

國立中央大學八十四學年度碩士班研究生入學試題卷

所別: 工業管理研究所 乙組 科目: 計算機概論

共 2 頁 第 1 頁

注意: 回答問題時, 請避免只寫上答案; 亦即, 請儘量註明推導之過程或原因。有不完整答案仍得 partial credit, 請會多少, 寫多少 (尤其是 programming 部份, 請注意配分。) 加油!

1. What is the range of integers which can be stored in a four-byte word? Assumed the leftmost bit is reserved for sign. (10 分)
2. 請解釋 Modem 的原理為何? (10 分)
3. What are main memory, secondary memory and cache memory? And their relationship? (10 分)
4. Can you suggest any categories to evaluate an Operating System? (Namely, what kinds of characteristics should a good Operating System have.) (10 分)
5. 何謂 Array? 何謂 Linked list? (請舉例說明)。又二者適用之時機為何? (10 分)
6. 請比較不同之 topology of network (i.e., Star topology, Ring Topology, Bus Topology and Tree Topology 四種)。又 Bridge 和 Gateway 常用來 link two networks, 請問 Bridge 和 Gateway 使用之時機有何不同? (10 分)
7. 請畫圖註明 Binary tree 是如何建立, 並以你/妳認為最適當的表示方式, 說明如何在 Binary tree 上執行 $Search(x)$ 這一 procedure。 $Search(x)$ 這一 procedure 之功能敘述如下: (15 分)
 $Search(x)$: find the key x in the data structure, or determine that x is not there.
8. You have been hired by the Department of Transportation to computerize a traffic control at a 4-way intersection. The rules for this intersection are:
 - a. Each car arriving at the intersection will call a procedure *Enter (direction)*, where *direction* is a parameter whose value is one of the defined constants: NORTH, SOUTH, EAST, or WEST. This procedure returns when it is safe to go through the intersection. (注意: *Direction* specifies where the car is from)
 - b. After leaving the intersection, the car must call procedure *Leave (direction)*, where *direction* is the same above.
 - c. Cars only proceed straight through the intersection. There are never any turns. (亦即車子只直行, 不左右轉。)
 - d. If a car is waiting from the north, and a car is also waiting from the south, they should both proceed through the

國立中央大學八十四學年度碩士班研究生入學試題卷

所別：工業管理研究所 乙組 科目：計算機概論

共 2 頁 第 2 頁

intersection together. If a car is waiting from the east, and a car is also waiting from the west, they should both proceed through the intersection together. (亦即相反方向之二車，可同時經過十字路口。)

- e. If cars are waiting in both the north-south and east-west directions, they must alternate (亦即東西向及南北向輪流通過十字路口。)。且，爲了讓control 簡單一點，需等正行進之車子已完全通過十字路口後，才alternate。

請以 Pseudo code (或 Basic, FORTRAN, Pascal, C - 如果你/妳對它比較有信心) 寫上述之 *Enter()* 和 *Leave()* 二個 procedures。You can assume that you are supplied with (already written) a procedure called *DriveThroughTheIntersection()*. You have no idea how long this procedure takes to execute. (備註：你/妳可自由假設需要之 procedures，但評分依程式之 Logic、完整性、複雜度等爲準。)(25 分)