

系所組別： 資訊工程學系

考試科目： 計算機組織與系統

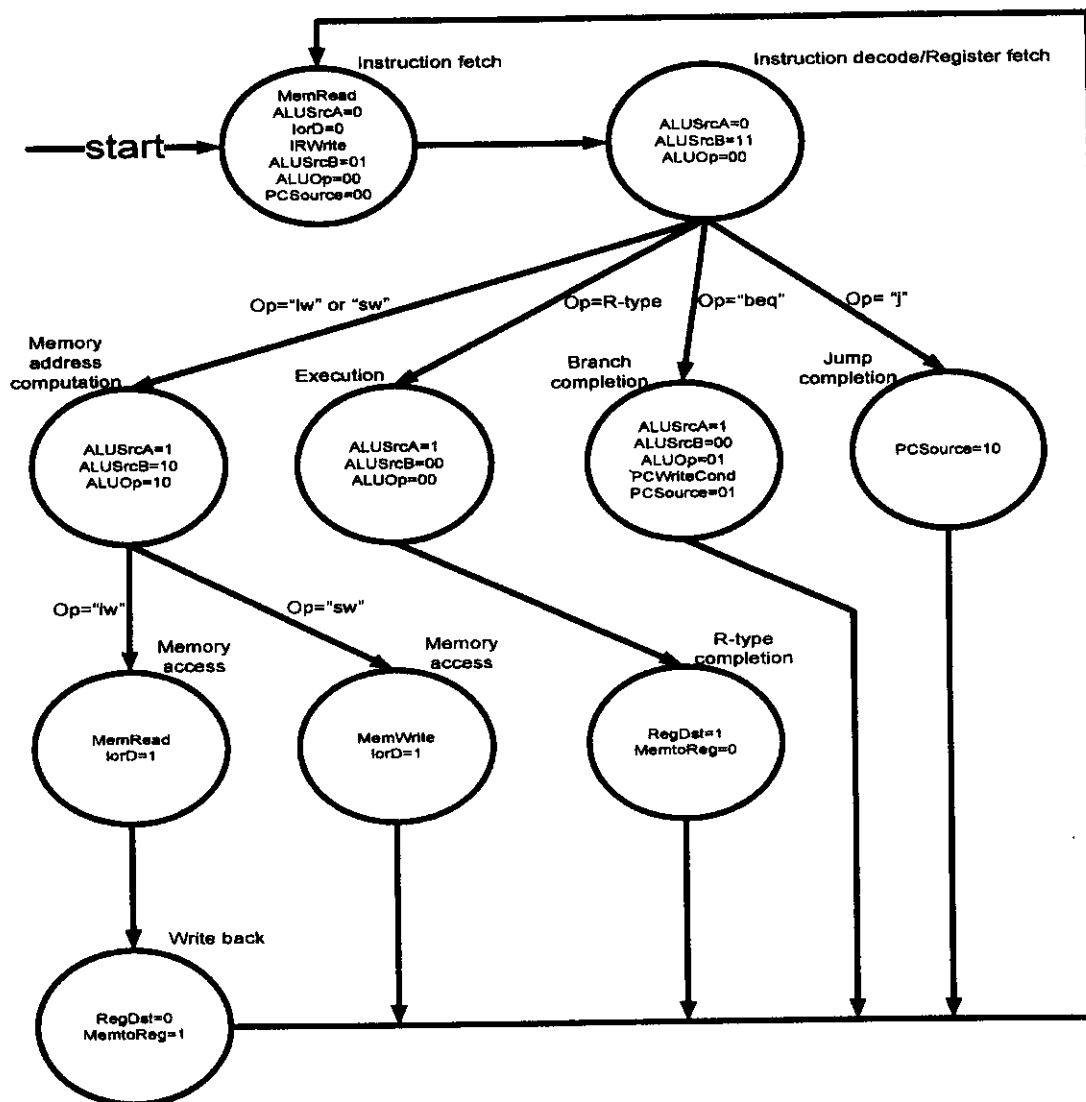
考試日期： 0307， 節次： 1

※ 考生請注意：本試題 可 不可 使用計算機 (請勿在本試題紙上作答，否則不予計分)

共七題(三頁)，請在答案卷作一表格如下，並清楚地填入這七個題目的答案，否則不予計分。

題號	答案	
一		
二		
三		
四	(a)	(b)
五		
六		
七		

一. [30%] The figure shown as follows is the control for the multicycle MIPS processor. There are six typos in the plot. Identify and correct the typos.



(背面仍有題目,請繼續作答)

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二. [15%] Consider a pipelined processor. Give a "single" MIPS code to illustrate RAW, WAR and WAW hazards. Note that the MIPS code can only consist of no more than four R-type instructions.

三. [5%] Assume a virtual memory addressing space of 8 Gbytes and a physical memory addressing space of 2 Gbytes. Let the size of a page be 2 Kbytes. What is the size of a page table in terms of the number of entries?

四. [10%] Consider a demand-paging system with the following time-measured utilizations:

CPU utilization	20%
Paging disk	98%
Other I/O devices	5%

Will the following methods improve the CPU utilization? Describe the reasons shortly.

- (a) [5%] Install a bigger paging disk.
 (b) [5%] Increase the degree of multiprogramming.

五. [10%] Consider the following set of processes, with the length of the CPU-burst time given in milliseconds:

Process	Burst Time	Priority
<i>P1</i>	10	3
<i>P2</i>	1	1
<i>P3</i>	2	3
<i>P4</i>	1	4
<i>P5</i>	5	2

The processes are assumed to have arrived in the order *P1*, *P2*, *P3*, *P4*, *P5*, all at time 0. What is the average waiting time for the RR scheduling algorithm (quantum = 1)?

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六. [15%] Please draw the parent-child process relationship graph resulting from the execution of the following pseudo code. Note that the following code is included in an executable file called programP.

```
main()
{
    if ( fork() == 0 )      exec("programA");
    else
    {
        if ( fork() == 0 )  exec("programB");
        else                exec("programC");
    }
}
```

七. [15%] Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous request was at cylinder 100. The queue of pending requests, in FIFO order, is

86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130

Starting from the current head position, what is the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests if the C-LOOK disk-scheduling algorithm is used?

