CPE432: Computer Architecture and Organization (2)

Course Introduction

Prof. Gheith Abandah
أ.د. غيث علي عبندة

Outline

- Course Information
- Video: Advanced CPU Designs
- Textbook and References
- Course Objectives and Outcomes
- Course Topics
- Policies
- Grading
- Important Dates

Course Information

- Instructor: **Prof. Gheith Abandah**
- Email: **abandah@ju.edu.jo**
- Office: **CPE 406**
- Home page: **http://www.abandah.com/gheith**
- MS Teams: **Link**
- Prerequisites: **CPE 335: Computer Architecture and Organization (1)**
- Office hours: **Sun – Thu: 8:30 – 14:00**

Advanced CPU Designs

- From CrashCourse

https://youtu.be/rtAlC5J1U40

Textbook and References

- **Patterson and Hennessy. Computer Organization & Design RISC-V Edition: The Hardware/Software Interface, Second ed., Morgan Kaufmann, Elsevier Inc., 2021.**
- References:
  - Hennessy and Patterson, Computer Architecture: A Quantitative Approach, 6th ed., Morgan Kaufmann, Elsevier Inc., 2017.
  - J. P. Shen and M. H. Lipasti. Modern Processor Design: Fundamentals of Superscalar Processors, Mc Graw Hill, 2005.
  - D. Culler and J.P. Singh with A. Gupta. Parallel Computer Architecture: A Hardware/Software Approach, Morgan Kaufmann, 1998.
  - J. Hayes. Computer Architecture and Organization, 3rd ed., McGraw-Hill, 1998.
- Course slides at: http://www.abandah.com/gheith/?page_id=2827

Course Objectives

- Introduce students to the technological changes in designing and building processors and computers.
- Introduce students to the advanced techniques used in modern processors including pipelining, branch prediction, dynamic and speculative execution, multiple issue, multithreading, and software optimizations.
- Introduce the students to the basic concepts and technologies used in designing memory and storage systems including cache, main memory, virtual memory, and secondary memory.
- Introduce the students to the various approaches in parallel processing including SIMD extensions, vector processors, GPUs, multicore processors, shared memory multiprocessors, clusters, and message-passing multicomputers.

Course Outcomes

- Understand and analyze the performance of single-processor architectures, as well as multiprocessor architectures [1].
- Understand and analyze the performance of memory hierarchy levels [1].
- Understand the technological improvements and the effect of these improvements on modern computers [4].
- Survey research papers that describe contemporary issues in computer design [3, 4, 7].

Course Topics

- Introduction
- Computer Technology and Performance (1.2, 1.5-1.11)
- Processor: Instruction-Level Parallelism (4.6–4.12, 4.15–4.16)

Midterm Exam

- Memory Hierarchy (5.1–5.11, 5.13, 5.16–5.17)
- Parallel Processors (6.1–6.9, 6.11–6.15)

Final Exam

Policies

- Attendance is required
- All submitted work must be yours
- Cheating will not be tolerated
- Open-book exams
- Check department announcements at: http://www.facebook.com/pages/Computer-Engineering-Department/369639656466107

Grading

- Two Quizzes 10%
- Technology Trends Research Project 10%
- Midterm Exam 30%
- Final Exam 50%

Important Dates

Mon 28 Feb, 2022	First Lecture
TBA, 2022	Midterm Exam
Wed 1 Jun, 2022	Project Report Due
Thu 9 Jun, 2022	Last Date to Withdraw
Wed 8 Jun, 2022	Last Lecture
Jun 11 - 23, 2022	Final Exam Period