

系所組別： 工程科學系乙、戊組

考試科目： 計算機概論

考試日期：0307，節次：2

※ 考生請注意：本試題 可 不可 使用計算機

請注意：以下題目分：第一部分：共同必須作答、第二部分：乙組作答、及第三部分：戊組作答。第一部分所有考生均須作答、其餘請就您所報考之組別分別作答

第一部分：共同必須作答

1. Terminology: (Detail description please) (20%)
 - (a.) Time slicing in OS.
 - (b.) Bluetooth
 - (c.) Flash ROM
 - (d.) SMTP protocol
 - (e.) Cache Memory
2. Please rewrite the following C++ if-else statement by using C++ conditional operator (?:) and keep its original semantics. (10%)

```
If ( answer == 7 ) {  
    d=d+1;  
    cout << d;  
}  
else{  
    d=d-1;  
    cout << d;  
}
```

3. What are the major difference between an **interpreter** and a **compiler**? Please describe in detail and give examples in your answer. (15%)
4. There are 15 integers: 15, 64, 32, 20, 83, 97, 71, 40, 38, 44, 99, 92, 72, 69, 23. Please use these integers to create a **binary tree** so that the result of an **inorder traversal** will bring you a sorted array of integers in descending order. (15%)

(背面仍有題目,請繼續作答)

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第二部分：乙組作答

5. There are 4 tests for 10 students with grade ranges as:

A : (grade \geq 90)B : (90 > grade \geq 80)C : (80 > grade \geq 70)D : (70 > grade \geq 60)

E : (grade < 60)

- a) please declare a two dimensional **integer** array **score4** in **C++** or **Java** with initialization of 40 scores to store the 4 test scores of the ten students, 4 for each student (give integer numbers as you wish). (10%)
- b) write a nested loop statement in **C++** or **Java** to count the number of grades, e.g. 10 'A's, 15 'B's, etc. of the 10 students and put the results in an array **sc[5]**, i.e. 10 in **sc[0]**, 15 in **sc[1]**, etc. (you cannot use **if** statement) (10%)
- c) write a function **average** in **C++** or **Java** that accepts a **one dimensional integer** array and return the average (float) of these integer values. (10%)
- d) write a loop in **C++** or **Java** that calls the function **average** in c) and passes the 4 scores of each student in array **score4** to the function and get the average result back. (10%)

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第三部分：戊組作答

5. Nearly all CPUs use the following steps in their memory cycle: **fetch**, **decode**, **execute**, and **writeback**. Please describe these four steps in detail. (15%)
6. A truth table of a one-bit full adder is shown as below; please design the circuit from the truth table using appropriate gates (OR, AND, NOT, XOR). (using fewer gates will get higher score) (15%)

Inputs			Outputs	
C_{in}	A	B	S	C_{out}
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1
$A + B + C_{in}$			Sum	Carry out

7. A CPU has registers related to fetching information from RAM; please describe the functions of the following registers. (10%)
- Memory buffer register (MBR)
 - Memory data register (MDR)
 - Memory address register (MAR)