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# 淡江大學 96 學年度碩士班招生考試試題

系別：電機工程學系積電系統組  
電機工程學系機器人工程碩士班

科目：計算機概論(含計算機組織)

准帶項目請打「V」	
✓	簡單型計算機

本試題共 / 頁

1. 20% Please use the Booth's algorithm to calculate  $(-2)*5$ , and show your calculation step by step.
2. 20% In the pipelining operation, structure hazard, control hazard, and data hazard may disturb the instruction sequences. Please explain these three hazards, namely:
  - (a) Structural hazard
  - (b) Control hazard
  - (c) Data hazard
3. 20% Please briefly describe the differences between (among) the following terms:
  - (a) Queue/Stack
  - (b) Hardware/Software/Firmware
  - (c) Temporal locality/Spatial locality
  - (d) Parallel processing/Distributed processing
4. 20% Consider a virtual memory system with the following properties:
  - (a) 40-bit virtual byte address
  - (b) 16-KB pages
  - (c) 36-bit physical byte address
 What is the total size of the page table for each process on the machine, assuming that the valid, protection, dirty, and use bits take a total of 4 bits and that all the virtual pages are in use? (Assume that disk addresses are not stored in the page table)
5. 20% Construct a 3-bit counter using three D flip-flops and a selection of gates. The input should consist of a signal that resets the counter to 0, called *reset*, and a signal to increment the counter, called *inc*. The output should be the value of the counter. When the counter has value 7 and is incremented, it should wrap around and become 0.