CS 105
Introduction to Computer Programming

Code: Why, What~~,& How~~

Media Computing: Why & What~~,& How~~

Course Introduction

Ch 1, Ch 2 (skip “Download and Setup” p. 9)

Why Learn to Code (0:00 - 6:40; 7:18 - 9:10)

- https://www.youtube.com/watch?v=dU1xS07N-FA

Teaching kids to code is the next frontier in 21st century education

By Helena Game | September 15, 2017 | @helenagame

Japan Makes Coding Mandatory for All Students Starting in Elementary School

Posted on March 28, 2019 by Ted

Soon, Japanese elementary schoolchildren like these will be taught computer p

A computing revolution in schools

Rory Cellan-Jones
Technology correspondent
@BBCRoryCJ

1 September 2014 | Share

Coding at school: a parent's guide to England's new computing curriculum

China Pushes Coding for Kids in Effort Tackle Innovation Gap

A young boy learns to code at the Tarena Learning Center in Beijing. NBC News

EDUCATION

Teaching coding in Canadian schools: How do the provinces measure up?

BY ALYSSA JULIE - NEWS TALK 770
Posted August 24, 2017 2:23 pm
Updated August 28, 2017 12:10 pm

File photo. *AP Photo/Stephan Savoia*

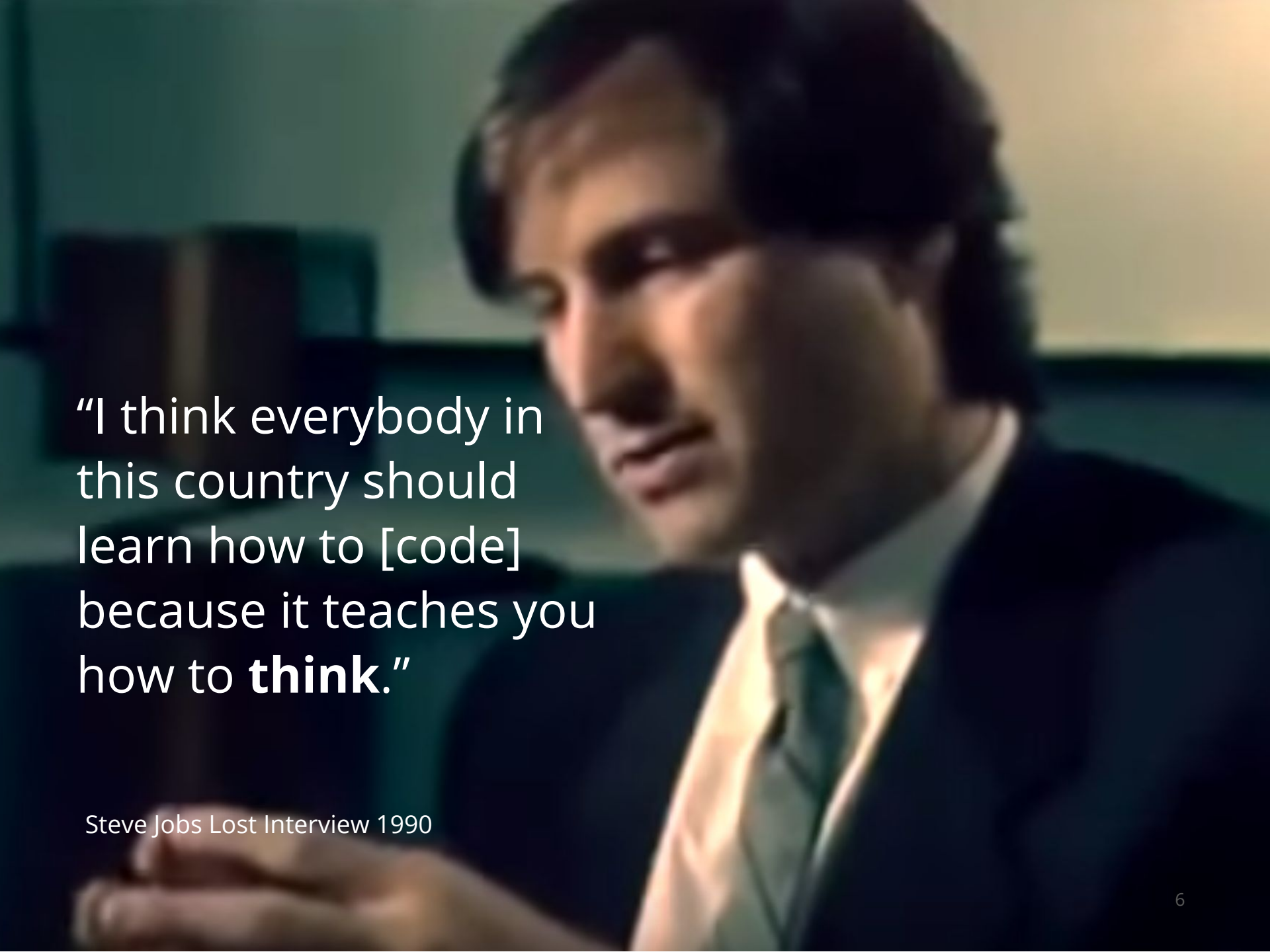
m the start of the new term, children as young as five will be
ning programming skills in the classroom

ding is on the curriculum for primary and secondary school pupils in the UK. Photograph: Alamy

Why Learn to Code?

Why Learn to Code?

- Bring your imagination or ideas to life!
- Tool for expressing your creativity


“I think everybody in this country should learn how to [code] because it teaches you how to **think**.”
Steve Jobs Lost Interview 1990

What is Coding?

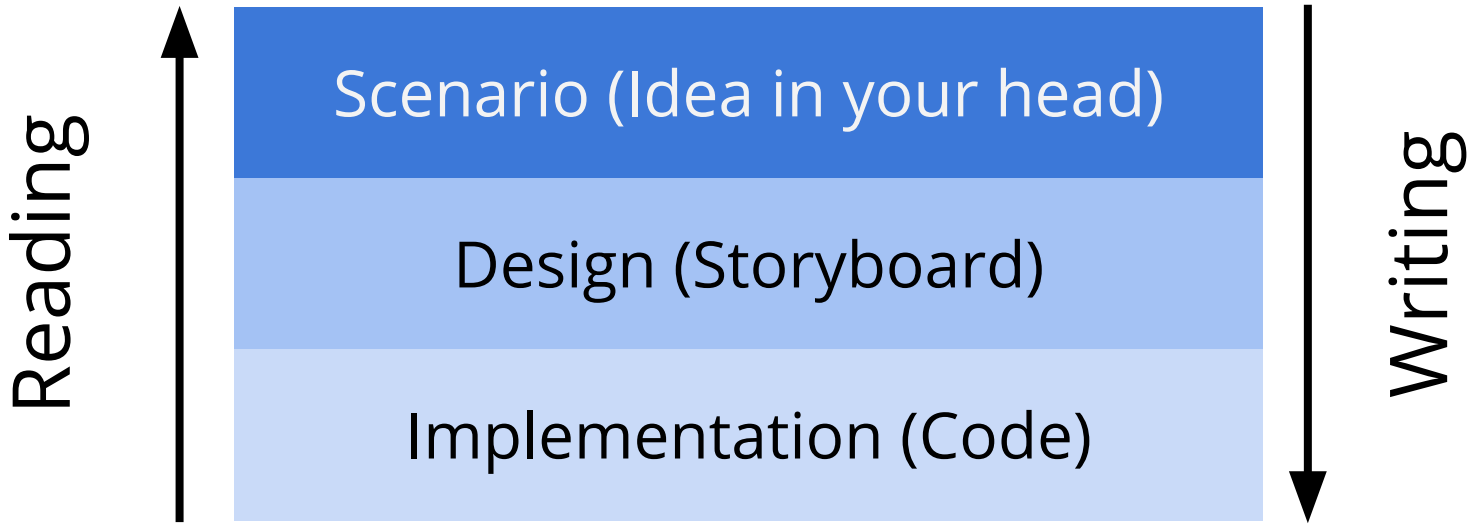
Ability to…

What is Coding?

Ability to…

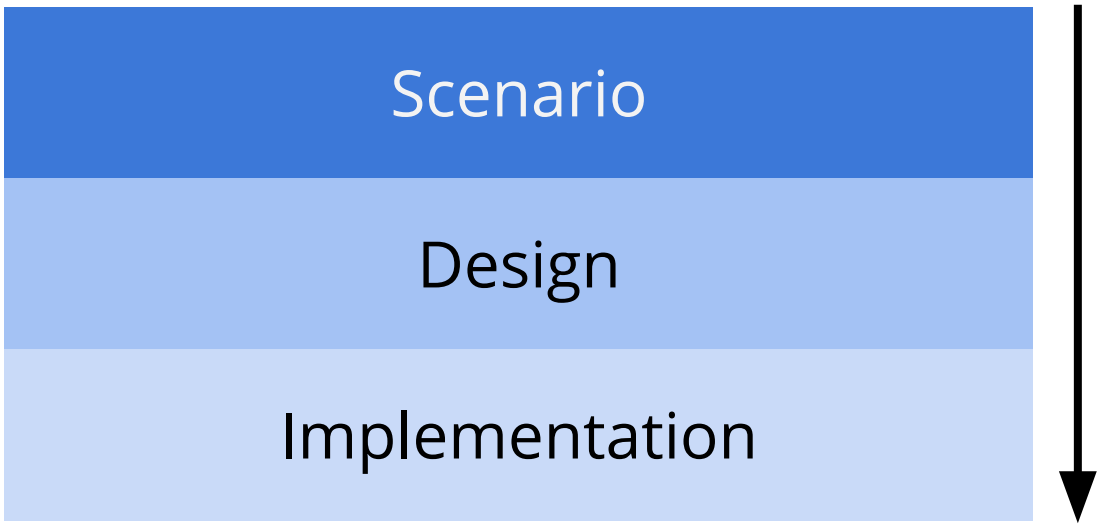
- “explain to computer what you want it to do for you”
- “teach a stupid machine how to do something”

Coding Teaches You How to Think

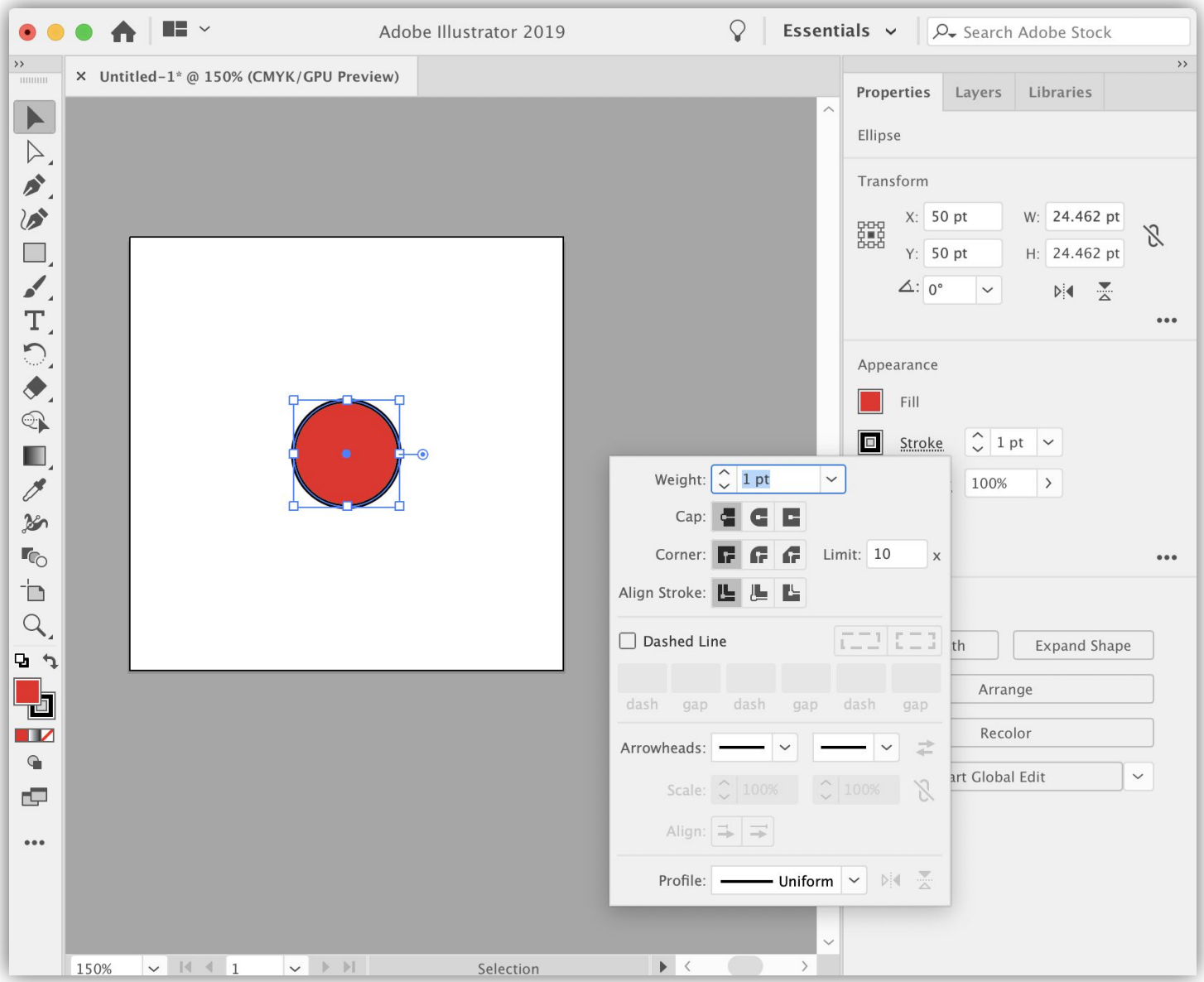


Cutts et al., The Abstraction Transition Taxonomy

We Already Know How to Do This



… just not how to communicate with computers


Adobe Illustrator 2019
Essentials
Search Adobe Stock
Untitled-1* @ 150% (CMYK/GPU Preview)
Properties
Layers
Libraries
Ellipse
Transform
X: 50 pt
Y: 50 pt
W: 24.462 pt
H: 24.462 pt
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Appearance
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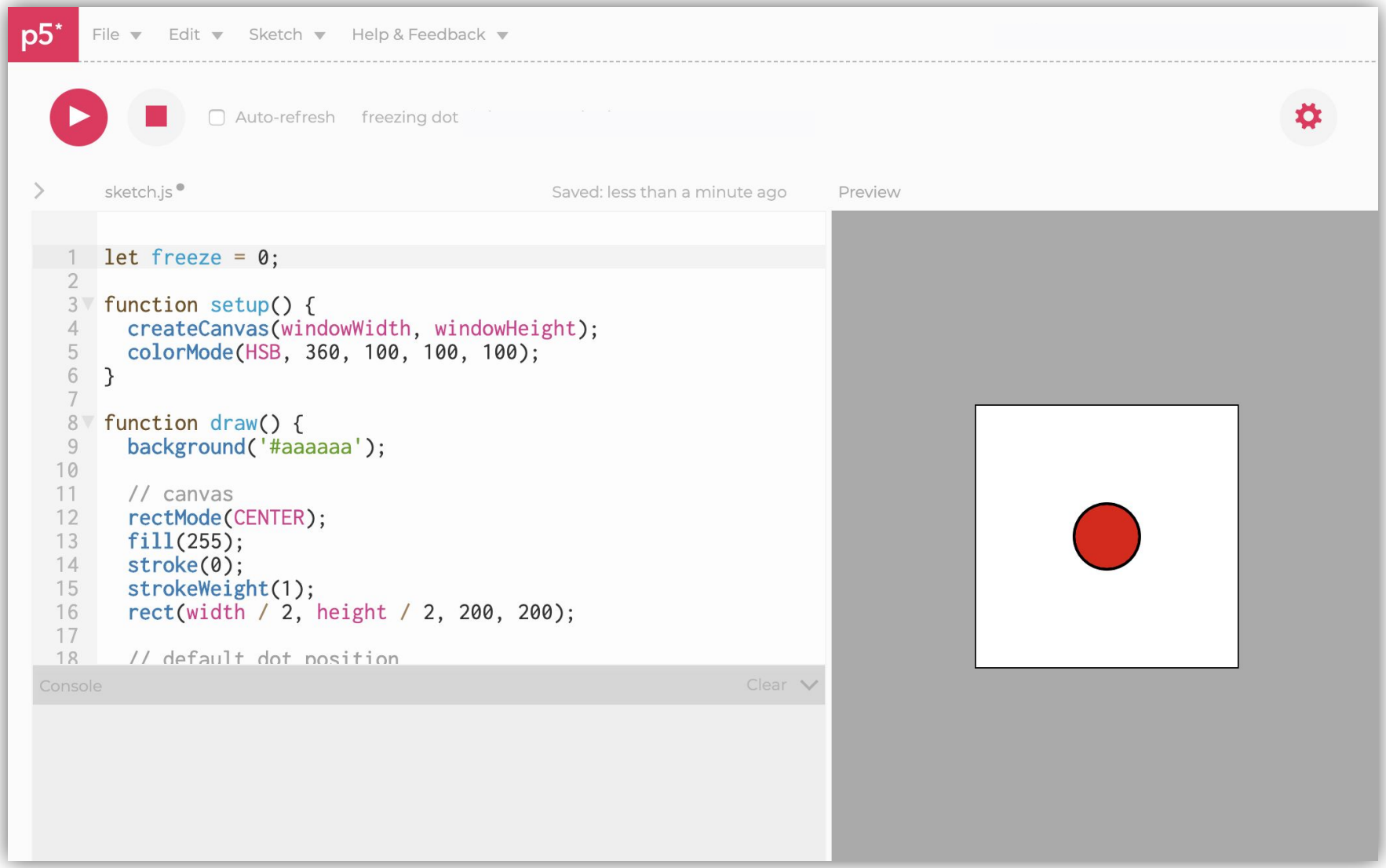
Selection



https://editor.p5js.org/cs105/sketches/gJjiPdznK

Installation for MOO-YOUNG by SPACEFILLER

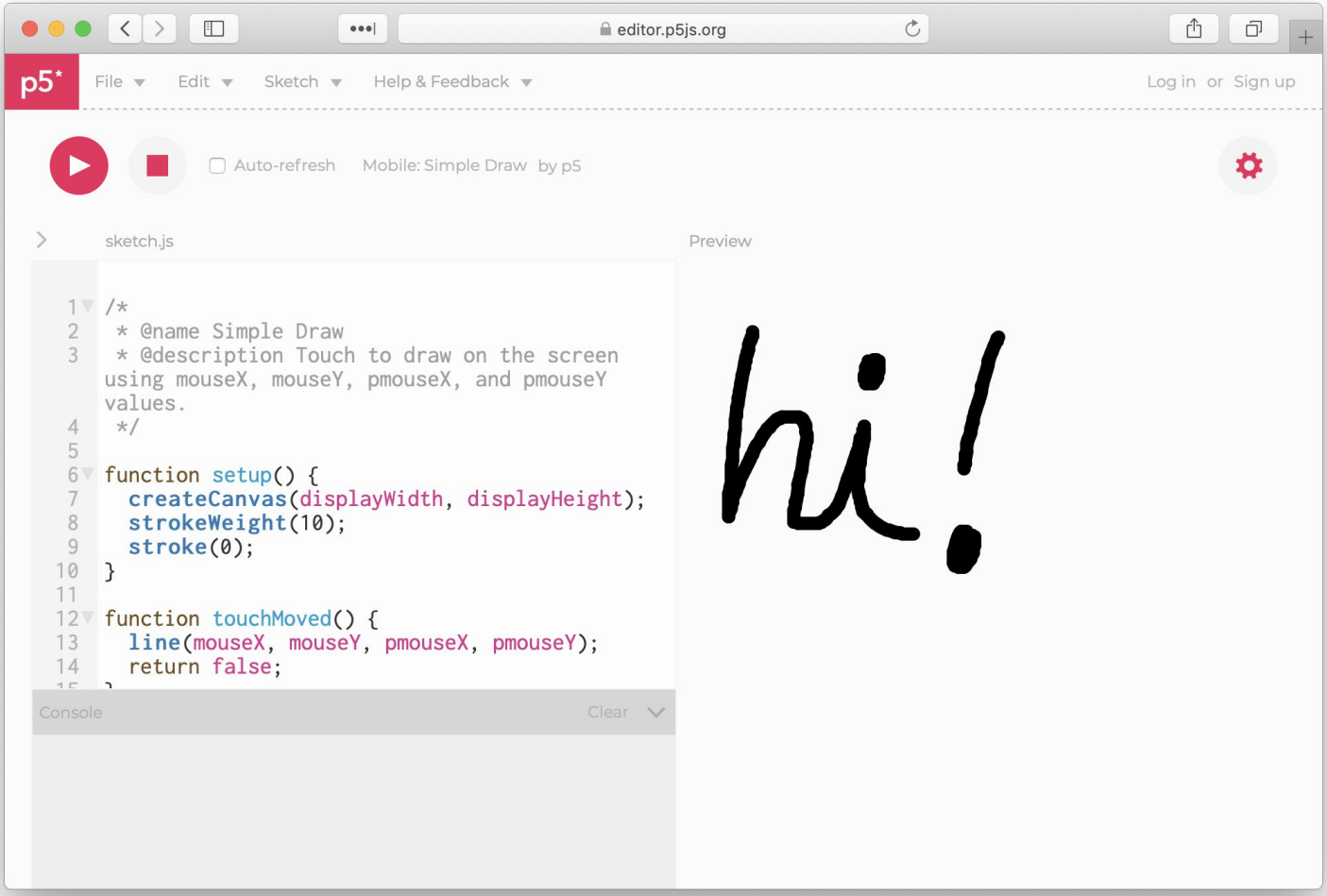
- https://youtu.be/07hiEtggHXw (0:00 - 0:20)

Siftor

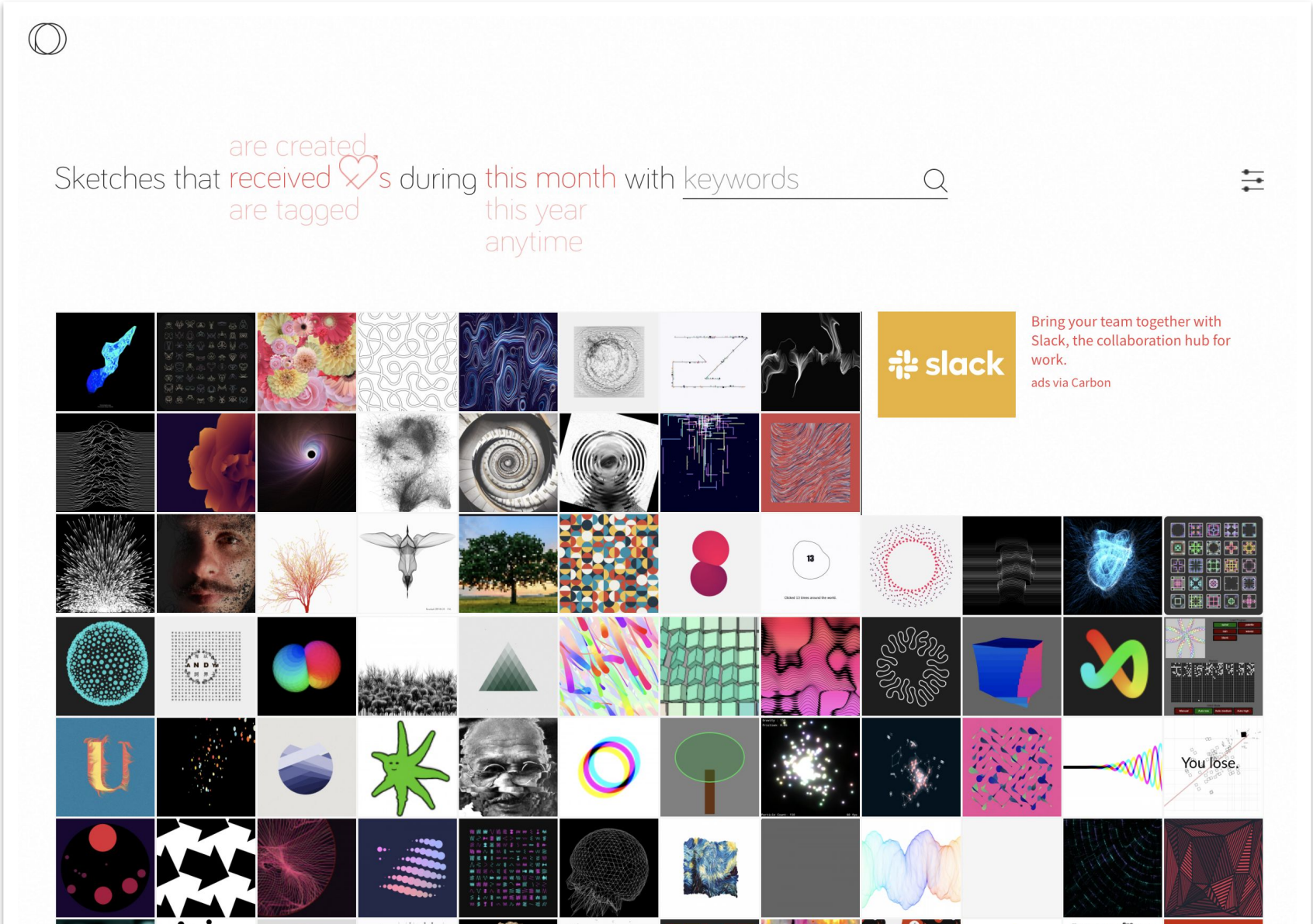
- http://youtu.be/b7j_T9xUNNI

JavaScript with Processing p5.js

- https://editor.p5js.org/

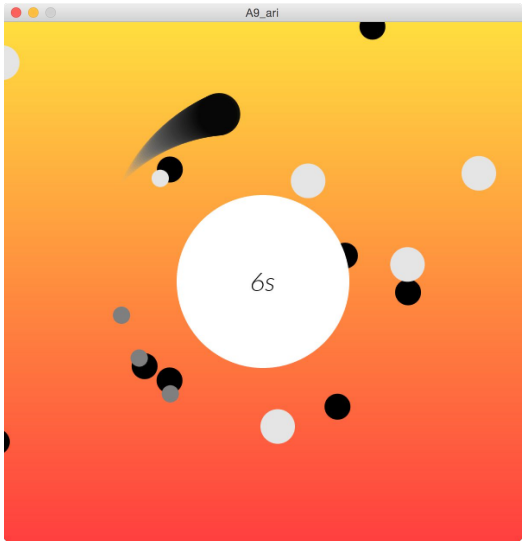


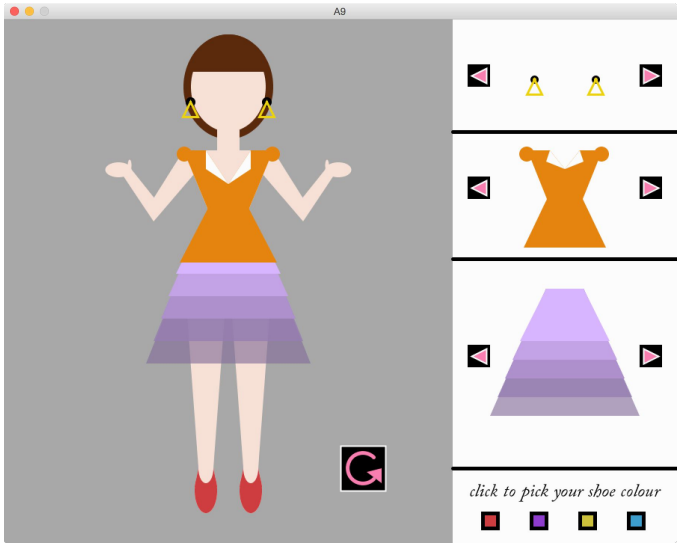
https://www.openprocessing.org/browse



CS 105 Final Project

- A chance to design and code a program of your choice





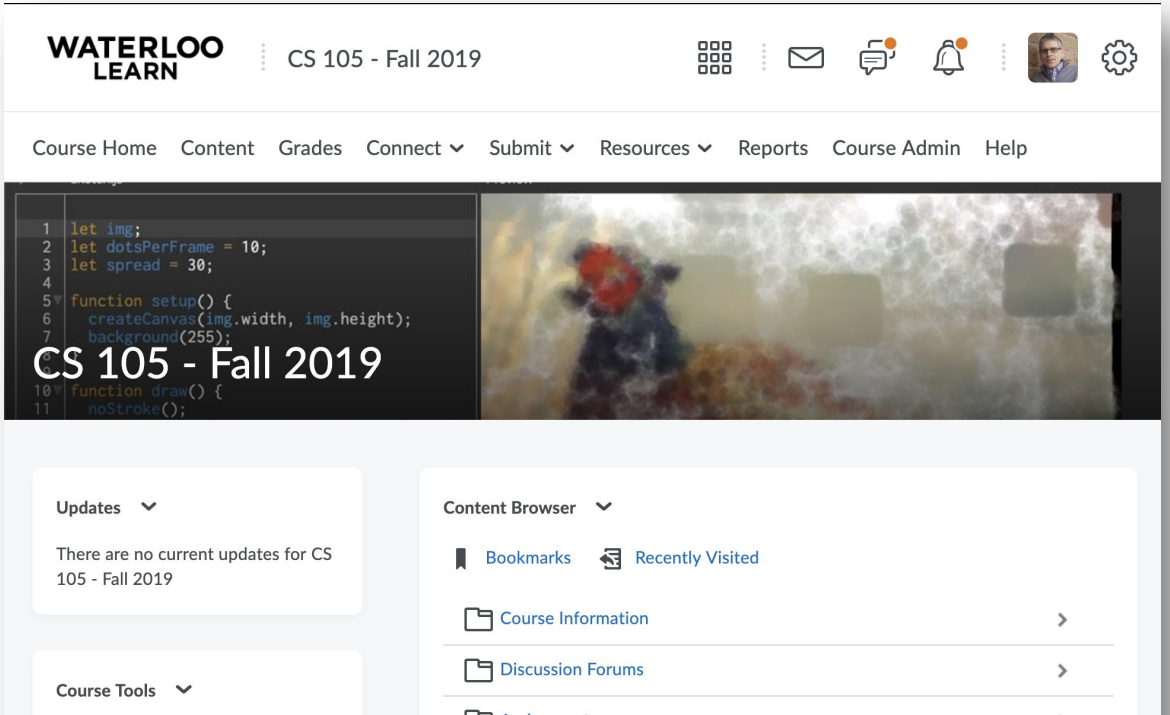
Program or Be Programmed, Douglas Rushkoff (2:18)

- http://youtu.be/kgicuytCkoY

Course Website

- LEARN: https://learn.uwaterloo.ca/
  - Announcements
  - Course Information (e.g. syllabus, schedule, office hours, …)
  - Labs and Assignments (LEARN Dropbox for submitting)
  - Discussion Forums for asking questions

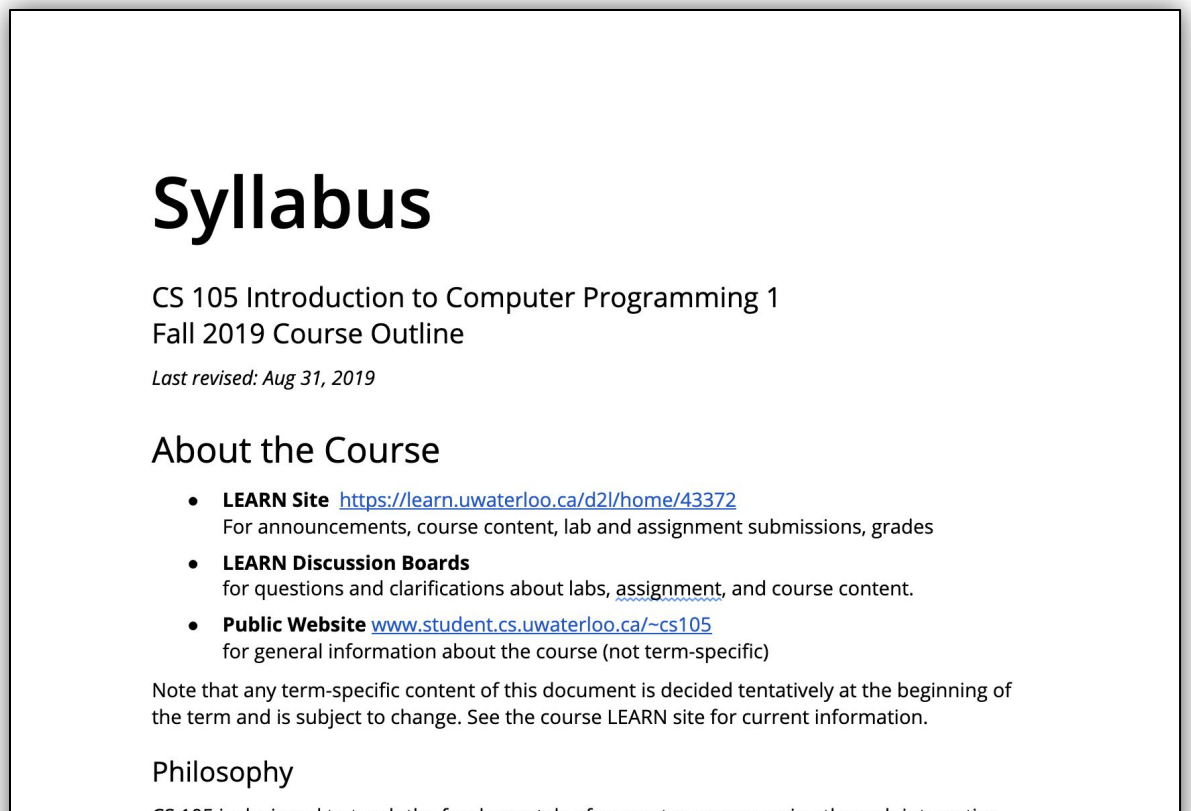
Note https://www.student.cs.uwaterloo.ca/~cs105/ is course promo site only.



Syllabus Walkthrough

- Philosophy
- Audience
- Research
- Textbook
- Lecture Handouts
- Guides
- Communication
- Staff
- Schedule
  - Topics
  - Due Dates
- Grading
- Policies

Find it on LEARN: https://learn.uwaterloo.ca/



Syllabus

CS 105 Introduction to Computer Programming 1
Fall 2019 Course Outline

Last revised: Aug 31, 2019

About the Course

- **LEARN Site** https://learn.uwaterloo.ca/d2l/home/43372
  For announcements, course content, lab and assignment submissions, grades
- **LEARN Discussion Boards**
  for questions and clarifications about labs, assignment, and course content.
- **Public Website** www.student.cs.uwaterloo.ca/~cs105
  for general information about the course (not term-specific)

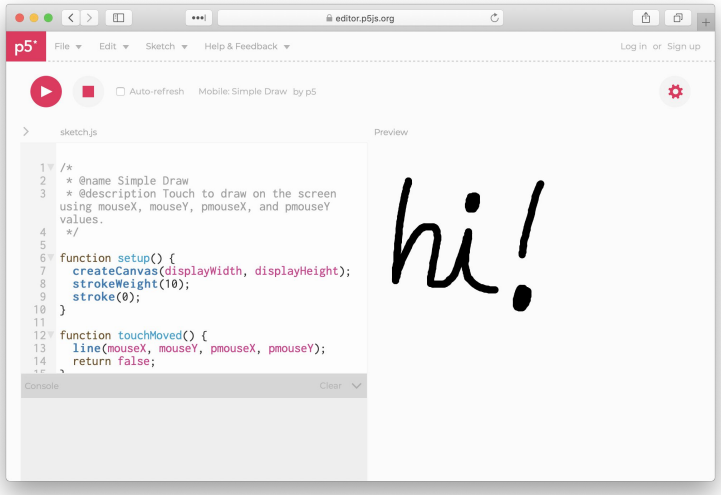
Note that any term-specific content of this document is decided tentatively at the beginning of the term and is subject to change. See the course LEARN site for current information.

Philosophy

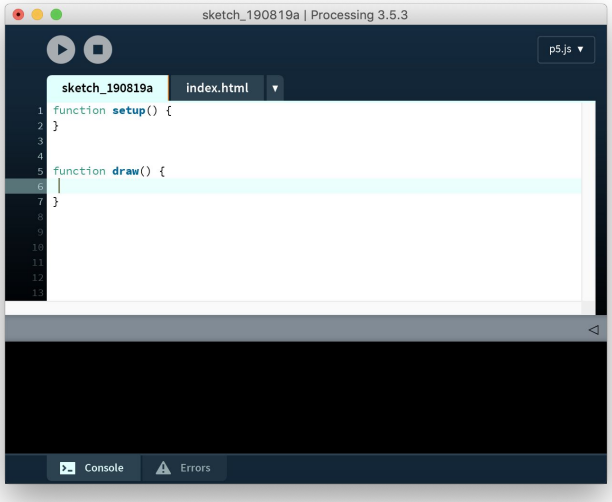
Computing Resources: Coding

- We will be using JavaScript with the p5.js library
  - https://p5js.org/get-started/
  - You must run the most up-to-date version of your browser
- Three ways to code:

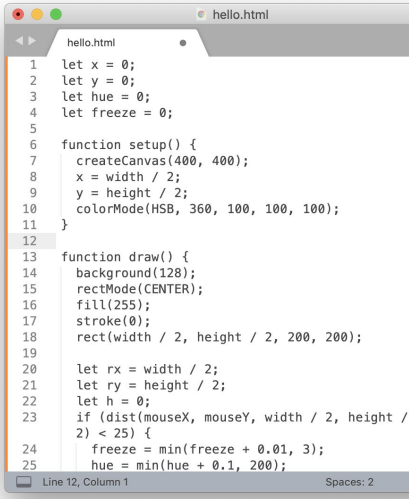
1. Online P5 Editor
https://editor.p5js.org
(only for quick testing)



2. Processing IDE in P5 Mode
https://processing.org/
The Recommended Way

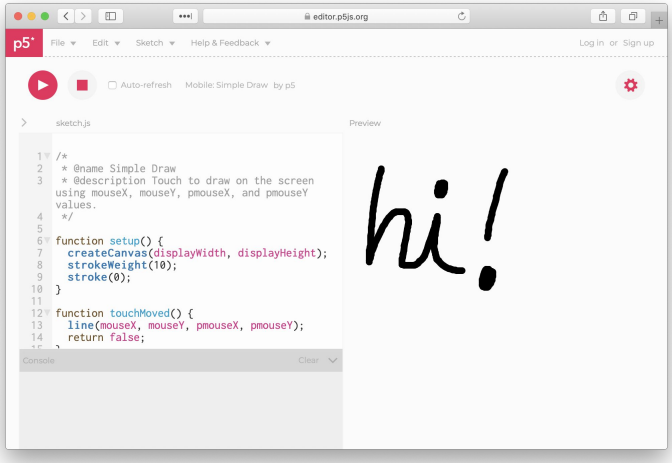


3. Text Editor
(not recommended)



Computing Resources: Coding

- **Online P5 Editor has a serious security issue: anyone can view all of another user's sketches saved in the P5 online editor.** All you need is to guess or discover the user's username, or for that user to share even a single sketch with you.
- *****Due to this issue, you must NOT use the P5.js online editor to save any labs or assignment.*****



Computing Resources: Labs

- Weekly Labs are on 3rd floor of **MC** building
  - Labs are open 24 hours
  - You need to set a lab computer password:
  - https://www.student.cs.uwaterloo.ca/password/auth/

In-class laptop use and its effects on student learning

Carrie B. Fried *

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Received 29 June 2006; received in revised form 15 September 2006; accepted 24 September 2006

Abstract

Recently, a debate has begun over whether in-class laptops aid or hinder learning. While some research demonstrates that laptops can be an important learning tool, anecdotal evidence suggests more and more faculty are banning laptops from their classrooms because of perceptions that they distract students and detract from learning. The current research examines the nature of in-class laptop use in a large lecture course and how that use is related to student learning. Students completed weekly surveys of attendance, laptop use, and aspects of the classroom environment. Results showed that students who used laptops in class spent considerable time multitasking and that the laptop use posed a significant distraction to both users and fellow students. Most importantly, the level of laptop use was negatively related to several measures of student learning, including self-reported understanding of course material and overall course performance. The practical implications of these findings are discussed.
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Keywords: Laptop use; Classroom teaching; Post-secondary education; Teaching/Learning strategies

Computers, and especially laptops, have become standard equipment in higher education as the number of universities instituting laptop initiatives continues to grow (Weaver & Nilson, 2005). Brown, Burg, and

Journal of Computing in Higher Education
Fall 2003, Vol. 15(1), 46-64.

The Laptop and the Lecture: The Effects of Multitasking in Learning Environments

Helene Hembrooke and Geri Gay
Human Computer Interaction Laboratory
Cornell University

ABSTRACT

THE EFFECTS OF MULTITASKING IN THE CLASSROOM were investigated in students in an upper level Communications course. Two groups of students heard the same exact lecture and tested immediately following the lecture. One group of students was allowed to use their laptops to engage in browsing, search, and/or social computing behaviors during the lecture. Students in the second condition were asked to keep their laptops closed for the duration of the lecture. Students in the open laptop condition suffered decrements on traditional measures of memory for lecture content. A second experiment replicated the results of the first. Data were further analyzed by "browsing style." Results are discussed from Lang's Limited Process Capacity model in an attempt to better understand the mechanisms involved in the decrement. *(Keywords: multitasking, divided attention, technology, education, limited capacity model)*

Psychological Science OnlineFirst, published on April 23, 2014 as doi:10.1177/0956797614524581

Research Article

Psychological Science
1–10
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DOI: 10.1177/0956797614524581
pss.sagepub.com

The Pen Is Mightier Than the Keyboard: Advantages of Longhand Over Laptop Note Taking

Pam A. Mueller[1] and Daniel M. Oppenheimer[2]
[1]Princeton University and [2]University of California, Los Angeles

Abstract
Taking notes on laptops rather than in longhand is increasingly common. Many researchers have suggested that laptop note taking is less effective than longhand note taking for learning. Prior studies have primarily focused on students' capacity for multitasking and distraction when using laptops. The present research suggests that even when laptops are used solely to take notes, they may still be impairing learning because their use results in shallower processing. In three studies, we found that students who took notes on laptops performed worse on conceptual questions than students who took notes longhand. We show that whereas taking more notes can be beneficial, laptop note takers' tendency to transcribe lectures verbatim rather than processing information and reframing it in their own words is detrimental to learning.

Keywords
academic achievement, cognitive processes, memory, educational psychology

Received 5/11/13; Revision accepted 1/16/14

The use of laptops in classrooms is controversial. Many professors believe that computers (and the Internet) serve as distractions, detracting from class discussion and

important but relatively unsurprising, given the literature on decrements in performance when multitasking or task switching (e.g., Iqbal & Horvitz, 2007; Rubinstein, Meyer,

During Lecture, Laptop and Tablets …

… may **only** be used to:

- view lecture slides
- take lecture notes
- look up content related to lecture
- try lecture sample code

… may **not** be used to:

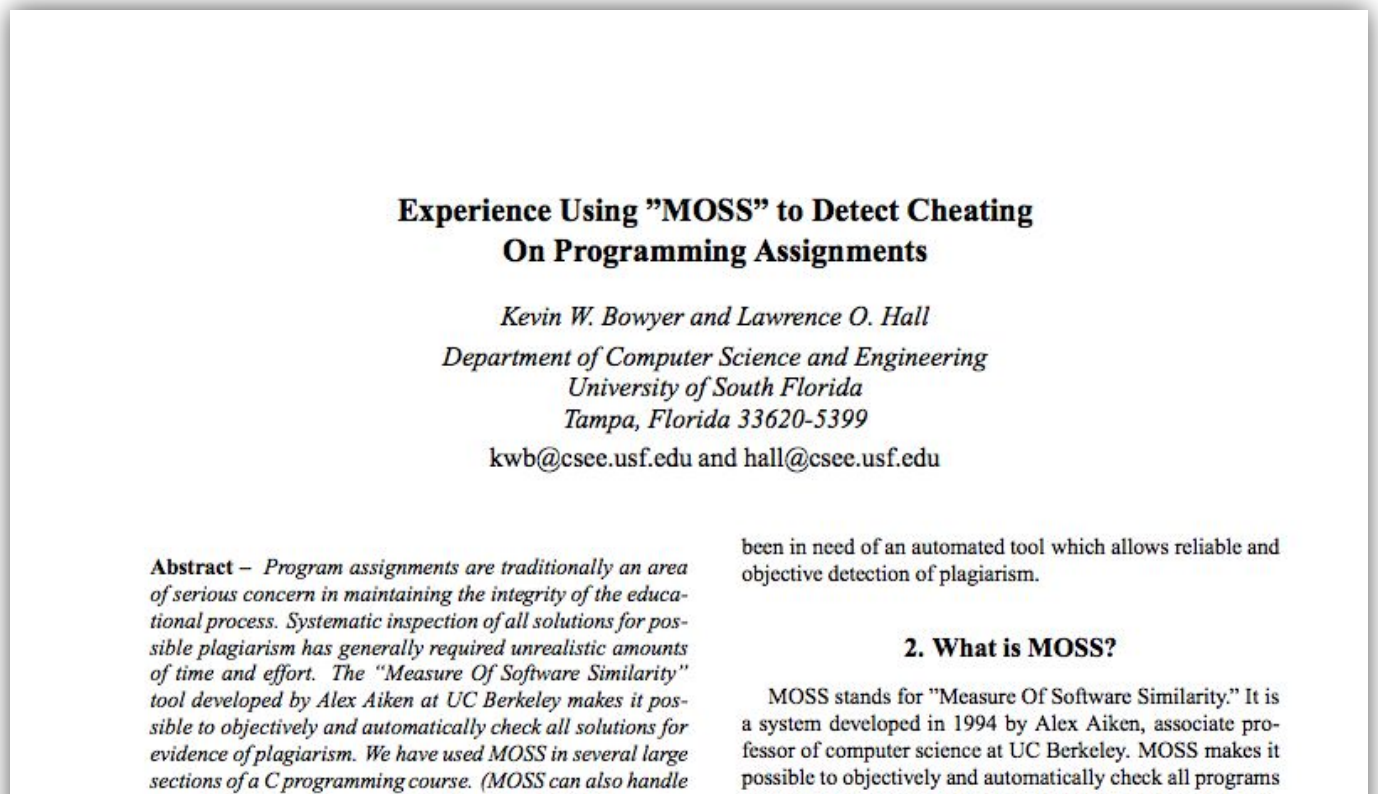
- work on assignments
- email, text, im, etc.
- view facebook, twitter, youtube, etc.

- No using smartphones
- No wearing headphones

CREDIT: https://dribbble.com/Lnda

Detecting Plagiarism

- We monitor reddit, file trading sites, etc.
- Measure Of Software Similarity (MOSS)
  - automatic system for determining the similarity of code



Experience Using "MOSS" to Detect Cheating On Programming Assignments

Kevin W. Bowyer and Lawrence O. Hall
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kwb@csee.usf.edu and hall@csee.usf.edu

Abstract – *Program assignments are traditionally an area of serious concern in maintaining the integrity of the educational process. Systematic inspection of all solutions for possible plagiarism has generally required unrealistic amounts of time and effort. The "Measure Of Software Similarity" tool developed by Alex Aiken at UC Berkeley makes it possible to objectively and automatically check all solutions for evidence of plagiarism. We have used MOSS in several large sections of a C programming course. (MOSS can also handle*

been in need of an automated tool which allows reliable and objective detection of plagiarism.

2. What is MOSS?

MOSS stands for "Measure Of Software Similarity." It is a system developed in 1994 by Alex Aiken, associate professor of computer science at UC Berkeley. MOSS makes it possible to objectively and automatically check all programs

Exams

- Midterm Exam
  - Friday Feb 28 at 6:30 PM
  - 20% of grade
- Final Exam
  - 40% of grade

Important:
You must pass the weighted exam average to pass the course.

- If you get 60% on the midterm (12/20) and 40% on the final (16/40), then your weighted exam average is 28/60 and you will not pass the course (regardless of the rest of your course mark).
- If you get 35% on the midterm (7/20) and 60% on the final (24/40), then your weighted exam average is 31/60 and you can pass the course (assuming you get at least 19/40 for the rest of your course mark).

Clickers and Class Participation

- **Buy a clicker before next class** and register it here: https://www.student.cs.uwaterloo.ca/~cs105/cgi-bin/clicker-form.cgi
- We'll start using a clicker from next class and use them regularly in every class
- The best 75% off clicker grades will be counted into your class participation mark
- Participation is 5% of course grade

Labs

- Two 80 minute lab times each week
  - Mon and Wed
- Lab modules reinforce lectures
  - guided learning and practice with programming
  - build up knowledge and skill for assignment
  - 5% of grade
- **Labs are due Wednesdays at 11:59 PM**
  - (First set of labs are due this Wednesday)
  - **no late labs accepted**

First Lab Today!

- In MC (find the room you are registered for)
- You can use your own laptop or a lab computer
- **If you plan on using a lab computer,**
  you must set a lab computer password before logging on:
  https://www.student.cs.uwaterloo.ca/password/auth/