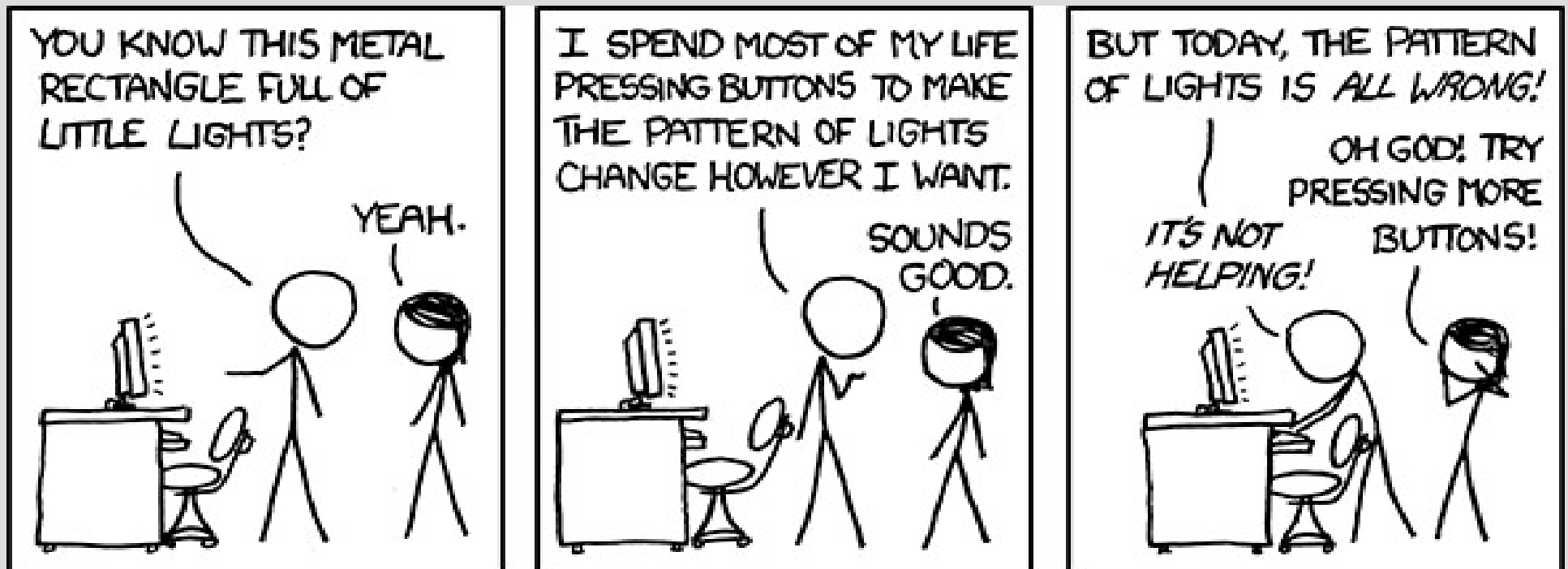


Welcome to CSci 1113

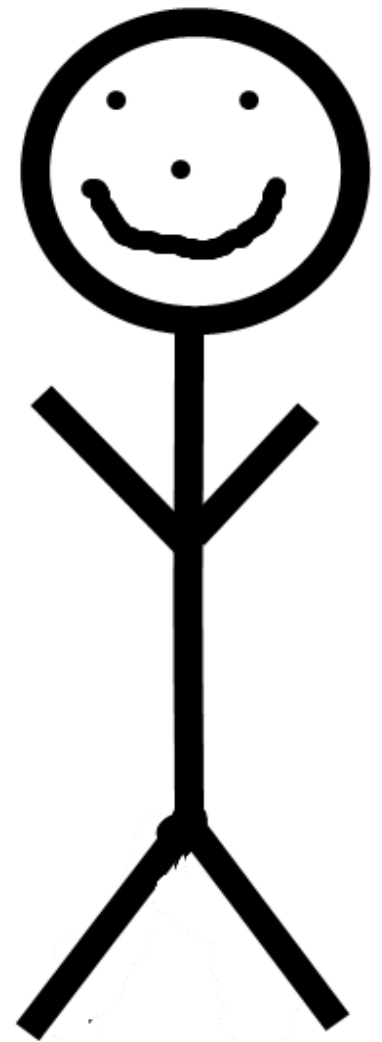
Introduction to C/C++ Programming for Scientists and Engineers



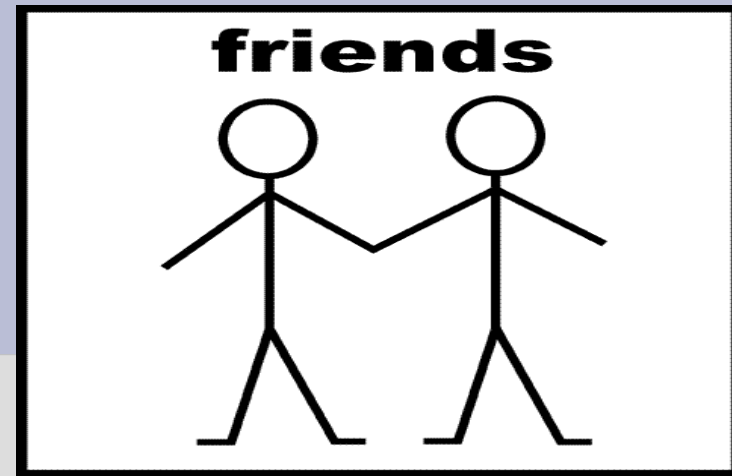
Instructor (me)

James Parker
Shepherd Laboratories 391

Primary contact:
jparker@cs.umn.edu



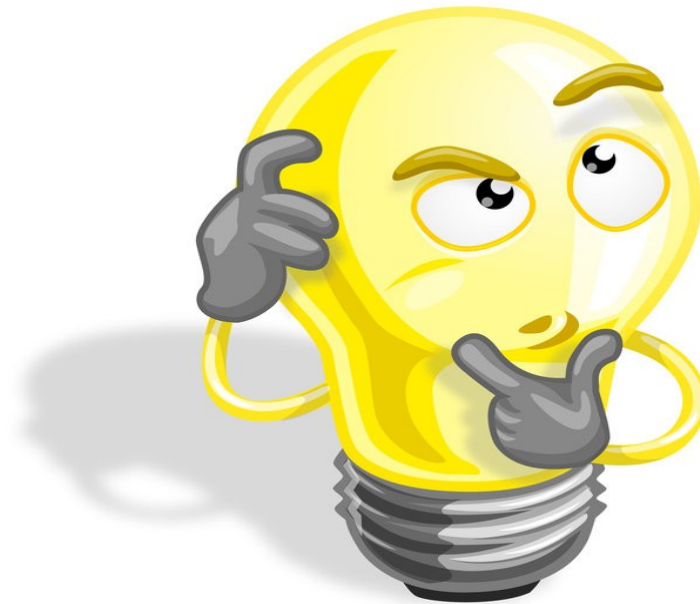
TAs



Karthik Unnikrishnan, Prashanth Venkatesh,
Jackson Benning, Yanjun Cui, Mitchell Dillon,
Skye Gagnon, Jacob Hammer, Samuel Highbargin,
Lin Huynh, Shane Jung, Jin Hong Kuan, Jan-Wei Lim,
Haoran Liu, Ying Lu, Sophia Manicor,
Andrew McCullough, Adam McCune, Kyle Meng,
Brandon Nee, Tanner Skluzacek, Antonio Turley,
Ruobing Wang, Kaiwei Wu, Yuyang Xiao, Songyu Yan,
Lei Zhang, Xintong Zhang

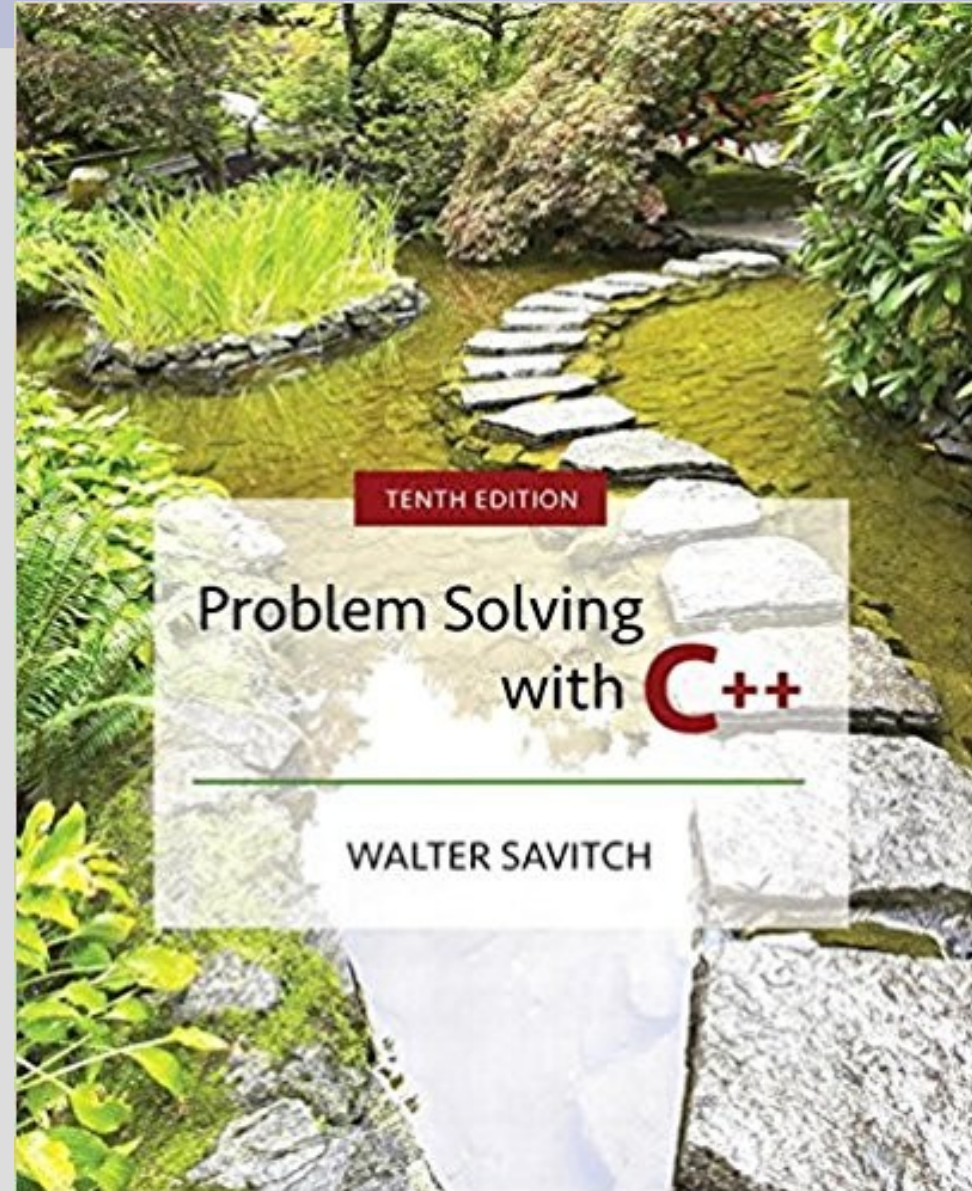
Questions?

Direct questions to:
Canvas forum discussion
jparker@cs.umn.edu



Textbook

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



Sister course: CSci 1115

This course is an “introduction” (from start), but many find it difficult

We started to run a supplementary course to provide additional help: CSci 1115(Th 6pm)

Sister course: CSci 1115

This course is an “introduction” (from start), but many find it difficult

We started to run a supplementary course to provide additional help: CSci 1115(Th 6pm)



Sister course: CSci 1115

This course is an “introduction” (from start), but many find it difficult

We started to run a supplementary course to provide additional help: CSci 1115(Th 6pm)



Sister course: CSci 1115

This course is an “introduction” (from start), but many find it difficult

We started to run a supplementary course to provide additional help: CSci 1115(Th 6pm)

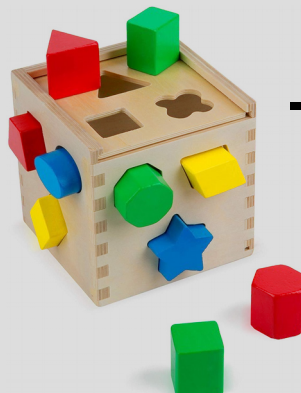


-group problem solving

Sister course: CSci 1115

This course is an “introduction” (from start), but many find it difficult

We started to run a supplementary course to provide additional help: CSci 1115(Th 6pm)



-group problem solving
-free food!

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/

CSE-IT | - Mozilla Firefox

CSE-IT |

https://cseit.umn.edu

UNIVERSITY OF MINNESOTA
Driven to DiscoverSM

COLLEGE OF Science & Engineering

One Stop MyU

Search Websites and People

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

CSE-IT

Home | Instructional Resources | Computer Classrooms | **Forms** | About | CSE-IT Service Status | Knowledge & Help

College of Science and Engineering - Information Technology

*All the power of a CSE Linux desktop...
no matter where you are.*

CONNECT NOW!

CONNECT NOW! - 3D
if you would like to use 3D apps

VOLE Cluster Now Available in CSE Labs
Access your Linux desktop and software remotely for more convenient access to instructional resources.

TELL ME MORE

https://cseit.umn.edu/

Forms | CSE-IT - Mozilla Firefox

Forms | CSE-IT

https://cseit.umn.edu/forms

UNIVERSITY OF MINNESOTA
Driven to DiscoverSM

COLLEGE OF Science & Engineering

One Stop MyU

Search Websites and People

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

CSE - IT

Home | Instructional Resources | Computer Classrooms | **Forms** | About | CSE-IT Service Status | Knowledge & Help

Home > Forms

Forms

CSE-IT Contact Info
Keller Hall - Room 1-201
Office Hours: M-F 8:00 AM - 5:00 PM
612-625-0876
csehelp@umn.edu
Or use the red phone in the labs.

- Classroom Access Form
- CSE Account Authorization Form**
- CSE Labs Classroom Reservation Form

© 2018 Regents of the University of Minnesota. All rights reserved. The University of Minnesota is an equal opportunity educator and employer. Privacy Statement

https://cseit.umn.edu/

CSE Labs Account Creation - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://www.cs.umn.edu/account-management/

Campuses: Twin Cities Crookston Duluth Morris Rochester Other Locations

myU One Stop

Search U of M Web sites Search

COLLEGE OF Science & Engineering CSE Home CSE Directory Give to CSE Student Dashboard

CSE Labs Account Creation

CSE Labs accounts no longer closing every term

If you have had a previous CSE Labs account, you do not need to reopen it every term. Accounts will now, only be closed after a year of inactivity.

Welcome to the CSE Labs Account Creation Site

Use this site to initiate your CSE Labs account. CSE Labs use is open to any student currently enrolled in the College of Science and Engineering.

If you do not know what your username is, or you are having problems see the [U of M Student Internet Account Initiation Form](#).

[Create CSE Labs Account](#)

For further information send email to operator@cseilabs.umn.edu or stop by the Systems Staff Office in Keller Hall 1-201.

For a list of our hours see [Systems Staff Contact Information and Hours](#).

Changing your Password

If you want to change your password, you will need to use the [U of M Internet Account Options web page](#).

Systems Staff Office, 1-201 Keller Hall, 300 Haring St, Minneapolis, MN 55455 Phone: (612) 625-9876 Email: systems@cseilabs.umn.edu

https://www.cs.umn.edu/account-management/auth.cgi

www.cs.umn.edu

https://cseit.umn.edu/

CSE Labs Account Creation - Mozilla Firefox

File Edit View History Bookmarks Tools Help

https://www.cs.umn.edu/account-management/

- On UNIX: df.
- On Windows: Right click on your directory and look at the properties.

Welcome to the Fall2012 CSE Labs Account Creation Form.

Use this form to initiate or change your CSE Labs account for the Fall2012 semester. CSE Labs use is open to any student currently enrolled in the College of Science and Engineering.

Please enter the following information:

- Your student email **username**.
- Your **password** for your general UMN email account. (To verify your eligibility for a CSE Labs account.)

Username: @umn.edu

Password:

If you do not know what your username is, or you are having problems see the [U of M Student Internet Account Initiation Form](#).

For further information send email to operator@cseilabs.umn.edu or stop by the Systems Staff Office in Keller Hall 1-213.

For a list of our hours see [Systems Staff Contact Information and Hours](#).

Systems Staff Operator: 1-213 Keller Hall, 200 Union St, Minneapolis, MN 55455 Phone: (612) 625-0876 Email: operator@cseilabs.umn.edu

© 2011 Regents of the University of Minnesota. All rights reserved. Twin Cities Campus: [Parking & Transportation](#) [Maps & Directions](#)

Done www.cs.umn.edu

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

Canvas page will have grades and
(maybe) homework submissions

Class website

Canvas also has a link to the website:

The screenshot displays the Canvas LMS interface for the course 'CSCI 1113 (010) > Modules'. The left sidebar contains navigation links: Account, Dashboard, Courses, Calendar, Inbox, and Commons. The main content area shows the '2020 Spring (12/30/2019-0...' session with buttons for 'View Progress' and '+ Module'. Under the 'Home' tab, a list of course items includes Announcements, Assignments, Discussions, Grades, Pages, Files, Modules, Chat, and Student Rating of Teaching. A red circle highlights the 'Public Website (majority of class material)' section, which contains a link titled 'Schedule & PDFs webpage (clicky)' with an external link icon. A red arrow points from the 'Public Website' header to the 'Schedule & PDFs webpage (clicky)' link.

Canvas LMS Interface Screenshot:

- Course: CSCI 1113 (010) > Modules
- Session: 2020 Spring (12/30/2019-0...)
- Buttons: View Progress, + Module
- Home Tab:

 - Public Website (majority of class material)
 - Schedule & PDFs webpage (clicky) (circled in red)

www.cs.umn.edu



UNIVERSITY OF MINNESOTA
Driven to DiscoverSM

myU >

One Stop >

Search U of M Web Sites

Search

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 P.M.

Syllabus

15% Labs

30% Homework (due Fridays)

5% Quiz (Feb. 19)

10% Midterm 1 (March 4)

15% Midterm 2 (April 15)

25% Final (Monday May 11,

10:30am to 12:30am in this room)

Syllabus

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

Homework is due Fridays at 11:55 P.M. (more info to come)

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 (“warm up” Qs must be checked off in your lab)

Homework must be done by yourself

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)



Homev



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 & Inheritance

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 programmed

Banana Nut Bread

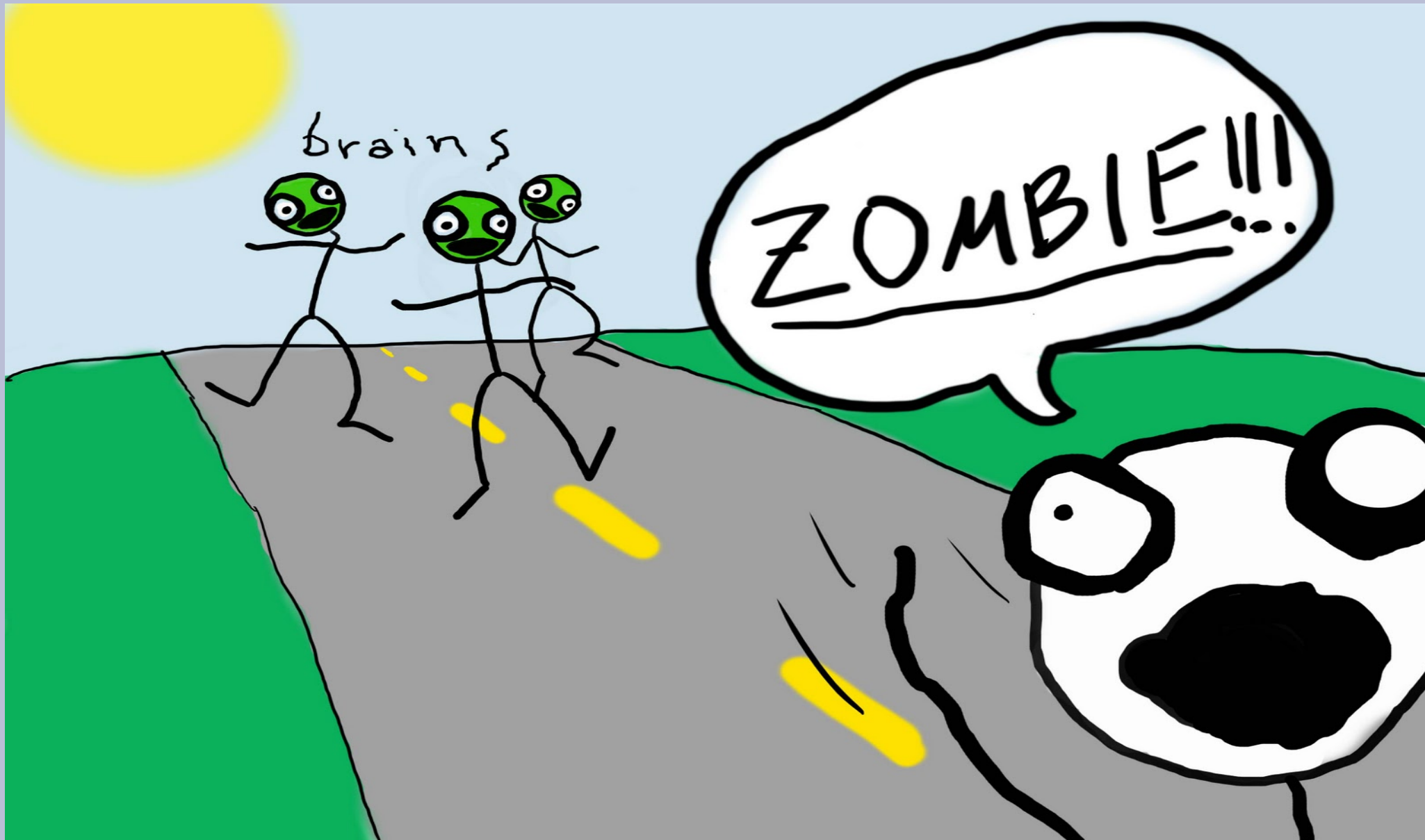
Directions

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

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

Repetitive tasks



Repetitive tasks

names.csv - OpenOffice.org Calc

File Edit View Insert Format Tools Data Window Help

Find

A1:A21

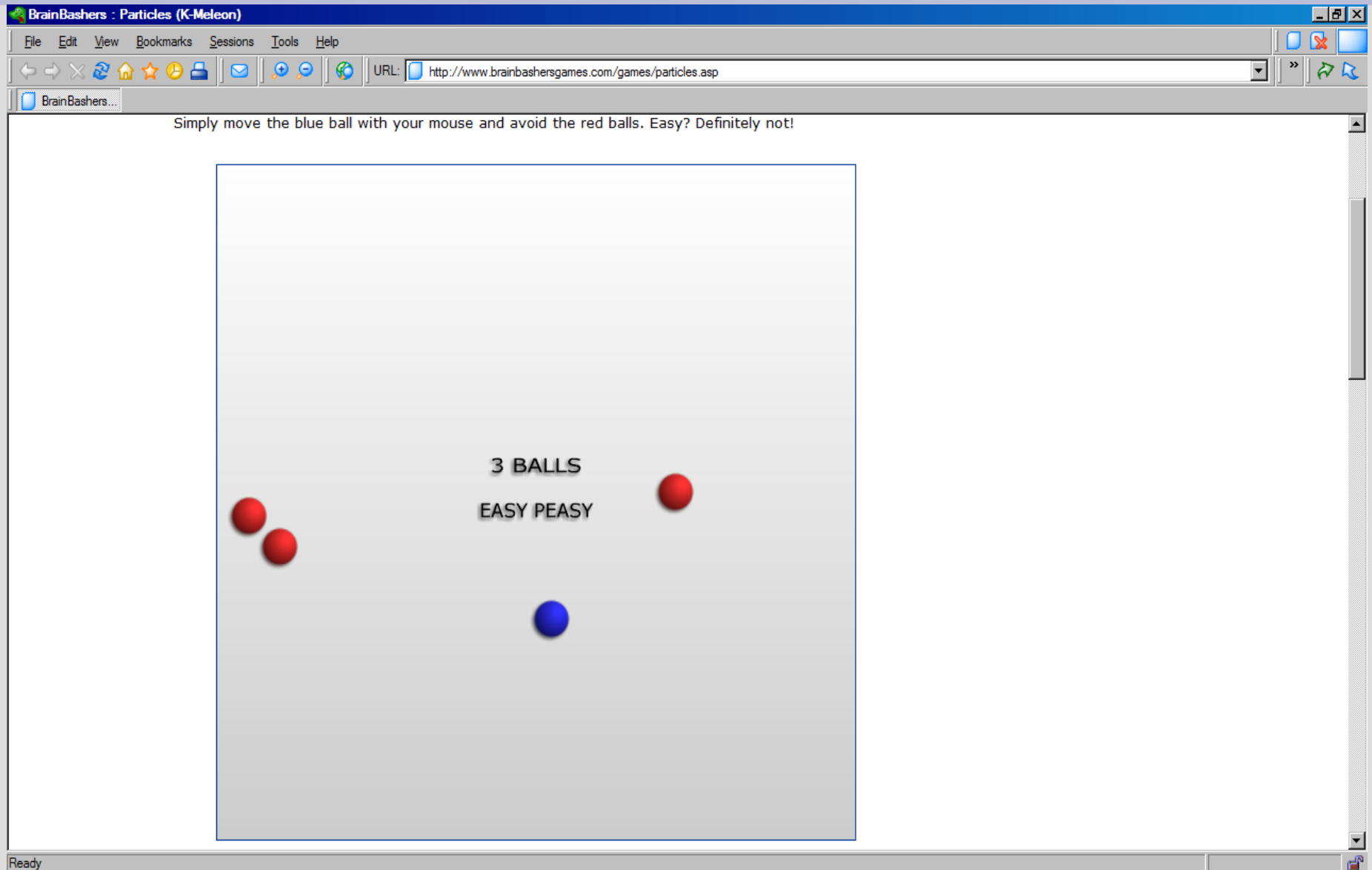
Tommy V. Guzman

	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:

Sheet 1

Sheet 1 / 1 Default STD Sum=0 100%

Repetitive tasks



ATMs

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

Auto leveling?



Software vs Hardware

Software - the more intangible
code on a computer



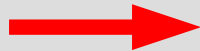
Hardware - the physical
Parts of the computer



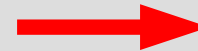
Hardware interaction



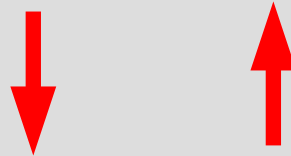
Input



CPU



Output



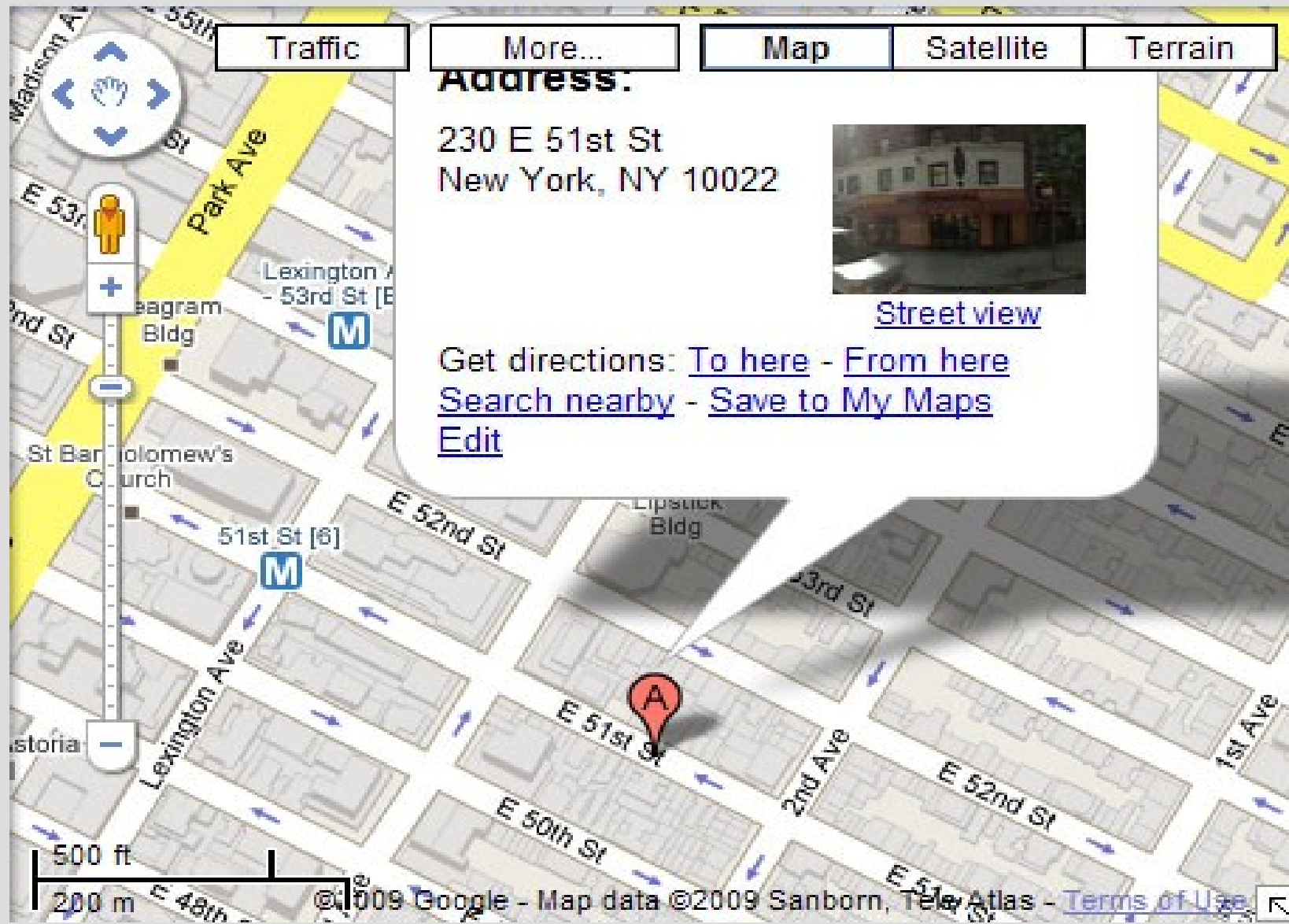
Memory

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)