

(This is a WRITTEN HW)

1. (25 points)
 - (a) Define the 3-processor scheduling problem in a way analogous to the 2-processor scheduling problem
 - (b) Define a kind of matching problem such that an optimal solution to the 3-processor scheduling problem yields a maximum matching. (HINT: think about defining and using matchings in hypergraphs.)
2. (25 points) For an infinite number of n give an example of a connected bipartite graph on $\Theta(n)$ vertices such that there exists a maximal matching M and a maximum matching M^* such that $|M^*| \geq 2|M|$.
3. (25 points) Show how to multiply two $n \times n$ matrices over Z_4 in $O(n^3/\log n)$ steps in a way similar to the method showed in class for Z_2 .
4. (25 points) Let P be an instance of the 2-proc scheduling problem and let G be the compatibility graph. We showed that (1) a solution to P yields a matching in G , and (2) a matching in G yields a solution in P . Show that (1) an optimal solution to P yields a maximum matching in G , and (2) a maximum matching in G yields an optimal solution in P .