Assignment 2

Due: 5pm, 2 Dec 2008

1.   (20 points) Give an algorithm to compute `C` = `A×B`. where A and B are n×n matrices. Your algorithm should have cache complexity `O(n³/L)`. Assume that the matrices are stored in row major order.

2.   (20 points) Show all steps involved in finding the 5 th smallest number from the following list of numbers, using the randomized selection algorithm discussed in class: `2 5 16 10 11 3 8 4 22 9`. Use the following random sequence, with elements in (0,1): `0.95 0.4 0.5 0.85 0.7`.

3.   (20 points) Find the max flow for the following flow network, using the Ford-Fulkerson method. Show each step of the algorithm. In each step, you should choose an augmenting path of minimum length, using breadth first search. In the breadth first search that you perform, choose the lexicographically smaller neighbor first.
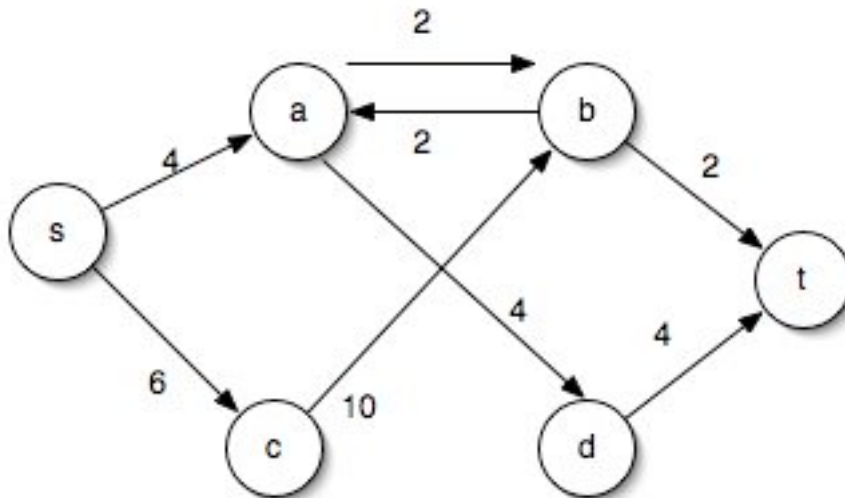
4.   (20 points) Draw a layered range tree for the following set of points: *{(1, 0), (2, 1), (0, 2), (3, 3), (4, 4), (7, 5), (5, 6), (6, 7)}*. Show the search paths when searching for the following range, and give all the points in the range: x-range *[1.5, 6.5]*, y-range *[1.5, 5.5]*. Your range tree should be constructed as discussed in class.

5.   (20 points) Construct a DFA that will match the pattern: *010010*. Show all the states visited by the DFA on searching for this pattern in the text: *00100101010010*.