A Page in the UCSB ECE Web Site of Behrooz Parhami

UCSB

ECE 1: Previous Offerings of the Seminar

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Go up to: B. Parhami's course syllabi or his home page

Background and history of ECE 1

This 1-unit freshman seminar (offered for the first time in spring 2007) was proposed and developed by Professor Parhami. The main goal of the seminar is to expose incoming students to challenging computer engineering problems, faced by practicing engineers and research scientists, in a way that is both entertaining and motivating. The course is useful because CE students have very limited exposure to key concepts in their chosen major during their initial studies that involve mostly foundational, basic science, and general-education courses.

Special note: Web links in the following descriptions may be out of date. Please refer to the most recent offering of ECE 1 for up-to-date information.

Link to the most recent offering of ECE 1

Previous offerings of ECE 1

- Spring Quarter 2008
- Spring Quarter 2007

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ECE 1: Spring Quarter 2008 offering

This area is reserved for important course announcements: **The spring 2008 offering of the course is now over. Thank you for your comments and suggestions. Have a pleasant summer!**

Course:	ECE 1 – Ten Puzzling Problems in Computer Engineering, University of California, Santa Barbara, Spring Quarter 2008, Enrollment Code 09852
Catalog entry:	**1. Ten Puzzling Problems in Computer Engineering.** (1) PARHAMI. *Prerequisite: open to pre-computer engineering only. Seminar, 1 hour.* Gaining familiarity with, and motivation to study, the field of computer engineering, through puzzle-like problems that represent a range of challenges facing computer engineers in their daily problem-solving efforts and at the frontiers of research.
Instructor:	Behrooz Parhami, Room 5155 HFH (Engineering I), Phone 805-893-3211, E-mail parhami at ece.ucsb.edu
Meetings:	W 5:00-6:15, in Phelps 1260
Consultation:	Open office hours, held in Room 5155 HFH (Engineering I) – T 9:00-10:30, R 10:00-11:30
Motivation:	Whether they work in the industry or in academic research settings, computer engineers face many challenges in their quest to design or effectively employ faster, smaller, lower-energy, and more cost-effective systems. Most computer engineering students do not begin tackling such problems, and more generally are not exposed to specific challenges of their field of

study, until they enroll in upper-division major courses. Meanwhile, during their freshman- and sophomore-year experiences with foundational courses in mathematics, physics, electrical circuits, and programming, they wonder about where they are headed and what types of problems they will encounter as working professionals. This course is intended to provide an introduction to day-to-day problems and research endeavors in computer engineering via their connections to familiar mathematical and logical puzzles.

Prerequisite: Open to pre-computer engineering and computer engineering majors only.

References: Textbook (required or recommended) – None.
Presentations – All lectures will be posted in PowerPoint and PDF formats to this website.
Handouts – A handout/worksheet (also available on the website) will be distributed in class.

Evaluation: Pass/Fail grading is based on attendance and class participation. There will be no homework or exam.
0 or 1 absence: Automatic "Pass."
2 absences: "Pass" if you had prior approval for your 2nd absence or else had strong participation in class or out of class (via e-mail).
3 absences: Can earn a "Pass" by taking a final oral exam covering the three missed lectures.
4 or more absences: "Fail."
Attendance will be taken as follows. Single-sheet handouts will be distributed at the beginning of each class session (additional sheets will be supplied to students who arrive no more than 10 minutes late). Students are to write their names and perm numbers on the sheets and hand them in before leaving the classroom at the end of the lecture.

Calendar:

Topics for class discussion have been scheduled as follows.

Day/Date	Topic of Discussion	Lead Puzzle	Special Notes
W 4/2	Easy, hard, impossible!	Collatz's conjecture	http://en.wikipedia.org/wiki/Collatz_conjecture
W 4/9	Placement and routing	Houses and utilities	http://mathforum.org/dr.math/faq/faq.3utilities.html
W 4/16	Satisfiability	Making change	http://mathforum.org/library/drmath/view/68609.html
W 4/23	Cryptography	Secret messages	http://www.antilles.k12.vi.us/math/cryptotut/intro.htm
W 4/30	Byzantine generals	Liars and truth-tellers	http://www.math.uchicago.edu/~antonio/MEC/liars.html
W 5/7	Binary search	Counterfeit coin	http://www.delphiforfun.org/Programs/counterfeitcoin.htm
W 5/14	Task scheduling	Sudoku	http://www.websudoku.com
W 5/21	String matching	Word search	http://puzzlemaker.school.discovery.com/
W 5/28	Sorting networks	Rearranging trains	http://www.americanscientist.org/template/AssetDetail/assetid/54774
W 6/4	Malfunction diagnosis	Logical reasoning	http://www.expandyourmind.com/logicproblems/

Presentations

The following PowerPoint presentations (up to 2^+ MB each), and equivalent PDF files, are updated periodically by the instructor. Note that any animation in the PowerPoint presentations is lost in the pdf versions. When a particular presentation/handout file has been updated for spring 2008, you will see a 2008 date in front of it; otherwise, the presentation is from last spring's offering of the course. [Note added on 2008/12/01: The following presentations may have undergone further revisions since spring 2008.]

- Binary search (ppt file, pdf file, handout, updated 2008/05/07)
- Byzantine generals (ppt file, pdf file, handout, updated 2008/04/30)
- Cryptography (ppt file, pdf file, handout, updated 2008/04/23)
- Easy, hard, impossible! (ppt file, pdf file, handout, updated 2008/04/02)
- Malfunction diagnosis (ppt file, pdf file, handout, updated 2008/05/30)
- Placement and routing (ppt file, pdf file, handout, updated 2008/04/10)
- Satisfiability (ppt file, pdf file, handout, updated 2008/04/23)
- Sorting networks (ppt file, pdf file, handout, updated 2008/05/28)
- String matching (ppt file, pdf file, handout, updated 2008/05/19)
- Task scheduling (ppt file, pdf file, handout, updated 2008/05/14)

The following additional topics may be included in future:

- Computational geometry
- Loss of precision
- Secret sharing
- Amdahl's law
- Predicting the future
- Circuit value problem
- Maps and graphs

Record of student absence (1) and presence (0); "Merp" is the first few digits of the reversed Perm #

Merp	1	2	3	4	5	6	7	8	9	10	All	Merp	1	2	3	4	5	6	7	8	9	10	All
01	0	0	0	1	0	0	1	0	0	0	2	60	0	0	0	0	0	0	1	0	0	0	-
07	0	0	0	0	0	0	0	1	0	0	-	6371	0	0	0	0	1	0	0	0	0	0	-
080	0	0	0	0	0	1	0	0	0	0	-	6378	0	0	0	0	0	0	0	0	0	1	-
083	0	0	0	1	0	0	0	0	0	0	-	65	0	1	0	0	0	1	0	0	0	1	3
101	0	0	1	0	0	0	0	0	0	0	-	68	0	0	0	0	1	0	0	1	0	1	3
105	0	0	0	0	0	0	0	0	0	1	-	70	0	0	0	0	0	0	1	0	0	0	-
15	0	1	0	0	0	0	0	0	0	0	-	75	0	0	0	0	0	0	0	1	0	0	-
22	0	0	0	0	0	0	1	0	0	0	-	800	0	0	0	0	0	0	0	0	1	0	-
27	0	0	0	0	0	0	0	0	0	0	-	804	0	0	0	0	1	0	0	0	0	0	-
41	0	0	0	0	0	0	1	0	0	0	-	805	0	0	0	0	0	1	0	0	0	0	-
48	0	0	0	0	0	0	0	0	0	0	-	81	0	0	0	0	0	0	1	0	0	0	-
50	1	0	0	0	0	0	0	0	0	0	-	83	0	0	0	0	0	0	0	0	0	0	-
51	0	0	0	0	0	0	0	0	0	1	-	84	0	0	0	0	0	0	0	1	0	0	-
54	0	0	0	0	0	0	0	0	0	0	-	880	0	0	0	0	0	0	0	0	0	0	-
55	0	0	1	0	0	0	0	0	0	0	-	888	0	0	0	0	0	0	1	0	0	0	-
57	0	1	0	0	0	0	1	0	0	0	2	9	0	1	0	0	0	0	0	1	0	0	2

ECE 1: Spring Quarter 2007 offering

This area is reserved for important course announcements: **The spring 2007 offering of the course is now over. Thank you for your comments and suggestions. Have a pleasant summer!**

Course:	ECE 1 – Ten Puzzling Problems in Computer Engineering, University of California, Santa Barbara, Spring Quarter 2007, Enrollment Code 53348
Catalog entry:	**1. Ten Puzzling Problems in Computer Engineering.** (1) PARHAMI. *Prerequisite: open to pre-computer engineering only. Seminar, 1 hour.* Gaining familiarity with, and motivation to study, the field of computer engineering, through puzzle-like problems that represent a range of challenges facing computer engineers in their daily problem-solving efforts and at the frontiers of research.
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Prerequisite: Open to pre-computer engineering and computer engineering majors only.

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3 absences: Can earn a "Pass" by taking a final oral exam covering the three missed lectures.
4 or more absences: "Fail."
Attendance will be taken at the beginning of each class period. If you arrive late, it is your responsibility to see the instructor after class.

Calendar:

Topics for class discussion have been scheduled as follows.

Day/Date	Subject of Discussion	Lead Puzzle	Special Notes
W 4/4	Easy, hard, impossible!	Collatz's conjecture	http://en.wikipedia.org/wiki/Collatz_conjecture
W 4/11	Placement and routing	Houses and utilities	http://mathforum.org/dr.math/faq/faq.3utilities.html
W 4/18	Satisfiability	Making change	http://mathforum.org/library/drmath/view/68609.html
W 4/25	Cryptography	Secret messages	http://www.antilles.k12.vi.us/math/cryptotut/intro.htm
W 5/2	Byzantine generals	Liars and truth-tellers	http://www.math.uchicago.edu/~antonio/MEC/liars.html
W 5/9	Binary search	Counterfeit coin	http://www.delphiforfun.org/Programs/counterfeitcoin.htm
W 5/16	Task scheduling	Sudoku	http://www.websudoku.com
W 5/23	String matching	Word search	http://puzzlemaker.school.discovery.com/
W 5/30	Sorting networks	Rearranging trains	http://www.americanscientist.org/template/AssetDetail/assetid/54774
W 6/6	Malfunction diagnosis	Logical reasoning	http://www.expandyourmind.com/logicproblems/

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- Byzantine generals (ppt file, pdf file, handout, updated 2007/05/02)
- Cryptography (ppt file, pdf file, handout, updated 2007/04/25)
- Easy, hard, impossible! (ppt file, pdf file, handout, updated 2007/04/20)
- Malfunction diagnosis (ppt file, pdf file, handout, updated 2007/06/04)
- Placement and routing (ppt file, pdf file, handout, updated 2007/04/20)
- Satisfiability (ppt file, pdf file, handout, updated 2007/04/20)
- Sorting networks (ppt file, pdf file, handout, updated 2007/05/31)
- String matching (ppt file, pdf file, handout, updated 2007/05/23)
- Task scheduling (ppt file, pdf file, handout, updated 2007/05/11)

The following additional topics may be included in future:

- Computational geometry
- Loss of precision
- Secret sharing
- Amdahl's law

ECE 1: Computer Engineering Freshman Seminar

- Predicting the future
- Circuit value problem
- Maps and graphs

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