CS 3020: Assignment 9

Theory: Reasoning about computation and its limits

The lecture discussed some of the main ideas and questions in theoretical computer science. Here are some papers/surveys that we think illustrate the kind of questions theorists ask and try to answer.

1. J. Kleinberg. Authoritative sources in a hyperlinked environment (SODA 1998).
2. T. Roughgarden, E. Tardos. How bad is selfish routing? (JACM 2002).
3. L. Valiant. Evolvability (JACM 2009).
4. D. Spielman, S. Teng. Smoothed Analysis: An Attempt to Explain the Behavior of Algorithms in Practice (CACM 2009). Not to be confused with a *much* more technical article on the Simplex method.
5. L. Babai. E-mail and the unexpected power of interaction. This is an entertaining survey on interactive proofs, available from https://www.cs.princeton.edu/courses/archive/spring07/cos522/BabaiEmail.pdf
6. R. Gradwohl, M. Naor, B. Pinkas, G. Rothblum. Cryptographic and Physical Zero-Knowledge Proof Systems for Solutions of Sudoku Puzzles. [Cryptography and Zero knowledge proofs explained for the 'lay person'.]
7. R. de Wolf. Quantum Computation and Shor's Factoring Algorithm. This is a survey on a remarkable and surprising algorithm developed by Peter Shor to factor integers in polynomial time, on quantum computers. [Of course, we do not know yet if such computers exist!]

Choose one of these papers, write a two page description, and what you think you might like to work on. Create a pdf document for your work, and hand in your assignment by typing on a CADE machine:

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handin cs3020 assignment9 assignment9.pdf
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