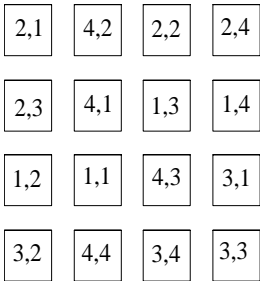


Short Answer - 10 Points Each

1. What is the bisection width of a 6 x 8 mesh?
2. What is the diameter of a 1024-node hypercube?
3. What is the purpose of the GCD test?
4. What is the diameter of a 8 x 9 torus?
5. How many automorphisms does a 4 x 5 torus have?
6. What is the difference between `forall` and `doall` parallelism? What situations cause difficulties in converting a loop to these forms?
7. Suppose that a permutation is to be routed dynamically in a  $n \times n$  mesh. How may this be performed to ensure that the messages are routed in  $2n - 2$  steps?

Long Answer

1. Show how to achieve the following mesh permutation using perfect matching and linear array sorting. 15 points



2. Show how to route the provided permutation. 15 points

$$\begin{pmatrix} 0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ 2 & 1 & 6 & 4 & 0 & 7 & 3 & 5 \end{pmatrix}$$

