

中原大學 102 學年度 碩士班 入學考試

102/3/2 15:30 ~ 17:00 資訊工程學系

誠實是我們珍視的美德，
我們喜愛「拒絕作弊，堅守正直」的你！

科目：計算機系統

(共 2 頁第 1 頁)

不可使用計算機

1. What are the differences between user-level thread and kernel-level thread? (10%)
2. What is the semaphore? (10%)
3. What are the differences between external fragmentation and internal fragmentation? (10%)
4. The file system resides permanently on secondary memory, three major methods of allocating disk space are in wide use: contiguous, linked, and indexed. Which allocation methods suffer from external fragmentation and internal fragmentation? Why? (10%)
5. CPU scheduling deals with the problem of deciding which of the processes is to be allocated the CPU. Consider the FCFS, SJF, priority, RR, and multilevel feedback queue algorithms, which algorithms may be preemptive? Why? (10%)
6. Consider two different implementations, M1 and M2, of the same instruction set. There are three classes of instructions (A, B, and C) in the instruction set. M1 has a clock rate of 2.4 GHz and M2 has a clock rate of 3.2 GHz. The average number of cycles for each instruction class and their frequencies (for a typical program) are as follows:

Instruction Class	Machine M1 (Cycles/Instruction Class)	Machine M2 (Cycles/Instruction Class)	Frequency
A	2	3	50%
B	3	2	30%
C	5	4	20%

- (a) Calculate the average CPI for each machine, M1, and M2. (10%)
- (b) Calculate the average MIPS ratings for each machine, M1 and M2. (10%)

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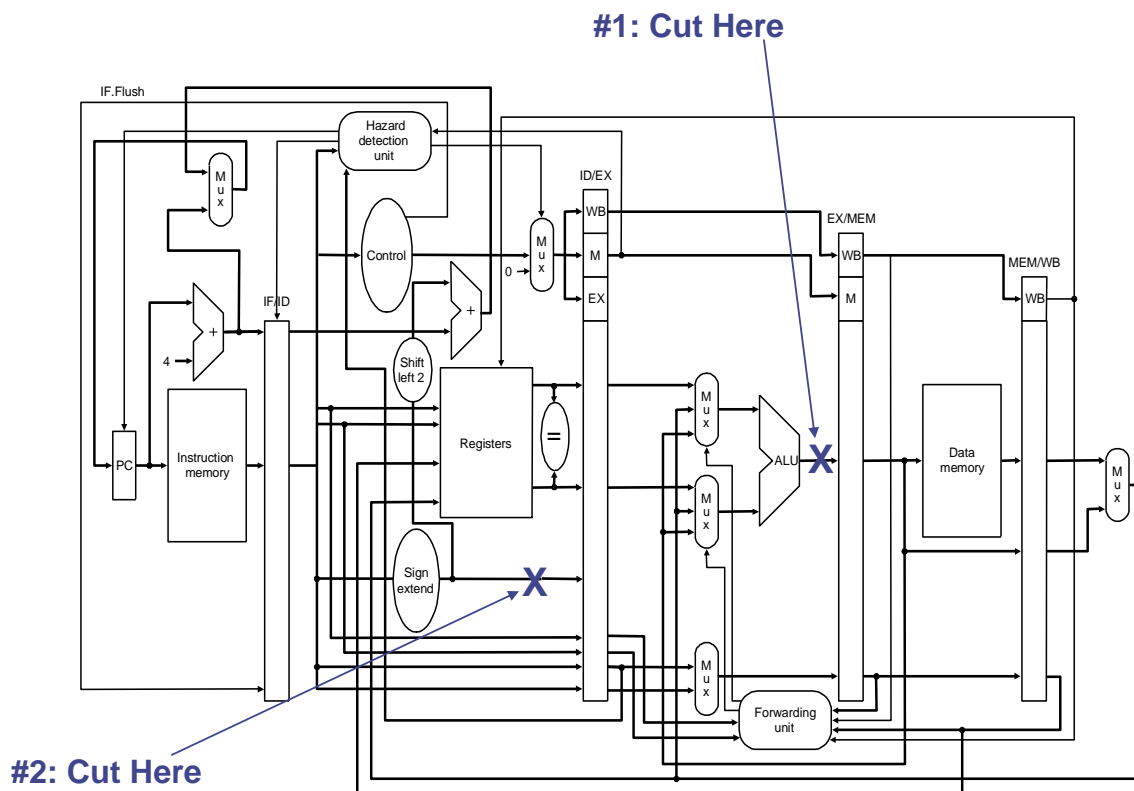
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7. The Pipelined MIPS datapath of seven instructions (add, sub, and, or, lw, sw, beq) is shown as the following figure. There are two lines are cut and marked with “X”.
- (a) Please describe the effects of cutting wire #1 and the fail instructions. (10%)
- (b) Please describe the effects of cutting wire #2 and the fail instructions. (10%)



8. Please describe the “Memory Hierarchy” of a computer system, and then explain why the hierarchy works by using the concept of “The Principle of Locality”. (10%)