Principles of Computer Systems
Fall 2013

Final Exam

You have 105 minutes to answer the 5 questions in this exam. The entire exam is worth 100 points, which means you earn about 1 point/minute of work.

If you exit the room during the exam, you will have to turn in your exam, and you will not be permitted to return to the room until the end of the exam.

You are allowed to have any amount of printed material you like (books, papers, notes), but no laptops, tablets, cellphones, etc. are permitted during the exam. You must take the seat assigned by the course staff and present your CAMIPRO card to the staff upon request.

Please write your name and SCIPER below.

Do not open the exam until instructed to do so.

Name: _____ SCIPER: _____

The rest of this page reserved for grading

Q1		Q2		Q3	
Q4		Q5			

TOTAL

Question 1 (20 points)

Apply the end-to-end argument to Thompson's reflection on trusting trust: what are the end points, what are the layers in between, and what does the end-to-end argument push for in terms of design?

Question 2 (20 points)

Consider the problem of traversing a massive graph (terabytes in size) stored on disk (for example, to test reachability or connectedness). Use a back-of-the-envelope calculation to explain whether a strategy of breadth-first traversal is more (or less) efficient than depth-first traversal? What assumptions about hardware, software, and graph representation are you making?

Question 3 (20 points)

Assume that it is possible to achieve near-zero overhead dynamic binary translation. What is the impact of this technology on the Popek/Goldberg theorem?

Question 4 (20 points)

Identify how the CAP theorem is applied in OLTP systems. What is the most important protocol involved and how does it behave with respect to the theorem?

Question 5 (20 points)

Lampson's Hints paper puts forth two seemingly conflicting principles: "Do not hide power" and "Keep secrets". Is Lampson contradicting himself or do you believe otherwise? Use one example from other papers or principles discussed to justify your argument.