●不可使用電子計算機

1. (24%) Write down T (true) or F (false) for each of these descriptions. 〔2% for each〕
   (a) In order to solve a problem computationally, two things are needed: a representation that captures all the relevant aspects of the problem, and an algorithm that solves the problem by use of the representation.
   (b) The brute force approach is one of the most widely used algorithmic programming solutions because it is such an efficient problem – solving method.
   (c) Programming languages are artificial languages, and therefore do not have a clear set of rules of syntax.
   (d) Virtual Machine is a hardware which is used to simulate power supply unit.
   (e) In C/C++ language, the call by value method of passing arguments to a function copies the actual value of an argument into the formal parameter of the function. In this case, changes made to the parameter inside the function have no effect on the argument.
   (f) Two circuits are equivalent if and only if we can find at least one input sequence which can generate identical outputs for the two circuits.
   (g) Given x-y=3; 2x-2y=k. The linear system cannot have a unique solution, regardless of the value of k.
   (h) One way to evaluate a scheduling algorithm is to use it on a script that creates a predefined mix of jobs, then track one or more statistic about the algorithm's performance.
   (i) In a rising edge triggered D flip-flop design, the output Q changes when the clock signal is HIGH (logic 1)
   (j) If g=O(f) and h=O(f) then g = O(h). Here we define f $\equiv$ f(n) and g $\equiv$ g(n).
   (k) NOP insertion is the easiest way to solve data/control hazard. We should use this technique as much as possible.
   (l) Least Recently Used is a strategy used for page replacement. Since the penalty for page fault is so high that the LRU should be implemented exactly using software.

2. (20%) Explain the following terms 〔2% for each〕
   (a) Von Neumann architecture
   (b) Memory Alignment
   (c) Chip Yield
   (d) Interrupt
   (e) Race condition
   (f) External Fragmentation
   (g) Pipeline Hazard
   (h) Deadlock
   (i) TCP (Transmission Control Protocol)
   (j) Belady's Anomaly

3. (5%) Consider the following C program. What is the output of this program?
```c
#include <stdio.h>
int sum(int n);
int main()
{
    int number, result;
    result = sum(10);
    printf("sum=%d", result);
}
int sum(int num)
{
    if (num!=0)
        return num + sum(num-1);
    else
        return num;
}
```