CS105L: Discrete Structures
I semester, 2005-06

Homework # 9

Due before class on **Friday, November 18, 2005**

Instructor: Amitabha Bagchi

November 10, 2005

1. Let G be a 2-connected graph but not a triangle, and let e be an edge of G. Show that either $G - e$ or G/e is again 2-connected.

2. (a) Show that every cubic 3-edge connected graph is 3 connected.

   (b) Show that a graph is cubic and 3-connected if and only if it can constructed from a K^4 by successive applications of the following operation: subdivide two edges by inserting a new vertex on each of them, and join the two new subdividing vertices by an edge.

3. For $k \geq 2$ show that every k-connected graph of order at least $2k$ contains a cycle of length at least $2k$.

4. Read the handout introducing basic concepts in probability theory. Particularly read and understand the definition of an event, the inclusion-exclusion principle, conditional probability, random variables, expectation and its properties, and Markov's inequality. This reading should be done before your tutorial for the week of 14th to 18th November.