(103)輔仁大學碩士班招生考試試題	考試日期：103 年 3 月 7 日第 3 節
	本試題共 2 頁 (本頁為第 1 頁)

科目： 計算機系統　　系所組：資訊工程系

(1) 是非題(30%) 每題二分
未按作答格式(範例)作答者，扣該科總分 10 分。
未在彌封答案卷內作答者，扣該科總分 20 分。
作答格式：

1. O	2. X	3. O	4. X	5. X
6. O	7. X	8. X	9. O	10. O
11. O	12. X	13. O	14. X	15. O

請依照上述範例之格式，以橫式書寫方式將全部答案寫在彌封答案卷第 1 頁.
答請寫成 "O" 或 "X"

1. Every possible chain of recursive calls must eventually reach a base case.
2. By inspecting the pseudocode, we can determine the maximum number of primitive operations executed by an algorithm, as a function of the input size.
3. The growth rate of running time is affected by constant factors or lower-order terms.
4. Algorithm analysis measures the reliability of an algorithm as the input size becomes large.
5. We can implement a queue with a singly linked list.
6. A tree is an abstract model of a hierarchical structure.
7. For proper binary tree $h \geq (n - 1)/2$ where h : height, n : number of nodes. .
8. The divide step of merge-sort consists of merging two sorted sequences A and B into a sorted sequence S containing the union of the elements of A and B.
9. The best case for quick-sort occurs when the pivot is the unique minimum or maximum element.
10. Heap-sort is much faster than quadratic sorting algorithms, such as insertion-sort and selection-sort.
11. A hash function is usually specified as the composition of two functions:
Hash code: h_1: keys $\rightarrow$ integersCompression function: h_2: integers $\rightarrow [0, N - 1]$.
12. Hash collisions occur when same element is mapped to the different cells
13. Separate chaining is simple to handle hash collision, but requires additional memory outside the table.
14. A preorder traversal of a binary search trees visits the keys in increasing order.
15. A traveling salesperson tour of a weighted graph is a tour that is simple (i.e., no repeated vertices or edges) and has has minimum weight.

(2) (10%) Suppose an initially-empty queue Q has performed a total 40 enqueue operations, 15 front operations, and 19 deque operations, 8 of which generated EmptyQueueExceptions, which were caught and ignored. What is the current size of Q ?

(3) (10%) Insert, into an empty binary search tree, entries with keys 25, 48, 26, 11, 13, 30, 40, 24 (in this order). Draw the tree after all key are inserted.

※ 注意：1.考生須在「彌封答案卷」上作答。
2.本試題紙空白部份可當稿紙使用。
3.考生於作答時可否使用計算機、法典、字典或其他資料或工具，以簡章之規定為準。

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(4) (10%) One important problem with priority CPU scheduling algorithm is the "starvation". Explain what it is and how to fix this problem.

(5) (10%) Explain the problem of the "critical section" in process synchronization.

(6) (10%) Explain the "best-fit" memory allocation method. What is its main disadvantage?

(7) (10%) Explain the problem of "thrashing".

(8) (10%) For disk scheduling algorithms, explain why SCAN generally has a better overall performance than FCFS.