

EECE416 :Microcomputer Fundamentals and Design (“Microcomputer & Microprocessor”)

Intel Atom-based Course

Fall 2012

Dr. Charles Kim

Department of Electrical and Computer Engineering

Howard University

Course Introduction

- **EECE416: Microcomputer Fundamentals**
 - Fall 2012
 - CRN 80105
 - MT 1710-1830 @LKD3121
 - * Those who have problem with Monday's schedule can inform Dr. Kim so that he arranges a special session in R 1710-1830 with Mr. Keir Morris.
 - Dr. Charles Kim (LKD 3014) 202-806-4821; ckim@howard.edu
 - **TA and Assistant:**
 - **Mr. Ravi Jaglal:** ravi.jaglal@gmail.com
 - **Mr. Keir Morris:** morriske013@gmail.com
- **Course Focus**
 - Intel Atom-based curriculum based on Intel gift of Atom-based boards
 - Networked and media rich application is now possible
 - Emphasis 1:
 - IA 32 and x86 Architecture as background information – MASM32
 - Emphasis 2:
 - Embedded SW Development and Debug Tools (Application Environments) and Real Time Programming (Hardware/Software) for Atom boards.

Learning Outcomes - ABET

- ⌘ **(c) An ability to design a system component, or process to meet desired needs**
 - ☒ Programming of assigned works
 - ☒ Programming of class projects
- ⌘ **(j) An ability to use the techniques, skills and modern engineering tools necessary for engineering practice**
 - ☒ Familiarity in assembly language coding environment
- ⌘ **(k) A knowledge of contemporary issues**
 - ☒ Assignment on emerging technologies and their socio-cultural impact
 - ☒ Go-green
 - ☒ Sustainability
 - ☒ E-waste
 - ☒ Robots
 - ☒ Patent Disputes
 - ☒ Next Gen Smartphones

Course Structure

⌘ Computer Architecture in General

- ☑ Computer History
- ☑ Computer Architecture-brief (ISA)

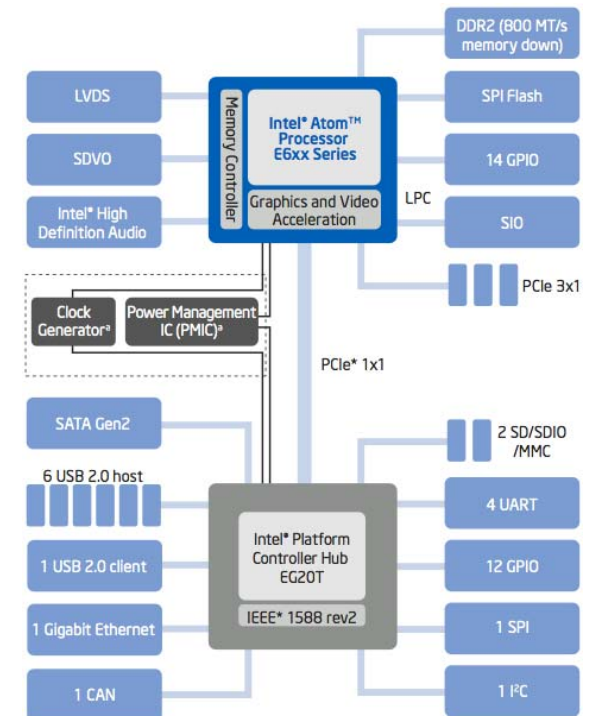
⌘ IA32 and MASM (Microsoft Assembler)

- ☑ Architectural Study
- ☑ Instruction Sets
- ☑ MASM32 and Code Viewer
- ☑ Programming Practices

⌘ Atom-Based Board (“Tunnel Creek”)

- ☑ Architectural study
- ☑ Programming Environments
- ☑ Programming Practices
- ☑ Projects

⌘ Class Web Page: www.MWFTR.com



Text and Resources



⌘ Intro to 80x86 Assembly Language and Computer Architecture,

⌘ Richard Detmer, 2nd Ed

⌘ Helpful Books on System Integration with Intel Atom Processor Board

⌘ “Break Away with Intel Atom Processors” and “Study Guide” by L. M. Matassa and M. Domeika

⌘ “Modern Embedded Computing” by P. Barry and P. Crowley

⌘ **Above two books are available for check out through the course offering**

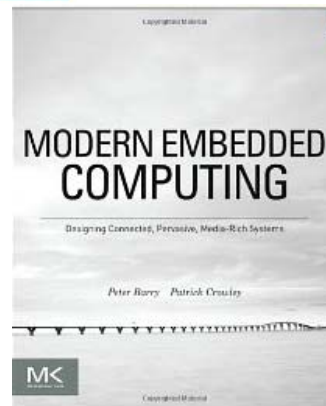
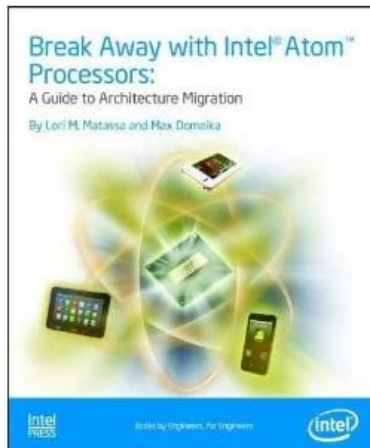
⌘ Resources

⌘ Art of Assembly Language Programming

⌘ Randall Hyde

⌘ <http://www.arl.wustl.edu/~lockwood/class/cs306/books/artofasm/toc.html>

⌘ Chapter 3 →



Course Expectations

- ⌘ Lecture/Programming Lab Combination
- ⌘ Until end of September
 - ☒ Lecture Only (Tuesday 1710-1830; M 1710-1830)
- ⌘ From October
 - ☒ Lecture: Tuesday
 - ☒ Lab (TA: Ravi Jaglal) (Assistant: Keir Morris): M 1710-1830
- ⌘ * If you cannot make Monday, but can come Thursday, please let Dr. Kim know beforehand so that he can arrange Mr. Morris to help you on Thursday.
- ⌘ Active Participation in Lecture and Lab
- ⌘ Timely Submission of Program Practices
- ⌘ An Early and Essential Element for Senior Design Project Implementation & a must for Embedded-Computing Class (Spring 2013)
- ⌘ Individual/Group Works –PC/Laptop use in Classroom is highly recommended (especially in the LAB)

Grading

- ⌘ Mid-term Exam - 20%
- ⌘ Final Exam – 20 %
- ⌘ Coding Assignments – 20%
- ⌘ Atom-Board Project(s) – 20 %
- ⌘ Essay Writing on Contemporary Issues (emerging technology in computer and embedded systems) – 10%
- ⌘ Attendance – 10% (On-time arrival only)
- ⌘ Grades:
 - ☒ A: 90% or above
 - ☒ B: 80 – 89 %
 - ☒ C: 70 - 79 %
 - ☒ D: 60 – 69 %
 - ☒ F: 59% or below

Class Schedule (Tentative)

⌘ August:

- ☑ Week 1 – Class Introduction and Computer History

⌘ September:

- ☑ Week 1 – Computer Architecture
- ☑ Weeks 2 – 4: IA32 & MASM32 & Coding practice

⌘ October

- ☑ Week 1: Mid-Term Exam
- ☑ Weeks 2- 4: Atom Board Intro and Example Codes

⌘ November

- ☑ Weeks 1-2: Atom Board Coding Project
- ☑ Week 3: Submission and Presentation of Project
- ☑ Week 4: Final Exam

Advice for success in the class

- ⌘ Be on time – Important things are covered at the very first moment and at the very first few classes. (80/20 rule)
- ⌘ Finish work in the class – Do not postpone or extend the work to the evening/night hours.
- ⌘ Bring your own Laptop – It would be more convenient and productive than using a PC in the class.
- ⌘ Do your first coding work yourself and master it – all other coding practices will be built on the first work.
- ⌘ **Classroom**
 - ☑ LKD3121
- ⌘ **Office Hour**
 - ☑ TBD
 - ☑ Open Door Policy (except 1200 – 1300 lunch hour)
 - ☑ By appointment (or just walk-in)

Cornell/Intel Cup 2013

- ⌘ 2nd year: USA national contest for embedded systems - Intel Atom board based Design and Implementation
- ⌘ College-level embedded design competition created to empower student teams to become the inventors of the newest innovative applications of embedded technology.
- ⌘ Proposal deadline: October, 2012 (??)
- ⌘ Year-long experience and 2-day summit at Walt Disney World
- ⌘ Open to all **Undergraduate** or **Masters** Engineering and Computer Science students in any accredited US university
- ⌘ **Teams of 3-5 students** will create detailed **design plans**, a **working prototype**, and a **final presentation** that effectively demonstrates the **capabilities and robustness of their ideas**.

