying to cover up a lack of knowledge. Interviewers do not want their time wasted. Interviewers do not want to see an attempted cover-up. They do respect honesty, eager appreciation of knowledge, and an attitude that you can learn about new things.

Cite your sources!