Final review

The Final exam will be Thursday May 4th at 7:30am-9:20am in Stauffer B125.

Preparation

Review your assignments. If there was a concept you did not understand in an assignment, work to clear up anything missed.
Review the readings, or class recordings for any concepts that you need to better understand.
Review the p5.js reference page.
The final exam is open book.
You can use Visual Studio Code.
You can use the p5js.org website.
You can look at the p5 projects you have made for the assignments as a reference.
No other notes, references, or websites are allowed during the test.
Obviously, no communication during the test, please silence and put away your phone.

If you need to checkout a computer to use, please arrive early.

Form

The exam is on canvas. You must be present in the classroom, and sign the attendance roster sheet in order to receive credit. Students with accommodations can take the test in the SAILS test center.

There are some multiple choice questions.
There are some short answer questions that require writing code.
Writing code for these short answer questions will mean writing short bits of code, or correcting short segments of code. You will not need to write long segments of code. You will not need to complete a new programming project.

Topics

Simple drawing

- How to draw a line, rectangle, ellipse, triangle?
- How to set stroke and fill color for shapes?
- Where is the origin in the drawing coordinate system for p5.js?

Variables

- A variable associates a name with a value of a particular type.
- How to declare a variable? Use the keyword let.
- How to assign a value to a variable? (assignment operator is =)
- How to use the value stored in a variable?
- assignment and order of operations.
- What is the scope of a local variable of a function? (a variable is only available within the function where it is declared.)
- A variable has a name, a type, and a value.
- What are some of the fundamental types in JavaScript? (Number, Boolean, String)

Interactive programs

- What is the draw function used for? (Redraw the canvas.)
- How often is the draw function called? (The default frame rate is based on the frame rate of the display (here also called "refresh rate"), which is set to 60 frames per second on most computers.)
- What is the setup function used for? (One time initialization, before the draw function is called for the first time.)

Operators, Conditional statements

- What are the arithmetic operators?
- What are the comparison operators?
- What are the logical operators?
- When is logical AND true?
- When is logical OR true?
- Write a boolean expression using a comparison operator.
- Write a boolean expression using a logical operator.
- Write an if-else statement

Loops

- A loop makes it possible to repeat a set of instructions
- A boolean test determines whether the block of instructions is performed again.
- Write a while loop to draw 10 lines.
- Write a for loop to print a series of numbers.

Functions

- Functions have a name, and the name is used to call the function to perform its task when needed. The Name is chosen to describe the function’s purpose.
- Optionally, functions have parameters. One or more named values that the function takes as input.

- Optionally, functions can return a value, passed back as output when done.
- Functions have a body. The instructions that make up the implementation.
- Define a function to perform a simple calculation.
- How to call a function?
- Why write functions? Encapsulation, modularity, reusability, safety, testability.

Objects (Classes)

- Object Oriented Programming - a paradigm that organizes a relationship between certain functions and data.
- Classes are general-purpose, flexible constructs that become the building blocks of your program's code. Using classes you can create new Types to use in your program.
- You define properties and methods to add functionality to your classes by using syntax as for variables, and functions.
- Define properties to store values.
- Define methods to provide functionality.
- Know how to declare a new variable, and create a new instance of an object. (eg. `let myCar = new Car()`)
- Know how to access a property of an object if you have an instance. (eg `myCar.x = 200.0`)
- Call a method using an instance of an object. (eg. `myCar.move()`)

Arrays

- An array is used to store an ordered collection of values/objects.
- Create a new empty array.
- Use length to get the number of values stored in an array.
- Add an element to the end of an array.
- Access an element in an array using an index value and subscript notation.

Images

- Use loadImage to create a p5.Image object using a jpg or png image file.
- The jpg (jpeg) file format uses compression to reduce the size of the file. It is especially useful for photographs.
- The png file format uses lossless compression and supports transparency. It is especially useful for graphics.
- Use the image function and a p5.Image object to draw an image.
- Use p5.Image object and the get() method to get a pixel color from an image.

Transformations (translate/rotate)

- Use translate to change the x and/or y position of drawing in the canvas.
- Use rotate to rotate the canvas about the origin.
- Use push/pop to save/restore the current drawing style and transformations.

Text

- Use text to draw a string in the canvas.
- Use textFont/textSize to set the current font/size.
- Use textAlign to position text.

Miscellaneous

- Use the random function to get a random sequence of values.
- Use the map function to remap an input value into a new range of values.