ICS 2021-2022 秋季学期期末考试

1. 考试形式：开卷（不能带计算器）

2. 考试范围：ICS 教材 1-10 章

3. 考试重点：主要考察期中考试之后的内容，但前五章的内容也会涉及

4. 试卷内容

- PART A: 选择题
- PART B: 简答题（类似期中考试 PART A）
- PART C: LC3 数据通路
- PART D: 数据结构/子程序调用
- PART E: I/O (Trap、RTI 指令)

5. 一些说明：

- PART A 和 PART B 的内容覆盖 1-10 章，主要考察基础知识，所以要多看书
- PART C 需要清楚的了解 LC3 数据通路（习题 5.51）
- 会有程序阅读、填空题
- 考试以第三版为准（请使用第二版教材的同学注意），尤其是 9.3 节

Major Changes in the Third Edition

The LC-3

A hallmark of our book continues to be the LC-3 ISA, which is small enough to be described in a few pages and hopefully mastered in a very short time, yet rich enough to convey the essence of what an ISA provides. It is the LC "3" because it took us three tries to get it right. Four tries, actually, but the two changes in the LC-3 ISA since the second edition (i.e., changes to the LEA instruction and to the TRAP instruction) are so minor that we decided not to call the slightly modified ISA the LC-4.

The LEA instruction no longer sets condition codes. It used to set condition codes on the mistaken belief that since LEA stands for Load Effective Address, it should set condition codes like LD, LDI, and LDR do. We recognize now that this reason was silly. LD, LDI, and LDR load a register from memory, and so the condition codes provide useful information – whether the value loaded is negative, zero, or positive. LEA loads an address into a register, and for that, the condition codes do not really provide any value. Legacy code written before this change should still run correctly.

The TRAP instruction no longer stores the linkage back to the calling program in R7. Instead, the PC and PSR are pushed onto the system stack and popped by the RTI instruction (renamed Return from Trap or Interrupt) as the last instruction in a trap routine. Trap routines now execute in privileged memory (x0000 to x2FFF). This change allows trap routines to be re-entrant. It does not affect old code provided the starting address of the trap service routines, obtained from the Trap Vector Table, is in privileged memory and the terminating instruction of each trap service routine is changed from RET to RTI.

As before, Appendix A specifies the LC-3 completely.