

# 大同大學 九十四 學年度 轉學考試 試題

考試科目：計算機概論 系別：資訊工程學系

第 1 頁，共 2 頁

註：本次考試不可以參考自己的書籍及筆記； 不可以使用字典； 不可以使用計算器。

Please note that answering in English is encouraged but NOT required for all questions in this test.

I. **Explain** the following terminologies (術語). Full points will be rewarded for each question when the **description** is provided. (20 points)

- |                      |                     |                  |
|----------------------|---------------------|------------------|
| 1. von Neumann Model | 2. Multiprogramming | 3. Browser       |
| 4. Operating System  | 5. Truth Table      | 6. Machine Cycle |
| 7. Compile           | 8. Quantization     | 9. Security      |
| 10. Bridge           |                     |                  |

II. In each of the following questions, select the right answer among the given choices. 0.5 point will be deducted from your score for each wrong answer. (30 points) (答錯每題倒扣 0.5 分)

1. To execute a program, the computer will need to load it to (1) CPU (2) hard disk (3) memory (4) ROM.
2. The performance of an algorithm can be expressed as a function of the size of (1) code (2) output (3) input (4) space.
3. Which of the following words is not used in describing the layout of a magnetic disk? (1) sectors (2) gaps (3) branches (4) tracks.
4. In the two's complement representation, -6 is expressed as (1) 10000110 (2) 01111001 (3) 11111010 (4) 11111001.
5. Which layer in the OSI reference model does the TCP protocol belongs to? (1) transport (2) data-link (3) session (4) network.
6. In C, if x is declared as a character and  $x = 34 + 43\%(5*9) - \text{floor}(-3/2)$ . We know the character A is encoded to 65 in ASCII, then x is (1) N (2) P (3) O (4) not printable.
7. Which of the following operators cannot be used in masking? (1) XOR (2) NAND (3) OR (4) AND (5) not above.
8. In the public key encryption scheme, the plaintext is encrypted using (1) public key (2) private key (3) secret key (4) digital signature.
9. Which of the following devices has the faster access speed than the others? (1) cache (2) register (3) RAM (4) USB memory stick.
10. If the address bus has 32 wires, then typically what is the largest possible size of memory the computer can manage? (1) 4G words (2) 512M bytes (3) 8G bits (4) not above.

III. Find the solution to each of the following problems. (50 points)

- i. A series of cylinder requests have been received in the order of their arrival as follows: 40, 12, 22, 66, 67, 33, and 80. Assuming that the read/write heads are currently positioned at cylinder 50, please list the order in which these requests are handled if the shortest-seek-time-first disk-scheduling policy is adopted. (10 points)
- ii. Show how the two-dimensional array below would be arranged in main memory when stored in (a) row major order and (b) column major order. Give a formula for finding the entry in the ith row and jth column for each arrangement. (10 points)

	1	2	3	4	5
1	5	3	7	4	2
2	8	0	-1	1	9
3	6	10	-2	11	20

<背面繼續>

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考試科目：計算機概論 系別：資訊工程學系

第 2 頁，共 2 頁

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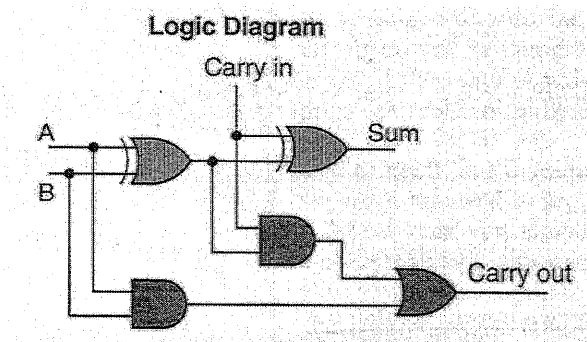
- iii. Function **strange**, shown below, is called with two parameters, the first an array of integers and the second the size of the array. For an input array (34, 12, 44, 1, 37, 18, 22, 98, 3, 41, 76, 9, 11), find the contents of the array after the function is executed. (10 points)

```
void strange(int *table, int n)
{
    int k, temp;

    if (n == 1) return;
    myth(table, n, &k);
    temp = *(table+k);
    *(table+k) = *(table+n-1);
    *(table+n-1) = temp;
    strange(table, n-1);
}

void myth(int *items, int m, int *p)
{
    if (m == 1) *p = 0;
    else
    {
        myth(items, m-1, p);
        if (*(items+*p) < *(items+m-1))
            *p = m - 1;
    }
}
```

- iv. The following is the logic diagram of a 1-bit full adder. Please give its truth table and then draw the logic diagram of a 4-bit full adder. (10 points)



- v. The analysis of some English text yields the following frequency counts of the characters that appear in the text. Please compute the amount of savings in storage space if Huffman encoding is employed to represent the text in the computer as opposed to ASCII. (10 points)

character	A	E	T	C	L	S	R	O	I	N	F	H	D	M
number of appearances	90	85	60	50	49	45	43	30	28	15	13	12	10	9