

# Problem Set 11

Engineering 3422, 2004

To do for Nov 29

## Part 1 From Gossett section 10.1.3

- Problem 15. Give the solution as a function of  $m$ .
- Problem 17 (Hint: I proved the contrapositive.)

## Part 2 From Gossett section 10.2.3

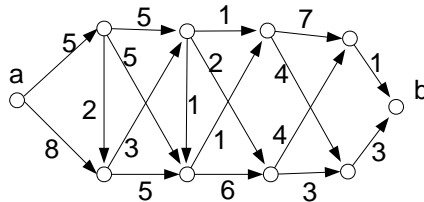
- 1. Give an adjacency matrix,  $A$ , for the graph in figure 7(b). Please note that there is exactly one edge with endpoints  $\{v_3, v_3\}$  and therefore  $a_{3,3}$  should be 1; don't be misled by table 10.3, which has an error in it.
- 2. Compute  $A^0$ ,  $A^1$ ,  $A^2$ ,  $A^3$ , and  $A^4$
- 3. How many walks of length 4 or less are there from  $v_1$  to  $v_3$ .

## Part 3 From Gossett section 10.5.4

- Exercise 10

## Shortest Paths

- Use Dijkstra's algorithm to find a shortest path from  $a$  to  $b$  in this graph:



- Explain why in Dijkstra's algorithm, the grey node that is turned black is always labeled with the length of a shortest path from  $a$  to that node. (Hint: Use proof by contradiction.)