

MATH 3330 — Applied Graph Theory

Assignment 10

Due Thursday, April 5, 2007 (before class)

1. (9.1.9 and 9.1.16) Find a proper colouring of the graph of 9.1.8 which uses the minimum number of colours. Give an argument why this is indeed the minimum number of colours. Then apply the largest-degree-first heuristic (greedy colouring where the vertices are ordered so that vertices with larger degree come first).
2. Consider the collection of intervals given by the table below. (a) Draw the interval graph corresponding to this collection. (b) Find the clique number of this graph. (c) Show how to apply greedy colouring to obtain an *optimal* colouring of this graph. Explain your work.

Interval	start time	end time
a	10:01	10:35
b	9:05	11:35
c	10:05	10:15
d	9:55	10:45
e	8:30	9:35
f	10:55	11:15
g	11:00	12:05
h	8:05	10:10

3. For which values of n is the wheel W_n perfect? Explain your answer in detail.
4. (6.3.8) Draw an 8-vertex simple hamiltonian graph with more than 8 edges that is not eulerian, or give an argument why it does not exist.
5. (6.4.4) Apply each of the algorithms 6.4.1 (nearest neighbour), 6.4.2 (double the tree) and 6.4.3 (tree and matching) to the given TSP problem. Show your work.
6. (6.3.22) A knight's tour of a chessboard is a sequence of knight moves that visits each square exactly once, and returns to its starting square with just one move. Pose the knight's tour problem as one of determining whether a certain graph is hamiltonian. Give details.