4190.308
Computer Architecture

Course Syllabus and Organization

CSE 컴퓨터공학부
Department of Computer Science & Engineering

Teaching Staff

- **Instructor** Bernhard Egger
  bernhard@csap.snu.ac.kr

  Office Hours Tuesdays, 9-12 in my office (301-403)

- **TA Team** Eunjin Song
  Surim Oh
  Changmin Ahn
  comparch@csap.snu.ac.kr

  Office Hours Thursdays, 9-12, 13-15
  in the CSAP lab (301-419)

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Course Organization

- **Lecture**
  - higher level concepts
- **Homework Assignments**
  - every week
  - practice knowledge covered in class, small assignments
  - **prerequisite to participate in the exam**
- **Projects**
  - provide in-depth understanding of computer architecture aspects
  - larger programming assignments
- **Exams / Quizzes**
  - mid-term and final, plus random quizzes here and there
  - test your understanding of computer architecture concepts & principles

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Course Logistics

- **Communication**

eTL	the main channel of communication is through the course website on eTL. Check that site often and regularly! We consider all information posted on eTL read within three weekdays.
Email/SMS	in certain cases we may use eTL's email/SMS functionality to transmit important information to you. All emails/SMS sent to your email address/phone number are considered read within one weekday. → make sure that your email address/phone number in eTL are correct. While you're at it, please also upload a current picture.
Emails to Instructor/TA	use the course email (comparch@csap.snu.ac.kr). You can expect an answer within one weekday.

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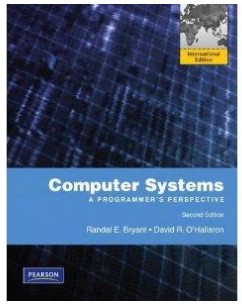
Lectures

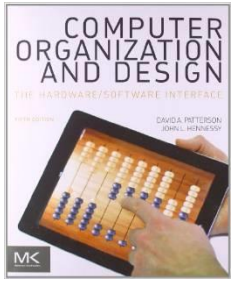
- **Time/Location** — Tuesdays, Thursdays 15:30 – 16:45
  in room 302-409

- **Material** — on eTL
  http://newetl.snu.ac.kr/

- **Textbook** — "Computer Systems: A Programmer's Perspective"
  Randal E. Bryant, David R. O'Hallaron,
  2nd international edition, Pearson, 2011
  (must have)

  "Computer Organization and Design:
  The Hardware/Software Interface"
  David A. Patterson, John L. Hennessy
  5th edition, Morgan Kaufmann, 2013
  (for interested students)





- **Acknowledgements** — slides are based on the cs:app course at CMU

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Projects

- **Material** — on eTL
  http://newetl.snu.ac.kr/
- **Teamwork** — unless stated otherwise, you must work alone on all assignments and projects
- **Submission** — follow the instructions in the assignment
- **Late Policy** — 5 grace days for the entire semester
  once grace days are used up, **20% penalty per day**
  Tip: don't spend them all on the first project

Homework Assignments

- **No teamwork** — work alone on your homework assignments

- **Submission** — - paper handins: drop-off box in class and front of the CSAP lab (301-419)
  - electronic handins: per email to the TA

- **Grading** — homework is checked, but not graded.

  Required number of submissions to participate in the
  - mid-term exam: 5
  - final exam: 5

- **Late Policy** — homework must be submitted by the deadline.

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Exams

- **Two exams**
  - mid-term
  - final

- **Test your understanding of computer architecture concepts & principles**
  - blindly memorizing stuff will not help. A lot of the questions will be based on the homework and projects.

- **Exam logistics**
  - 75 minutes
  - closed book
  - one A4 page (front + back) of *handwritten* notes (original, no copy) allowed

- **Again: you need to submit five (5) homework assignments *in time* to participate in an exam (both for the mid-term and the final exam)**

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Attendance & Participation

- **Attendance**
  - you are old enough to know that you should attend the lectures
  - without notice from you, we assume that you attend the class.
    If you are unable to attend a lecture, you must notify the TA until 15:45 of the same day. ***If you are found to be absent without notification, you get 0% in attendance & participation.***
  - you are allowed to skip two lectures and still get 100% attendance
  - be on time

- **Participation**
  - very much encouraged
  - participation tracking: will try chocolate paper score, may have to find other means

- **Attendance and participation are part of your grade**
  - easy points, make sure not to miss them!

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Grading

- **Grading**

Homework assignments	prerequisite	for exams
Projects	35%	
Mid-term exam	25%	
Final exam	33%	
Quizzes	4%	plus rounding
Attendance & Participation	8%	plus rounding
Total	105%	

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Cheating

- **Cheating is**
  - sharing code
  - copying code from somewhere (previous courses, Internet, …)
  - helping your friend to write an assignment/lab, line by line
  - seeking/receiving/giving any kind of help in exams

- **Penalty for cheating**
  - removal from course with “F” mark
  - notification to department/university

- **If an assignment/lab is too hard for you**
  - ask a colleague to explain the concepts
  - send an email to the TA and have him/her explain things

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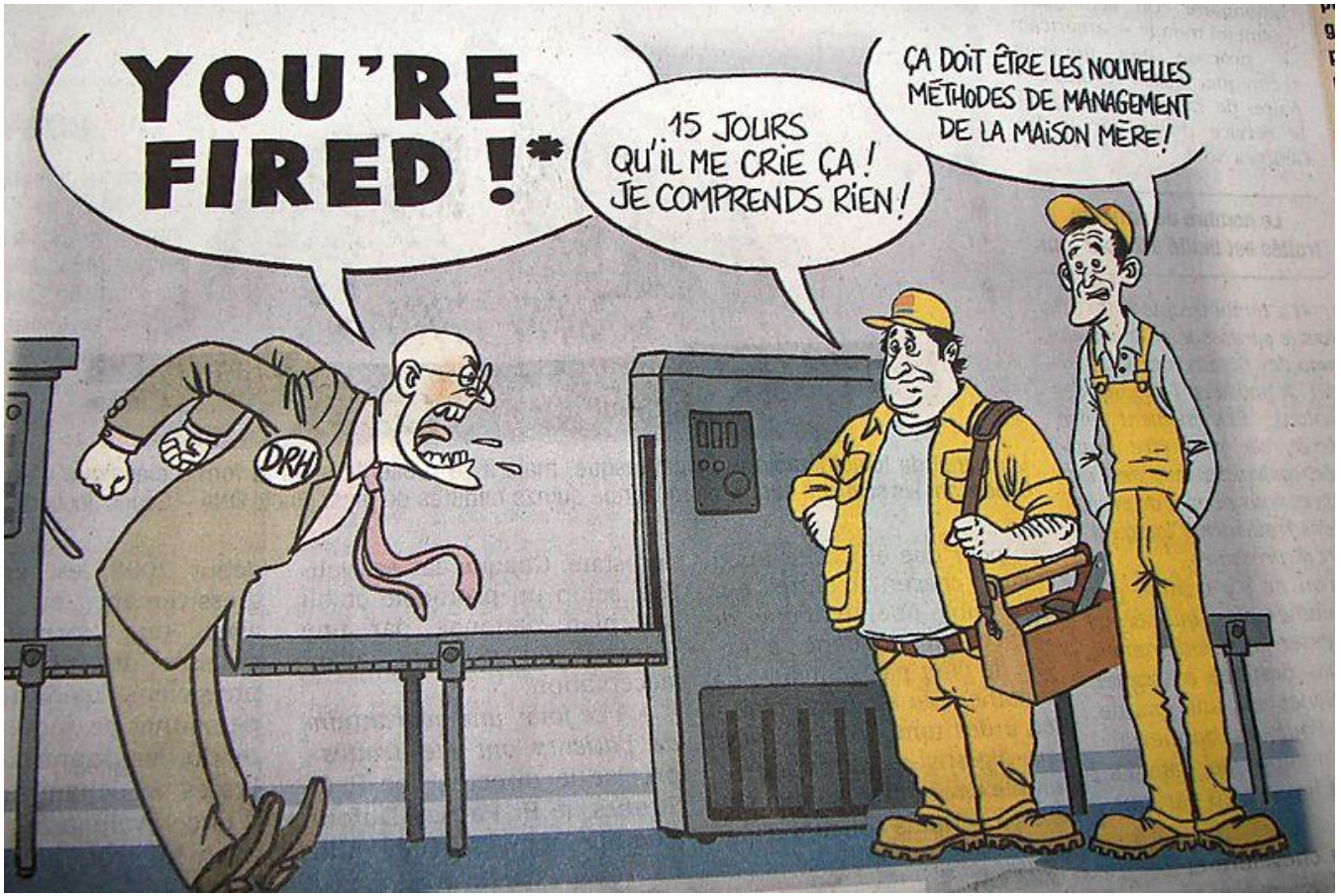
Language



source: http://lost-tans.blogspot.com/

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A Word of Advice

- **Computer Architecture is hard**
  - a tiny mistake/oversight can lead to incorrect behavior
- **Programming requires 10% talent, 40% knowledge, and 50% experience**
  - take every opportunity you have to gain experience (homework assignments, labs, your own ideas, …)
- **This course is hard and requires a lot of time/effort**
  - read the book *before* coming to class
  - unfortunately, I cannot read minds. Ask if you don't understand!
  - start the labs early and ask if you have difficulties

On the positive side: at the end of this class, you will understand how a CPU works and as an added benefit become a better programmer

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Course Schedule

Week	Date	Lecture Topic	Homework (due)	Project
1	09/01 (Tue) 09/03 (Thu)	Introduction to Computer Architecture		Bomb Lab
2	09/08 (Tue) 03/10 (Thu)	The HW/SW Interface (ISA): Basic Operations The HW/SW Interface (ISA): Arithmetic & Control	HW#1	
3	09/15 (Tue) 09/17 (Thu)	The HW/SW Interface (ISA): Control flow structures The HW/SW Interface (ISA): Procedures and Calling Convention	HW #2	
4	09/22 (Tue) 09/24 (Thu)	Processor Architecture: the Y86 Instruction Set Architecture Processor Architecture: Logic Design	HW #3	
5	*09/29 (Tue)* 10/01 (Thu)	*(public holiday (Chuseok) – no class)* ***→ 10/16 09:30-10:45 in 301-107*** Processor Architecture: Sequential Implementation	HW #4	Processor Lab
6	10/06 (Tue) 10/08 (Thu)	Processor Architecture: Sequential Implementation Processor Architecture: Pipelining Basics	HW #5	
7	10/13 (Tue) 10/15 (Thu)	Processor Architecture: Pipelined Implementation The Memory Hierarchy: Introduction	HW #6	
8	10/20 (Tue) 10/22 (Thu)	Recitation Mid-term examination *(class cancellation deadline: 10/21)*	HW #7	

Course Schedule

Week	Date	Lecture Topic	Homework (due)	Project
9	10/27 (Tue) *10/29 (Thu)*	The Memory Hierarchy: Cache Memories *(reading period – no class)*		
10	11/03 (Tue) 11/05 (Thu)	The Memory Hierarchy: Virtual Memory – Concepts	HW#8	Cache Lab
11	11/10 (Tue) 11/12 (Thu)	The Memory Hierarchy: Virtual Memory – Implementation	HW #9	
12	11/17 (Tue) 11/19 (Thu)	Advanced Topics: Parallel Architectures	HW #10	
13	11/24 (Tue) 11/28 (Thu)	Advanced Topics: Virtualization	HW #11	
14	12/01 (Tue) 12/03 (Thu)	Advanced Topics: Modern Processor Architectures	HW #12	
15	12/08 (Tue) 12/10 (Thu)	Recitation Final examination	HW #13	
16	12/15 (Tue) 12/17 (Thu)	Make-up classes		

"no plan survives contact with reality"

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Classroom Etiquette

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Dos and Don’ts

- Dos
  - come to class **to listen, learn, and participate**
  - turn your **mobile phone off/on mute and put it away** during class

- Don’ts
  - **no food and drinks** allowed in the classroom / lab
    - exception: exams
  - **no hats, baseball caps**, etc
    - exception: cover for religious reasons
  - **don’t use your tablet, laptop**
    - except to follow the lecture

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E-Mail Etiquette

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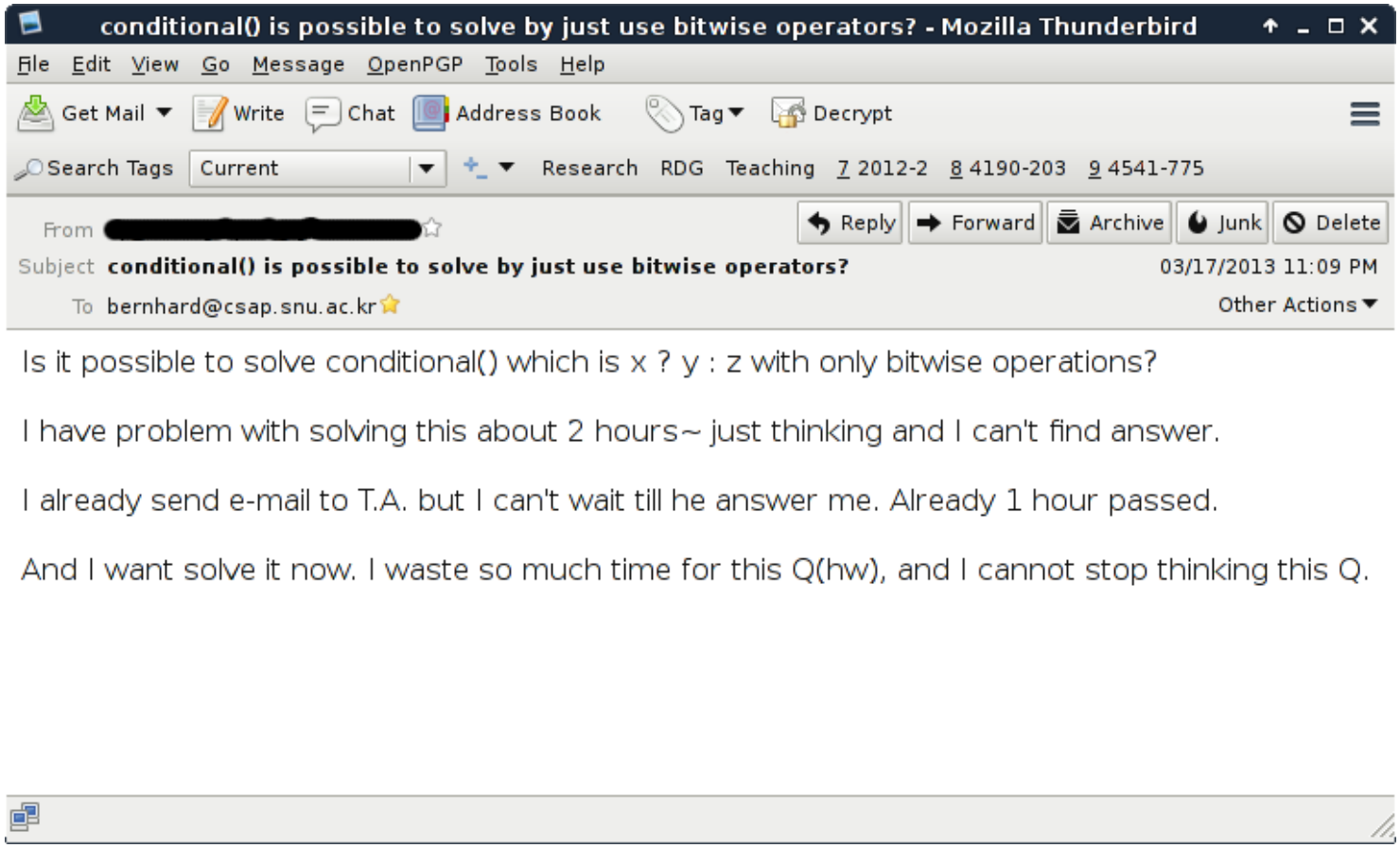
Example



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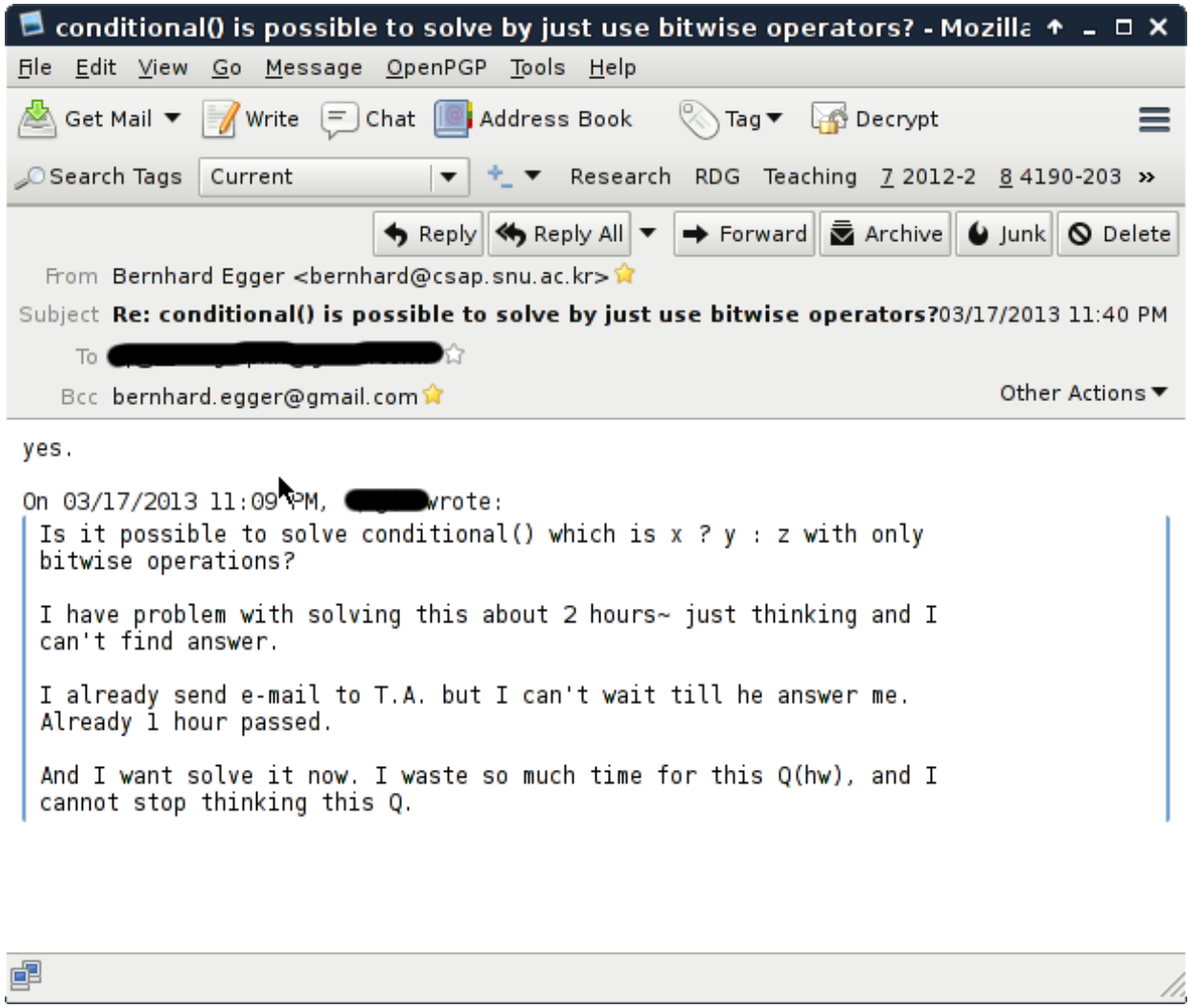
The Answer



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Don’ts

- Meaningless subject
  - “URGENT”
  - “I need help”
- Empty body
  - Subject: Need help with the data lab
- No/impolite greetings, salutation
  - Hi, prof!
- Smileys, emoticons, excessive use of punctuation, etc
  - Help me please ^**^ ☺ ORZ…..!!!!
- Expecting an answer within 1 hour

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Dos

- State your name, student-number, and class
- Use a meaningful subject
- Be polite
  - salutation
    - Dear Prof. Egger
    - Dear TA
  - greetings
    - Best,
Cheolsoo Lee
2014-12345
- Write some content!

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Dos

- Example

  [CompArch] Question regarding Homework #3

  Dear TA,

  I have tried to download the paper as instructed in the handout, but the link to the external material in homework #3 seems to be broken. Could you please check? Thank you!

  Best regards,
  Cheolsoo Kim
  2014-12345

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