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Theory of Network Communication

Fall 2002

Assignment 2

Problem 4 (2 points)**:**
Compute the degree and diameter of the shuffle-exchange graph.

Problem 5 (2 points)**:**
Show that the b-ary DeBruijn graph of dimension d has a degree of $2b$ and a diameter d. Express d in terms of n (the number of nodes) and b in order to show that the DeBruijn graph can be used to prove Theorem 2.10.

Problem 6 (2 points)**:**
Compute the edge expansion of an $n \times n$-torus. It is sufficient here to guess the right set U and to compute the value $c(U, \bar{U}) / \min\{c(U), c(\bar{U})\}$.

Problem 7 (2 points)**:**
Specify a set U in the d-dimensional hypercube with the property that $c(U, \bar{U}) / \min\{c(U), c(\bar{U})\} = \Theta(1/d)$.