CS 105L: Introduction to Computer Programming using JavaScript Spring 2016

Department of Computer Science
University of New Mexico

Instructor:

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Course Description

CS-105L, Introduction to Computer Programming, is a gentle and fun introduction. Students will use a simple Integrated Development Environment to author small programs in a high level language that do interesting things.

Pre-Requisites: None.
Co-Requisites: None.

This semester, we will be programming in JavaScript to make small, but fun programs that run in Web Browsers. In addition toprogramming, the course also covers some of the great ideas in computer science such as modeling, visualization, emergence, search engine page ranking systems, and complex adaptive systems. Throughout the course, students will author many short programs that preform two-dimensional graphics, animations, customized image manipulations and some simple games.

CS-105 is designed as a first course in computer programming for:

1. Pre-CS majors who do not have previous programming experience and are not yet ready for the fast pace and rigor of CS-152 (Computer Programming Fundamentals).
2. Students without programming experience who want to learn the basics of programing, an introduction to the JavaScript, HTML 5, and CSS to gain practical skills in Web design, how to create customized multi-media effects and other tasks.

Syllabus & Lab Schedule:

CS-105 Syllabus for Spring 2016

CS-105 Schedule of lab, office hours and tutor times and e-mails.

Textbooks and Web Resources:

Eloquent JavaScript, 2nd Edition
by Marijn Haverbeke
ISBN-13: 978-1593275846

w3schools.com: HTML 5 Tutorial

w3schools.com: JavaScript Tutorial

w3schools.com: CSS Tutorial

Software:

WebStorm: JavaScript Integrated Development Environment (IDE) Note: with your UNM e-mail, you can get a free student license.

putty.exe Windows client for remote terminal access to linux.unm.edu.

Lecture Notes, Videos, Labs and Source Code

Week 1:

1. Video: Khan Academy: What is Programming?
2. Video: Khan Academy: Learning Programming on Khan Academy
3. Video: Khan Academy: Drawing Basics
4. Notes: Welcome to CS-105
5. Lab: Lab 1: I Love to Draw
6. Code: CS105_Lab1_MyFirstName_MyLastName.html This is the Template HTML file I showed in class.

Week 2:

1. Video: Khan Academy: Coloring
2. Video: Khan Academy: Variables
3. Video: Khan Academy: Animation Basics
4. Read: w3Schools on if statements (and check out the "Try it Yourself" button).
5. Notes: Variables and the Draw Loop
6. Code: CS105_Lab2_BouncingBall.html This is the starting bouncing ball code for lab 2. Start with this and change it.
7. Code: processing.min.js JavaScript file NEEDED by to include `Processing` code in your JavaScript program.
8. Lab: Lab 2: Bumper Ball

Week 3:

1. Video: Khan Academy: Functions
2. Video: Khan Academy: Logic and if Statements
3. code: Lab 2 Solution by Zach Ward Zach has portals! - he also some ellipses collisions - not perfect, but what he has works better than the unmodified circle collision.
4. code: Lab 2 Solution by Alex Booher A simple Pong game with a ***very simple*** AI - but since an interactive game and AI were not required, this is extra credit.

Week 4 & 5:

1. Read: Eloquent JavaScript, Chapter 1: Values, Types, and Operators
2. Video: Khan Academy: Interactive Programs: Responding to Mouse clicks and Mouse movements.
3. Video: Khan Academy: Resizing with Variables
4. Lab: Lab 3: Bumper Pool: Using mouse, collisions and physics Part 1: Board setup and cue ball shot.
5. Code: processing.min.js JavaScript file NEEDED by to include `Processing` code in the same folder as your JavaScript program.
6. Code: CS105_Lab3_MouseDrag.html
7. Code: CS105_Lab3_ChangeInTime.html
8. Code: CS105_Lab3_DragBall.html This is a particial solution to lab 3. It is the code we developed in class on Tuesday, Feb 16. It combines the mouse drag with the change in time code. As we left it in class, it sets the X speed after click-and-drag, but does not yet set the y speed. To restart the ball on the right edge, reload the page.

Week 6:

1. Video: Khan Academy: Looping
2. Video: Khan Academy: Intro to Arrays
3. Read: Eloquent JavaScript, Chapter 2: Program Structure
4. Lab: Lab 4: Bumper Pool: Using mouse, collisions and physics Part 2: Wall collision, friction, and speed vector.
5. Code: processing.min.js JavaScript file NEEDED by to include `Processing` code in the same folder as your JavaScript program.
6. Code: CS105_Lab3_Pool_Part1_Joel.html
7. Notes: Loops
8. Code: Factors.html Example how to get input from a web page and a while loop inside the draw loop.
9. Code: PrimeFactors.html Modification of Factors.html that displays the input number's prime factors.
10. Code: Lines1_LinesInALoop.html Drawing Lines Example 1: Use a loop to draw many lines.
11. Code: Lines2_DrawingAndErasingLines.html Drawing Lines Example 2: Cycles between drawing and erasing lines.
12. Code: Lines3_CrossingSetsOfLines.html Drawing Lines Example 3: Draws a crossing set of lines in different colors. Then erases the lines and starts over.
13. Code: Lines4_100sOfColors.html Drawing Lines Example 4: Drawing lines smooth color changes.
14. Code: Lines5_StringArt_SingleCorner.html Drawing Lines Example 5: Line art that draws straight lines that have the illusion of curving.

15. Code: Lines6_StringArt_FourCorners.html Drawing Lines Example 6: Cool line art that draws 8 lines each frame.
16. Lab: Lab 5: Line Art
17. Code: LineArt_Anjuli_Kvamme.html Lab 5 Line Art solution by Anjuli Kvamme

Week 7 & 8:

1. Midterm exam on Thursday, March 10.
2. Lab: Lab 6:Publishing a Webpage.
3. Code: Lines7_StringArt_Slider.html Example JavaScript animation that responds to slider movements.
4. Notes: Midterm Exam Review

Week 9:

1. Exam: Midterm Exam: 2016 Spring
2. Code: MidtermExam_2016_Spring.html Exam questions in a single program.
3. Code: ColorChooser.html Example showing 3 sliders used to set the Red, Green and Blue value of the canvas background.
4. Code: CS105_Lab7_BouncingBalls.html This sample program combines much of what we did in the past to draw two balls that move with friction. They bounce off the walls and off each other. Also, moving the mouse over a ball, gives the ball a kick. This is a great starting place for lab 7. All you need to do is to add 98 balls and you are done!
5. Lab: Lab 7:A Hundred Bouncing Balls on the Web.
6. Code: http://www.unm.edu/~botelloc/home.html Cin's Milkyway: JavaScript Website by Cindy Botello.
7. Code: http://www.unm.edu/~boohera/home.html Art from Music: JavaScript Website by Alexander Booher.

Week 10:

1. Code: WalkAndTurn.html Starting point for lab 8.
2. Notes: Computer Tour

Week 11 & 12:

1. Code: CryptogramGame.html Starting point for lab 9.
2. Lab: Cryptogram Game: Requirements and Algorithms
3. w3schools: Creating a drop-down menu using the HTML <select> Tag
4. w3schools: How to get the index and value selected in a drop-down menu
5. Code: ElasticCollision.html Elastic Collision Example

Week 13 & 14:

1. Web: Khan Academy: Index of all Khan Acamemty's Computer Programming Courses
2. Web: Khan Academy: Intro to HTML/CSS: Making Web Pages. Text emphasis, HTML Images, HTML Tabels, CSS font familiew and font sizes HTML connection to JavaScript (Selecting by id),
3. Web: Khan Academy: Advanced JS: Games & Visualizations. Buttons, 3D Shapes, Making a Memory Game, Objects, Object Constructors, Object member fields (this.) and Object member functions (.prototype.)
4. Code: MemoryGame.html This version has a getImage(filename) function that looks in the current directory for the file and it also has a getKhanImage(filename) function that gets the image form the Khan Academy webpage.
5. image: ladybug.png

Week 15:

1. Code: Flapper.html Image Rotation Example: Flapper.
2. image: flipperLeft.png