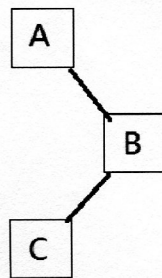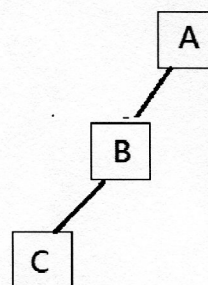可攜帶計算機＊

1. (10%) A linear list is being maintained circularly in an array c[n] with *front* and *rear* set up as for circular queues. Please obtain a formula in terms of *front*, *rear* and *n* for the number of elements in the list.

2. (5%) What is the minimum number of key comparisons needed to sort 8 keys in the worst case? Justify your answer.

3. (10%) An array A contains n-1 unique integers in the range [0,n-1]; that is, there is one number from this range that is not in A. Design an O(n)-time algorithm for finding that number. You are allowed to use only O(1) additional space besides that array A itself.

4. (10%) How many number of distinct permutations of 1, 2, 3, and 4 can be obtained by a stack?

5. (15%) Show the AVL tree after inserting the following input sequence: 10, 20, 30, 40, 100, 90, 80, 70, 15, 25, 35, 60, 28, 45, 95, 85, 75, 65, 50.

6. (10%) There are 300 distinct keys, arranged in three sorted list of 100 keys each. If we want to find the 6th smallest key among the 300 by pairwise comparisons, how many comparisons must be performed at least? Why?

7. (10%) Given an int Array[6][6]. Assume that Array[0][0] address is 1000. What are the addresses of Array[0][5] and Array[5][1], if the array is stored by row major and column major, respectively? (note: integer is 2 bytes)

8. (10%) Balance the following two trees to satisfy the AVL tree property.

(a)　　　　　　(b)