



EE 234

Microprocessor Systems

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Course Website

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- Grading
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(your own secret code)
 - (send me your 5-letter code (all uppercase) by email)

Themes

- Assembly programming
- How microprocessors work (basic computer architecture)
- From assembly to C/C++

- At the end of this semester, you will be able to
 - Understand how a microprocessor works.
 - Code ARM assembly programs.
 - Understand a basic computer architecture.
 - Understand computer systems.
 - Convert an assembly code to a C/C++ code and vice versa.

References

- M. A. Mazidi, “ARM Assembly Language Programming & Architecture (ARM Books) (Volume 1)”, 2016, ISBN 978-0997925906
 - ARM assembly language reference
- D. Patterson, “Computer Organization and Design”, 5E, 2013, ISBN 978-0124077263 (MIPS) or 978-0128017333 (ARM) or 978-0128122754 (RISC-V)
 - (Ch. 1 – Ch. 4)
- <https://realdigital.org>

Schedule

| Week | Contents |
|---------------------|--|
| 1 (8/24, 26, 28) | Digital systems (logic circuits, embedded systems, VLSI/ASIC, CPU, memory, etc.) |
| 2 (8/31, 9/2, 4) | Computer systems, arithmetic & logical operations |
| 3 (9/9, 11) | Arithmetic & logical operations |
| 4 (9/14, 16, 18) | Assembly programming (arithmetic, logical, memory, I/O) |
| 5 (9/21, 23, 25) | Assembly programming (arithmetic, logical, memory, I/O) |
| 6 (9/28, 30, 10/2) | Assembly programming (branch, jump, comparison) |
| 7 (10/5, 7, 9) | Assembly programming (branch, jump, comparison), Midterm 1 |
| 8 (10/12, 14, 16) | C programming |
| 9 (10/19, 21, 23) | Function call, memory management, stack |
| 10 (10/26, 28, 30) | Function call, memory management, stack |
| 11 (11/2, 4, 6) | Pointer in C |
| 12 (11/9, 13) | Pointer in C, Midterm 2 |
| 13 (11/16, 18, 20) | Structure, pointer, array |
| 14 (11/23 – 27) | Break |
| 15 (11/30, 12/2, 4) | Structure, pointer, array, project due |
| 16 (12/7, 9, 11) | Compiler, linker, loader |
| Dec. 15 | Final exam (10am – 1pm) |

Grading

- Homework assignments: 10%
- Lab assignments (assembly programming): 25%
- Project: 15%
- Midterms 1, 2: 30% (15% each)
- Final: 20%

- All the exams are **open-book** (you can use whatever you want. Laptops, calculators, books, notes, PPTs, etc.)

Assignments

- Homework & lab assignments
 - Late submission penalty
 - -5%/day
 - maximum -50%
- Labs are very important parts of this course.
 - Lab assignments will be ARM assembly & C programming.
 - No worries! You will learn ARM assembly programming step by step.
 - You will use only basic features of C.
 - You will need a blackboard (<https://realdigital.org>).
 - TAs will be available only during their office hours.