WELCOME TO CS 16!

Problem Solving with Computers-I

`https://ucsb-cs16-sp17.github.io/`
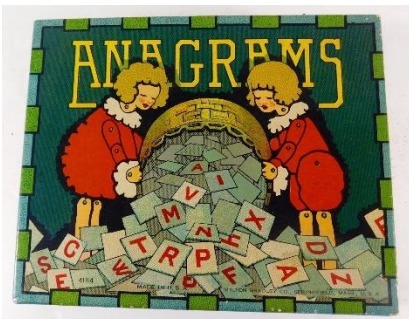
Instructor

- Diba Mirza (dimirza@cs.ucsb.edu)
  - PhD (Computer Engineering, UCSD)
  - New teaching faculty at the department of Computer Science, UCSB!
  - Before this: Teaching faculty at UCSD for three years

- Office: HFH 1155
- Office hours (starting on Friday 04/07):
  - Tues: 10am-11am, Friday: 9am -10am
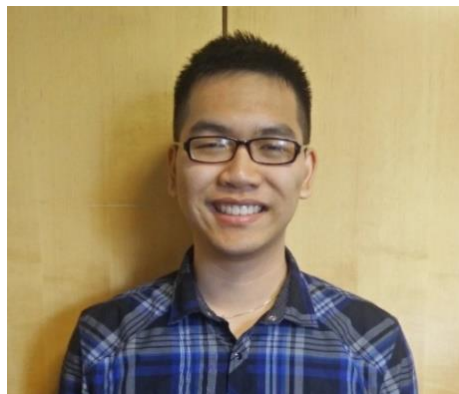 - Or by appointment

Our teaching staff and brand new tutor program !

Angela Yung
(UG tutor)

Barbara Korycki
(UG tutor)

Jimmy Le
(UG tutor)

Sayali Kakade
(UG tutor)

Sean Shelton
(UG tutor)

Steven Fields
(UG tutor)

Andrew Huang
(UG tutor)

Bryanna Pham
(UG tutor)

Natasha Lee
(UG tutor)

Sherry Li
(UG tutor)

Shreyas
Radhakrishnan
(UG tutor)

Thien Hoang
(UG tutor)

Clickers out – frequency AB

About you…

What is your major?
A. Computer Science
B. Computer Engineering
C. Other

About you…

What is your past programming experience?

A. Have never programmed.
B. Have programmed before "just for fun"
C. Have taken an introductory CS course
D. I have a lot of programming experience

Which of the reasons best describes why you are taking this class?

A. You are a CS/CE major, and will be taking follow up classes
B. You are NOT a CS/CE major, but are contemplating on switching into CS or CE
C. Your major requires you to take the class. You are NOT a CS/CE major, are NOT contemplating on switching into CS or CE.
D. Other - Just curious

About you…

What is your familiarity/confidence with programming in C++?

A. Know nothing or almost nothing about it.
B. Used it a little, beginner level.
C. Some expertise, lots of gaps though.
D. Lots of expertise, a few gaps.
E. Know too much; I have no life.

About you…

What is your familiarity/confidence with using version control with Subversion, Git or any other VCS?

A. Know nothing or almost nothing about it.
B. Used it a little, beginner level.
C. Some expertise, lots of gaps though.
D. Lots of expertise, a few gaps.
E. Know too much; I have no life.

Have you been in a class that used peer instruction before?

A. Yes
B. No
C. I'm not sure

Clickers, Peer Instruction, and PI Groups

- Find 1-2 students sitting near you. If you don't have any move.
- Introduce yourself.
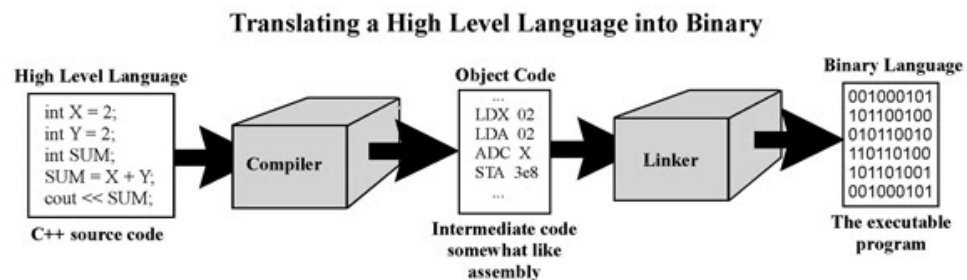- This is your initial PI group (at least for today)

About this course

GitHub

Under the hood of programs

Solve fun problems!

Translating a High Level Language into Binary

High Level Language

int X = 2;
int Y = 2;
int SUM;
SUM = X + Y;
cout << SUM;

C++ source code

Compiler

Object Code

LDX 02
LDA 02
ADC X
STA 3e8

Intermediate code somewhat like assembly

Linker

Binary Language

001000101
101100100
010110010
110110100
101101001
001000101

The executable program

Why learn C++?

C++
#include <iostream>
using namespace std;

int main(){
    cout<<"Hola Facebook\n";
    return 0;
}

BIG

① Data

(Discuss with your group)

— fast

② Popular (in research & industry)

→ Jobs!

③ Large scale programs

Which of these reasons is the most important reason to you?

Why learn what goes on under the hood of programs?

(Discuss with your group)

① Debug (correcting an incorrect program)

② Gateway to the rest of CS

Which of these reasons is the most important reason to you?

Why learn github?

(Discuss with your group)

Collaboration

Managing medium to large code base without going losing your mind

Which of these reasons is the most important reason to you?

Course website!

https://ucsb-cs16-sp17.github.io/

* ATTENDENCE in sections and lecture is REQUIRED!

* To complete the labs you need a college of engineering account. Send me an email before tomorrow's section if you don't have an account

iClickers: You must bring them

- Buy an iClicker at the Bookstore
- Register it on GauchoSpace by Friday (01/13)
- Bring your iclicker to class AND section

Assigned Reading from

- Problem Solving with C++, Walter Savitch, Edition 9

You must attend class and lab sections
You must prepare for class
You must participate in class
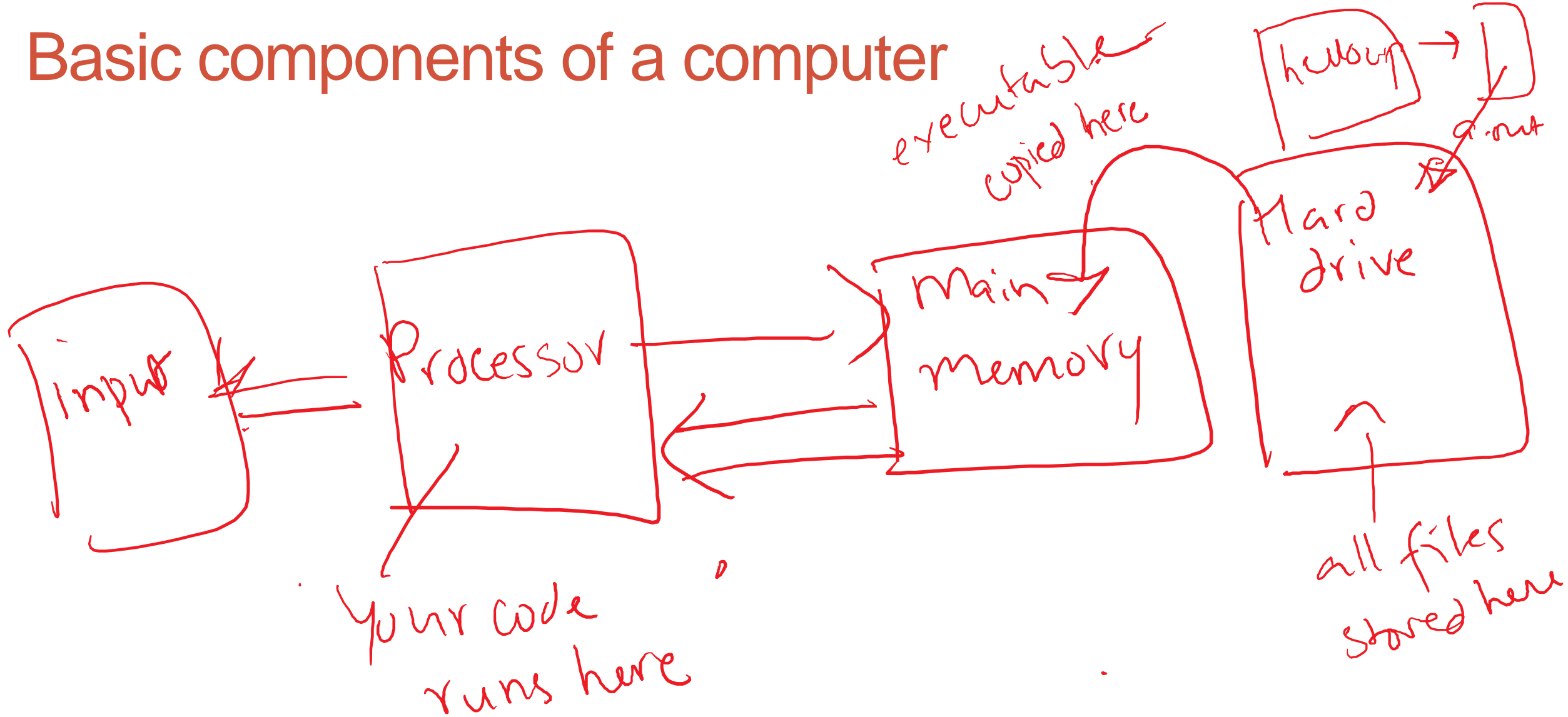
Course Logistics

- Grading
  - Class and section participation (iclickers): : 2%
  - Homeworks (due every lecture) : 13%
  - Lab (programming) Assignments(due weekly on Fridays) : 35%
  - Midterm exams: (two, 15% each) : 30%
  - Final exam : 20%

- Less than 75% iClicker response ≡ missing a class/section
- No makeups for exams. Make sure you have no scheduling conflicts with exams
- No LATE submissions unless you have a real emergency!

Assignment Calendar

Week	S	M	T	W	R	F	S
1	04/02	04/03 **h01** assigned **h02** assigned lect01: Course overview, a gentle intro to C++ - Standard I/O, variables, if-else control structure **First day of classes**	04/04 lab00 assigned	04/05 lect02: Evaluating C++ expressions, simple flow control- for, while loops, nested and multi-way if-else	04/06	04/07	04/
2	04/09	04/10 **h01** due 02:00pm **h02** due 02:00pm h03 assigned h04 assigned lect03: Nested loops, git, intro to lab01	04/11 lab00 due 11:59am lab01 assigned	04/12 lect04: C++ functions and function call mechanics, passing parameters to programs	04/13	04/14	04/

- For more information, see our Assignment Calendar: https://ucsb-cs16-sp17.github.io/info/calendar/

- All sections will be in PHELPS 3252

- Open labs: CSIL in Harold Frank Hall

- The schedule for sections, office hours and open lab hours is available on our class Google Calendar:
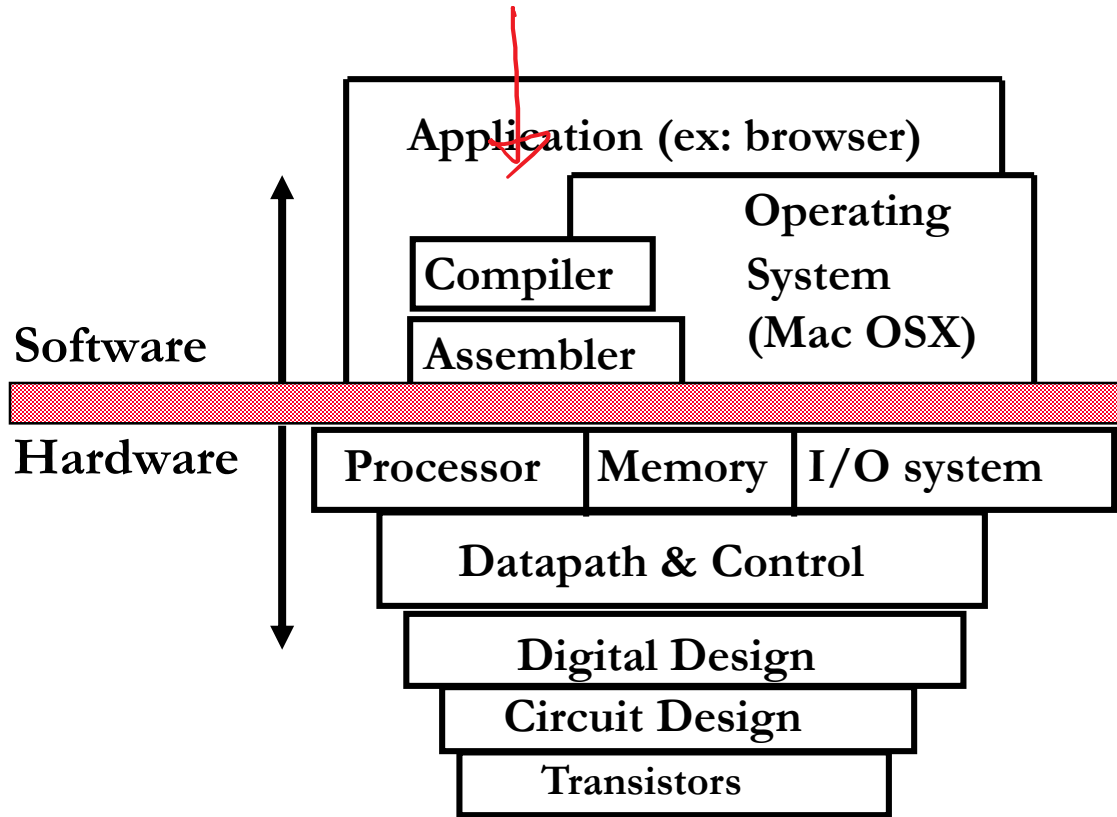
  https://ucsb-cs16-sp17.github.io/info/schedule/

Basic components of a computer

Processor

Main memory

Input

Hard drive

executable copied here

hello.cpp

a.out

your code runs here

all files stored here

How do we handle complexity?

→ English

temp = v[k];
v[k] = v[k+1];
v[k+1] = temp;

```
ldr    r0, [r2]
ldr    r1, [r2, #4]
str    r1, [r2]
str    r0, [r2, #4]
```

```
0000 1001 1100 0110 1010 1111 0101 1000
1010 1111 0101 1000 0000 1001 1100 0110
1100 0110 1010 1111 0101 1000 0000 1001
0101 1000 0000 1001 1100 0110 1010 1111
```

Application (ex: browser)

Operating System (Mac OSX)

Compiler

Assembler

Software

Hardware

Instruction Set Architecture

Processor | **Memory** | **I/O system**

Datapath & Control

Digital Design

Circuit Design

Transistors

Register File

ALU
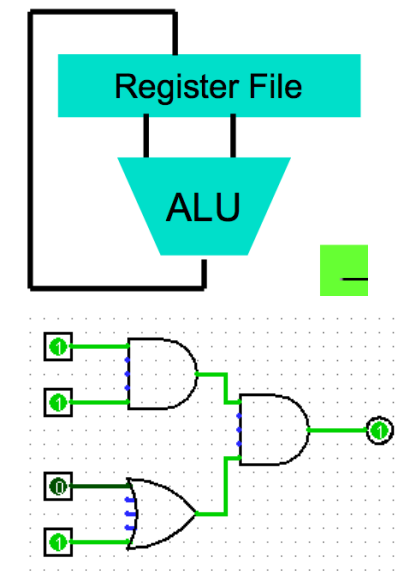
- Big idea: Coordination of many *levels of abstraction*

Lab 00: Must be done individually

Key learning goals:

• Connect remotely to the CSIL unix servers (csil-0X.cs.ucsb.edu)

• Get familiarized with basic UNIX commands

• Create your first C++ program, compile and run it

• Get started with github

• Let us know if you don't have a CoE account before coming into section

LIVE DEMO

Next time

- Evaluating C++ expressions
- simple flow control- for, while loops, nested and multi-way if-else