COMP 3221 Administration (1/2)

Lecturer:
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Consultation: Friday 2:00–5:00pm

Lecturer In Charge of the Lab:
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For all issues regarding the lab contact Samir
Course Homepage:

http://www.cse.unsw.edu.au/~cs3221

Course homepage contains:

• All Lecture slides presented in the class.
• All documentations related to the Laboratory Exercises.
• Pointer to supplementary material.
• Announcements.

Check it out frequently!
Syllabus (1/2)

Main Topics:

- Instruction Set Architecture (ISA).
- Number representation, computer arithmetic.
- Assembly and machine language Programming.
- Interrupts and I/O interfacing.
- Serial communication.
- Analog Input and output.
- Buses and memory system.
Syllabus (2/2)

Laboratory exercises:

• AVR assembly programming and I/O interfacing. Tools include AVR Studio, AVR board designed by David Johnson.

Assignment:

• A survey of ARM microprocessor.
• A lift controller using AVR.
Pre-Requisite (1/2)

Digital Circuits (ELEC 1041, COMP 2021)

- Number representation, coding, registers, state machines.
- Realisation of simple logic circuits.
- Integrated circuit technologies.
- Designing with MSI components.
- Flip-Flops & state machines.
- Counters and sequential MSI components.
- Register transfer logic.
- Bus systems.
Pre-requisite (2/2)

Computers and Computing (COMP1011 & COMP1021)

- The von Neumann model: memory/I-O/processing.
- The instruction set and execution cycle.
- Registers and address spaces.
- An instruction set: operations and addressing modes.
- An expanded model of a computer: mass storage and I/O.
- The layered model of a computer: from gate- to user-level.
- C- Language Programming.
Textbooks

-Main references for lecture material


-Additional references


Laboratory Schedule

- Tuesday: 13:00 – 15:00 EE233
  18:00 – 20:00 EE233
- Wednesday: 9:00 – 11:00 EE233
- Friday: 18:00 – 20:00 EE233

- You will be only allowed to attend the lab session that you are enrolled in. No exception allowed.

- Starts in week #3.

Special Open Access labs

- TBA

- Not assessed.

- It is only for those who need a bit of extra time.
Enrolment System in Lab Session

• Run “sirius” booking system form any CSE lab machine.

• Read http://www.cse.unsw.edu.au/%7Ehelpdesk/documentation/SiriusGuideNew.ps as how to run “sirius”.

• Any problem with “sirius", contact Mei-Cheng Whale (meicheng@cse).

• If you want to work with a partner please make sure that both of you enrol for the same lab session.

• You will be paired with a partner randomly if you don’t have one.

Students who DO NOT select their Lab sessions will be not be allowed into the lab.
Lab Format

° In group of two partners.

° You choose your partner in Sign Up Session (Week #3).  
   It CANNOT be changed later.

° You will get a group account.

° No formal report to hand in.

° You are assessed based on a system of checkpoints.

° Assessors mark you check points.

° Lab Demonstrators help you with the lab.
Laboratory Preparation & Catch Up

° You CAN finish the laboratory exercises in the allocated time only if you do the preparation before hand.

° You need to prepare for the laboratory outside the laboratory by:
  • Carefully reading the lab related documentation
  • Writing your program and simulating them at home

° Leaving things to the last minute or walking into the laboratory without preparation may make you fail in this course.

° Go to one of the OPEN ACCESS Sessions if you think you are falling behind.
Laboratory Structure & Specifications

• 5 experiments.
• Each experiment lasts two weeks.
• Lab specifications are available in the course homepage one week before each experiment starts.
Assignments

• Two assignments.

• The first assignment: A Survey of ARM Microprocessor.

• The second assignment: An AVR-Based Lift Controller.

• Details to be announced.
Course Grading Scheme

- Laboratory mark = 25%
- Assignment mark = 25%
  - Assignment 1: 10%
  - Assignment 2: 15%
- Final exam mark = 50%
Why Take This Course?

- Embedded Systems is a big, fast growing industry (US$ 40 billions in 2000).
- Microprocessors/Microcontrollers are the core of embedded systems.
What is an Embedded System?

- A combination of computer hardware and software, and perhaps additional mechanical or other parts, designed to perform a dedicated function. In some cases, embedded systems are part of a larger system or product, as is the case of an anti-lock braking system in a car. Contrast with general-purpose computer.

- Examples range from washing machines, cellular phones to missiles and space shuttles.
Microprocessors are everywhere in our life.
Why AVR?

- RISC architecture with load-store memory access.
- Two-stage instruction pipelining.
- Internal program and data memory.
- Wide variety of on-chip peripherals (digital I/O, ADC, EEPROM, UART, pulse width modulator (PWM) etc.).
Microcontrollers vs Microprocessors

• A microprocessor is a CPU on a single chip.
• If a microprocessor, its associated support circuitry, memory and peripheral I/O components are implemented on a single chip, it is a microcontroller.