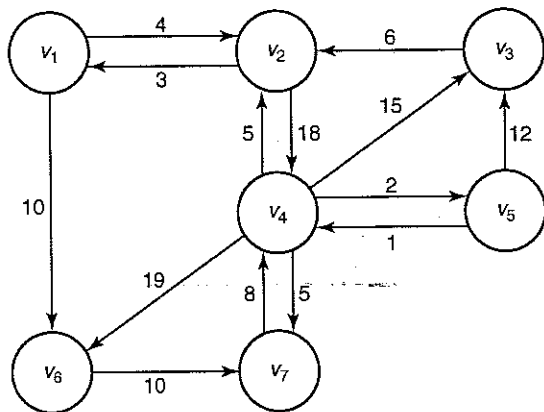


# HW #3 Chapter 3

## Section 3.2

5. Use Floyd's algorithm for the Shortest Paths problem 2 (Algorithm 3.4) to construct the matrix  $D$ , which contains the lengths of the shortest paths, and the matrix  $P$ , which contains the highest indices of the intermediate vertices on the shortest paths, for the following graph. Show the actions step by step.



22. Create the optimal binary search tree for the following items, where the probability occurrence of each word is given in parentheses: CASE (.05), ELSE (.15), END (.05), IF (.35), OF (.05), THEN (.35).

26. Generalize the Optimal Binary Search Tree algorithm (Algorithm 3.9) to the case in which the search key may not be in the tree. That is, you should let  $q_i$ , in which  $i = 0, 1, 2, \dots, n$ , be the probability that a missing search key can be situated between  $Key_i$  and  $Key_{i+1}$ . Analyze your generalized algorithm and show the results using order notation.

(No program needed -- just an algorithm)

## Section 3.6

28. Find an optimal circuit for the weighted, direct graph represented by the following matrix  $W$ . Show the actions step by step.

$$W = \begin{bmatrix} 0 & 8 & 13 & 18 & 20 \\ 3 & 0 & 7 & 8 & 10 \\ 4 & 11 & 0 & 10 & 7 \\ 6 & 6 & 7 & 0 & 11 \\ 10 & 6 & 2 & 1 & 0 \end{bmatrix}$$

29. Write a more detailed version of the Dynamic Programming algorithm for the Traveling Salesperson problem (Algorithm 3.11).
30. Implement your detailed version of Algorithm 3.11 from Exercise 28 on your system and study its performance using several problem instances.

} Write a program and show output for problem in Ex. 28