88-1 淡江大學 96 學年度碩士班招生考試試題

系別：資訊工程學系　　科目：作 業 系 統

准帶項目請打「V」	
	簡單型計算機

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1. (20%) Consider the following process

```
shared y ;
begin
   local x ;
(1)    x := y ;
(2)    x := x + 1 ;
(3)    y := x ;
end
```

If local variable x and shared variable y initially 0 and three copies of the process run concurrently. What is the possible values of y after three copies of the process terminate? Also show one of the corresponding execution sequences for each of the possible values of y.

2. (20%) In the operating system, the time required by a single file-read operation has four nonoverlapping components:

disk seek time – 15 msec
disk latency time – 3 msec
disk transfer time – 1 msec per 4K bytes
operating system overhead – 1 msec per 4K bytes + 5 msec

In version 1 of the system, the file read retrieved blocks of 4K bytes. In version 2, the file read (along with the underlying layout on disk) was modified to retrieve blocks of 8K bytes. What is the ratio of the time required to read a large file under version 2 to the time required to read the same large file under version 1?(Justify your answer!)

本試題雙面印製

◀ 注意背面尚有試題 ▶

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3. According to the table below, which lists eight jobs to be scheduled on two identical processors, the times at which these jobs arrive, and their required CPU burst. Assume that jobs can be scheduled instantly.

Job	Arrival Time	CPU Burst
A	0	7
B	0	2
C	0	3
D	2	5
E	3	4
F	5	1
G	7	3
H	9	6

a. What is the earliest time at which processing of all jobs can be completed? Also show the corresponding Gantt chart for each of the two processors.(10%)

b. Assume that the criterion for scheduling is to minimize the waiting time in starting the processing of each job and assume nonpreemption. What is the minimum average delay time? Also show the corresponding Gantt chart for each of the two processors. (10%)

4. Consider the following frame table in a paging system with page size of 1024 words.

	PID	Page#
0	3	1
1	7	4
2	3	0
3	3	2
4	7	1
5	7	2
6	7	0
7	7	3

a. Assuming the running process PID is 3, what physical address is referenced by the virtual address 2608, 3119, 1120? (10%)

b. Assuming page tables were used instead of the frame table, show the contents of the corresponding page tables.(10%)

88-4 淡江大學 96 學年度碩士班招生考試試題

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5. Consider the solution to the readers/writers problem. Assume the first request is a reader R1. While R1 is reading, the requests arrive in the order: R2, W1, R3, and while W1 is writing, the new requests arrive in the order: W2, R4, W3, and while W2 is writing, the new requests arrive in the order: R5, W4.
   a. In which order will these requests be processed? Which groups of readers will be reading concurrently? (10%)
   b. Assume that if the statements in start_read( ) modified to
   "**if (writing) OK_to_read.wait ;**",
   show the order of the requests processed. (10%)

```
monitor readers/writers {
      int read_cnt = 0 , writing = 0 ;
      condition OK_to_read , OK_to_write ;

start_read( ) {
      if ( writing || !empty(OK_to_write) ) OK_to_read.wait ;
      read_cnt = read_cnt + 1 ;
      OK_to_read.signal ;
}

end_read( ) {
      read_cnt = read_cnt – 1 ;
      if (read_cnt = = 0)
          OK_to_write.signal ;
}

start_write( ) {
      if ( (read_cnt != 0) || writing) OK_to_write.wait ;
      writing = 1 ;
}

end_write( ) {
      writing = 0 ;
      if ( !empty(OK_to_read) )
          OK_to_read.signal ;
      else OK_to_write.signal ;
}
}
```