●不可使用電子計算機

Part 1: Multiple choice questions (30 %). Each correct answer is worth 3 pts.

1. Which of the following device is used to allocate a unique IP address to a wake-up computer in a local area network?

   (a) Web server (b) DNS server (c) Default gateway (d) DHCP server

2. For operating system, which one of following statements is wrong?

   (a) A process is a selected program to be run and some part of this program has been loaded into main memory.

   (b) The file manager in OS is responsible for archiving and backup.

   (c) The context switching is the process that CPU saves the address of the memory location where the last instruction was executed and moves to the next program.

   (d) The job scheduler is responsible for selecting the next job and loading it into the main memory.

3. Which I/O controller does not use the technique of the serial communication?

   (a) USB 3.0　(b) STA　(c) SCSI　(d) IEEE 1394a

4. _____ is the hexadecimal representation for a binary number 10111001B.

   (a) B9H　(b) 271H　(c) 0xC9　(d) 185

5. _____ are the three stages of machine cycle for executing an instruction.

   (a) Sampling, quantization and decoding　(b) Fetch, decode and execute

   (c) Ready, running and waiting　(d) Read, modify and write

6. For data compression, which one of following statements is correct?

   (a) Motion Pictures Experts Group (MPEG) is a kind of lossless data compression.

   (b) MPEG uses I, P and E frames to compress video.

   (c) In Huffman coding, the code length is a function of symbol frequency; more frequent symbols have shorter codes than less frequent symbols

   (d) Joint Photographic Experts Group (JPEG) is a method to compress video

7. Assume 7 bits are used to allocate a signed integer in a computer by using the 2's complement representation. Which is the binary number to represent -38?

   (a) 1011010B　(b) 1100110B　(c) 1011001B　(d) 1011010B

8. Assume that true color is used to store a color picture (i.e. color depth is 24 bits.) If a picture is composed of 128×128 pixels, how many bytes are needed to represent the picture?

   (a) 3M bytes　(b) 48k bytes　(c) 1.536Gbytes　(d) 192Kbytes

9. 【C language】 int a=7,b=3,c; c= a/b; What is the value of c?

   (a) 2　(b) 2.333　(c) 0　(d) 3

10. 【C language】 Which loop statement will be executed at least once?

   (a) for　(b) while　(c) while...do　(d) do...while

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Part 2: Short problems (70 %).

11. Given a function $f(a,b,c,d)= a'b'd'+a'b'cd+a'bcd'+ab'c'+ab'd'$.

    (a) **(4pts)** Find the minimum expression for f.

    (b) **(2pts)** Find the value f if a=d=1, b=c=0.

12. Consider TCP/IP protocol suite.

    (a) **(3pts)** Explain the terminology "network protocol"?

    (b) **(3pts)** Show the functionality or importance of IP address.

    (c) **(3pts)** We usually say that IP (Internet Protocol) is a unreliable protocol. Why IP is unreliable?

    (d) **(3pts)** Although IP is unreliable, we can use TCP to solve the problem. How does TCP do for it?

13. **(8 pts)** Please write an algorithm to get the gcd (greatest common divisor) of two positive integers m and n. You can use pseudo code or any programming language to write it. Hint: it is easier to do this question by using recursive technique.

14. **(10 pts)** What would be printed by the following C program segment?

```
int i=3 ;
while(i<19) {
    if(i%4==1)   printf("%d ",i);
    i++;
}
```

15. **(12 pts)** Rewrite the following C program segment using a **for** loop.

```
int x = 0;
do{
    printf("%d   ", x);
    x+=2;
}while(x <20);
```

16. **(9 pts)** What would be printed by the following C program segment?

```
void swap(int x, int y) {
    int temp=x;
    x=y;
    y=temp;
}
```

```
int main(void) {
    int a=4, b=2;
    swap(a,b);
    printf("a=%d b=%d", a, b);
    return 0;
}
```

17. **(13 pts)** Write a short program using **for loops** to print the following pattern.

```
*
**
***
****
*****
******
```