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Communication in Parallel Systems

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Assignment 8

Problem 14 (4 points)**:**
Show that the deBruijn graph of size n is $(n, \log n)$-universal. Use the same arguments for this as in the proof for the hypercube, however, in a more detailed way.

Problem 15 (4 points)**:**
Consider the following extension in the capability of the networks that are to be simulated in Section 8.2. Instead of assuming that the communication has to form a partial permutation, we assume now that every node has a public window in which it can place a data item. Every node can now either send a read request or a write request to one of these windows. Multiple read requests to a window are allowed, but if multiple write requests are sent to the same window, then only one of them succeeds (the rule, which one succeeds, can be set in an arbitrary way). Think about how to simulate this communication model efficiently on a realistic graph with the help of a sorting algorithm (and maybe other tricks such as broadcasting).