Slide 1

University of Illinois at Urbana-Champaign
Dept. of Electrical and Computer Engineering

ECE 120: Introduction to Computing

Introduction and Overview

Slide 2

ECE120: Introduction to Computing

Lectures

Prof. V. Kindratenko	**AEL**	M/W/F 8:00-8:50	East Theater Hall 204
	BEL	M/W/F 9:00-9:50	East Theater Hall 204

Discussions

Yucheng Jin, *yucheng.17@intl.zju.edu.cn* Huili Tao, *huili.18@intl.zju.edu.cn*	ED1 W 13:00-13:50	LTW 201/202
Xinyu Lian, *xinyul.18@intl.zju.edu.cn* Yichi Zhang, *yichi.18@intl.zju.edu.cn*	ED2 W 13:00-13:50	LTW 204/205
Qi Gao, *qigao.17@intl.zju.edu.cn* Xiwei Wang, *xiwei.18@intl.zju.edu.cn*	ED3 W 13:00-13:50	LTW 207/20

Slide 3

What is ECE120?

◦ Teach a systems perspective that includes both hardware and software (and math!)
◦ ECE culture and goals
◦ Expectations of engineers
◦ Lifelong learning necessary
◦ Understand and identify tradeoffs
◦ International teachers—leverage it!
◦ Academic reality and grade philosophy

Slide 4

Computers are Universal Computation Devices

Described by Alan Turing in 1936

Sunway TaihuLight
LC-3
iPad
Android phone
computable
undecidable
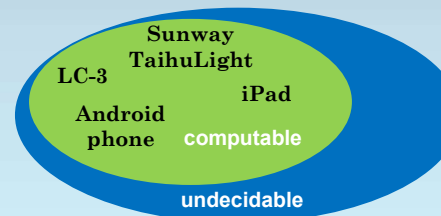
space of problems to solve (& examples of computers that solve each subspace)

Church-Turing Hypothesis: Computers and humans can compute the same things.

More Neurons than Transistors?

"The apparatus they [animals] use for timing their movements has more in common with an electronic computer, although it is strictly different in fundamental operation. The basic unit of biological computers, the nerve cell or neurone, is really nothing like a transistor in its internal workings. Certainly the code in which neurones communicate with each other seems to be a little bit like the pulse codes of digital computers, but the individual neurone is a much more sophisticated data-processing unit than the transistor. Instead of just three connections with other components, a single neurone may have tens of thousands. The neurone is slower than the transistor, but it has gone much further in the direction of miniaturization, a trend which has dominated the electronics industry over the past two decades. This is brought home by the fact that there are some ten thousand million neurons in a human brain: you could pack only a few hundred transistors into a skull."

--Richard Dawkins, "The Selfish Gene," Oxford University Press, New York and Oxford, 1976, p. 51

Today: Billions of Transistors

Dawkins was writing in 1976.

Moore's Law continued.

1997: Pentium released, **4.5 million** transistors

Today: **4.3 billion** transistors on **541mm^2**

(Denser in 2012: **1.4B** transistors on **160mm^2**)

Smaller than neurons!

… still only 3 terminals

ECE Has Undergone a Digital Convergence

Many alumni, including EEs, in the industry are now computer people.

Most solutions are digital.

Digital system design provides a critical set of skills needed by nearly every ECE grad.

These skills will enable you to go further faster…

Bottom Up Approach Provides a Firm Understanding

Why do we build from the ground up?
◦ Helps you develop of solid understanding of the design an operation of each level.
◦ Easier to make effective use of abstractions and to improve those abstractions.
◦ Our students have been successful based on this approach (alumni feedback).

Where to Find Information

Start with the Wiki!

Remember this link:

https://wiki.illinois.edu/wiki/display/zjuiece120

Do not get confused with this link!

https://wiki.illinois.edu/wiki/display/ece120

Read the Wiki Every Day

https://wiki.illinois.edu/wiki/display/zjuiece120

What you will find includes:
◦ announcements from course staff
◦ course information and timing
◦ assignments, solutions, exams, and due dates

Piazza will be our place for exchanging information
◦ http://piazza.com/intl.zju.edu.cn/spring2020/ece120/home
◦ ask any non-personal questions here
◦ do not post answers

What to Read (and What Not to Read)

Reading materials
◦ Patt & Patel, 2nd edition
◦ ~150 pages of notes (free online)

Read the notes (see the Wiki for which parts)
◦ before class
◦ AND after class

Look at learning objectives in
notes summary sections.

Use the online tools to practice skills.

Be wary of the Web. No one has
screened the content for accuracy.

Workload Includes Labs and Homework

Weekly lab assignments
◦ Software and hardware
◦ Usually due Fridays at 9 p.m.
◦ See assignment for specifics of how and when to turn
  in

FIRST LAB: due on Friday, February 21st

Weekly homework assignments
◦ Paper and computer-based
◦ Due Wednesdays at 9 a.m. at the start of lecture

FIRST HOMEWORK: due Wednesday, February 26th

Workload Also Includes Exams

Three midterms
◦ Midterm 1 will cover ~ Lectures 1-9
◦ Midterm 2 will cover ~ Lectures 10-19
◦ Midterm 3 will cover ~ Lectures 20-30

Final exam
◦ Covers entire course

If you have a conflict, **let us know early**!
(specific deadlines are on the Wiki)

And Workload Includes Discussions

A question for you:

What skill least developed in many ECE grads?

The answer that many alumni and
employers give: **soft skills**!

In discussion section every Wednesday, you will…
◦ work in small groups
◦ solve fun problems related to lecture together
◦ practice working with others

How Will We Grade?

Labs   15% *
Homework   15% *
Discussions   5%   *
Midterms   10%, 15%, 15%
Final   25%

* Lowest scores (of all weeks) dropped for labs,
homeworks, and discussion sheets.

No late assignments accepted.

ECE120 Grading Scale is Absolute

90% of total points → A of some sort

80% of total points → B of some sort

70% of total points → C of some sort

(more detail on the Wiki)

Many of your classes here will be curved.

Don't Cheat!

See **the Academic code**.

Discussion sections are done in groups.

In some labs you will have partners.

Otherwise, work must be your own.

It's ok to talk and help each other understand, but it's not ok to give/share/lend/copy/allow someone to copy answers.

Your Guide to the Slides

The title gives the main point.

Definitions and **key messages** in bold blue.

Parameters and **variables** in bold green.

Other colors used on a per-slide basis.