CSCI 1590: Homework 5

Professor John Savage

Assigned: April 9, 2009,

Due: April 16, 2009

1. Describe an $O(\log n)$-time algorithm to multiply two $n \times n$ matrices on a hypercube with $O(n^3)$ processors.

2. The goal of the **list-ranking problem** is to assign a rank to each record in a linked list; the rank of a record is its position relative to the last element in the list where the last element has rank zero. Each record has two fields, one for its rank and another for the address of its successor record. The address field of the last record contains its own address.

   Describe an efficient p-processor EREW PRAM algorithm to solve the list-ranking problem for a list of p items stored one per location in the common memory.

   Hint: Use **pointer doubling** in which each address is replaced by the address of its current successor.

3. Show that there is an an associative operation such that it realizes the segmented prefix computation as a regular prefix computation.