2110714   Digital Systems 2013

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lecture: for weekend class: Sat 12:30-15:30 Eng. Bld. 3, room 17-01

This series of lectures aims to integrate the knowledge of computer systems from the bottom level: functional units, data path, to the high level: operating system, high level language and large scale computing.

This course offers a mix of "hand-on" and "self-investigation".   Many topics that are discussed in class expect students to read and prepare materials beforehand. Students also use simulators to explore a number of basics: logic design, running operating systems on top of a simulated processor .   The system simulation composed of: an instruction-level processor simulator, a compiler, an operating system includes task switcher and message passing. Concurrent application programs will be run on this operating system.

Assessment

homework	20%
small project (may be two)	40%
final exam	40%

Topics

Large scale computing: amazon web services, exascale computing
Modern computer architecture: Haswell, graphics processing units
Processors and operating systems: running concurrent OS on a cpu simulator
Assembly language programming: a simple processor
Logic design: use logic simulator

References

- Chongstitvatana, P., The Essence of Computer System Engineering, in preparation, 312 pages, since 2006. (on the web)
- Katz, R., Contemporary Logic Design, Addison-Wesley Pub Co., 1993.
- Hennessy, J., and Patterson, D., Computer Architecture: a quantitative approach
- Tanenbaum, A., Modern Operating Systems
- Silberschatz, A., Galvin, P., Gagne, G., Operating System Concepts

Additional materials will be hand-out as needed.