Université d'Ottawa • University of Ottawa

Faculté des sciences Informatique
Faculty of Science Computer Science

CSI 3105 FINAL EXAMINATION

PROF: Dr. Jorge Urrutia
Time: 3 hours

December 1996

NOTES:
(1) THIS IS A CLOSED BOOK EXAMINATION.

(2) CALCULATORS ARE ALLOWED.

(3) THE EXAM IS GRADED OUT OF 100.

QUESTIONS	MARKS	MARKS OBTAINED
1	10	
2	10	
3	15	
4	10	
5	15	
6	10	
7	15	
8	15	
TOTAL	100	

Please, make sure you explain all your answers.

LAST NAME: _____

FIRST NAME: _____

STUDENT NUMBER:_____

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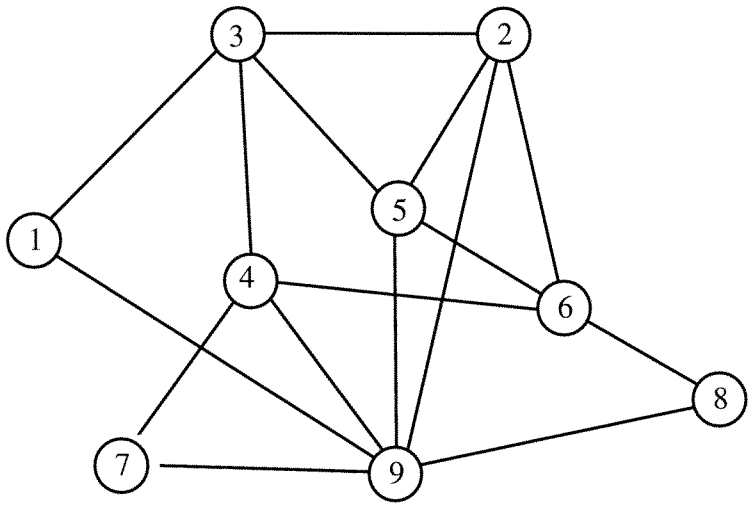
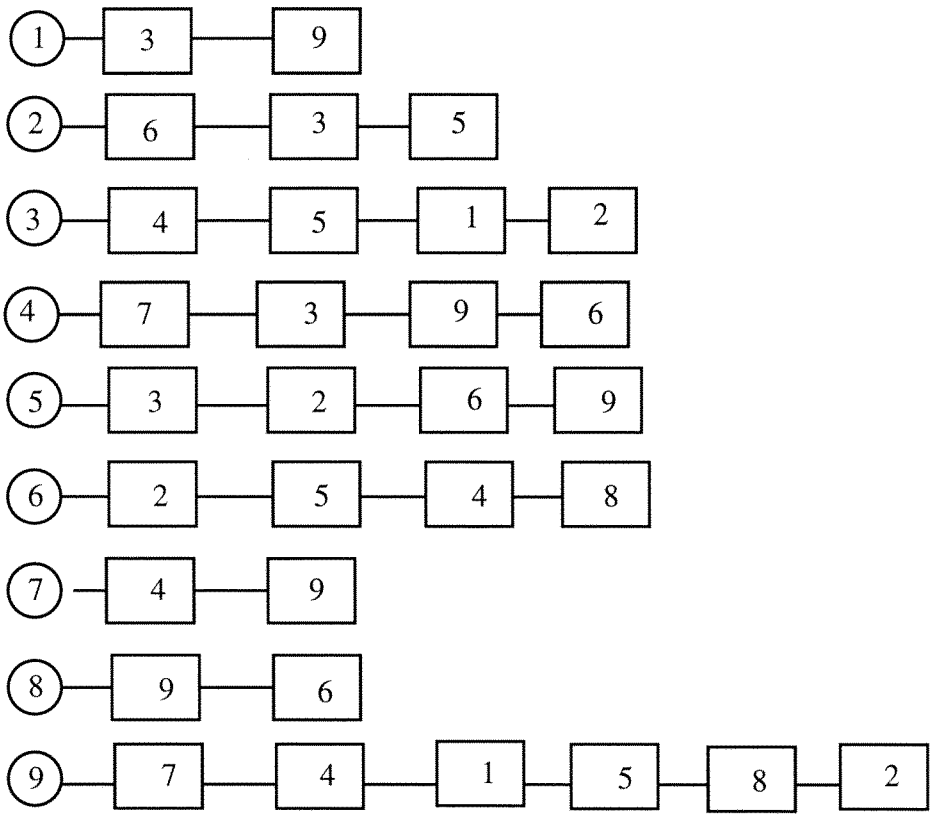
1) Give the *next* table for the Knut-Morris-Pratt algorithm for the string:

010010001010

2) Draw the depth-first search spanning tree that results when traversing the following graph:

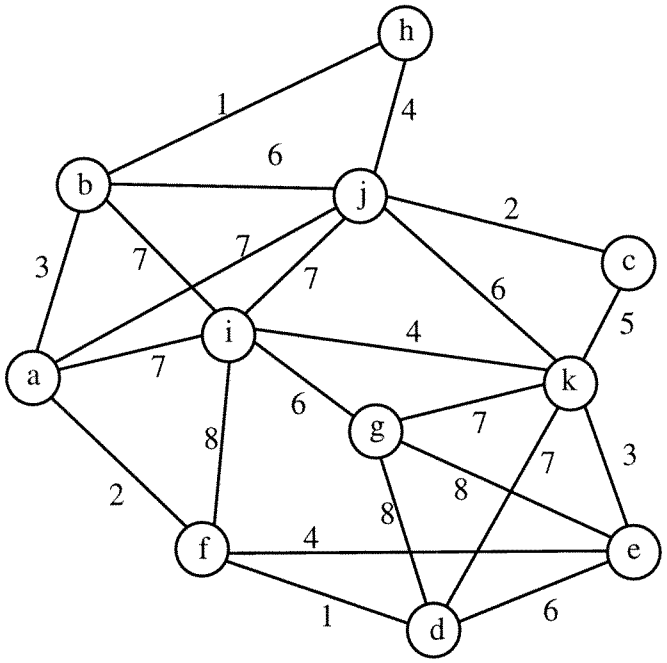


Assume that the **search starts at vertex 1**, and that the graph has been stored using the following adjacency list representation:



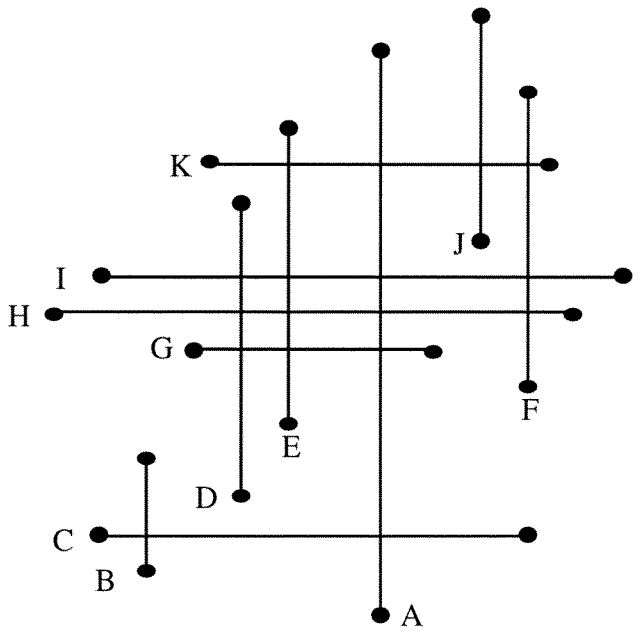
(Use this page to give the solution for problem 2)

3) Construct a minimum weight spanning tree of the following graph:



4) Give an algorithm to test if the polygon generated by four points is a parallelogram.

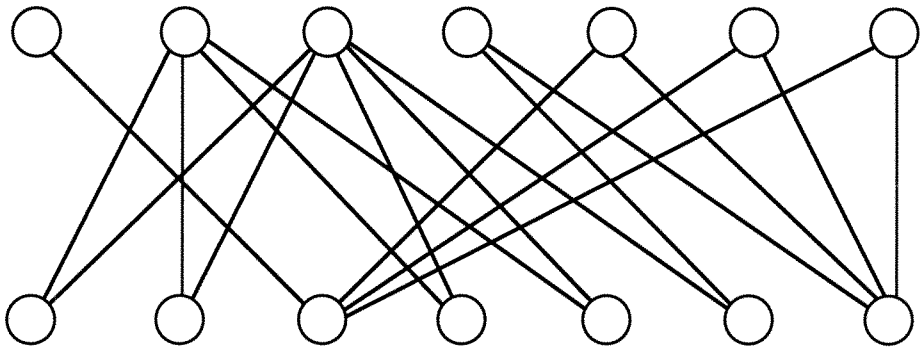
5) Draw the sequence of binary search trees generated by the sweeping line algorithm to count the number of intersections of the following set of horizontal and vertical line segments.



6) Construct the Huffman coding tree for the following text, ignoring blank spaces.

TWO AND FOUR ADD TO SIX

7) Find a maximum matching for the following bipartite graph:



8) Show that it takes linear time to build a heap.