548 Final Exam -- Please finish no later than Friday March 18th by 5pm.

NO LATE EXAMS WILL BE ACCEPTED

This exam is 2 hours closed book and closed note and close net. Please time yourself 2 hours and then start reading the questions. Work individually. At the end of two hours please e-mail the results to Andrew Putnam and Mark Oskin.

Please answer all 3 questions in essay form. This test is not about the right answer -- there is none. This test is about demonstrating your ability to synthesize knowledge from class and use it to take a point of view and convince others of that perspective.

1) Explain how 5 of the research papers we have read have evolved into structures that are implemented in the Pentium 4. (By 5 here, I mean 5 very different topics, not different papers on the same topic).

2) Trace the path of instructions from fetch through completion in a machine with has VLIW-based vector instruction set, a decoupled access/execute front end, and a Tomasulo's execution core. Why was this processor built as the Pentium 5? Be sure to address all concepts in the question and explain why each concept makes the microprocessor execute faster.

3) In the last 15 years there has been a push towards deeper pipelined machines. Explain why, and explain all of the effects of a deeper pipeline. Is there any reason why you might want to make the pipeline shallower? Be sure to consider *all* aspects of the machine.

Gift: to conclude this class I leave you with this puzzle. May it pass many a dark hour and give you comfort. Given A, B and C generate logical not(A), not(B) and not(C). You can use as many AND and OR gates as you wish, but only *two* NOT gates.