Welcome to
"Solving Problems with Computers I"

CS 16: Solving Problems with Computers I
Lecture #1

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Dept. of Computer Science, UCSB

A Word About Registration for CS16

FOR THOSE OF YOU NOT YET REGISTERED:

- This class is currently **FULL**
- If you are on the waitlist, you will be added automatically as others drop the course
- If you are not on the waitlist, you will not get into this class
- If you are an extension student, please see me after class

Your Instructor

Your instructor: **Ziad Matni** *(zee-ahd mat-knee)*

Email: ***zmatni@cs.ucsb.edu***

(please put **CS16** at the start of the subject header)

My office hours: Tuesdays **10:00 AM – 12:00 PM**, at **SMSS 4409**

(or by appointment)

Your TAs

TA NAME	LAB SECTION	OFFICE HOURS
Sujaya Maiyya	Wed. 8 am	Mon. 3 – 5 PM
Jinjin Shao	Wed. 9 am	Thu. 3 – 5 PM
Nataly Moreno	Wed. 10 am	Wed. 2 – 4 PM
Bay-Yuan Hsu *(grader)*	-	-

All labs will take place in **PHELPS 3525**
All TA office hours will take place in **TRAILER 936**


402
451
Phelps
Hall
560
Physical
Science
(570)
570
489
936
935
232
598
YOU ARE HERE
Buchanan
Hall
573
657
Physical
Science North
(PSB North)

TRAILER 936

You!

With a show of hands, tell me… how many of you…

A. Are Freshmen? Sophomores? Juniors? Seniors?
B. Are CS majors? Other?
C. Have programmed before? What language?
D. Have programmed before “just for fun”?
E. Have programmed before “for work or school”?
F. Have used a Linux or UNIX system before?

This Class

- An **intermediate** (not a beginner's) class in computer science
  - You WILL need to have taken a beginner's class somewhere
- Covers the **basic building blocks for solving problems** using computers, in general, and using **C++ programming** specifically
  - ***Why*** C++?
- Enables you to go on to take other exciting classes in programming!!!!! OMG!!!

Why Are We Using C++ in this Course?

- ***C++ is one of the most widely used and in-demand programming languages***
  - For a list of commercial applications written in C++, see http://www.stroustrup.com/applications.html
- If you can learn C++, you can more easily learn (or even teach yourself) other popular P.L.s
  - Like Python, Java, Ruby, etc…
- It looks great on your resume!
  - Actually, it's a must on any "decent" CS major's resume…

How Is This Class Taught?

- Every class has a lecture based on the readings

  YOU MUST DO THE READINGS BEFORE CLASS!!!

- You will be in a lab on Wednesdays

  YOU MUST READ YOUR LAB ASSIGNMENT BEFORE YOU GO TO LAB!!!

- You have to do a lot of (short) homeworks and (not-so-short) lab assignments

  PRACTICE MAKES PERFECT!!!

There's ~~actual~~ A LOT OF "work" to do…

- 15-16 Homeworks
- 9-10 Lab Assignments
- 2 Midterm Exams
- 1 Final Exam

… and a partridge in a pear tree…

Resources?

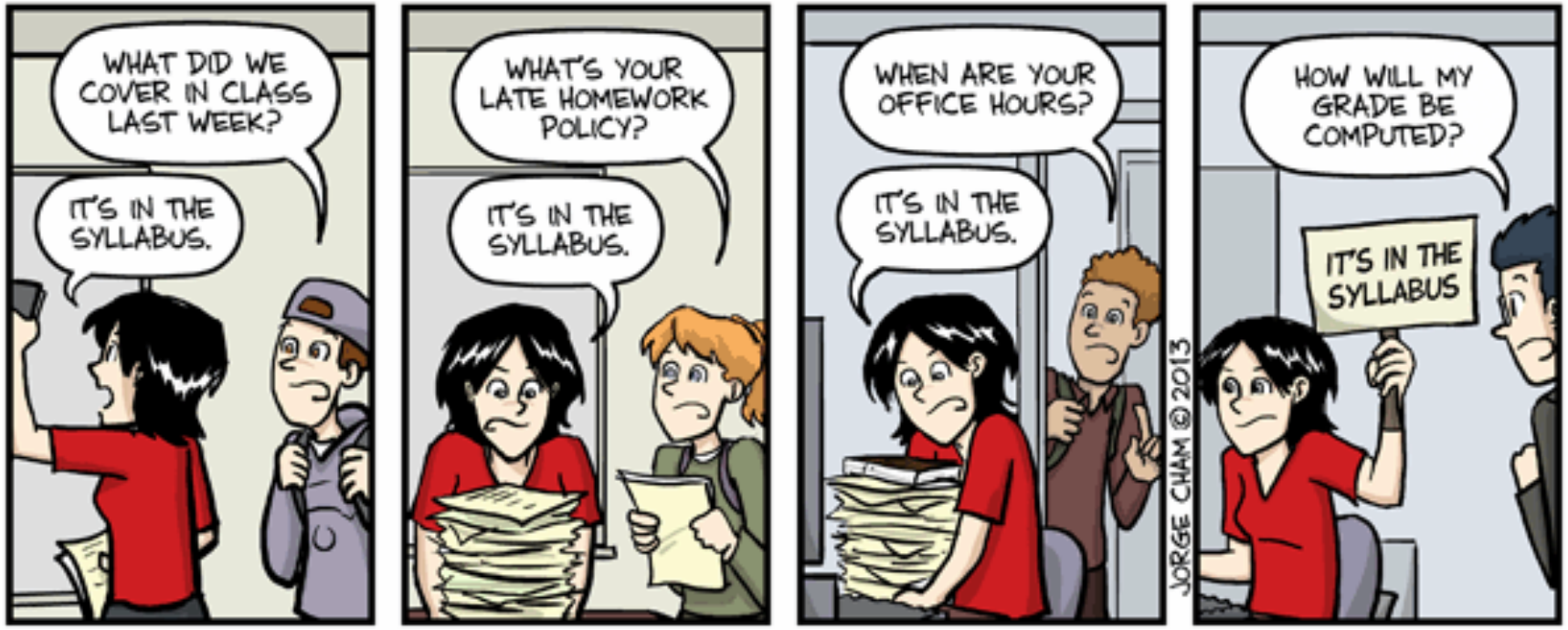
Class webpage:

https://ucsb-cs16-s17.github.io

Piazza discussions/Q&A:

https://piazza.com/ucsb/spring2017/cs16

Just in Case…



IT'S IN THE SYLLABUS

This message brought to you by every instructor that ever lived.

WWW.PHDCOMICS.COM

So… let's take a look at that syllabus…

Electronic version found at:
http://cs.ucsb.edu/~zmatni/syllabi/CS16S17_syllabus.pdf

Also found on the class webpage

Switching About In The Labs…

… is frowned upon ☹

- Please stick to the lab time that you have per your registration
  - The labs are pretty full and at capacity

IF YOU WANT TO SWITCH LAB SECTIONS, YOU MUST:

1. **Find a person in the other lab to switch with you**
2. Get the OK from *BOTH* T.A.s

What YOU have to do ***before tomorrow***

YOU HAVE A LAB TOMORROW!!!

- Log into **Piazza** and have a look around
  - Sign up for this class' page. Go to: **https://piazza.com/ucsb/spring2017/cs16**
- Go to the **class main website** and have a look around
  - Go to: **https://ucsb-cs16-s17.github.io/**
- Read the lab assignment (**lab01**) *before* you go into your lab: BE PREPARED

What YOU have to do
before Thursday

YOU HAVE ANOTHER LECTURE ON THURSDAY!!!

- **Do the required reading!!! (Chapter 1)**
- **On the class main website:**
  1. Click on your first homework assignment (**h01**)
     - Best to click on the PDF link
  2. Print it DOUBLE SIDED
  3. Did you print it DOUBLE SIDED??????
     - NO??!?!?!?! GO BACK TO STEP 2!!!!
  4. Do the homework in pen or pencil
  5. Bring the hardcopy of the homework **to class with you on Thursday and hand it in**

A Refresher Lecture on Computers

What is this "Computer" you speak of?

… and how can it help me "solve problems"???

Let's define a "computer"

- Computer (n.): a computing device

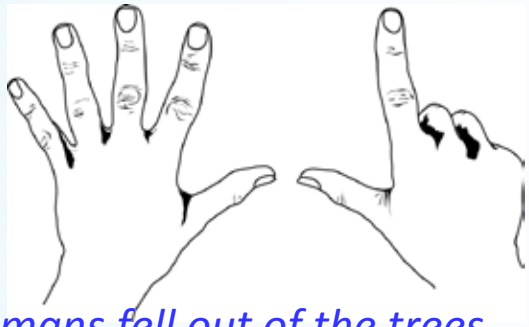
- A device **that can be instructed** to carry out an **arbitrary** set of **arithmetic or logical operations** automatically

Computers = Computing Devices

Compute

(v) To make sense of ; to **calculate** or reckon

- What was the first computing tool ever?



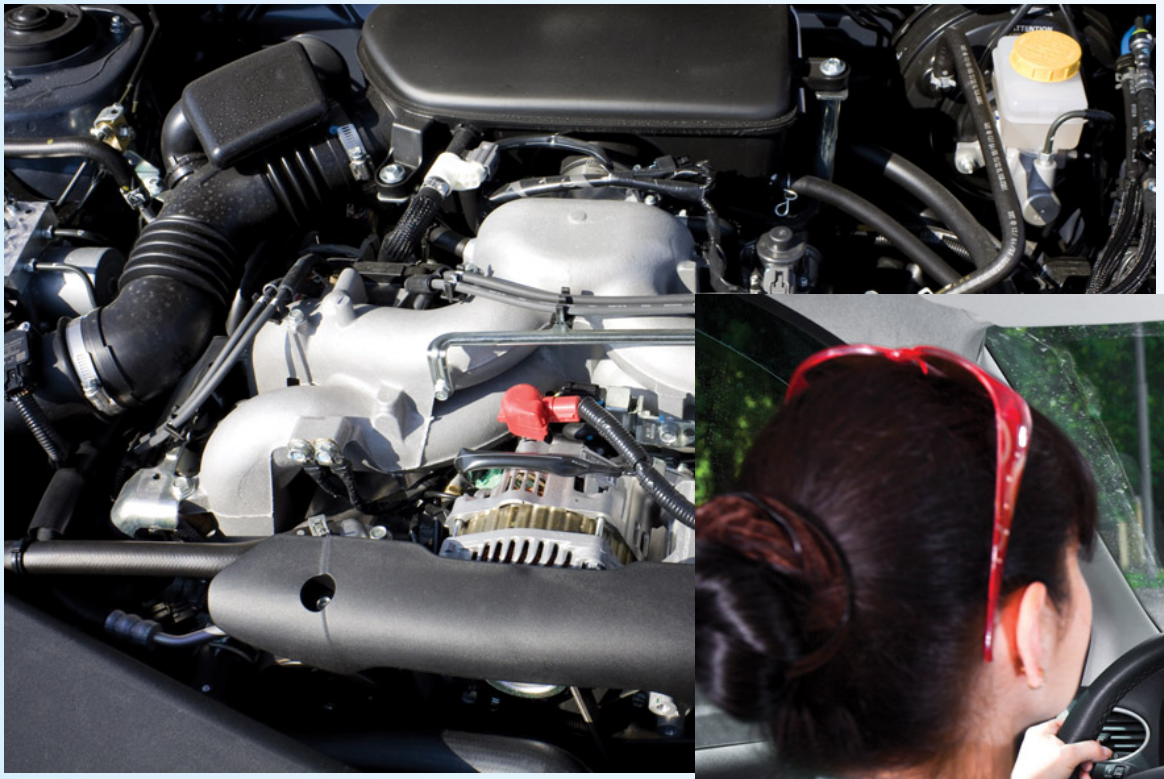
Invented around when humans fell out of the trees

COMPUTING TOOLS!

Abacus → *Invented in China about 5000 years ago*
Mechanical computer → *Invented in France about 400 years ago*
Programmable computer → *Invented in UK about 150 years ago*
Electronic prog. computer → *Invented in UK/US about 70 years ago*

Abstraction

(n) A **mental model** that *removes complex details*



Do you need to know this?

To know how to do this?

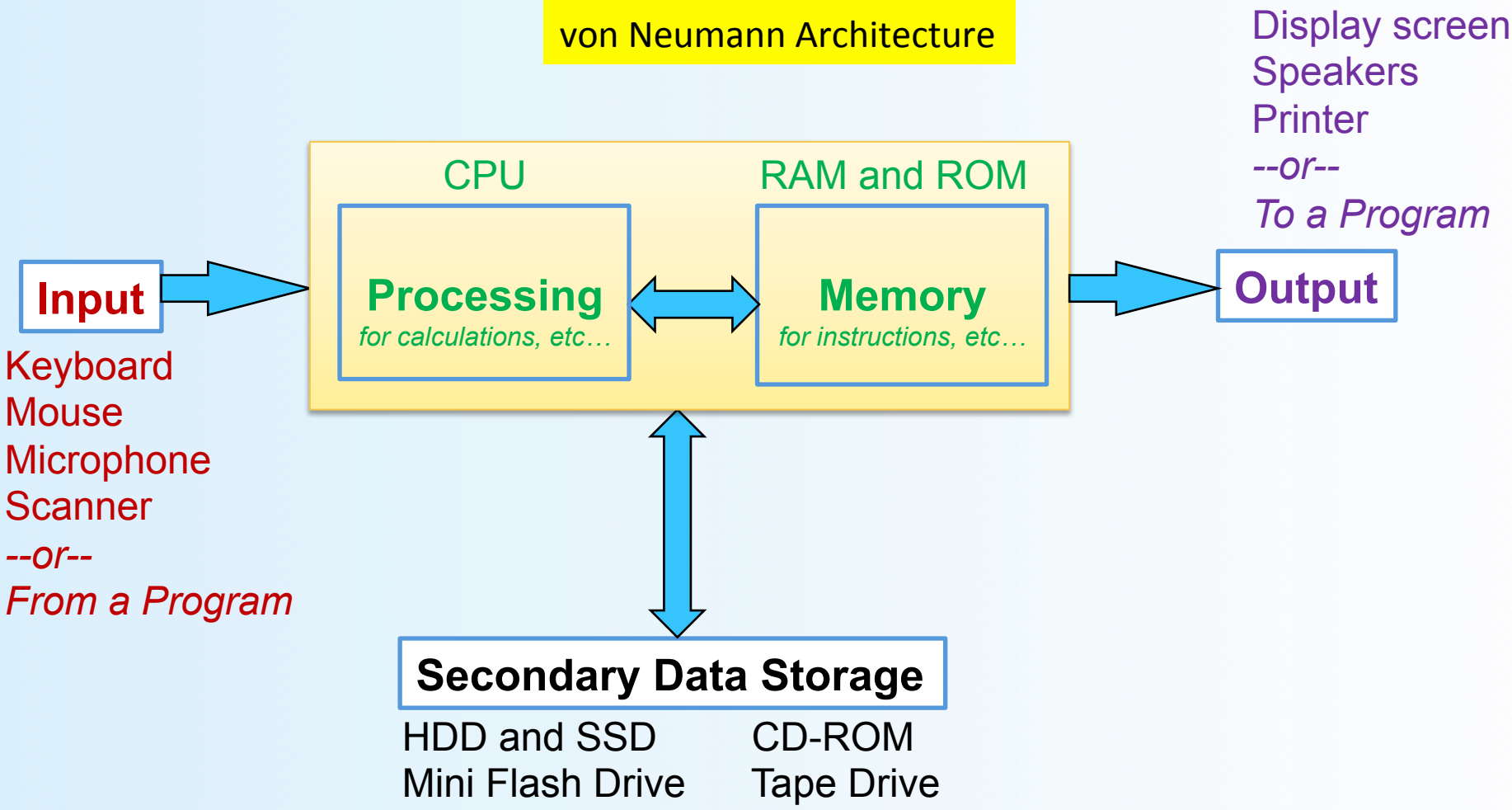
Images from jblearning.com

Computer Systems

- **Hardware**
  - The physical
    - CPU and Memory ICs
    - Printed circuit boards
    - Plastic housing, cables, etc…
- **Software**
  - The instructions and the data
    - Programs and applications
    - Operating systems

A Map of Computer Components (Modern Computer Architecture)

von Neumann Architecture



CPU = Central Processing Unit
RAM = Random-Access Memory
HDD = Hard Disk Drive
SSD = Solid State Drive
CD-ROM = Compact Disk – Read-Only Memory
OS = Operating System

5 Main Components to Computers

1. Inputs
2. Outputs
3. Processor
4. Main memory
   - Usually inside the computer, volatile
5. Secondary memory
   - More permanent memory for mass storage of data

Computer Memory

- Usually organized in two parts:
  - Address
    - Where can I find my data?
  - Data (payload)
    - What is my data?

- The smallest representation of the data
  - A binary *bit* ("0"s and "1"s)
  - A common collection of bits is a byte (8 bits = 1 byte)
  - **Can one store *any* type of information building- block (like a number, or a letter) in 1 byte?**

What is the Most Basic Form of Computer Language?

- Binary *a.k.a* Base-2

- Expressing data AND instructions in either "1" or "0"
  - So,

"01010101 01000011 01010011 01000010 00100001 00100001"

could mean an *instruction* to "calculate 2 + 3"

Or it could mean a *number* (856783663333)

Or it could mean a *string of 6 characters* ("UCSB!!")

YOUR TO-DOs

- ❑ Sign up on Piazza
- ❑ Go to the class website
- ❑ Read Lab1 TODAY
- ❑ Do Lab1 TOMORROW
- ❑ Do HW1 and hand it in on Thursday in class

- ❑ Solve world hunger
- ❑ Reverse global warming

</LECTURE>