

國立臺灣科技大學
八十八學年度碩士班招生考試試題

系所別：資訊管理系碩士班

組別：甲組、丙組

科目：計算機概論

1. State Sollin's algorithm to find the minimum cost spanning tree. You should give an example to verify that your stated algorithm is correct. (10%)
2. Given the postfix representation of an expression: $abcd+*+ef/-$, where a, b, c, d, e, and f are operands, find the prefix representation of the expression. (10%)
3. If an array is declared as $A[a_1, a_2, \dots, a_n]$ in C language. By row major representation, determine the location of $A[b_1, b_2, \dots, b_n]$, where each $0 \leq b_i < a_i$, within memory. Assume that the starting location of A within memory is X. (10%)
4. The ISO Open System Interconnection (OSI) reference model is used as a guideline for communication network development. For each of the functions below, assign the OSI layer at which it is performed. (15%)
 - (a) Packet Routing
 - (b) Encryption/Decryption
 - (c) File Transfer
 - (d) Error Detection
 - (e) Error Recovery
5. Explain baud rate and bps. (10%)
6. Manchester and Differential Manchester are commonly used for encoding of digital data. In the Manchester code, there is a transition at the middle of each bit period. The midbit transition serves as a clocking mechanism and also as data: a 0 is represented by a high-to-low transition, and a 1 is represented by a low-to-high transition. In Differential Manchester, the midbit transition is used only to provide clocking. A 0 is represented by the presence of a transition at the beginning of a bit period, and a 1 is represented by the absence of a transition at the beginning of a bit period. Assume the data input sequence is: 001101, draw the output of the two encoding schemes. (10%)

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7. (20%)

考慮和公司計畫有關的 database schema 如下：

WORKER (EMPID, EMPNAME, SALARY, EMPDEPT)PROJECT (PROJNAME, PROJMRG, BUDGET, STARTDATE)ASSIGN (EMPID, PROJNAME, HOURS, RATING)

其中，PROJMRG 欄位代表 project manager 的名字。ASSIGN relation 記錄員工參加計畫的情形。

回答下列各小題：

- 寫出一個 *SQL* 指令去找出 "the names of all workers who have worked on any projects managed by Frank Jones" (5%)
- 寫出一個 *SQL* 指令去找出 "the names of all workers who have been assigned to all the existing projects" (5%)
- 寫出一個 *relational calculus* 指令去找出 "the names of all workers who have worked on any project with a budget greater than \$100,000" (5%)
- 寫出一個 *relational algebra* 指令去找出 "the names of all projects which have been assigned to John Smith" (5%)

8. (15%)

在 Linux 作業系統中，記憶體的管理使用所謂的 buddy system，回答下列各小題

- 以下圖解釋 buddy system 的作法。(5%)
- 有一個 memory block，其大小為 4 個 word，其起始地址為 011011110000，請問其 buddy memory block 的起始地址為何？(5%)
- 有一個 memory block，其大小為 16 個 word，其起始地址為 011011110000，若此 block 及其 buddy block 均被釋放(free)，則(只)由這兩個 block 所 merge 而成的 32 word 的 memory block 的起始地址為何？(5%)

