

※ 考生請注意：本試題不可使用計算機。請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

一、選擇題 50 分(每題五分)

1. Which of the following is a possible LZW compression of the message "xyz xyz xyz"?  
A. 1234      B. 1234545      C. 232      D. 12
2. Which of the following representations in two's complement notation represents the largest value?  
A. 00000010      B. 11111111      C. 00000001      D. 11111110
3. Which of the following is not an activity performed entirely within a CPU?  
A. Fetch instructions      B. Perform Boolean operations  
C. Perform arithmetic operations      D. Move data between registers
4. Which of the following is not involved in a context switch?  
A. Interrupt      B. Process table      C. Dispatcher      D. Shell
5. Which of the following would be a concern of the file manager in a multi-user computer system that would not be a concern in a single-user system?  
A. Maintain records regarding the location of files  
B. Maintain records regarding the ownership of files  
C. Maintain records regarding the size of files  
D. None of the above
6. Which of the following is a protocol for controlling the right to transmit a message in a network?  
A. UDP      B. CSMA/CD      C. TCP      D. FTP
7. Which layer of the TCP/IP hierarchy actually transmits a message?

A. Application B. Transport C. Network D. Link

8. The binary search algorithm is an example of an algorithm in which of the following classes?

A.  $\Theta(\lg n)$  B.  $\Theta(n)$  C.  $\Theta(n \lg n)$  D.  $\Theta(n^2)$

9. Which of the following is not associated with object-oriented programming?

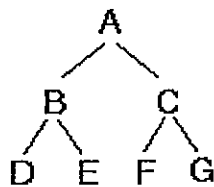
A. Inheritance B. Resolution C. Encapsulation D. Polymorphism

10. Suppose you were going to retrieve items of data that you would later need to process in the opposite order from that in which they were retrieved. Which of the following would be the best structure in which to store the items?

A. Traditional linked list B. Stack C. Queue D. Tree

二、非選擇題 50 分

1. (10%) What sequence of nodes from the tree



would be printed if the following recursive procedure were applied to it? (The procedure uses a global stack called Stack that is assumed to begin empty.)

```

procedure printTree (Tree)
  if (Tree is not empty)
    then (push the current node on Stack;
          apply the procedure printTree to the right subtree of Tree)
  if (Stack is not empty)
    then (pop an entry from Stack and print that node)
    
```

2. (10%) What sequence of values will be printed when the following instructions are executed?

```
X ← 5;
while (X < 7) do
  (print the value of X;
   X ← X + 1)
print the value of X;
while (X > 2) do
  (print the value of X;
   X ← X - 2)
```

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3. (10%) Suppose a sequential file contains 50,000 records and 5 milliseconds is required to interrogate an entry. How long should we expect to wait when retrieving a record from the middle of the file?
4. (10%) Suppose we were faced with solving the traveling salesman problem in a context involving 15 cities in which any two cities were connected by a unique road. How many different paths through the cities would there be? How long would it take to compute the length of all of these paths assuming that the length of a path can be computed in one microsecond?
5. (10%) Apply the procedure MysteryPrint (defined below) to the value 2 and record the values that are printed.

```
procedure MysteryPrint (N)
if (N > 0)
  then (print the value of N and
        apply the procedure MysteryPrint
        to the value N - 2)
else (print the value of N and
      if (N > -1)
        then (apply the procedure
              MysteryPrint
              to the value N + 1))
```