Syllabus
CSC218 Computer Organization
Professor Leon Tabak
Block 4
November 27, 2017 to December 20, 2017

Our daily schedule of reading and writing assignments will be subject to revision throughout the term. Please visit this page regularly to look for updates.

1 Our meeting times and places

- My office is in Law 206C.

- You may call me in my office at (319) 895 4294.

- You may send me electronic mail at l.tabak@ieee.org.

- I will be in my office and available to meet with you Monday through Friday from 3:00 p.m. until 3:30 p.m.

- We will all meet together in the classroom in the mornings and in the laboratory in the afternoons.

	Where	When
Classroom	Law Hall 109	9 a.m. to 11 a.m.
Laboratory	Law Hall 113	1 p.m. to 3 p.m.

2 Resources

- The Elements of Computing Systems: Building a Modern Computer from First Principles, Noam Nisan and Shimon Schocken, The MIT Press, Cambridge, Massachusetts, 2005, ISBN 0-262-14087-X

- Build a modern computer from first principles: from NAND to Tetris

- Professor Alan J. Rosenthal's CSC 258 Computer Organization course at the University of Toronto

3 Etiquette for the Classroom

Please show respect to your classmates, to me, and to the seriousness of our enterprise by exercising the following courtesies:

- Please give your attention to whomever is speaking. You cannot view unrelated pages on the Web and be part of our class' discussion at the same time.

- You learn from your classmates. Be generous in offering help to classmates in the laboratory. Take interest in your classmates' work. Encourage them. Compliment them for work that is well done. Give them a good audience when they stand at the front of the room to present their work. Show these courtesies to all of your classmates.

- Please do not interrupt the class by late entries or early departures. If you anticipate a need to be absent from all or part of one of our meetings, please notify me in advance of your anticipated absence.

- You may listen to music while working in the laboratory so long as you are still able to hear your name when called and you do not disturb neighbors.

- Please refrain from bringing food or drink into the classroom or laboratory. We can make reasonable exceptions for eating that is not noisy and foods that do not have strong smells.

  Acceptable beverages and foods include water, tea, and granola bars. Bringing breakfast to class is not courteous.

  Please clean up crumbs and spills. Please dispose of empty containers and leftovers.

- Please dress as you might for an employer in the software engineering industry. Please keep your shoes on. Wearing hoods, hats, or sunglasses (except when there is a medical reason for shielding the eyes) that hide your face is not courteous.

- Imagine that you are seeking employment. How will you present yourself to your prospective employer?

  Imagine that you are now employed in a software engineering firm. How will you speak to your teammates, the head of your team, and your company's clients?

  Imagine that your grandmother has purchased the company for which you work. She has joined you in the company's conference room to hear and see you walk through the code that you have written for the company (her company).

  Are there some words that you will keep out of your vocabulary during this hour?

4   Policies

Cornell College is committed to providing equal educational opportunities to all students. If you have a documented learning disability and will need any accommodation in this course, you *must* request the accommodation(s) from the instructor of the course and no later than the third day of the term. Additional information about the policies and procedures for accommodation of learning disabilities is available on Cornell College's Web site.

Please also familiarize yourself with the college's statement on academic honesty and its policies for dropping courses.

5   Goals

We will give special attention to three of Cornell College's Educational Priorities and Outcomes:

- Knowledge—you will gain familiarity with protocols for data commmunication, you will learn how layers of abstraction make the design of complex systems easier, and you will learn how to use a variety of tools for diagnosing problems on networks and building applications that use networks.

- Reasoning—-you will learn how to trace the passage of a message from sender to receiver.

- Citizenship—in this project-oriented course you will learn how to collaborate with classmates. You will learn with one another and from one another.

6   Grades

Written work will be due on each day of the term except for the first day and the last day. Printed copies and electronic copies of your papers will be due at 9 a.m.

Experience presenting work to peers will be a central part of the course. Practice asking your teammates questions during their presentations, critiquing their decisions, and suggesting improvements to their code will also be an important part of your education during this term. We will schedule one day in each week of the term for you to present your work.

Activity	Points
Daily work	20
Graded exercise 1 (Friday, 01 December 2017)	20
Graded exercise 2 (Friday, 08 December 2017)	20
Graded exercise 3 (Friday, 15 December 2017)	20
+ Graded exercise 4 (Wednesday, 20 December 2017)	20
	100

7 Calendar

	Mon	Tue	Wed	Thu	Fri
Week 0	27	28	29	30	01
Week 1	04	05	06	07	08
Week 2	11	12	13	14	15
Week 3	18	19	20	21	22

8 Schedule

8.1 Week 0

8.1.1 Monday, 27 November 2017

Read: Read the Preface on pages ixxiv in *The Elements of Computing Systems* .

Learn about people in the field that we are studying. Read an article by or about one of these people:

- Gordon Bell's homepage

- Peter J. Denning's homepage

- Carver Mead's homepage

- David Patterson's homepage

- Andrew S. Grove Dies at 79; Intel Chief Spurred Semiconductor Revolution (New York Times, 21 March 2016)

- 50 Years of Moore's Law (Intel Corporation Website)

- [Robert Noyce, Statesman of Silicon Valley](#) (Intel Corporation Website)

- [A Conversation with Federico Faggin](#)

- [The Designer Behind the First Microprocessor: Federico Faggin](#)

- [The Chip that Jack Built](#) (Texas Instruments Website)

- [Sir Maurice Wilkes Obituary: Scientist who built the first practical digital computer](#) (The Guardian, 30 November 2010)

Discuss:

Write: Write a 256–512 word summary of an article by or about one of the pioneers of our field.

Return to calendar.

8.1.2 Tuesday, 28 November 2017

Read: Read Chapter 1 on pages 1–28 in *The Elements of Computing Systems*. .

Discuss:

Write: There is no written work due today.

Return to calendar.

8.1.3 Wednesday, 29 November 2017

Read: Read and summarize one of these articles:

- [Microprocessors in 2020](#) (David Patterson, Scientific American, September 1995)

- [The Future of the Microprocessor Business](#) (Michael J. Bass and Clayton Christensen, IEEE Spectrum, 1 April 2002)

- [The Future of Microprocessors](#) (Kunle Olukotun and Lance Hammond, ACM Queue, Volume 3, Issue 7, 18 October 2005)

Discuss:

Write: Write a 256–512 word summary of one of the articles about the future of microprocessors.

8.1.4   Thursday, 30 November 2017

Read: Read Chapter 2 on pages 29–40 in *The Elements of Computing Systems.* .

Discuss:

Write: There is no written work due today.

8.1.5   Friday, 01 December 2017

Read: Begin to learn about the instruction set, addressing modes, and the structure of instructions for an old but very elegant and influential design:

- The PDP-11 Assembly Language

- Example PDP-11 Programs

Discuss:

Write: Graded Exercise 0.

Report on projects described in Chapters 1 and 2 of *The Elements of Computing Systems* due.

8.2 Week 1

8.2.1 Monday, 04 December 2017

Read:

- Moore's Law is really dead: what next?

Discuss:

Write: Write a 256–512 word response to the video.

Return to calendar.

8.2.2 Tuesday, 05 December 2017

Read: Read Chapter 3 on pages 41–55 in *The Elements of Computing Systems.* .

Discuss:

Write: There is no written work due today.

Return to calendar.

8.2.3 Wednesday, 06 December 2017

Read: View one of these talks about RISC:

- Instructions sets want to be free: A case for RISC-V
- MIPS: Risking it all on RISC

Discuss:

Write: Write a 256–512 word summary of the video.

Return to calendar.

8.2.4   Thursday, 07 December 2017

Read: Read Chapter 4 on pages 57–77 in *The Elements of Computing Systems. .*

Discuss:

Write: There is no written work due today.

Return to calendar.

8.2.5   Friday, 08 December 2017

Read:

Discuss:

Write: Graded Exercise 1.

Report on projects described in Chapters 3 and 4 of *The Elements of Computing Systems* due.

Return to calendar.

8.3   Week 2

8.3.1   Monday, 11 December 2017

Read: This is a break from computer organization—learn more about the most important unanswered question in computer science.

- MIT News Explained: P vs. NP

- The Blog of Scott Aaronson: Reasons to Believe

Discuss:

Write: Write a 256–512 word response to the articles.

8.3.2 Tuesday, 12 December 2017

Read: Read Chapter 5 on pages 79–101 in *The Elements of Computing Systems.* .

Discuss:

Write: There is no written work due today.

8.3.3 Wednesday, 13 December 2017

Read: Gene Amdahl gave us a simple but profound observation about parallel computations:

- Amdahl's Law, Gustafson's Trend, and the Performance Limits of Parallel Applications (Matt Gillespie, Intel White Paper)

Discuss:

Write: Write a 256–512 word response to the article.

8.3.4 Thursday, 14 December 2017

Read: Read Chapter 6 on pages 103–120 in *The Elements of Computing Systems.* .

Discuss:

Write: There is no written work due today.

8.3.5   Friday, 15 December 2017

Read:

Discuss:

Write: Graded Exercise 2.

Report on projects described in Chapters 5 and 6 of *The Elements of Computing Systems.* due.

8.4   Week 3

8.4.1   Monday, 18 December 2017

Read: View one of these videos:

- David Patterson: How to be a bad professor
- David Patterson: How to have a bad career

Discuss:

Write: Write a 256–512 word summary of lessons that you learned from your viewing.

8.4.2   Tuesday, 19 December 2017

Read:

Discuss:

Write: Review and evaluate course.

8.4.3   Wednesday, 20 December 2017

Read: Review Chapters 1–6 in *The Elements of Computing Systems*

Discuss:

Write: Graded Exercise 3.

8.4.4   Thursday, 21 December 2017

Block Break   We will not meet today.
There is no work due today.

8.4.5   Friday, 22 December 2017

Block Break   We will not meet today.
There is no work due today.