

國立東華大學資訊工程系博士班資格考  
Operating Systems, Fall 2007

1. (10%) Why is the separation of policy from mechanism an important principle in system implementation?
2. (10%) The following solution has been posed for the dining philosophers' problem, but has been shown to be faulty. Criticize the solution.

```
{  
  Semaphore fork [n]=(1,...,1)  
  While (TRUE)  
  {  
    P(s)  
    P(fork[i]);  
    V(s);  
    Eat;  
    V(fork[i]);  
    V(fork[(i+1) mod 5]);  
    Think;  
  };  
}
```

3. (15%) Explain the differences in the degree to which the following scheduling algorithms discriminate in favor of short processes: (5%) (a)FCFS (5%) (b)MFQ (5%) (c)Preemptive SJF.
4. (10%) List all possible components of a thread? What kinds of resources are shared by peer threads?
5. (15%) (5%) (1) Use an example to explain Belady's anomaly. (10%) (2) Prove that Belady's anomaly cannot occur if the LRU algorithm is used.
6. (10%) Suppose we have a demand-paged memory. The page table is held in registers. It takes 8 milliseconds to service a page fault if an empty page is available or the replaced page is not modified and 20 milliseconds if the replaced page is modified. Memory access time is 100 nanoseconds. What is the maximum acceptable page-fault rate for an effective access time of no more than 200 nanoseconds?
7. (10%) Describe how a UNIX system protect the password of it users.
8. (20%) Describe how do FAT-based file systems and UNIX based file systems implement random access to files.