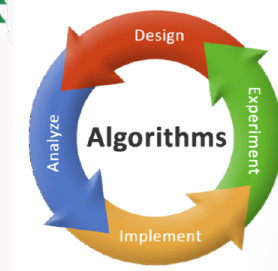


Turtle Graphics

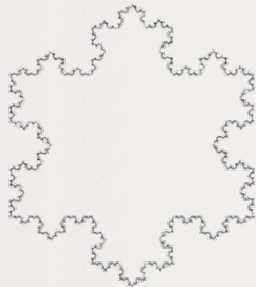


# Welcome to CS 8

## *“Introduction to Computer Science”*

*Spring 2019*

*Ziad Matni, Ph.D.*



# A Word About Registration for CS8

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## FOR THOSE OF YOU NOT YET REGISTERED:

- This class is currently **FULL**
- If **you are on the waitlist**, you will be added automatically IF others drop the course
  - There are **159** people on the waitlist. Most will not get in.
  - **If you do not get in by end of day tomorrow, you will not get in 😞**
- If you are not on the waitlist, you will **not** get into this class

# Your Instructor

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Your instructor: **Ziad Matni, Ph.D**      *(zee-ahd mat-knee)*

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

(please put **CS8** at the start of the subject header)

My office hours:

**Mondays 1:00 PM – 3:00 PM, at SMSS 4409**

Contact info in syllabus!  
Also, use Piazza! 😊

# Your TAs

TEACHING ASSISTANTS
Da Zhang
Chong Liu
Anacaren Ruiz
Zhicheng Zhang

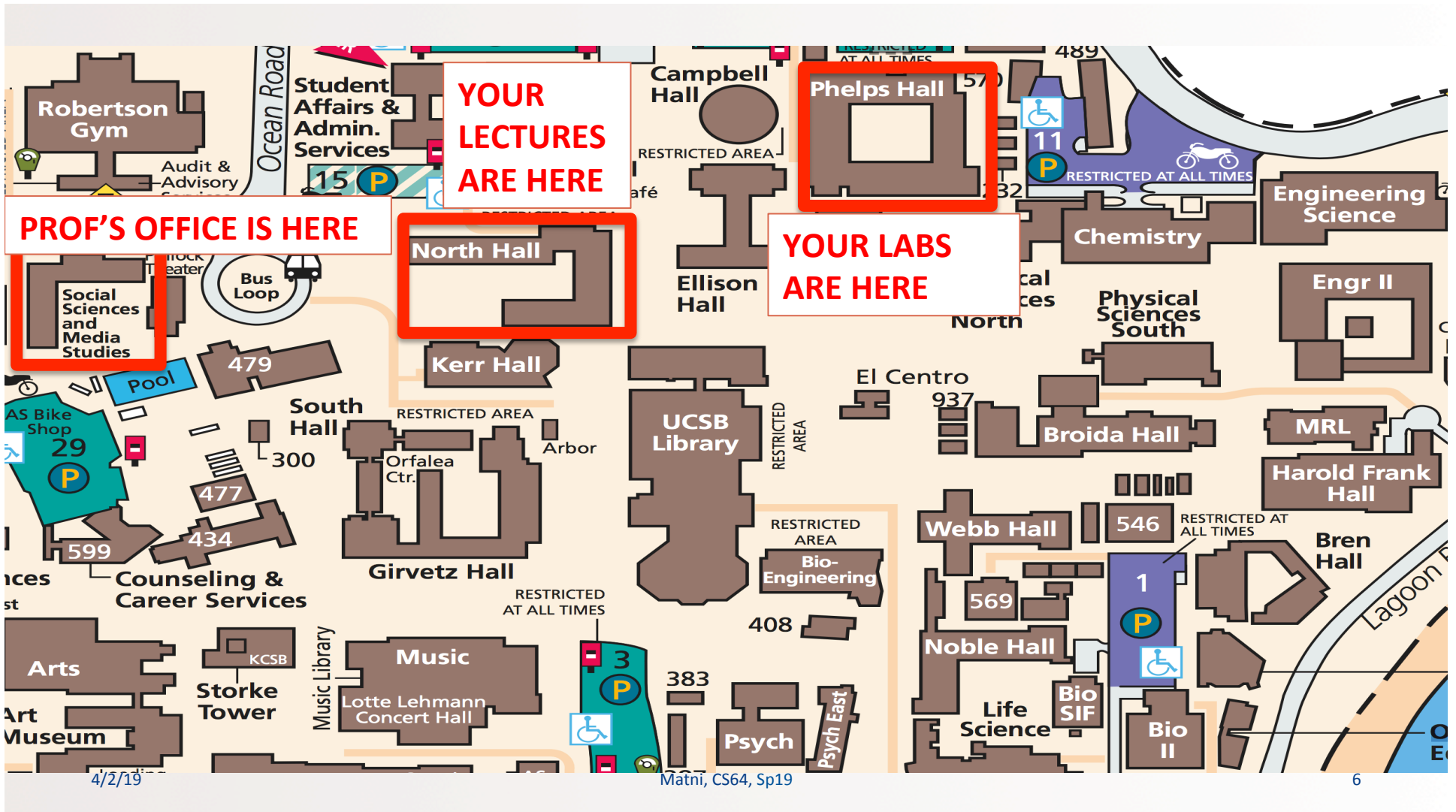
All labs will take place in **PHELPS 3525**  
The TAs will hold “open lab” hours

Contact info in syllabus!  
Also, use Piazza! 😊

# Your Peer Mentors

PEER MENTORS
Jacqueline Mai
Jose Cuellar
Daniel Shu
Siqi Zhao
Yichen Shao

Peer mentors will be in all the labs  
**And they will hold “open lab” hours as well!**



**YOUR LECTURES ARE HERE**

**PROF'S OFFICE IS HERE**

**YOUR LABS ARE HERE**

# You!

---

**With a show of hands, tell me... how many of you...**

- A. Are Freshmen? Sophomores? Juniors? Seniors? Other?
- B. Are Engineering & CS majors?
- C. Are Science (Physics, Chem, Bio, Geog, etc...) majors?
- D. Are Math, Stats, ActuarialSci, etc... majors?
- E. Are Econ or Psych majors?
- F. Are Social Science (Soc, Comm, PoliSci, etc...) majors?
- G. Are Humanities (English, languages, history, etc...) majors?
- H. Have programmed ***anything*** before? What language?
- I. Have used a Linux or UNIX system before?

# What Is Computer Science?

*What does it mean to you?*

CS  $\neq$  Programming

*programming is to CS as:*

surfing **is to** Santa Barbara  
equation **is to** mathematics  
grammar **is to** English literature  
Pokéball **is to** the adventure of a lifetime!

*“Does not equal to”  
in computer-ese!*





# What Is Computer Science?

---

CS == Computing Science



*"Equals to" in computer-ese!*

The science of solving problems  
using abstractions and algorithms

[https://www.youtube.com/watch?v=Zwwzrynqv\\_o](https://www.youtube.com/watch?v=Zwwzrynqv_o)

# What is CS 8?

---

- A **beginner's** class in computer science
- Through the lens of the ***Python*** programming language
  - More specifically, Python 3 (nothing earlier than ver. 3.4.3)
  - This course is not a *comprehensive* Python course
- We'll discuss both motivations (why? who cares?)  
and techniques (how do I do that?)

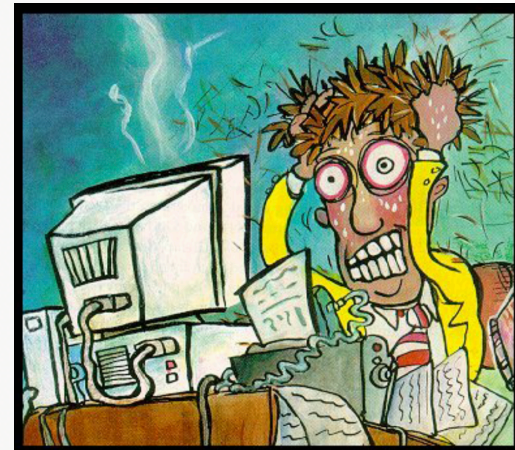
# What Can You Expect Computer Programming to Be Like?

Thrilling!

... but...  
(you knew there was "but" coming...)



Also sometimes frustrating  
(computers are stupid machines  
and instructing them isn't always easy)



# About Python

---

- *Python is one of the most widely used and in-demand programming languages for both engineering and non-engineering applications*
  - Very popularly used in Small Applications
  - Data Mining, Statistical Analysis
  - Content Analysis and Text Analysis, etc...
- A gateway programming language
  - It has “forgiving” ***syntax*** and ***form***
- It looks great on your resume!

# How Is This Class Taught?

- Every class has a lecture based on the readings  
**YOU SHOULD DO THE READINGS BEFORE CLASS!!!**
- You will be in a lab on Wednesdays  
**YOU SHOULD READ YOUR LAB ASSIGNMENT BEFORE YOU GO TO LAB!!!**
- You have to do a bunch of (short) homeworks and (kinda-short) lab assignments  
**PRACTICE MAKES PERFECT!!!**



# There's a LOT work to do...

- ~8 Homeworks (10%)
- ~8 Lab Assignments (30%)
  - 1 or 2 Project Assignments
- 2 Midterm Exams (30%)
- 1 Final Exam (30%)

*All of these need regular practice beyond just doing the assignment!!*

*... and a partridge in a pear tree...*

# Why All the Work?

---

- Programming is a **skill**
- Learning how to program requires **time**, **perseverance**, and **consistent** practice
  - Exactly like practicing a musical instrument
  - There's a *science* behind programming,  
but it is also about *technique*
- You learn by **doing** and by getting “*your hands dirty*”

# Resources?

---

Class webpage – has ALL information you need!

<https://ucsb-cs8.github.io/s19-matni>

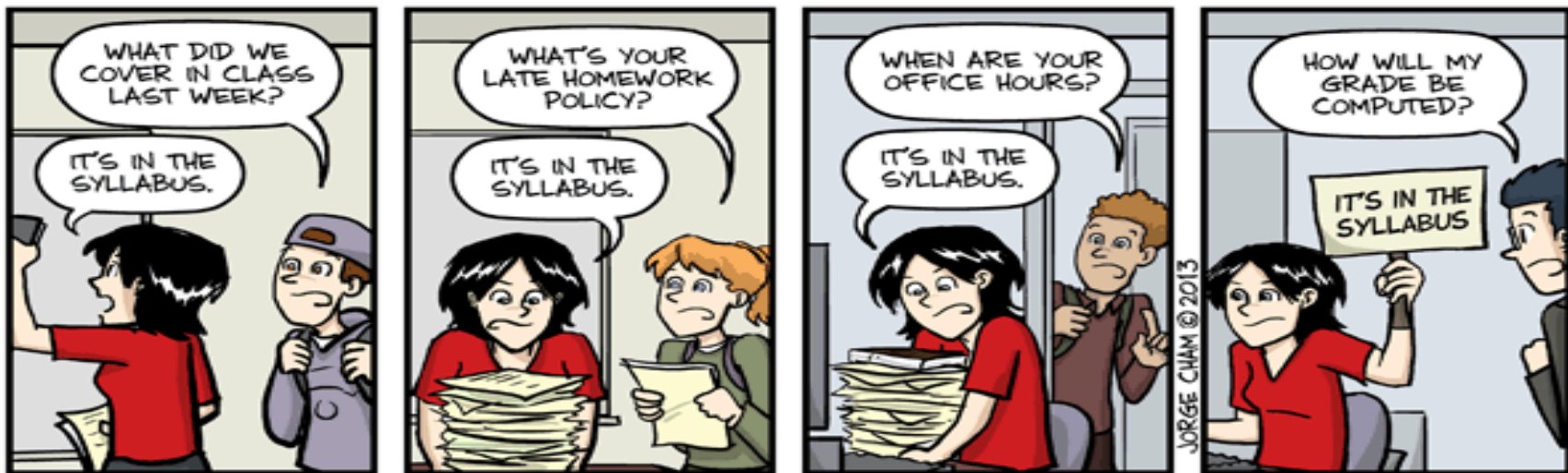
Piazza discussions/Q&A:

<https://piazza.com/ucsb/spring2019/cs8>

Grades will be posted on **Gauchospace**



# Just in Case...



# IT'S IN THE SYLLABUS

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

[WWW.PHDCOMICS.COM](http://WWW.PHDCOMICS.COM)

So...

# Let's Take A Look At That Syllabus...

---

**Electronic version found at:**

[http://cs.ucsb.edu/~zmatni/syllabi/CS8S19\\_syllabus.pdf](http://cs.ucsb.edu/~zmatni/syllabi/CS8S19_syllabus.pdf)

**Also found on the class webpage**

**CS 8 – Introduction to Computing**  
**Syllabus – Spring 2019**

**Required Textbook**



**Introduction to Computing Using Python: An Application Development Focus, 2nd Edition**  
 By Ljubomir Perkovic  
 ISBN: 978-1-118-89094-3

**Class Time:** Tu & Th 2:00 PM – 3:15 PM    **Location:** SMSS 44  
**Instructor:** Ziad Matni    **Email:** [ziad@cs.ucsb.edu](mailto:ziad@cs.ucsb.edu)  
**Office Hours:** Monday 1:00 PM – 3:00 PM in SMSS 44

**Closed Lab Times:** Mondays 8 AM, 9 AM, 10 AM, 11 AM in SMSS 44 (30 minutes long)

**T.A. and Peer Mentor Info:**

Name	Role	Email	M 8	M 9	M 10	M 11
Da Zhang	TA	dazhang@umail.ucsb.edu				
Chong Liu	TA	chongliu@ucsb.edu				
Anacaren Ruiz	TA	aruiz@ucsb.edu				
Zhicheng Zhang	Reader	zhichengzhang00@ucsb.edu				
Jacqueline Mai	Peer	jacquelinemai@ucsb.edu	✓	✓		
Yichen Shao	Peer	yichenshao@ucsb.edu	✓	✓		
Daniel Shu	Peer	danielshu@ucsb.edu	✓	✓		
Jose Cuellar	Peer	jrecinos@ucsb.edu			✓	✓
Siqi Zhao	Peer	siqi00@ucsb.edu			✓	✓

**Open Lab Times:** <http://bit.ly/cs8labhours>

**Class Main Website:** <https://ucsb-cs8.github.io/s19-matni> (Note, it's NOT GauchoSpace!)

**Class Piazza Site:** <https://piazza.com/ucsb/spring2019/cs8>

**Catalog Description:** <https://www.cs.ucsb.edu/education/courses/cmpsc-8>

# Lectures

---

- Very important to attend
  - My assignments and exams draw **heavily** from here!
- Take notes
- Bring your laptops with Python installed
  - Do not use your laptops for anything else
- Lectures have lots of demos

# Homework Assignments

---

- Once a week – given every Tuesday
  - Due **IN CLASS** the next Tuesday
  - Some exceptions...
- How?
  1. Go to the Main Website
  2. Find the PDF of the homework assignment
  3. Print it
  4. Write out your answers
  5. FOLLOW DIRECTIONS (eg. staples, pen use, double-sided, etc...)
  6. Submit the finished assignment in class
  7. Your graded homework will show up online on **GRADESCOPE**

# Lab Assignments

---

- Once a week – lab is every **Monday**
  - I will post description of what to do by Sunday
  - You have until the following **Sunday** to submit
  - Submissions must be done on **GRADESCOPE**
- How?
  - Go to the Main Website
  - Find the lab assignment description – **READ IT BEFORE GOING TO LAB!**
  - Go to lab
  - Do the program(s)
  - **FOLLOW DIRECTIONS**
  - Submit the finished assignment electronically on Gradescope

# Project Assignments

---

- Will only give 1 (maybe 2) projects
  - Submissions must be done on **GRADESCOPE**
- How? (it's just like labs...)
  - Go to the Main Website
  - Find the project description
  - Do the programs
  - FOLLOW DIRECTIONS
  - Submit the finished assignment electronically on Gradescope

# Exams

---

- There are 2 midterms and 1 final exam
- Dates are SET and will NOT change – see syllabus
- NO MAKE UP on missed exams
  - Very strict on this
- After they are graded, you can review them with the TAs or the instructor
  - Cannot take exams home
  - Cannot take pics or notes on exam



# Other Policies

---

- No make up for any assignment ; No make up for any exam
- If your assignment is late AND within 24 hours past due
  - You lose 20 percentage points on the homework
- If your assignment is late BEYOND 24 hours
  - You get a zero on the homework
- I will drop your (one) lowest homework grade
- No dropping of lab grades
- If you use techniques that I did not teach or cover in class
  - You get a zero on the entire assignment

# Academic Integrity and Honesty

---

- I will report all incidents of **cheating or plagiarism** to the University
  - As I am required to
- Further information is available at:  
<http://judicialaffairs.sa.ucsb.edu/AcademicIntegrity.aspx>
- Please do not post ANY class material on ANY website

# Grading

## Grading and Grade Distributions

Item	Grade %
Homework	10%
Labs and Projects	30%
Midterm Exams (2)	30%
Final Exam (cumulative)	30%
<b>TOTAL</b>	<b>100 %</b>

Range	Grade
[93 – 100]	A
[90 – 93)	A-
[87 – 90)	B+
[83 – 87)	B
[80 – 83)	B-

Range	Grade
[77 – 80)	C+
[73 – 77)	C
[70 – 73)	C-
[60 – 70)	D
< 60	F

[X – Y) means "X to Y inclusive of X (but not Y)"

# “Algorithms and Programs”

---

- Section in the syllabus
- **READ THIS FOR THURSDAY!**



# Python IDLE

---

- Our programming environment
  - Works on Mac OS, Windows, Linux
- Free install at: <http://www.python.org>
- Next class, we'll do a **CLASS DEMO!** 😊😊😊
  - Of Linux commands and some Python code
  - Basic Linux workshop may be announced

# Your First Lab...

---

**... is on MONDAY, APRIL 8<sup>th</sup>**

# Lab Etiquette

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- **When you go to the lab (PHELP 3525), please don't do anything that can harm other users of the computers or the computers themselves**
  - No food, no drinks
  - Do not unplug computers
  - Just log in and then log out when done
  - Do not use the computers to download illegal/pirated material. There are real legal consequences to you.



# CoE Computer Accounts

---

- You will need to establish a **UCSB College of Engineering (CoE) computer account**
- Please read the knowledge base website at:
  - <https://doc.engr.ucsb.edu/display/EPK/New+UCSB+Community+Member+Information>
- CoE account creation page:
  - <https://accounts.engr.ucsb.edu/create>
  - **Only people actively enrolled in the class will be able to create accounts**

# Switching About In The Labs...

---

... is frowned upon ☹️

- 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 is this “Computer” you speak of?

---

Let's define a “computer”

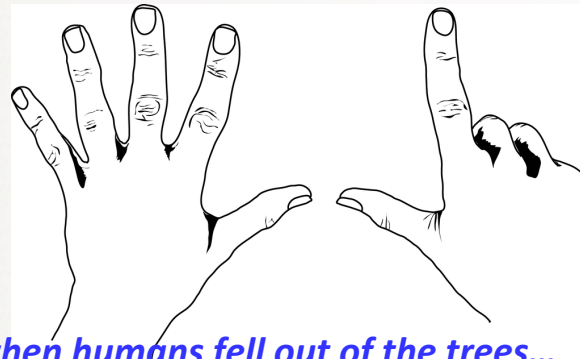
- Computer (n.): a computing device
- A device **that can be instructed** to carry out an **arbitrary** set of **arithmetic or logical operations** automatically

# Computers = Computing Devices

## Compute

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

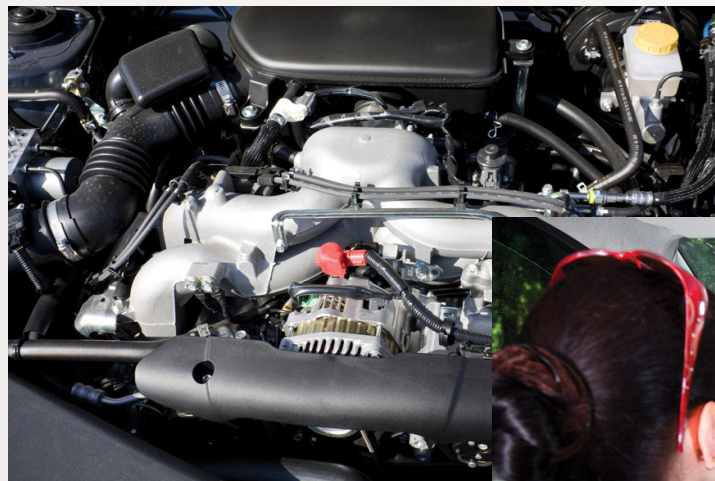
- What was the first computing tool ever?



*Likely invented around when humans fell out of the trees...*

# Using **Abstraction** is Key to Using Computers (or any Complex Machine)

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



Do you need to know this?



To know how to do this?



4/2/19

Images from [jblearning.com](http://jblearning.com)

# Algorithm

- *A step-by-step* logical procedure  
to *solve a problem*
  - Like a very precise recipe!
- Named after famed  
9th-century Persian mathematician  
Al-Khawarizmi who put a name to  
the practice and published a lot on it



# Examples of Everyday Use of Algorithms

- **Problem to Solve:** What coat, if any, should I wear today?
- **Algorithm:**

1. Measure the outdoor temperature,  $T$ .
2. If  $T < 62F$  then wear my blue coat.
  1. If blue coat is *dirty* ( $\text{dirt level} \geq 7$ ), wear my brown coat instead
  2. If it's also *raining* ( $\text{Now raining} = \text{True}$ ), wear my black poncho instead
3. If  $T \geq 62F$  then don't wear a coat
  1. Plan on buying ice-cream for lunch!





# And Now, With More Detail...

1. Measure the outdoor temperature,  $T$ .
2. If  $T < 62F$  then wear my blue coat.
  1. If blue coat is *dirty* (dirt level  $\geq 7$ ), wear my brown coat instead
  2. If it's also *raining* (Now raining = True), wear my black poncho instead
3. If  $T \geq 62F$  then don't wear a coat
  1. Plan on buying ice-cream for lunch!

- a) Define **outcomes**:
1. wear blue coat,
  2. wear brown coat,
  3. wear black poncho,
  4. wear nothing and get ice-cream for lunch!

- b) Define conditions:
1.  $T < 62$  or not
  2. **Dirt\_Level**  $< 7$  or not
  3. **Now\_Rain** = True or not

b) Get measures/values for **T**, **Dirt\_Level**, **Now\_Rain**

- c) If ( ( $T < 62$ ) AND (**Dirt\_Level**  $< 7$ ) ) then (**outcome** = 1)  
d) If ( ( $T < 62$ ) AND (**Dirt\_Level**  $\geq 7$ ) ) then (**outcome** = 2)  
e) If ( ( $T < 62$ ) AND (**Now\_Rain** = True) ) then (**outcome** = 3)  
    Otherwise (**outcome** = 4)  
f) The End

# And Now, With “Language” ...

1. Measure the outdoor temperature, T.
2. If  $T < 62F$  then wear my blue coat.
  1. If blue coat is *dirty* (dirt level  $\geq 7$ ), wear my brown coat instead
  2. If it's also *raining* (Now raining = True), wear my black poncho instead
3. If  $T \geq 62F$  then don't wear a coat
  1. Plan on buying ice-cream for lunch!

```
Measure(T)
Get(Dirt_Level)
Assess(Now_Raining)

if (T < 62) AND (Dirt_Level < 7)
    then Outcome = 1
if (T < 62) AND (Dirt_Level >= 7)
    then Outcome = 2
if (T < 62) AND (Now_Raining = True)
    then Outcome = 3
else
    Outcome = 4

End Program
```

...that has specific form  
and syntax  
*(like any “language” would!)*

*This is often called “pseudo-code” and is the pre-cursor to writing a program in a specific computer language*

# Your TO-DOs before Next Lecture

---

- Get on **Piazza** (I will send invites to all registered students)
- Do **ic0** (under “**Homework**” in the main website)
  - Bring ic0 printout to class ON THURSDAY
- Read **Chapter 1** in the textbook
- **READ THE SYLLABUS**
- Start preparing for your **first homework**:
  - Do **h01** (under “Homework” in the main website)
  - It’s due **next Tuesday (4/9) by start of class**

# The REST of Your TO-DOs for This Week

---

- Confirm that you have access to **Python IDLE**, version 3.7 or newer
  - Available for you at CSIL and Collaborate labs too
  - If you want to install on your own computer – go to <http://www.python.org/>
- **Play with Python at every opportunity**
  - For instance, try out examples from textbook and lectures

</LECTURE>