# CEG 5270 CAD for Digital Systems
Assignment Two
Due Date: March 30, 2009

1. Prove that the Left Edge Algorithm gives solution of minimum channel width assuming a HVH routing model.

2. In the FM algorithm, what is the largest possible number of updates performed due to a net on the gain values of the cells on it? Prove your answer.

3. Consider the single layer river routing problem with multi-pin nets. Given a list of pins lying along the boundary of the routing region, e.g.,

Input list: c1, b2, a1, a2, b3, d2, c2, e1, f1, e2, f2, e3, g1, f3, g2, d1, b1

Output: 5 nets
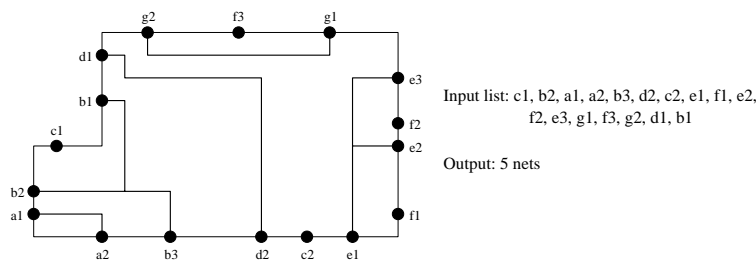
design an efficient algorithm to determine the largest number of nets that can be connected simultaneously. (Note that some of the nets are in conflict and cannot be routed at the same time.) What is the time complexity of your algorithm? Explain briefly why your algorithm is correct.

4. Consider the ladder graph G with $2n$ nodes depicted in the following figure. Show that the highly sub-optimal bisection $V_1 = \{1, 2, ..., n\}$, $V_2 = \{n+1, n+2, ..., 2n\}$ is a local minimum for the Kernighan-Lin partitioning algorithm.