

臺灣綜合大學系統 108 學年度學士班轉學生聯合招生考試試題

科目名稱	計算機概論	類組代碼	A06
		科目碼	A0602
※本項考試依簡章規定各考科均「不可以」使用計算機		本科試題共計 5 頁	
<p>I. Multiple Choice (32 pts, 2 pts for each) 請於答案卷上作答，否則不予計分</p> <p>(1). Suppose the 8-bits floating-point notation is adopted, where the high-order of the byte as the sign bit, the three bits following the sign bit as the exponent field and the remaining four bits as the mantissa field. Which of the following values cannot be represented accurately in the floating-point format?</p> <p>A. $4\frac{1}{2}$</p> <p>B. 9</p> <p>C. $\frac{15}{16}$</p> <p>D. $\frac{13}{16}$</p> <p>(2). Which of the following memories does not belong to the type of non-volatile memory?</p> <p>A. Dynamic random-access memory (DRAM)</p> <p>B. Phase change memory (PCM)</p> <p>C. NAND flash memory</p> <p>D. Hard disk drive (HDD)</p> <p>(3). Imagine that a host with IP address 150.55.66.77 wishes to download a file from the web server at IP address 202.28.15.123. Select a valid socket pair for a connection between this pair of hosts.</p> <p>A. 150.55.66.77:80 and 202.28.15.123:80</p> <p>B. 150.55.66.77:150 and 202.28.15.123:80</p> <p>C. 150.55.66.77:2000 and 202.28.15.123:80</p> <p>D. 150.55.66.77:80 and 202.28.15.123:3500</p> <p>(4). What statement concerning privileged instructions is considered false?</p> <p>A. They may cause harm to the system.</p> <p>B. They can only be executed in kernel mode.</p> <p>C. They cannot be attempted from user mode.</p> <p>D. They are used to manage interrupts.</p> <p>(5). Which of the following statements is false?</p> <p>A. Mobile devices must be concerned with power consumption.</p> <p>B. Mobile devices can provide features that are unavailable on desktop or laptop computers.</p> <p>C. Mobile devices usually have fewer processing cores than a standard desktop computer.</p> <p>D. The difference in storage capacity between a mobile device and laptop is shrinking.</p> <p>(6). Which of the following statements regarding threads is false?</p> <p>A. Sharing is automatically provided in Java threads.</p> <p>B. Both Pthreads and Win32 threads share global data.</p> <p>C. The start() method actually creates a thread in the Java virtual machine.</p> <p>D. The Java method join() provides similar functionality as the WaitForSingleObject in Win32.</p> <p>(7). Which of the following are unique characteristics of half-duplex Ethernet when compared to full-duplex Ethernet?</p> <p>A. Half-duplex Ethernet operates in a shared collision domain.</p> <p>B. Half-duplex Ethernet operates in a private collision domain.</p> <p>C. Half-duplex Ethernet has higher effective throughput.</p> <p>D. Half-duplex Ethernet has lower effective throughput.</p> <p>(8). Traffic in a VPN is not</p> <p>A. logically separated from other traffic</p> <p>B. invisible from public networks</p>			

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- C. accessible from unauthorized public networks
 D. restricted to a single protocol in IP
- (9). What is the binary representation of 123?
 A. 1010111
 B. 1101011
 C. 1111011
 D. 1110110
- (10). Which of the following statement is wrong regarding KB, MB, and GB?
 A. 1KB < 1GB
 B. 1MB = 1024KB
 C. 1GB = 1024KB
 D. 1KB = 1024B
- (11). Consider the following program code written in C.

```
for( int i = 20; i >= 1; i -= 3 )
    printf("*");
```

How many '*' will be printed after its execution?

- A. 0
 B. 6
 C. 7
 D. 8
- (12). What is the result of the following program code written in C?

```
int i = 3, j = 4, k = 5;

printf("%d", i++ + j++ + --k );
```

- A. 11
 B. 13
 C. 14
 D. 12
- (13). Assume the following declaration:

```
int i, j, k, *ptr;
```

Which of the following expressions is equivalent to $i+j**ptr++-k*2$?

- A. $((i+j) * ((*ptr)++) - k) * 2$
 B. $i+j * (*(ptr++)) - (k * 2)$
 C. $i+j * ((*ptr)++) - (k * 2)$
 D. $((i+j) * (*(ptr++)) - k) * 2$
- (14). Which of the following is a correct declaration of a pointer to a function that takes a chararray as parameter and that returns an integer?
 A. `char* (int) *func_ptr;`
 B. `int(char*) *func_ptr;`
 C. `int *func_ptr(char*);`
 D. `int (*func_ptr)(char*);`
- (15). What is the result of 1234567^{890} taking modulo 7?
 A. 1
 B. 2

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- C. 3
D. 4
- (16). Define $F_n := F_{n-1} + F_{n-2}$ for $n \geq 2$ and $F_0 = F_1 = 1$. According to the definition, which of the following statements is not true?
- A. $F_5 = 8$
 B. $F_n = F_{n-2} + 2 \cdot F_{n-3} + F_{n-4}$, for $n \geq 4$
 C. $F_n = 2 \cdot F_{n-3} + 2 \cdot F_{n-4}$, for $n \geq 4$
 D. $F_{10} = 89$
2. (12 pts) Please answer the following questions about the data manipulation schemes.
- (1) What would be the result of performing a 2-bit right circular shift on the following bytes represented in hexadecimal notation (give your answers in hexadecimal notation)? (6 pts)
 (A) 3F (B) 77 (C) 0D
- (2) Perform the indicated operations: (6 pts)
 (A) (B) (C)
- | | | | | | |
|-------|--------|-----|--------|-----|--------|
| | 111001 | | 111001 | | 111001 |
| AND | 101001 | XOR | 101001 | NOR | 101001 |
| ----- | | | | | |
3. (12 pts) An operating system (OS) is system software that manages computer hardware and software resources and provides common services for computer programs. Please answer the following questions about the basic concepts of the operating system.
- (1) What is the Linux or UNIX command for creating new processes? (3 pts)
 (2) What is the difference between virtual memory and main memory? (3 pts)
 (3) What is a real-time operating system? (3 pts)
 (4) What is a context switch? (3 pts)
4. (10 pts) Give course and branch relation as shown in Table 1, please using the commands SELECT, PROJECT, and JOIN, write a sequence of instructions to answer each of the following questions about branches and their courses in terms of the following database:
- (1) Which branches offer IT665? (3 pts)
 (2) List all the branches present in Branch relation. (3 pts)
 (3) Which branches offer 4-credit courses? (4 pts)

Table 1

Course Relation		Branch Relation		
CName	ID	BName	ID	Credits
Networks	IT655	Computer Science	CS543	4
DataBase	CS543	Computer Science	EC653	5
VLSI	EC653	Electronics & Communication	IT655	4
		Electronics & Communication	EC653	5
		Information Technology	CS543	4
		Information Technology	IT655	4

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5. (4 pts) What is the result of the following program code?

```
int n = 0, A[10] = { 8, 7, 6, 4, 3, 1, 2, 5, 9, 10 };

for( int i = 0; i < 6; i++ )
{
    int sum = A[i];
    for( int j = 1; j < 5; j++ )
        sum = sum + n * j;
    n = sum;
}
printf("%d\n", n );
```

6. (4 pts) The following is an unfinished program code, whose functionality is to print the minimum value of n input integers. Please finish the missing part.

```
void print_minimum( int n )
{
    int input;
    int current_min, flag_actv = 0;
    for( int i = 0; i < n; i++ )
    {
        scanf("%d", &input);
        if( !flag_actv )
            current_min = input, flag_actv = 1;

        /*
            ????? This part is not finished yet.
        */
    }
    printf("%d\n", current_min );
}
```

7. (4%) Bob wrote the following C function for comparing two input strings. However, when he uses this function, very often it results in a run-time error (crash). Find out where the problem is and correct the problem for him.

```
function str_compare(char *ptr1, char *ptr2)
{
    while( *ptr1 != *ptr2 )
        ptr1++;
    return *ptr1 - *ptr2;
}
```

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<p>8. (8%) Prove or disprove the following statements.</p> <p>(1) $\sum_{k=0}^n \binom{n}{k} = 2^n$</p> <p>(2) $\binom{n}{k} = \binom{n-1}{k} + \binom{n-1}{k-1}$</p> <p>9. (4%) How many solutions does the following equation have?</p> $x_1 + x_2 + \cdots + x_k = n, \quad x_i \in \mathbb{N}$ <p>Justify your answer.</p> <p>10. (4%) Consider the problem of throwing a pair of fair 6-sided dices. Suppose that each time when you throw, you'll earn the same amount of money for the sum of points you have thrown. What is the expected value of your earn after 10 times of throws?</p> <p>11. (6%) Describe a method that can sort a given set of n integers in non-descending order. What is the time complexity of the method you describe?</p>			