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| 招生學年度 | 100        | 招生類別 | 轉學招生考試 |
| 系所班別  | 資訊工程學系三年級  |      |        |
| 科目    | 資料結構       |      |        |
| 注意事項  | 禁止使用掌上型計算機 |      |        |

- (25%) Please explain the following terms
  - biconnected graph
  - complete binary tree
  - binary search tree
  - $B^+$  tree
  - stack
- (20%) Please write a pseudocode to construct a max heap from an array of size  $n$ . Moreover, the time complexity of your program should not exceed  $O(n)$  (You should justify your answer).
- (15%) Let "head" be the pointer pointing to the first node of the linked list. Write a pseudo code that traverses the linked list, and returns the data in the node with the minimum key value.
- (10%) Write the postfix expression of  $A/B+C*D+E/F*G-H$ , if the precedence of the four binary operations is  $"*" = "/" > "+" = "-"$ .
- (15%) Illustrate insertion sort by sorting following inputs. Moreover, what kind of inputs will result in the best case behavior and what is the best case time complexity of insertion sort?  
10, 16, 11, 2, 13, 5, 10
- (15%) 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.

