Introduction

Computer Architecture II
CSU34021

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Introduction

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Unusual Times

- Pre-recorded Lectures
  - Usually shorter than regular 50-minutes lecture slot
    - May even be much shorter depending on how the recording goes
- Live sessions between 15 – 16 on Wednesdays (Blackboard Collaborate)
- Extra live sessions or recorded sessions for particular problems can be arranged on need basis
- Schedule available (I will upload an image of it on blackboard as well)
- Tutorials
  - Face-2-Face (F2F)
  - 5–6 tutorials
  - Aligned with lectures (no set tutorial slot)
Tutorial Sessions

- Tutorial sessions
  - Weeks 4, 7 and 10
  - Two hour session with each pod (3 ICS and 1 Eng)
  - Tutorials might be released early to align with lectures
  - Deadlines will be at least a week after the F2F tutorial session
  - Feedback one week after the deadline (possibly online)

Syllabus

- IA32 and x64 assembly language programming
- IA32 and x64 procedure calling conventions
- RISC vs CISC
- RISC-1 design criteria and architecture
- Register windows and delayed jumps
- Instruction level pipelining
- DLX/MIPS pipeline
- Resolving data, load and control hazards
- Virtual Memory
- Memory management units [MMUs]
- Multi-level page tables and TLBs
- MMU integration with an OS
Syllabus

- Cache organization, operation and performance
- Virtual vs physical caches
- Multiprocessor architectures
- Cache coherency
- Cache coherency protocols

Assessment

- Coursework: 20%
  - 5 or 6 tutorials
- Examination: 80%
  - December 2020
  - Nature of exam → Take-Home Exam: An exam that will be released to students at a time determined by College and that students will have 24 hours. The complexity of the exam will be such that it should not take them more than 6 hours to complete.

- Supplemental
  - August 2021
  - 100% exam (will incorporate 20% coursework mark if it yields a better mark)
Introduction

Module Web Page

https://www.scss.tcd.ie/~alams/csu34021.html

- Lecture slides
- Tutorials
- Miscellaneous materials

Also available on Blackboard

Introduction

Books

- Computer architecture – A quantitative approach by John Hennessey and David Patterson

- High performance computer architecture by Harold S. Stone
Other References

- Computer Organization and Design, John Hennessey and David Patterson
- Assembly Language for x86 Processors, Kip Irvine
- Intel 64 and IA-32 Architectures Software Developer’s Manual, Volume 1: Basic Architecture
- Intel 64 and IA-32 Architectures Software Developer’s Manual, Volume 2: Instruction Set Reference

Software and Languages Used

- Visual Studio
- C++
- Assembly
- Microsoft Assembler
- Linux?
  - GCC
  - Netwide Assembler (NASM)
    - Difference in assembly for NASM (both inline and otherwise)
    - Most welcome to ask questions separately if this tool chain used

Next video → IA32 and x64 assembly language