Algorithms – handout 10

Two randomized algorithms

January 13, 2000

We present two randomized algorithms.

One is for finding minimum cuts in graphs. It easily extends to finding minimum cuts that partition a graph into k parts.

The other is an algorithm for finding domatic partitions of graphs. It is not optimal, but its approximation ratio is best possible, up to low order terms. It illustrates also a methodology for designing greedy algorithms, via the method of conditional expectations.

Notice: Two weeks from now, January 27, there will be no class.

Homework:

We have seen in lecture 2 (28 October, 1999) a polynomial time algorithm that finds a bisection containing k edges in a graph $G(V, E)$ when k is constant. The running time was $O(|E|^{k+O(1)})$. Give a randomized procedure that for dense graphs (namely, when $|E|$ is much larger than $k|V|$) speeds up the running time of the algorithm given in class. What can you conclude on the number of different bisections of size k that a connected graph can have?