

本考科禁用掌上型計算機

(請於此線以下開始出題)

1. (20%) Explain the following terms:
a. articulation point b. binary search tree c. B-tree
d. connected graph
2. a. (5%) What is a max heap?
b. (18%) Write an algorithm to construct a max heap from an array, moreover, the time complexity of your program should not exceed $O(n)$ (You should justify your answer).
3. (15%) Write a pseudo code that traverses a linked list and delete all nodes whose keys are negative.
4. Quick sort
a. (15%) Please write the quick sort algorithm.
b. (10%) Use an example to illustrate this method. Moreover, what kinds of inputs will result in the worst cases behavior?
c. (5%) Is this sorting method stable, why?
5. (12%) Prim's and Kruskal's algorithms are two ways to get the minimal spanning tree. Use the graph bellow to illustrate the steps of Kruskal's algorithm. What is the time complexity of this algorithm?

