國 立 臺 北 科 技 大 學

102 學年第一學期電機系博士班資格考試
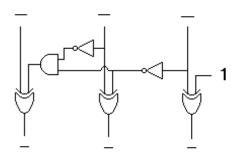
計算機概論(大學部)試題

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。

1. Rewrite the following pseudo code using a pre-test while statement. (10%)

```
repeat (print the value of X;
        X ← X + 1;)
until (X > 5); //This is a post-test do-while statement
```

2. Briefly describe the task of each of the following.

    A. Lexical analyzer (3%)
    B. Parser (4%)
    C. Code Generator (3%)

3. Define each of the following:

    A. Primitive data type (3%)
    B. User-defined data type (3%)
    C. Abstract data type (4%)

4. Given a relation called `People` whose attributes are `Name`, `Father`, and `Mother` (containing each person's name as well as the name of that person's parents), write an SQL statement to obtain a list of all the children of `ADAM`. (10%)

5. Under what condition is each of the following data compression techniques most effective?

   A. Run-length encoding (5%)
   B. Relative encoding (5%)

6. Explain why adding only a few characters to a text file may increase the file's size by several hundred bytes and at other times may not increase the file's size at all. (10%)

7. If the input and output bit patterns in the circuit below are interpreted as binary representations of numeric values, what operation does the circuit perform? (10%)

Input Pattern

Output Pattern

8. What is the primary difference between using Telnet and SSH to connect to a remote server? (10%)

9. The following segment of C code may cause an "exception". Explain why (5%) and rewrite it to avoid the occurrence of "exception". (5%)

```c
int *ptr;
*ptr = 3;
*(ptr+1) = 2;
*(ptr+2) = 1;
```

10. Given the following table, where 500 records are included. Using C language to define a struct STUDENT such that its members correspond to the fields of table, (5%) and then declare an array of struct STUDENT. (5%) The size of array should be large enough to contain all records in the following table.

name	age	gender
謝小夏	32	F
林顯書	32	M
羅一文	28	F
韋爾超	35	M
…	…	…
李必勝	31	M