Problem Set 9

Due: In class on Wednesday, April 28. Starred problems are optional.

Problem 9-1. Show that any VLSI layout can be transformed into a nearly square layout. That is, even a long skinny layout can be folded to be close to square.

Problem 9-2. Show that for any VLSI layout of a complete binary tree with all the leaves in a straight line, that the total wire area is $\Omega(n \log n)$.

Problem 9-3. Show that any binary tree with an even number of nodes can be cut exactly in half by cutting $O(\log n)$ edges. What is the constant?

Problem 9-4. Show that there is a layout for cube-connected-cycles network (or a butterfly) with $n = k2^k$ vertices with only $O(n^2 / \log^2 n)$ area.

Problem 9-5. * Show that the minimum dimension of any layout of a complete binary tree is $\Omega(\log n)$.