系所：資訊管理學系
科目：計算機概論

☆☆請在答案紙上作答☆☆

共4頁，第1頁

一．選擇題（50%）

1. ( ) In DBMS, _____ is enforced through the primary key. (a) entity integrity (b) referential integrity (c) data uniqueness (d) data redundancy (e) none of the above.

2. ( ) A program causing page faults every few instructions is said to be _____. (a) swapping (b) thrashing (c) fragmentation (d) paging (e) none of the above.

3. ( ) Starvation can be avoided by using _____ resource allocation policy. (a) first come, first serve (b) last come, first serve (c) dynamic (d) balanced (e) none of the above.

4. ( ) Problems inherent in the many-to-many relationship in the relational database environment can best be avoided by _____. (a) using the hierarchical model (b) placing all entities in one table (c) breaking the M:N situation up, to produce a set of 1:M relationships (d) enforcing referential integrity rules (e) none of the above.

5. ( ) FDDI is a token ring technology that uses _____ to overcome failures. (a) backup (b) redundancy (c) swappable component (d) plug and play technology (e) none of the above.

6. ( ) A strictly binary tree with n leaves contains _____ nodes. (a) 2n+2 (b) 2n+1 (c) 2n-1 (d) 2n-2 (e) none of the above.

7. ( ) A _____ pool in distributed system can be dynamically allocated to users on demand to offer efficient computing power. (a) memory (b) RAID (c) disk (d) processor (e) none of the above.

8. ( ) Which of the following is an object-oriented programming language. (a) Smalltalk (b) ADA (c) Schema (d) Visual Basic (e) none of the above.

9. ( ) The _____ model in paging systems is based on the locality of reference property. (a) virtual memory (b) cache (c) swapping (d) working set (e) none of the above.

10. ( ) The objective of _____ is to ensure the serialibility of transactions in a multi-user database environment. (a) concurrency control (b) lock manager (c) recovery manager (d) network manager (e) none of the above.

11. ( ) The process of manipulating a number so that there is only one digit to the left of the decimal point is called ____.  (a) excess_127 (b) normalization (c) encoding (d) rationalization (e)
12. ( ) If you make a mask of all 0s and then AND the bit pattern and the mask, you will _______.
   (a) complement the bits of the pattern (b) unset all the bits of the pattern (c) set all the bits of the pattern (d) randomize the bits of the pattern (e) none of the above.

13. ( ) The compiler consists of two separate programs, the _____ and the _____. (a) linker, loader (b) high-level, low-level (c) source file, object file (d) preprocessor, translator (e) none of the above.

14. ( ) The postfix of expression $A-B/(C*D/E)$ is equivalent to _____. (a) $A-B/(C*D/E)$ (b) $ABCDE/*/-$ (c) $-A/B*C/DE$ (d) $BCDE/*/A-$ (e) none of the above.

15. ( ) The biggest disadvantage of the public key algorithm is the _____. (a) ease that it can be cracked (b) difficulty in choosing a public key (c) difficulty in choosing a private key (d) slowness (e) none of the above.

16. ( ) In _____ encoding, you assign shorter codes to symbols that occur more often and longer codes to those that occur less often. (a) LZ (b) run-length (c) DCT (d) Huffman (e) none of the above.

17. ( ) The _____ layer is responsible for the delivery of a packet between the original source and the final destination. (a) transport (b) physical (c) network (d) data link (e) none of the above.

18. ( ) A(n) ________ operates at the first two layers of the OSI model. (a) hub (b) router (c) bridge (d) repeater (e) none of the above.

19. ( ) A properly constructed algorithm must _____. (a) be recursive (b) get the correct answer (c) be easy to understand (d) terminate (e) none of the above.

20. ( ) One of the important advantages of SQL is its ability to let the user produce complex free-form _____ (a) queries (b) reports (c) forms (d) databases (e) none of the above.

二、問答或程式寫作題(50%)
1. Write full names of the following abbreviated terms and then define them. (18%)
   (a) HTTP
   (b) RAID
   (c) CSMA/CD
   (d) VRML
   (e) GPRS
   (f) DHCP

2. Two-Phase locking protocol consists of a growing phase and a shrinking phase. In growing phase, new locks can be acquired but none can be released. In shrinking phase, existing locks can be released but no new locks can be acquired. (10%)
   (a) Prove that if every transaction in a schedule follows the two-phase locking protocol, the schedule is guaranteed to be *serializable*.
   (b) Prove that two-phase locking protocol can not prevent deadlock.

3. A function f is a tail recursive if it either returns a value without needing recursion, or it simply returns the result of a recursive activation. For example, the function g below is tail recursive. A tail recursive can be implemented efficiently using *goto*. Fill in the blanks, without using the return statement, of the following search function, where T is the value of interest. Function search returns 1 if T is found or -1 if not found. (10%)

<table>
<thead>
<tr>
<th>Tail recursive function</th>
<th>Re-implemented using goto</th>
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| int search (int lo, int hi) { int k;  
  if (lo > hi)  
    return -1;  
  k = (lo + hi) / 2;  
  if (x[k] == T)  
    return 1;  
  else if (x[k] > T)  
    return search (lo, k-1);  
  else if (x[k] < T)  
    return search (k+1, hi);} | int search (int lo, int hi) { int k;  
  L:  
  if (lo > hi)  
    return -1;  
  k = (lo + hi) / 2;  
  if (x[k] == T)  
    return 1;  
  else if (x[k] > T)  
    ___________;  
  else if (x[k] < T)  
    ___________;  
  goto L;} |
4. As you know, deadlock can occur when all five philosophers in the Dining Philosopher’s Problem using the following algorithm: (12%)

```plaintext
do forever
    get left fork.
    Get right fork.
    eat
    release right fork
    release left fork
    mediate
repeat
```

Fortunately, a monk comes along one day who has mastered the delicate art of eating with a single fork. He teaches exactly one of the five philosophers this skill and then goes on his way, the other philosophers must still use two forks.

(a) Can deadlock still occur?
(b) Why or why not?