科目 計算機概論 類組別 A5,023,038 共 3 頁第 1 頁 *請在試卷答案卷（卡）內作答

Part I (60%). 第 1-20 題爲單選題, 每題 3 分, 答錯不倒扣

1. The following binary have a sign in the leftmost bit and, if, negative, are in 2's complement form. 101110 – 110111= ? (1) -8 (2) -9 (3) -10 (4) 27

2. The following binary have a sign in the leftmost bit and, if, negative, are in 2's complement form. Which one in the following computation has overflow occurred?
(1)100111+111001 (2)001011+100110 (3)110001-010010 (4) 101110 +001011

3. Convert Hexadecimal number D6.A to the decimal number
(1) 214.625 (2) 223.3125 (3) 126.625 (4) 127.3125

4. Which function must be performed by the network layer in OSI protocol?
(1) streaming (2) encryption (3) routing (4) authentication checking

5. Instead of remembering IP address like 140.115.1.1, all we need to know is the host's domain name – www.ncu.edu.tw. what is the name of this service?
(1)SMTP (2)SNMP (3)DNS (4) TCP

6. Which layers of OSI protocol do TCP/IP focus on?
(1) Network layer & Transportation layer (2) Link layer & Network layer (3) Physical layer & Network layer (4) Physical layer &Link layer

7. What is the average-case time complexity for the binary searching?
(1) $O(n)$ (2) $O(n \log n)$ (3) $O(1)$ (4) $O(\log n)$

8. What is the Postfix representation of (a-b)/(c*d)?
(1) a-bcd*/ (2) abc-d*/ (3) abcd-*/ (4) ab-cd*/

9. Which strategy in the following is pre-emptive
(1) first come first serve (2)shortest job first (3) earliest deadline first (4) first come last serve

10. Which strategy can provide the minimum average response time?
(1) first come first serve (2)shortest job first (3) earliest deadline first (4) round-robin

11. What is the most appropriate replacement algorithm used in the demand paged memory system?
(1) First in first out (2) Least Recently Used (3) First in last Out (4) round-robin

12. Which of the following is not true for the JPEG compression standard.
(1) apply DCT transform (2) undergo quantization process (3) can compress image data (4) is a lossless compression method.

13. Which of the following computer component is responsible for interconnecting subsystems?
(1) ALU (2) Bus (3) Registers (4) ROM

14. Which of the following is not an advantage when use Object-Oriented language?
(1) efficient use of memory (2) software reuse (3) ability of inheritance (4) information hiding

15. Which of the following software is responsible to assemble all necessary functions from system library and programmers' sources?
(1) loader (2) linker (3) interpreter (4)assembler

16. Which of the following memory is usually the fastest in a computer system?
(1) registers (2) DVD drives (3) hard disks (4) RAM

17. Which of the following feature decrease the modularity of a program the most?

(1) while loop (2) function (3) class (4) go-to statement

18. Which of the following mechanism is not provided by the earliest SQL (for relational DataBase)?

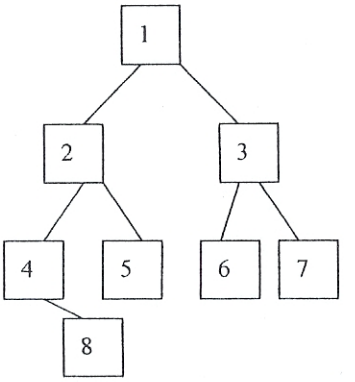
(1) projection (2) recursive query (3) natural join (4) relation update

19. In software engineering, who is usually responsible for the white box testing?

(1) the customer (2) the coordinator (3) the system test engineer (4) the programmer

20. . Which is the preorder of nodes visited by depth first search in the following graph?

(1) 1,2,4,8,5,6,7,3 (2) 1,2,3,4,5,6,7,8 (3) 1,2,4,8,5,3,6,7 (4) 1,2,4,5,8,3,6,7



Part II (20%). 第 21-24 題爲問答題, 每題 5 分

21. What is cache? What is it usually used for?

22. Explain what is a NP-hard problem?

23. What is virtual memory? How does Operation System use it?

24. What is a hash function? What is the advantage to use a good hash function?

Part III (20%). 第 25,26 題爲程式題, 各爲 6 及 14 分

25. (6%) What is the output of the following C program?

```
#include <studio.h>
int f1(int a[ ], int x)
{
    if (a[0] == 0) { return 1 };
    else {
        if (x> a[0]) { return (1+ f1(&(a[1]), x) ); }
        else { printf( "%d\n", a[0]);
            return f1(&(a[1]), x) ); }
        }
}

int main()
{   int b[ ] = { 5, 2, 8, 9, 0, 7, 3, 0 };
    int i;
    i = f1 (b, 4);
    printf( "%d\n", i);
    return 0;
}
```

26.(14%) Use C language to write a function f2 that has the same functionality as f1 in question 25, but use only while loop instead of recursion. (output of f1, the printf command, can be omitted)