

國立高雄科技大學 114 學年度碩士班招生考試 試題紙

系 所 別： 資訊工程系碩士班

組 別： 不分組

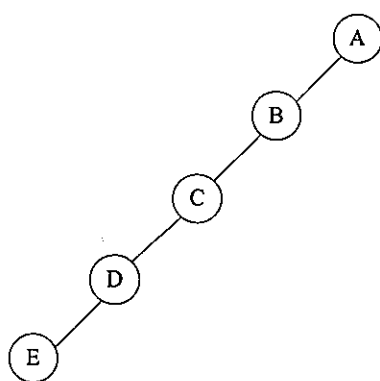
考科代碼： 2021

考 科： 資料結構

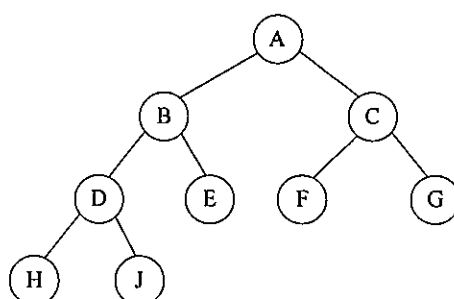
注意事項：

- 1、「可使用電子計算器之科目」及「電子計算器攜帶、使用規定」，依本校公告規定辦理，違者依本校「試場規則及違規處理辦法」規定扣分。
- 2、請於答案卷上規定之範圍作答，違者該題不予計分。

1. (5%) Assuming the tree is traversed using preorder traversal with the sequence ABCDEFGH, and inorder traversal with the sequence CDBAFEHG, draw the binary tree.
2. (10%) Write out the inorder, preorder, postorder, and level-order traversals for the following binary tree.



(a) (5%)



(b) (5%)

Level

1

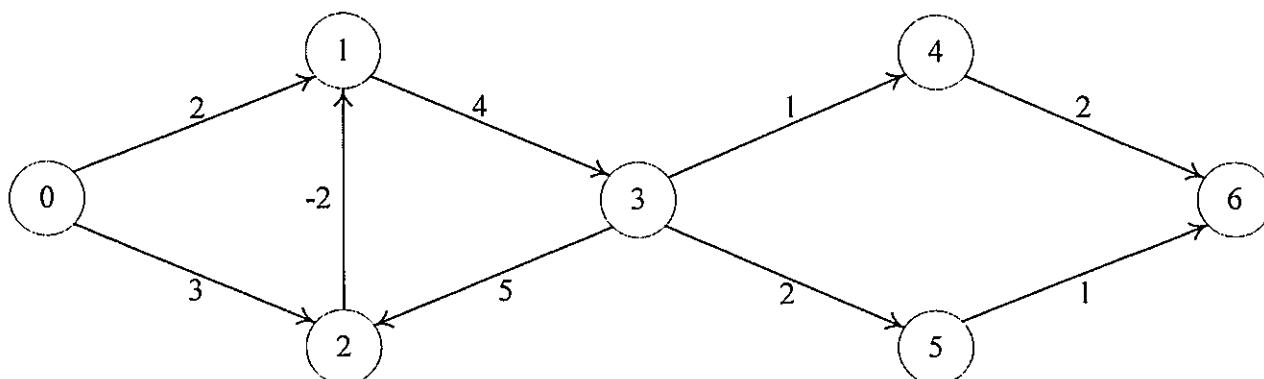
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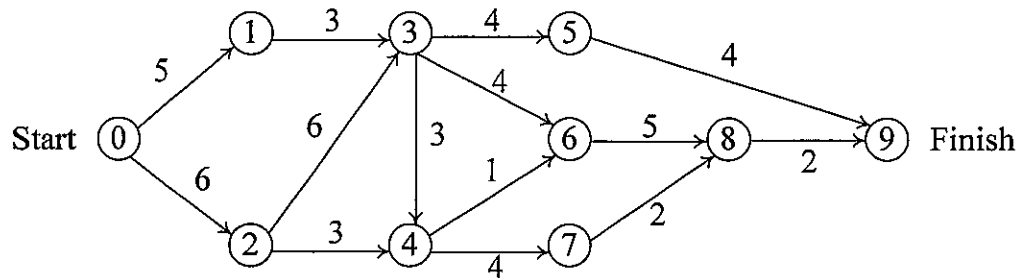
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3. (10%) Using the directed graph of the following Figure, explain why shortest path will not work properly. What is the shortest path between vertices 0 and 6.



4. (20%) Answer the following questions

- (a) Obtain the early and late starting times for each activity. (5%)
- (b) What is the earliest time the project can finish? (5%)
- (c) Which activities are critical? (5%)
- (d) Is there a single activity whose speed up would result in a reduction of the project length? (5%)



5. (20%) Given the following keys: 45, 83, 7, 61, 12, 99, 44, 77, 14, 29. Answer the following questions •

- (a) build binary tree (10%)
- (b) build heap tree (10%)

6. (20%) A hashing table has 26 buckets, each with 2 slots. The items {HD, E, K, H, J, B2, B1, B3, B5, M} are in the hashing table. If the hashing function is defined as:

$$f(x) = \text{Ord}(\text{First letter of } X - \text{Ord}(\text{"A"}) + 1)$$

where "Ord" represents the ordinal value of a character, answer the following:

- (a) What is the loading factor? (5%)
- (b) How many collisions occur? How many overflows occur? (5%)
- (c) If overflow uses linear probing, how does it handle the overflow? (5%)
- (d) If overflow uses linked list method, how does it handle the overflow? (5%)

7. (15%) Please insert the following keys in sequence to construct the corresponding AVL tree: Mar, May, Nov, Aug, Apr, Jan, Dec, July, Feb, June, Oct, seq. If inserting any key does not maintain the AVL tree properties, please perform the necessary adjustments.