Problem 1:   Solve Fall 2008 Final Exam Problem 4 and the additional questions below.

(*a*) For part (*a*) provide pipeline execution diagrams for the three systems (5-stage scalar, *n*-way superscalar, and 5*n*-stage superpipelined) running code of your choosing. Refer to these diagrams when answering part (*a*).

Problem 2:   Consider the three systems from Problem 4 in the final exam. The problem focused on potential (favorable) execution time, which can be achieved when there are few stalls, here we'll be more realistic.

(*a*) Which system will suffer more stalls on typical code? Explain.

(*b*) Invent a quantitative measure of implementation (not program) stall potential and apply it to the three systems. The answer should include a formula for each system (giving the stall potential); the superscalar and superpiplined formulas should be in terms of *n*. *Hint: think about the average or minimum distance between two dependent instructions needed to avoid a stall.* The formulas should be consistent with your answer to the first part.