長庚大學 111 學年度第一學期 資訊工程學系博士班資格考 計算機架構 考題

1. The virtual memory is a memory management mechanism. Answer the following questions about the virtual memory. (10 points, 10 points)
   (a) Explain the virtual memory design principles.
   (b) When a CPU issues a memory access request, how to speed up the translation from a virtual address to a physical address?

2. The compiler can optimize the execution time of a program by transferring the loop structures in the code and rescheduling the instruction execution sequence. List two different examples to show how a compiler did it. (10 points, 10 points)

3. The multi-core processor is the typical structure of a modern processor. Answer the following questions. (10 points, 10 points)
   (a) Explain how a modern processor uses the speculation execution to speed up the execution performance for a program with high-degree parallelism.
   (b) Why a multi-core processor needs the cache-coherence protocol

4. List any two possible approaches to enhance the cache access performance. (20 points)

5. Explain why a RISC (Reduced Instruction Set Computer) machine favored short instruction lengths, simple instruction formats, and regular addressing modes? (20 points)