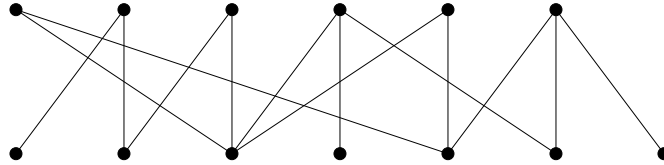


MATH2300
Graph Theory Problem Sheet 4

1. Prove that a maximum matching in the n -cube Q_n contains 2^{n-1} edges.
2. Show that for all positive integers n , it is possible to select an element from each of the $(n-1)$ -element subsets of an n -set such that no element is selected more than once.
3. Find a maximum matching in the bipartite graph shown below.



4. Show that $C_n \times K_2$ has a 1-factorization for every $n \geq 3$.
5. One of K_7, K_8 possesses a 2-factorization. Give a 2-factorization for this graph, and explain why the other graph does not possess one.
6. Determine the minimum size of a maximal matching in the cycle C_{3n} .
7. Show that the graph $K_{2,n}$ is C_4 -decomposable for all even integers $n \geq 2$.
8. Is the graph $K_{2,6}$ C_6 -decomposable?

End of Problem Sheet 4