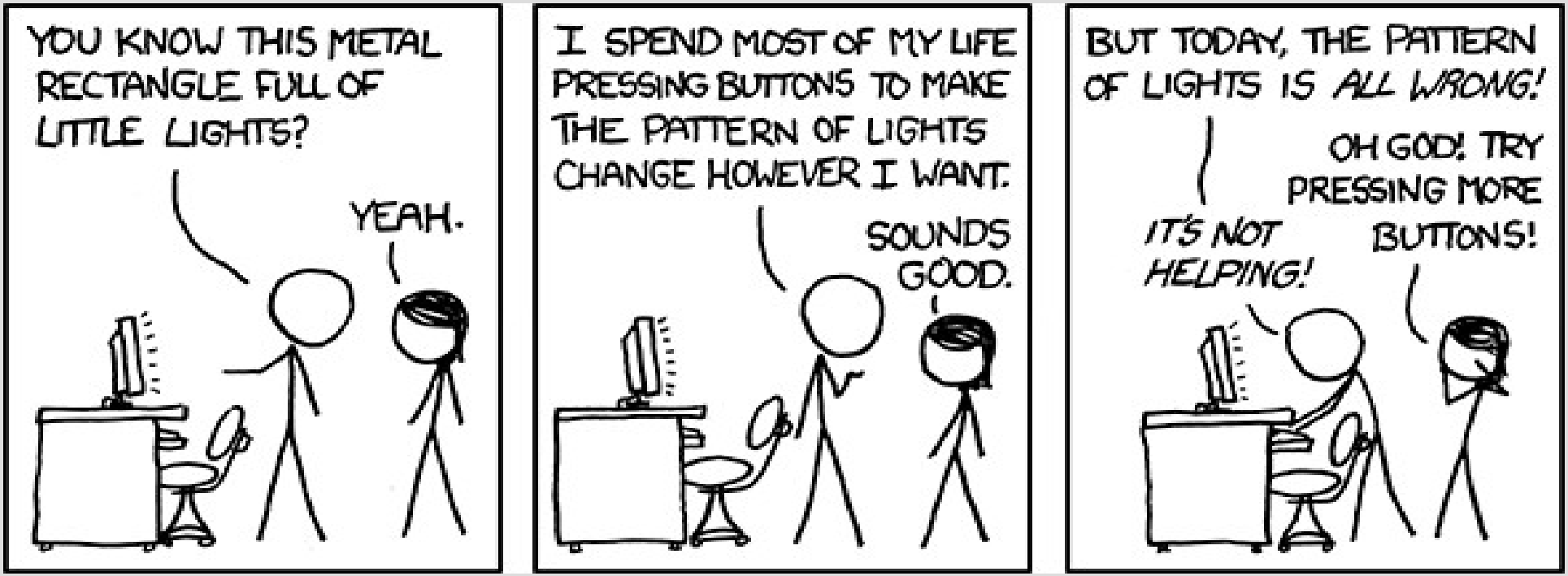
Welcome to CSci 1113

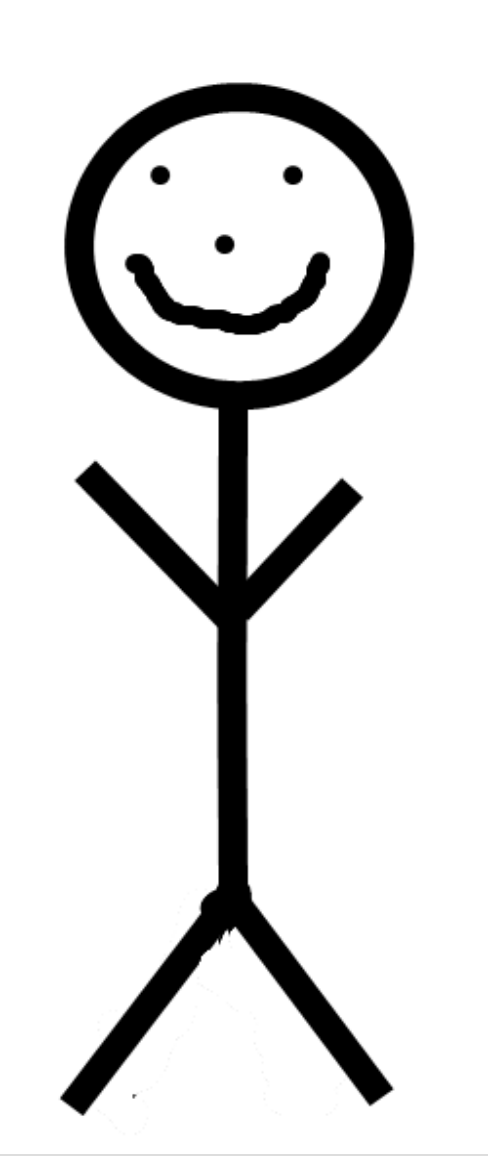
Introduction to C/C++ Programming for Scientists and Engineers



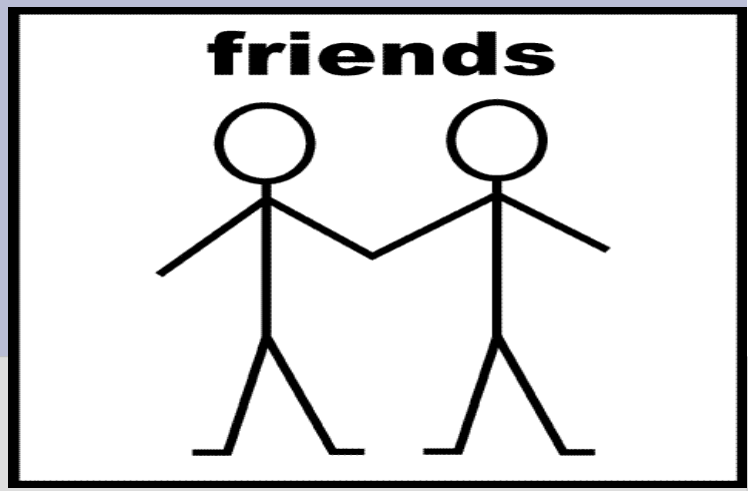
Instructor (me)

James Parker
Shepherd Laboratories 391

Primary contact:
jparker@cs.umn.edu



TAs



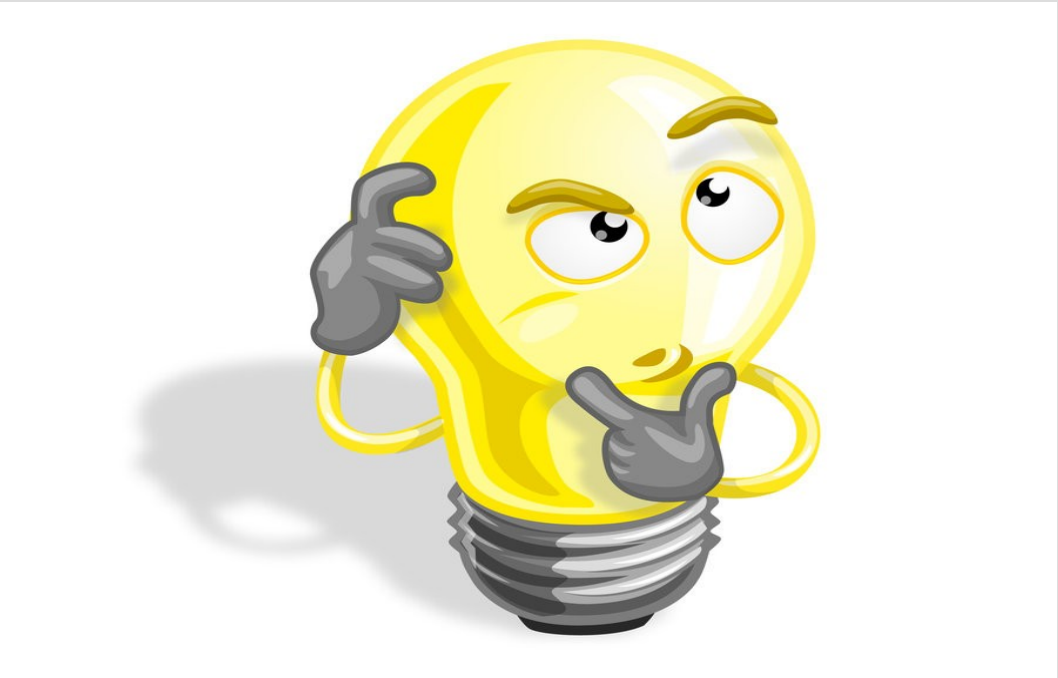
Raunak Manekar, Jiawei Mo,
Jackson Benning, Violet Chang,
Aaron Duebner, Nicholas Freiter,
Nickhil Gupta, Adam Hodapp,
Kyle Houser, Aaron Koenigsberg,
Michael Markiewicz, AJ Sakher,
Guangyu Yan, Tiannan Zhou,
Laura Ziegelski

Questions?

Direct questions to:

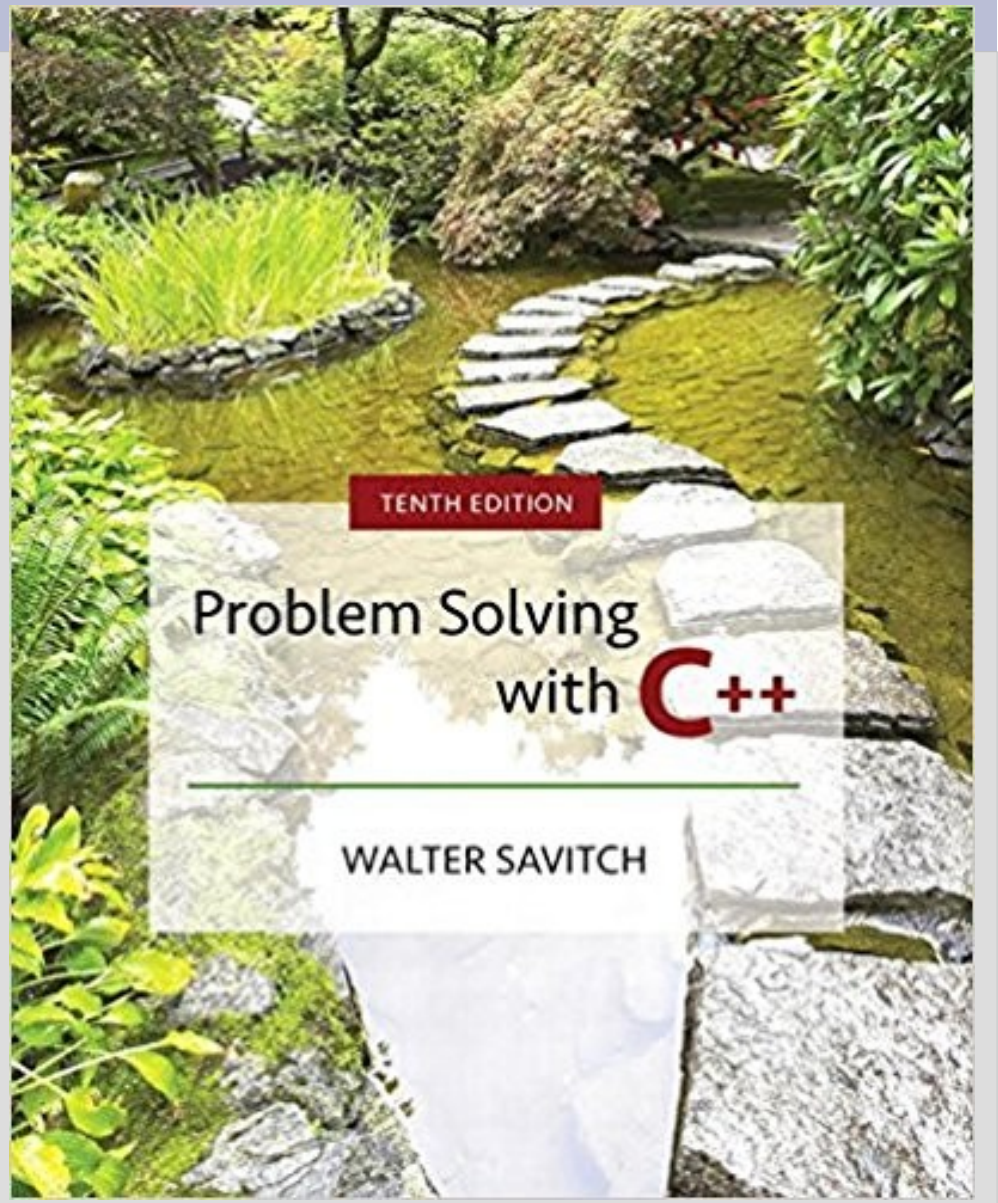
Moodle forum discussion

jparker@cs.umn.edu



Textbook

Problem Solving With C++, Walter Savitch, 10th edition

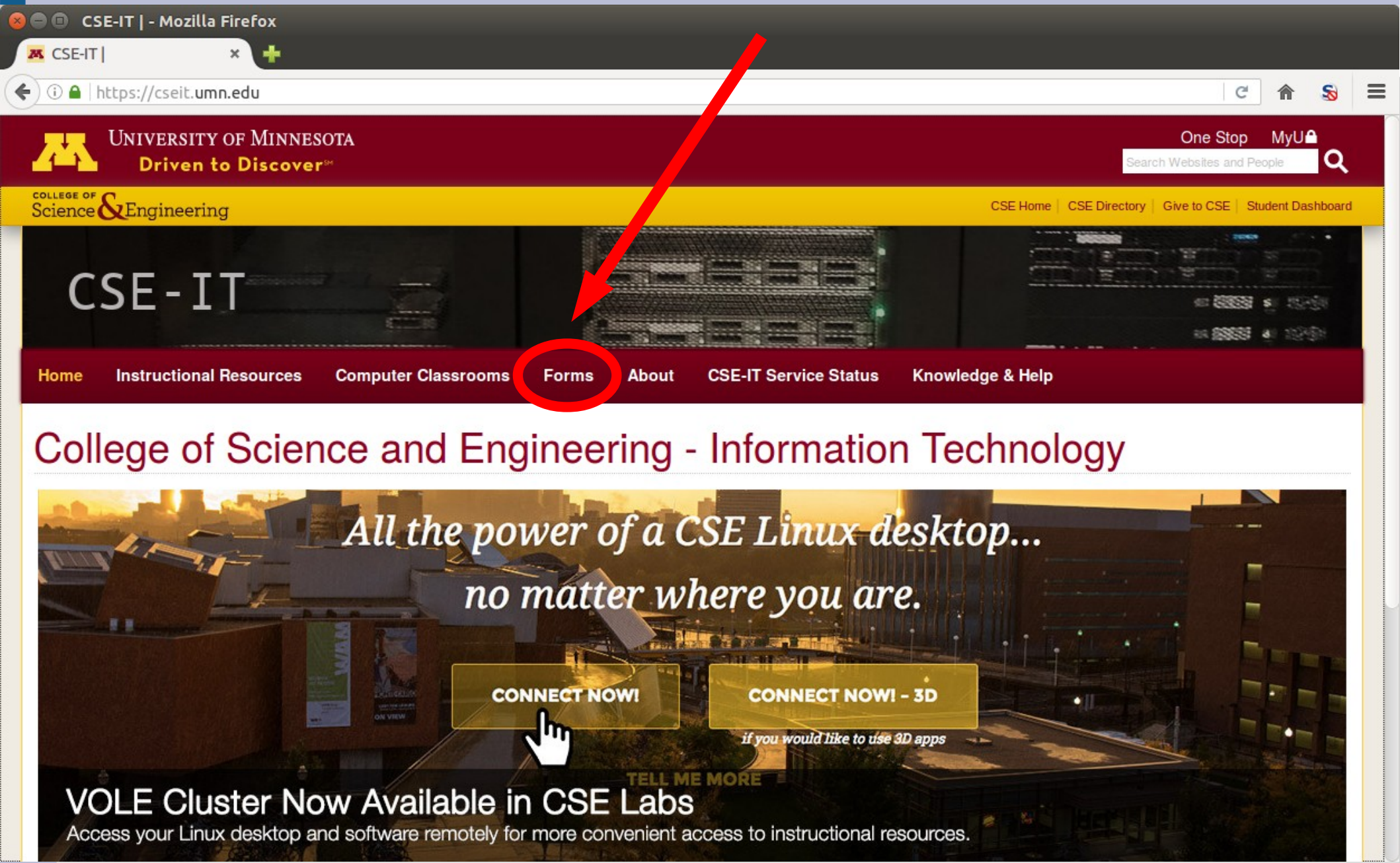


CSELabs account

You need a CSELabs account to participate in labs in this course

Lab attendance is mandatory (please make an account!)

https://cseit.umn.edu/



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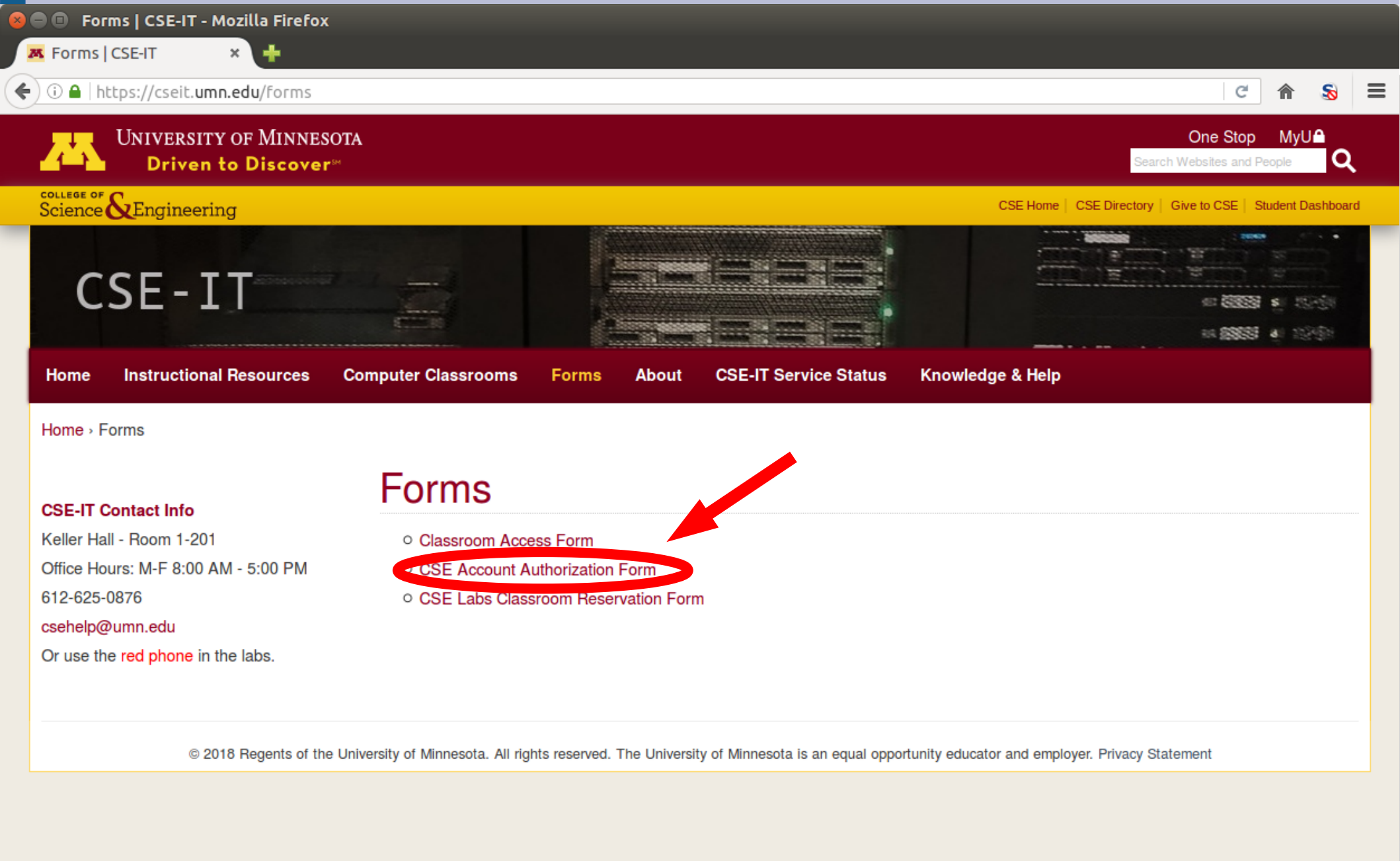

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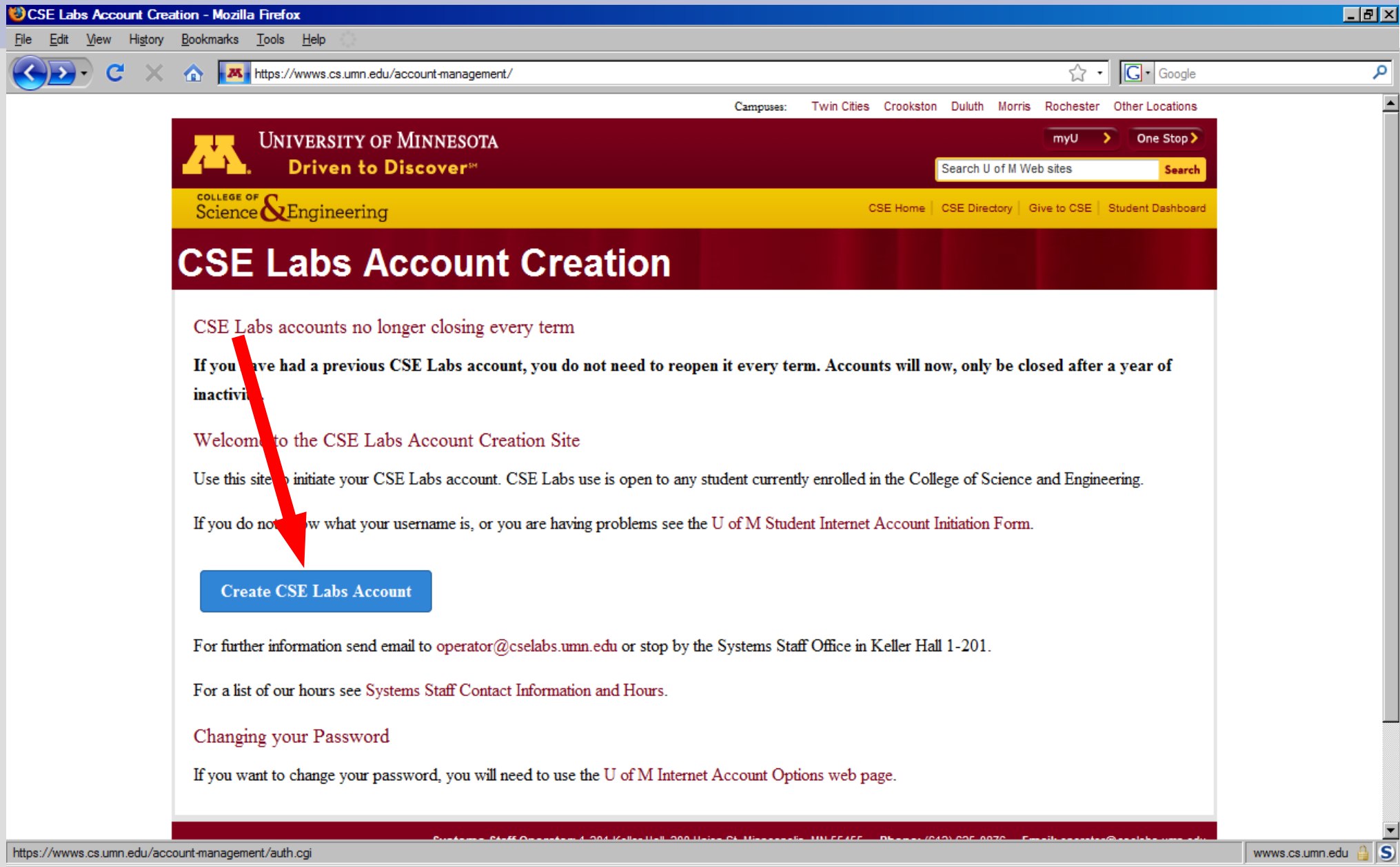

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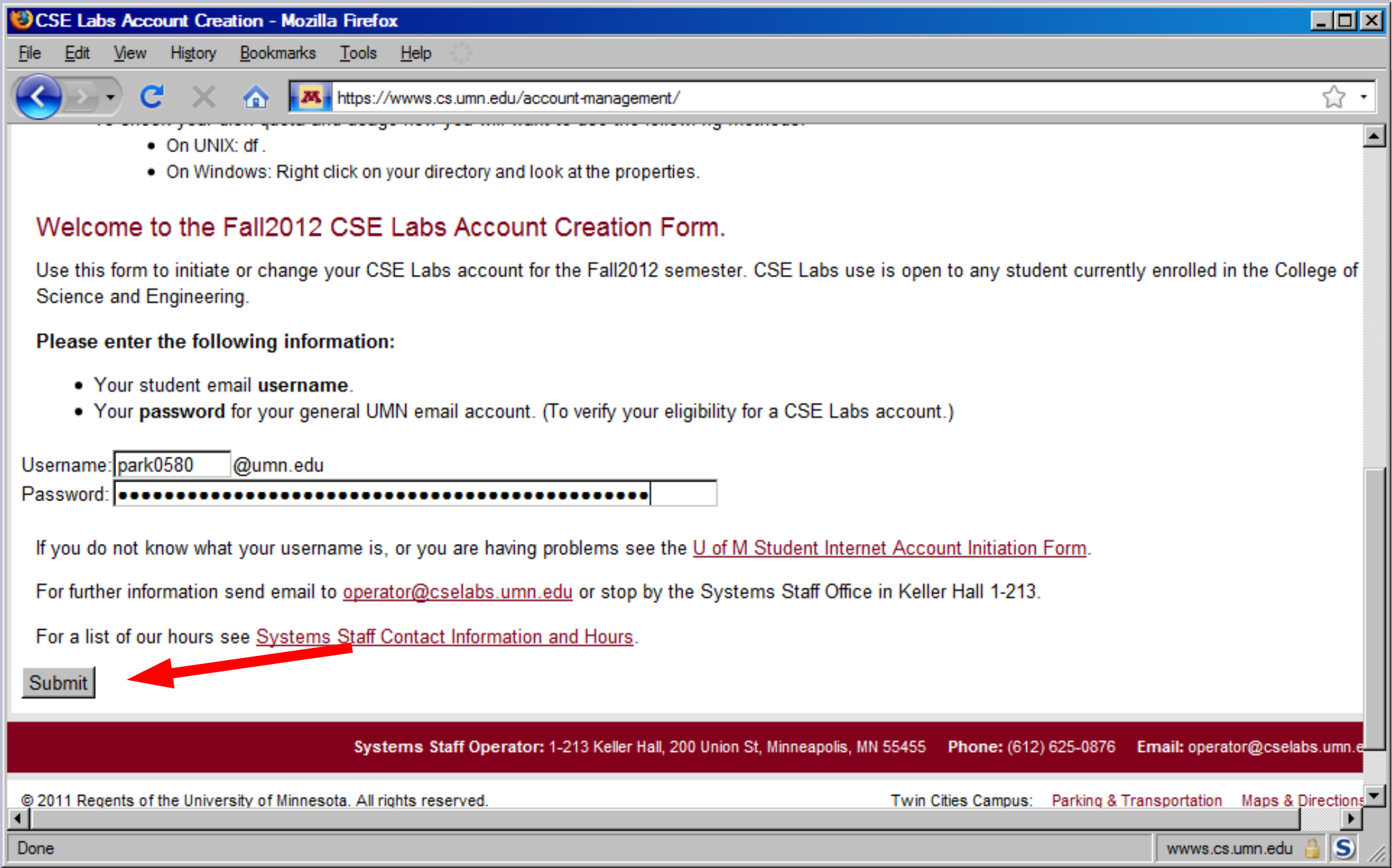


CSELabs account

CSELabs account used in lab
(first lab ensures account working)

Register ASAP

Problems?
Bug operator@cselabs.umn.edu

Class website

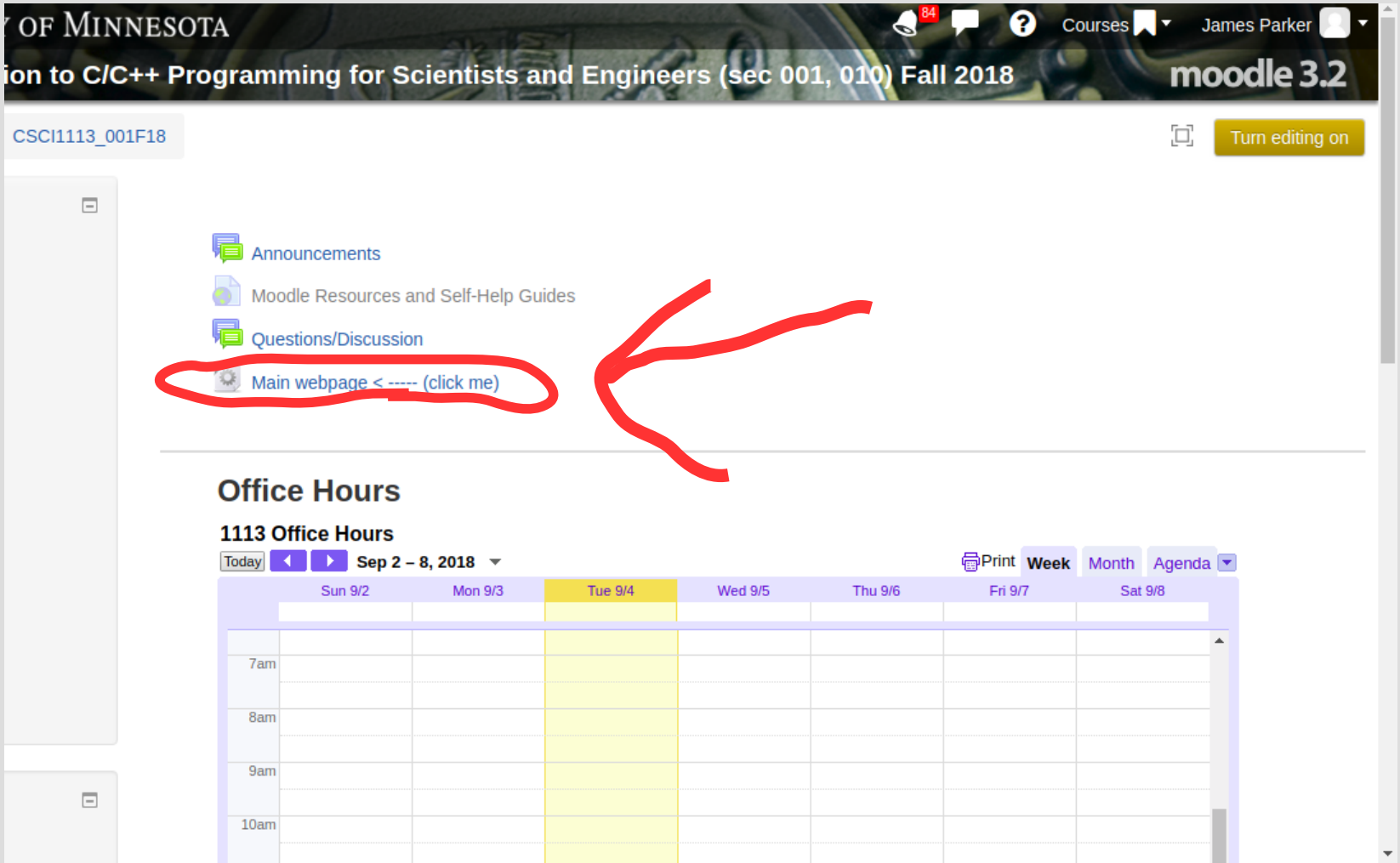
www.cs.umn.edu/academics/classes
Or google “umn.edu csci class”

Syllabus, schedule, other goodies

Moodle page will have grades and homework submissions

Class website

Moodle also has a link to the website:



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COLLEGE OF Science & Engineering

CSE Home | CSE Directory | Give to CSE | Student Dashboard

- Home
- Office Hours
- Syllabus
- Moodle (grades and hw submission)

CSci 1113: C++ Programming

Schedule*

This is an approximate schedule. It will be updated as the class progresses.

Week	Week Of	Topics	Lecture Materials (001)	Lecture Materials (010)	Readings	Exams	Lab	Due
1	Sept. 4	Introduction, computers, algorithms, programs, compilers		slides	Ch. 1		Unix tutorial (no lab this week)	
2	Sept. 10	Variables, expressions, assignment, console I/O, predefined functions			Ch. 2, Section 4.2		Lab 1: Basic C++ programs	
3	Sept. 17	Selection, boolean expressions, if-else, multiway-if, switch			Sections 3.1, 3.2		Lab 2: Sequence and selection	HW 0, Wednesday Sept. 19 at 11:00 P.M.
4	Sept. 24	Iteration, while loops, for loops, loop paradigms			Sections 3.3, 3.4		Lab 3: Iteration	HW 1, Wednesday Sept. 26 at 11:00 P.M.
5	Oct. 1	User-defined functions, procedural abstractions	10/3--Quiz	10/2--Quiz	Ch. 4, 5	**Quiz** Covers Ch 1-3.2 (up to week 3: if-	Lab 4: User defined functions	HW 2, Wednesday Oct. 3 at 11:00

Syllabus

15% Labs
30% Homework (due Wednesdays)
  5% Quiz (Oct. 3)
10% Midterm 1 (Oct. 17)
15% Midterm 2 (Nov. 21)
25% Final (Monday Dec. 17, 8:00am to 10:00am in this room)

Syllabus

Each week there will be either a homework due or a test

Homework is due Wednesdays at 11:00 P.M. on Moodle

Late homework is not accepted, but we will drop the lowest one

Syllabus

Labs can be checked off up until a week after the lab

Homework must be coded individually

Don't cheat
Really... don't cheat

Homework

Homework will be both a creative and problem solving endeavor:

Lego example

Build a castle with:

-4 walls enclosing

-Door

-At least one tower (higher than wall)

Homew

Exams

All exams will be open book/notes
Electronic notes okay
(no memorization)

You **cannot**:
1. Use the internet (no typing)
2. Compile/run programs
3. Talk to or copy from others

Syllabus

Grading scale:
93% A
90% A-
87% B+
83% B
80% B-
77% C+
73% C
70% C-
67% D+
60% D
Below F

Schedule

Ch. 1: Introduction, Programs, Compilers
Ch. 2: Input/Output, Data, Expressions
Ch. 3: Control Flow (if and loops)
Ch. 4, 5: Functions (return values)
Ch. 6: File I/O
Ch. 7, 8: Arrays and Strings
Ch. 9: Pointers and Dynamic Arrays
Ch. 10&11: Classes and Operator Overloading
Ch. 14&15: Recursion & Inheritence

Syllabus

Any questions?

What can I program?

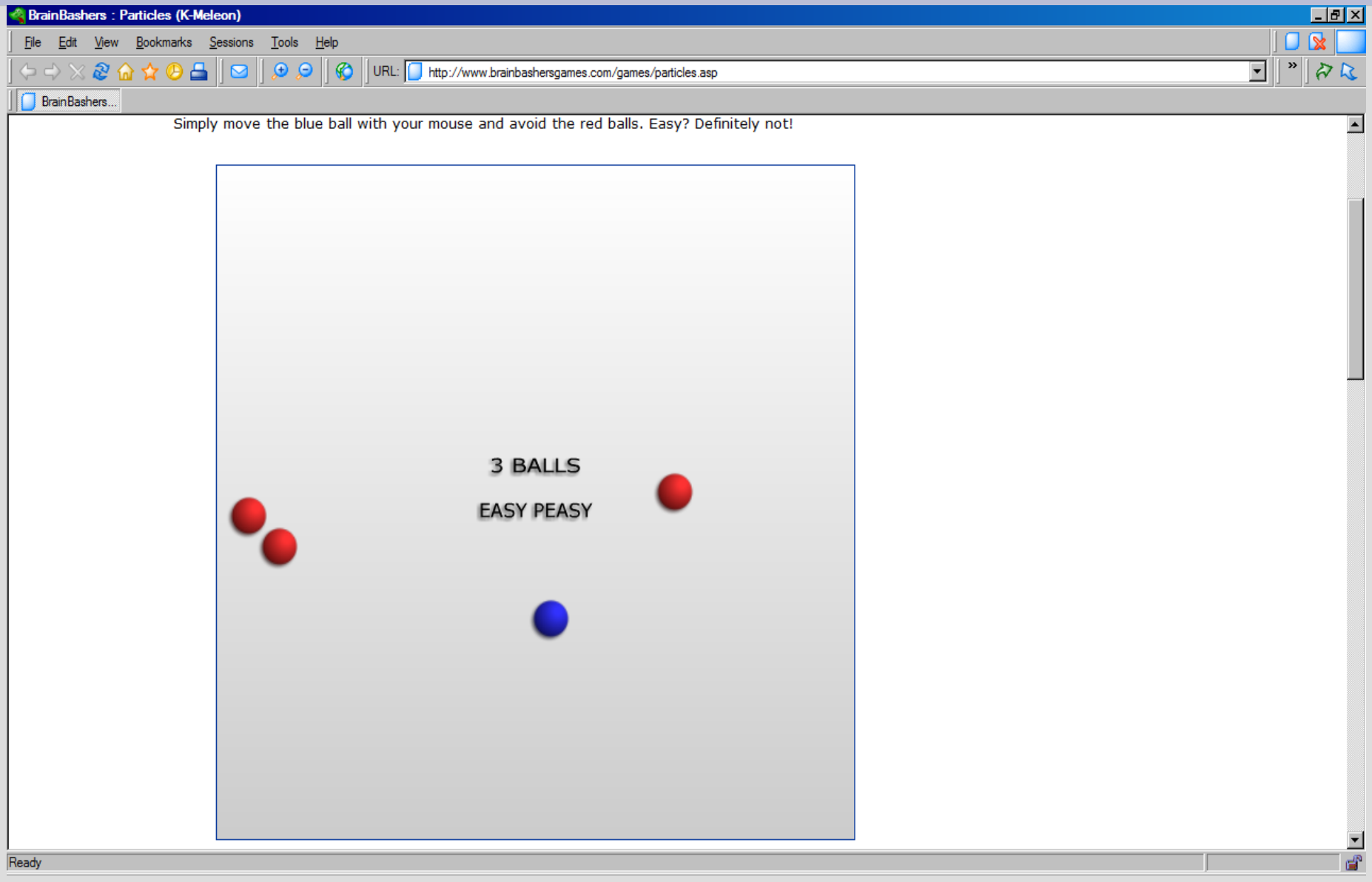
If you can think of an explicit process (of simple steps) to solve your problem, then it can be programed.

Banana Nut Bread

Directions

1. Preheat the oven to 350°F (175°C).
2. Mix butter into the mashed bananas in a large mixing bowl.
3. Mix in the sugar, egg, and vanilla.
4. Sprinkle the baking soda and salt over the mixture and mix in.
5. Add the flour and nuts last, mix.
6. Pour mixture into a buttered 4x8 inch loaf pan.
7. Bake for 1 hour. Cool on a rack.

Repetitive tasks



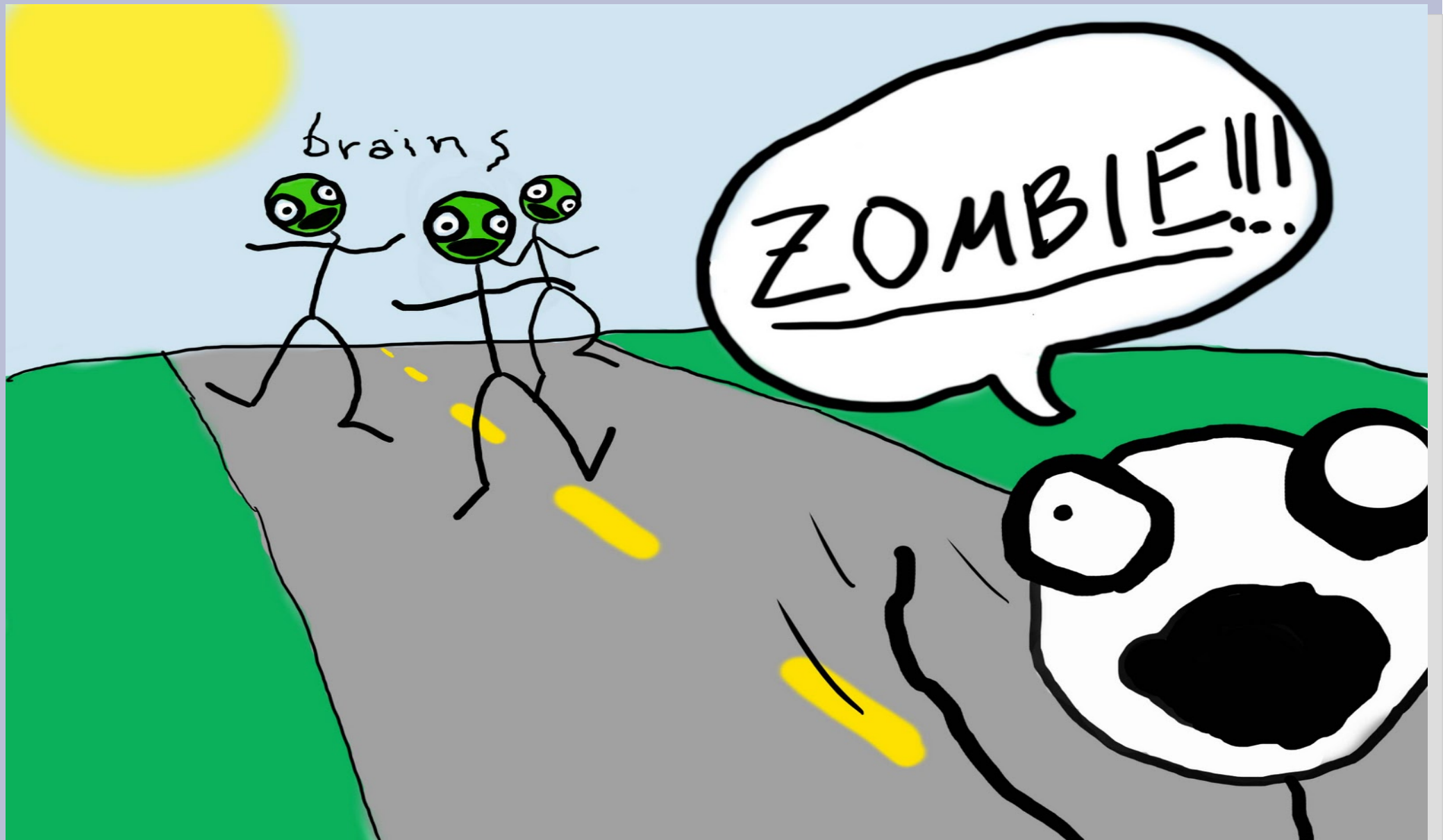
ATMs

How do you get change for $18.26 with the least amount of bills and coins?

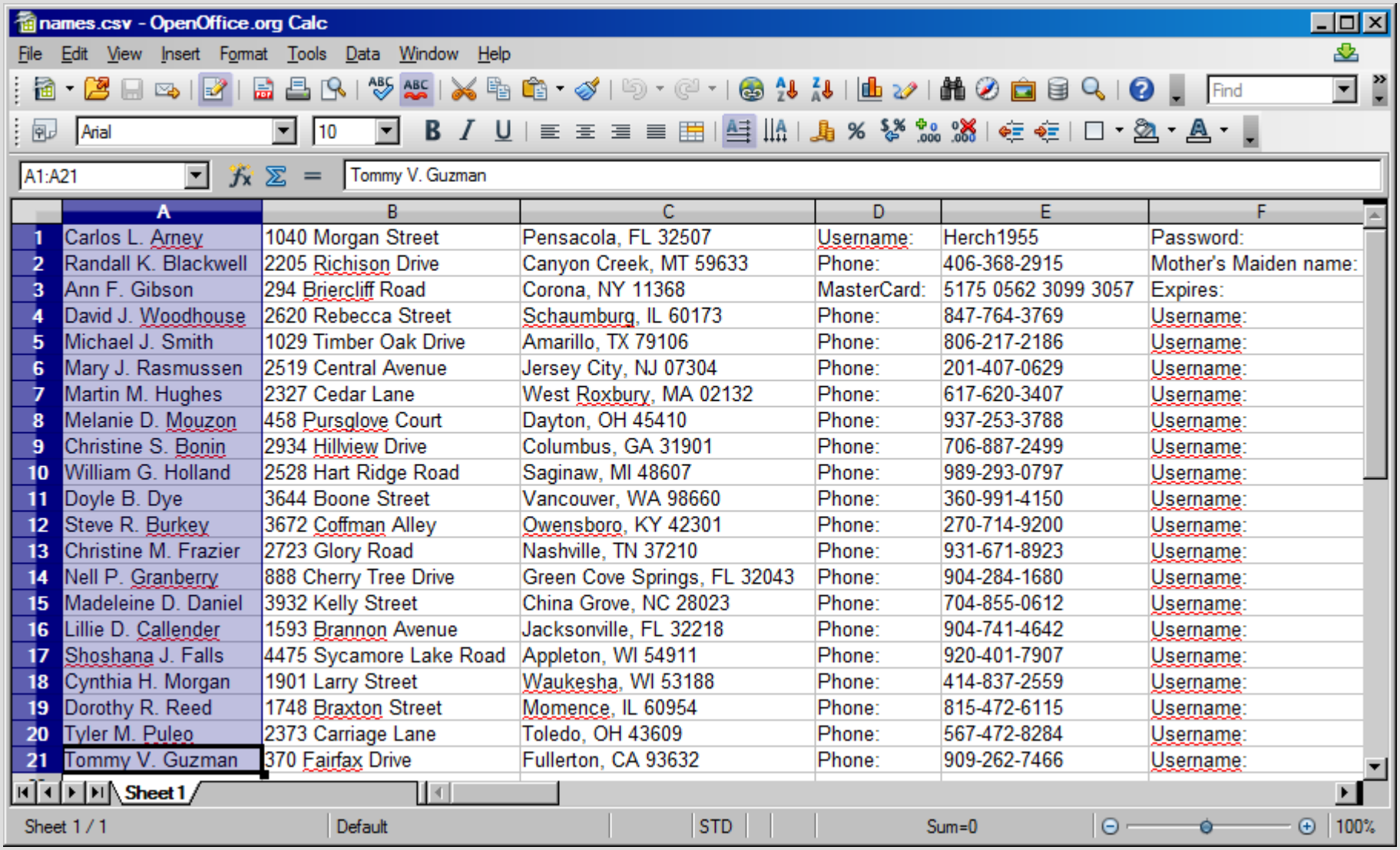
Repetitive tasks

If you feel like a mindless zombie when you do it a lot, you can probably program it.

Repetitive tasks



Repetitive tasks



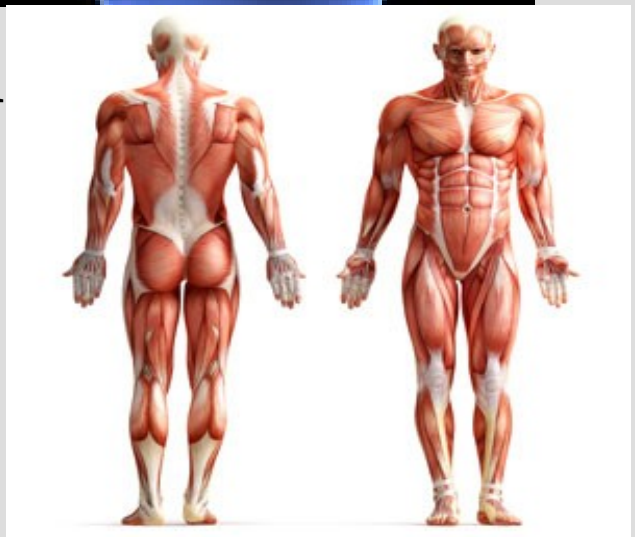
	A	B	C	D	E	F
1	Carlos L. Arney	1040 Morgan Street	Pensacola, FL 32507	Username:	Herch1955	Password:
2	Randall K. Blackwell	2205 Richison Drive	Canyon Creek, MT 59633	Phone:	406-368-2915	Mother's Maiden name:
3	Ann F. Gibson	294 Briercliff Road	Corona, NY 11368	MasterCard:	5175 0562 3099 3057	Expires:
4	David J. Woodhouse	2620 Rebecca Street	Schaumburg, IL 60173	Phone:	847-764-3769	Username:
5	Michael J. Smith	1029 Timber Oak Drive	Amarillo, TX 79106	Phone:	806-217-2186	Username:
6	Mary J. Rasmussen	2519 Central Avenue	Jersey City, NJ 07304	Phone:	201-407-0629	Username:
7	Martin M. Hughes	2327 Cedar Lane	West Roxbury, MA 02132	Phone:	617-620-3407	Username:
8	Melanie D. Mouzon	458 Pursglove Court	Dayton, OH 45410	Phone:	937-253-3788	Username:
9	Christine S. Bonin	2934 Hillview Drive	Columbus, GA 31901	Phone:	706-887-2499	Username:
10	William G. Holland	2528 Hart Ridge Road	Saginaw, MI 48607	Phone:	989-293-0797	Username:
11	Doyle B. Dye	3644 Boone Street	Vancouver, WA 98660	Phone:	360-991-4150	Username:
12	Steve R. Burkey	3672 Coffman Alley	Owensboro, KY 42301	Phone:	270-714-9200	Username:
13	Christine M. Frazier	2723 Glory Road	Nashville, TN 37210	Phone:	931-671-8923	Username:
14	Nell P. Granberry	888 Cherry Tree Drive	Green Cove Springs, FL 32043	Phone:	904-284-1680	Username:
15	Madeleine D. Daniel	3932 Kelly Street	China Grove, NC 28023	Phone:	704-855-0612	Username:
16	Lillie D. Callender	1593 Brannon Avenue	Jacksonville, FL 32218	Phone:	904-741-4642	Username:
17	Shoshana J. Falls	4475 Sycamore Lake Road	Appleton, WI 54911	Phone:	920-401-7907	Username:
18	Cynthia H. Morgan	1901 Larry Street	Waukesha, WI 53188	Phone:	414-837-2559	Username:
19	Dorothy R. Reed	1748 Braxton Street	Momence, IL 60954	Phone:	815-472-6115	Username:
20	Tyler M. Puleo	2373 Carriage Lane	Toledo, OH 43609	Phone:	567-472-8284	Username:
21	Tommy V. Guzman	370 Fairfax Drive	Fullerton, CA 93632	Phone:	909-262-7466	Username:

Auto leveling?

Software vs Hardware

Software - the more intangible code on a computer

Hardware - the physical Parts of the computer



Hardware interaction

CPU

Input

Output

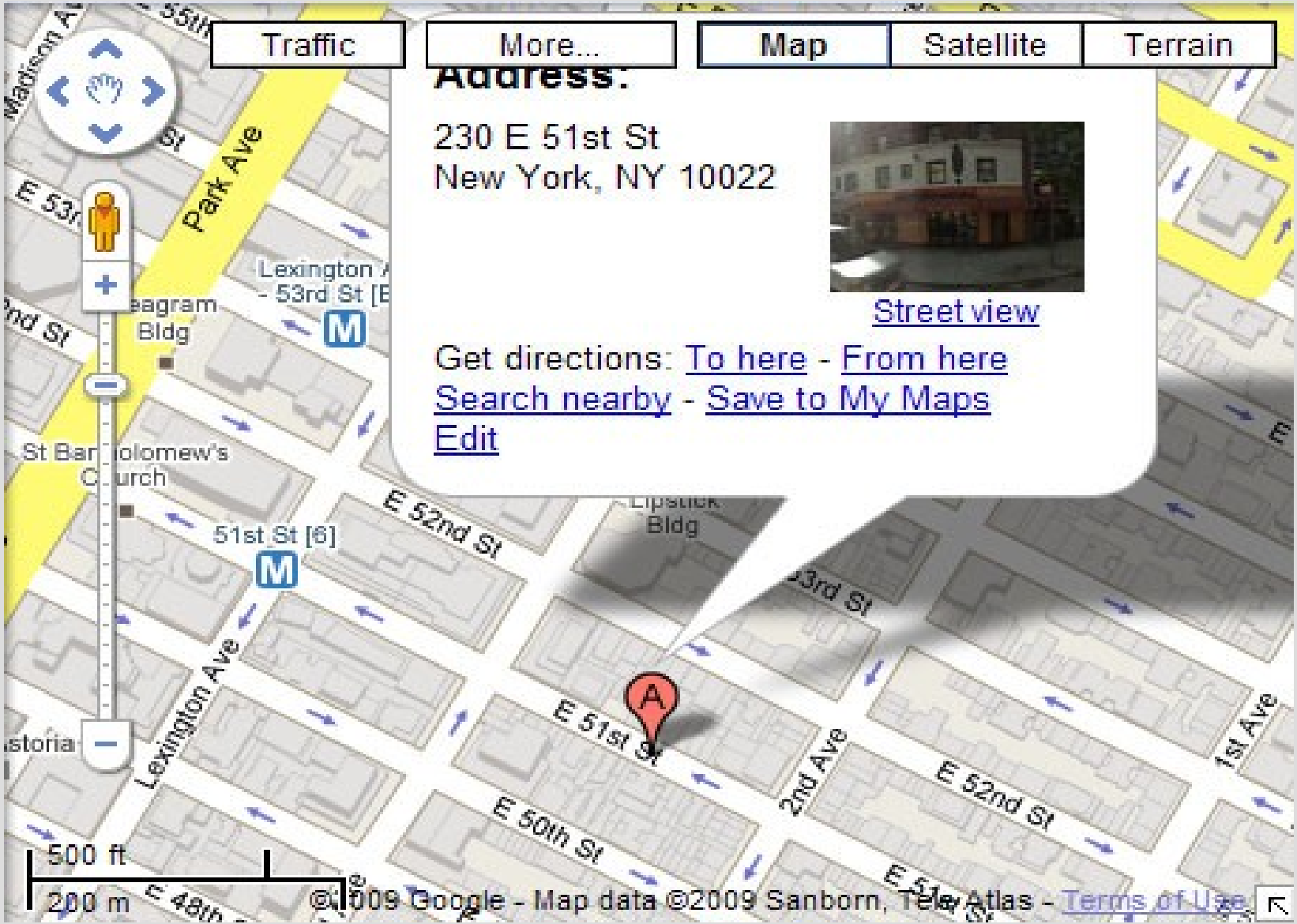
Memory

Memory addressing

Data is stored in “addresses” inside the memory

Later in this class, we will use these addresses to manipulate and share data

Memory addressing



Object oriented programming

OOP - focus on data and how they interact

To make algorithms for OOP, it is often useful to identify the data you are working with and their relationships before programming

Object oriented programming

Data for...

Banana nut bread?
ATM?
Ball game?

Object oriented programming

Data for...

Banana nut bread? Ingredients
ATM?
Ball game?

Object oriented programming

Data for...

Banana nut bread?	Ingredients
ATM?	Dollars & coins
Ball game?	

Object oriented programming

Data for...

Banana nut bread?	Ingredients
ATM?	Dollars & coins
Ball game?	Balls & mouse

Object oriented programming

Data for...

Banana nut bread? Ingredients

ATM? Dollars & coins

Ball game? ~~Balls & mouse~~

Lots of pixels (tiny color dots)