# 國 立 臺 北 科 技 大 學

## 106 學年第一學期電機系博士班資格考試

## 計算機概論(大學部)試題

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```
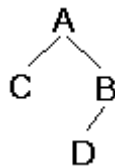
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**注意事項**：

1. 本試題共 【10】 題，配分共 100 分。
2. 請按順序標明題號作答，不必抄題。
3. 全部答案均須答在試卷答案欄內，否則不予計分。
4. 考試時間：二小時。

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1. (12%) Convert the following two numbers to binary. (4%) Calculate the following division in binary. (4%) If 1's complement binary numbers with the length of 6 bits (including sign) was used to store the quotient, determine if an overflow occurs. (4%)

$$246_{13} \div 14_8$$

2. (8%) Fill in the blanks below with the part on the operating system (file manager, memory manager, device drivers, window manager, scheduler, dispatcher) that performs the activity described.
   A. _____ Places new entries in the process table (2%)
   B. _____ Performs the actual communication with I/O units (2%)
   C. _____ Maintains a record of memory allocations (2%)
   D. _____ Protects files from unauthorized access (2%)

3. (10%) What conditions are necessary for deadlock to occur?

4. (10%) Describe the bootstrap process.

5. (10%) What are some distinctions between UDP and TCP?

6. (10%) Briefly summarize the steps performed by each of the four layers in the TCP/IP hierarchy at the computer at which a message originates.

7. (10%) Briefly describe the task of each of the following.
   A. Lexical analyzer
   B. Parser
   C. Code Generator

8. (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)
    push the left child of the root node on Stack;
      if (right branch of Tree is not empty)
        then (apply the procedure printTree to the right subtree of Tree)
pop an entry from Stack and print that node.
```

9. (10%) Given the following tables, X and Y, stored in a relational database.

| X: | A | B | | Y: | C | D |
|----|---|---|---|----|---|---|
| | 2 | s | | | t | 1 |
| | 5 | z | | | r | 3 |
| | | | | | w | 2 |

draw the relation result that would be produced by the following statements?

```
Temp ← JOIN X and Y where X.A > Y.D
Result ← PROJECT X.B, Y.C from Temp
```

10. (10%) Explain the distinction between time complexity and space complexity.

（本試題結束）