



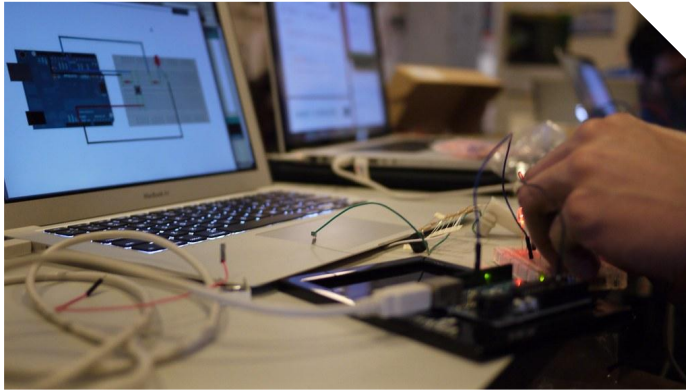
CoE 163

Computing Architectures and Algorithms

00: About the Course

HELLO!

Welcome to the world course
where algorithms and hardware
connect with each other!



ICE BREAKING SESSION!

Check the polls!



WHAT YOU ALREADY KNOW...

- Math 40
 - Linear algebra
 - Matrix operations
- EEE 121
 - Basic programming
 - Data structures and algorithms
- EEE 153
 - Computer organization
 - Memory, cache, etc.



WHAT ARE GOOD TO KNOW...

- Knowledge of several programming languages
 - C/C++
 - Python
 - Matlab/Octave
 - Assembly (MIPS)
- Signals and systems
 - Convolution
 - Filters and transforms



WHAT YOU'LL LEARN...

- How are hardware and algorithms related to each other?
- How do we implement algorithms with efficiency in mind?
 - Problem-solving paradigms
 - Platform-dependent programming
 - Parallel computing



COURSE SEGMENTS

- Introduction
- Efficient linear algebra operations
- Architectural features of computing systems



INTRODUCTION

- How to solve “any” problem?
 - Problem-solving paradigms
- How to assess algorithm efficiency?
 - Asymptotic analysis
- How to choose an appropriate platform for my project(s)?
 - Platform-dependent coding
- How do I exploit hardware to make my project more efficient?
 - High-level to low-level implementations
 - Parallel programming (intro)



EFFICIENT LINEAR ALGEBRA OPS

- Code caching behavior
- Linear algebra libraries (ATLAS)
- Matrix operations
 - RREF
 - Decomposition (SVD, LU)
 - ...
- Sparse matrix operations



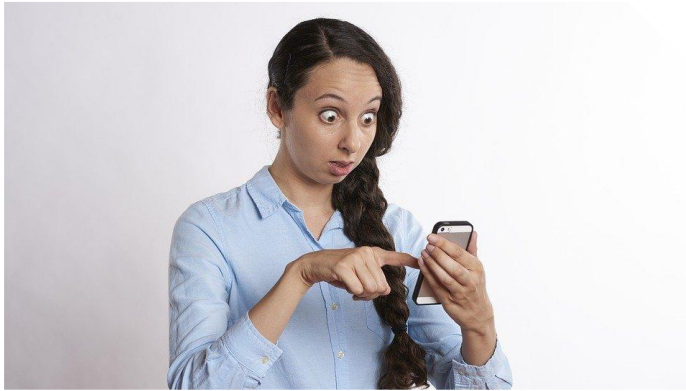
ARCH FEATURES OF COMP SYS

- Computer architecture types
- Parallel programming
- Other misc algorithms
 - Fourier transforms
 - Filtering
 - Sorting
 - Convolution



SURPRISE REVIEW QUIZ!

Check the polls!



CLASS ARRANGEMENT

CoE 163 is **partially asynchronous**, meaning you will take this course **at your own pace** with materials provided to you. No synchronous meetings, unless informed in advance.

Any exercises and online quizzes will have **deadlines** (usually a week after release).



LEARNING TOOLS

- Decent internet connection
 - Video lecture watching
 - Exercise submission
- Access to a desktop, laptop, or smartphone
 - Programming exercises
 - Capstone exercise
 - Will try our best to either:
 - Make exercises solvable on slow computers
 - Lend a remote server (VPS) or platform for your programs
- Better to have a camera and microphone for synchronous meetings, if any



CLASS MATERIALS

- Video lectures
- Slides used in video lectures
- Resource/reading links
- Forums
 - UVLe
 - Piazza

CLASS REQUIREMENTS

- Academic output
 - Short quizzes
 - Machine exercises
 - Machine problem/capstone exercise
 - **NO** exams
- Grading rubric, late submissions, the specific stuff...
 - ... to follow. ;(

INSTRUCTOR INFORMATION

Carl C. Dizon

Lecturer

ME Electrical Engineering

carl [dot] dizon [at] eeemail

... or forums via UVLe (or
Piazza)!

OTHER INSTRUCTORS

CoE 163 is co-taught with two other instructors from CNL/UCL:

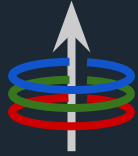
- Isabel A. Montes
- Nestor Michael C. Tiglao



OPEN FORUM

Enjoy and good luck with the course!





CoE 163

Computing Architectures and Algorithms

00: About the Course