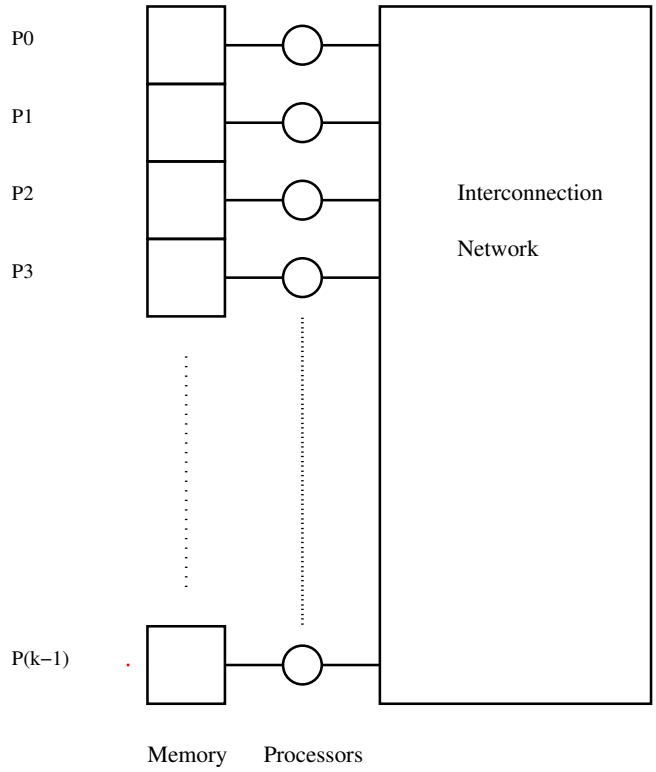
Parallel and Distributed Computing: Homework 6

Due May 8, 2020, in pdf format on Canvas.

Given the following Cross-Bar interconnected cluster of k computers.



Consider an n-element integer number sequence S we wish to sort in non-decreasing order such that $s_i \leq s_{i+1}$ and, for the purposes of this exercise, n is assumed to be a multiple of k.

Show how the sequence S can be sorted in this cluster based on (1) ShearSort and (2) Bitonic Sort. Describe two procedures and clearly show how you use the two sorting techniques to effect the ordering of the sequence S. (Hint: Many solutions found in the technical literature and available through the Internet.)

In both cases provide a complexity analysis that includes the number of compare-exchanges performed by each processor, the size of memory needed at each computer, and the number of Cross-Bar communications cycles needed to carry out each proposed procedure.

Submit a zip file named `x-y.zip`, where `x` and `y` are your UCInetIDs (the username used to login in Canvas), containing a digitally produced report (recommended length of 6 pages) called `report.pdf`.