中原大學 97 學年度碩士班入學考試

4 月 13 日 16:00~17:30 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(含作業系統與計算機組織)　（共 2 頁第 1 頁）

□可使用計算機，惟僅限不具可程式及多重記憶者　V 不可使用計算機

1. Please answer the following problems. (10%)
   1) What are the differences between semaphore and monitor?
   2) Is it possible to have an algorithm to detect deadlock situation. Explain your answer.

2. Please answer the following problems. (16%)
   1) Please explain the demand paging scheme. (6%)
   2) When do page faults occur? Describe the actions taken by the operating system when a page fault occurs. (5%)
   3) When do page replaces occur? Describe the actions taken by the operating system when page replace occurs. (5%)

3. Please answer the following process and thread problems. (24%)
   1) What are the differences between process and thread?
   2) What two advantages do threads have over multiple processes?
   3) Context switch is an interrupt (event) that alters the sequence in which a processor executes instructions. Please explain context switch processing when a time slice expires.
   4) Context switch selects another process to use CPU, please explain under what situations of a process, context switch decisions may take place?

4. Please briefly describe the characteristics of the following modern processors. (12%)
   1) Intel Itanium 2
   2) AMD dual-core Opteron
   3) Intel Core 2 Duo
   4) Sun UltraSPARC T1

5. Please describe four “MIPS Design Principles” and give some examples to explain. (8%)

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6. Please design a single precision IEEE 754 Floating Point Unit (FPU). (20%)
   1) Please provide the algorithm of “Add” operation.
   2) According to your algorithm, please design the datapath of your FPU.

7. Please design the “Barrel Shifter”. (10%)
   1) Draw the datapath “Barrel Shifter” and give an example to verify your design.
   2) Provide a correct Verilog HDL design according to your datapath.