國立成功大學 109 學年度碩士班招生考試試題

系　　所：製造資訊與系統研究所

考試科目：計算機概論　　考試日期：0210，節次：2

※ 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。

1. Obtain minimum SOP (Sum of Products) expressions and minimum POS (Product of Sums) expressions for F using K-maps with four inputs (A, B, C, D), where A is the most significant bit and D is the least significant bit. The inverse Boolean functions of F are given below, where $\prod M$ is the maxterm expansion, $\sum m$ is the minterm expansion, and d denotes don't care.

(a) $\overline{F}(A,B,C,D) = \prod M(1,2,3,5,6,9) \cdot \prod d(4,12,13)$. (10%)

(b) $\overline{F}(A,B,C,D) = \sum m(1,2,3,5,6,9) + \sum d(4,12,13)$. (10%)

2. In how many ways can 36 identical robots be assigned to five assembly lines with

1. at least four robots assigned to each line? (5%)

2. at least four, but no more than ten, assigned to each line? (5%)

(no score if you give no details.)

3. Please draw the parent-child process relationship graph resulting from the execution of the following pseudo codes. Note that the following codes are included in an executable file called "ProgramP". (10%)

```
main()
{
  if (fork()==0)          exec("ProgramA");
  else
  {
    if (fork()==0)        exec("ProgramB");
    else                  exec("ProgramC");
  }
}
```

4. Consider a Binary Search Tree.

(a) Insert $6, 1, 3, 9, 5, 7, 8, 4, 11, 10$ into an initially empty AVL tree. Show your steps in detail. (20%)

(b) Insert $6, 2, 11, 3, 9, 5, 10, 7, 8, 4$ into an initially 2-3 B-tree (B tree of order 3). Show your steps in detail. (20%)

5. Consider the database relation with schema: **Book**(Bnumber, Title, Publisher, Price, PublishedYear). Write a SQL statement to retrieve the first five publishers with most amount of books and the number of books published by them, where books published after 2016 are considered and publishers whose the average book price is less than 550 dollars are discarded. (20%)