

Hey, you! Yes, you. 😊

Did you log in to Zoom? 🤔

Please watch this right now:
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Please drop off the call, log in, and come back.

Intro to Computer Science

Grade 11

Thread 1, Day 4

Russell Gordon, Lakefield College School

Submit attendance!



Thread 1, Day 4

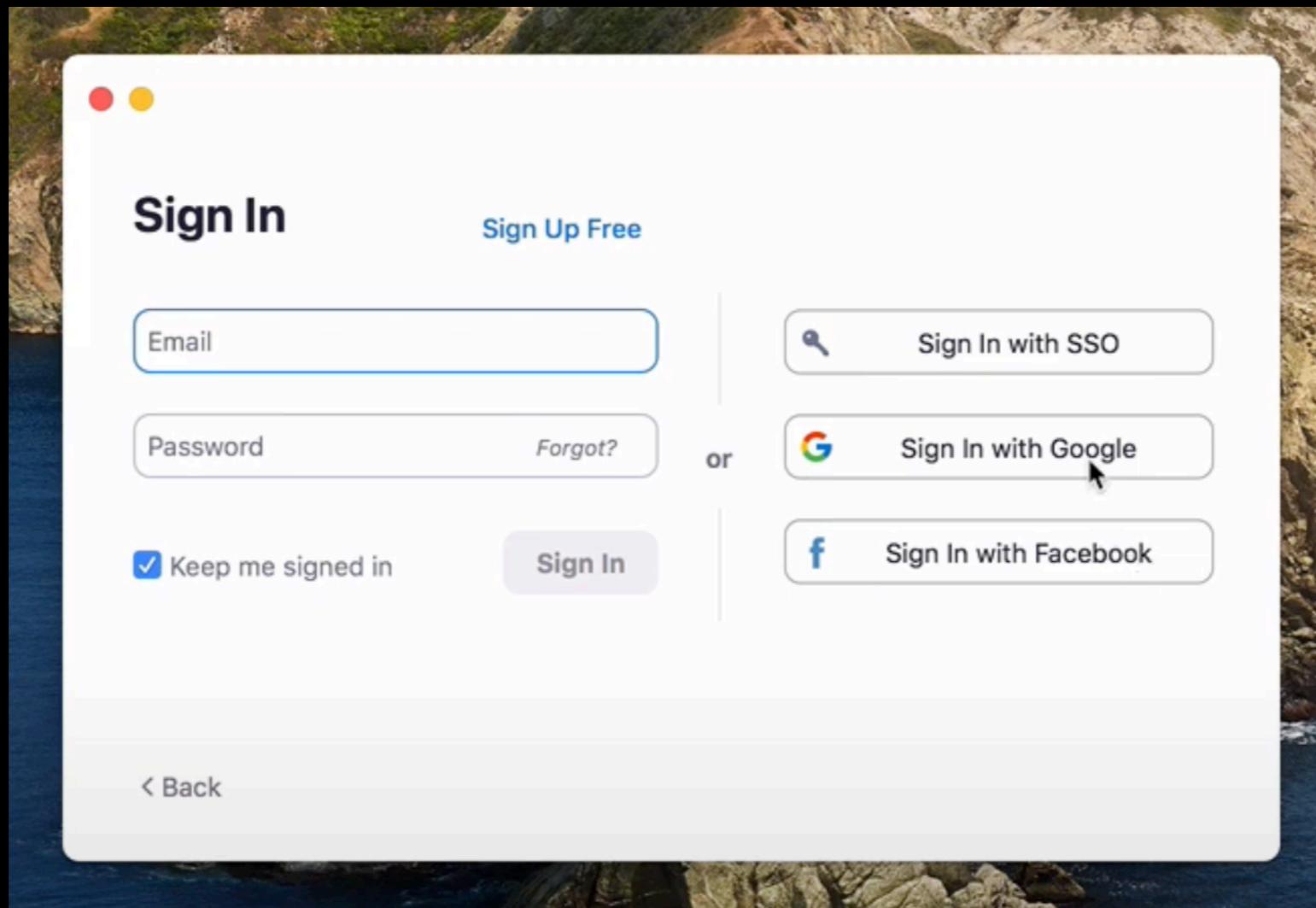
Agenda

- Please log in to Zoom before joining our call
- Portfolio updates – they (mostly) look great!
- One tiny additional bit of setup – source control ignored files
- A few short organizational tips
- Abstraction
 - Data Types in Swift: Int
 - Automating the conversion process: Decimal to Binary conversion program
- Homework: On paper, try writing a Decimal to Octal conversion program
 - Remember to make a post on Spaces! 😊

Logging in to Zoom

This makes pre-planned breakout rooms work

- Please log in to Zoom before joining our calls



Portfolio Updates

They (mostly) look great!

ca.spacesedu.com

Post

Portfolio

Jan 8, 2021, 11:29 PM (Edited)

Jan 8th, 2021

1. What did I learn or make progress upon today?
At the start, I only knew how to draw a circle and a rectangle with colors and boundaries. After some tries and researches online, I knew how to fill a figure with the color I want by setting brightness, saturation, alpha, and hue, and I learned how to draw curves. I combined these skills and created a scene of a panda standing on a log, with bamboos beside it and clouds above it.

2. What do I have questions about / what am I struggling with?
How to rotate a specific figure?
Can I add notes between my codes to help me identify the figures I create? Sometimes it's hard to find a specific figure because they all appear in numbers.

1

Russell Gordon • Jan 10, 2021, 8:48 AM

Hi [REDACTED]

Wow, this drawing is amazing! Well done on researching how to use the Hue-Saturation-Brightness colour model.

By completing this drawing you have deeply explored the concept of "sequence" – which is that the order of statements in our code directly impacts the output we can expect to see from that code.

To answer your question about adding notes to your code – yes! This is possible.

Just add these characters:

//

At the start of a line where you want to add a note. That creates a "comment" where the text that comes after the // are ignored by the computer. So the comment is just for you to help better organize

Show the Live View

Don't see any results?

```
151 canvas.drawCurve(from: Point(x: 147, y: 375),  
152     to: Point(x: 120, y: 352), control1:  
153     Point(x: 148, y: 355), control2: Point(x:  
154     142, y: 346))  
155  
155 canvas.drawShapesWithBorders = false  
156  
157 canvas.fillColor = Color.init(hue: 0,  
158     saturation: 55, brightness: 70, alpha: 50)  
159  
159 canvas.drawEllipse(at: Point(x: 200, y: 373),  
160     width: 30, height: 16)  
161  
161 canvas.drawEllipse(at: Point(x: 100, y: 373),  
162     width: 30, height: 16)  
163  
163 canvas.fillColor = Color.white  
164  
165 canvas.drawEllipse(at: Point (x: 115, y: 402),  
166     width: 15, height: 9)  
167  
167 canvas.drawEllipse(at: Point (x: 185, y: 402),  
168     width: 15, height: 9)
```

Additional Setup

Getting Source Control to Ignore Certain Files

- One last bit of setup...
- Saving our work to GitHub is key, but there are some files we don't want to commit.
- Please follow this tutorial to learn how to tell the source control system to ignore certain files on your computer.

Organizational tips

- Adding a favourite to the sidebar in Finder
- How to open an existing project

Data Types in Swift

Int

- What is a data type?
 - In a programming language, a *data type* defines what kind of value a constant or variable can hold
 - This is an *abstraction* – we can, for example, describe a decimal value of 17 simply by doing:

```
let x = 17
```

We don't have to know that the computer stores this as:

10001

The details of the implementation – the complexity – is hidden.

Data Types in Swift

UInt8

- What is the UInt8 data type?
 - unsigned integer, 8 bits
 - Try this in your Xcode playground:

`UInt8.max`

`UInt8.min`

- Why are the max and min values as shown? 🤔

NumberSystems.playground

DataTypes.playground

☰ | +

```
1 import Cocoa
2
3 // Data Types
4
5 // Q. What is the UInt8 data type?
6
7 // A. It is an unsigned integer, storing 8 bits.
8
9 UInt8.max      255
10 UInt8.min     0
11
12 // We know in binary...
13 //
14 // in a 8 bit value...
15 //
16 // ... the first digit counts for 2^0 or 1.
17 // ... the second digit is 2^1 or 2
18 // ... the third digit is 2^2 or 4
19 // ... the fourth digit is 2^3 or 8
20 // ... the fifth digit is 2^4 or 16
21 // ... the sixth digit is 2^5 or 32
22 // ... the seventh digit is 2^6 or 64
23 // ... the eighth and final digit counts for 2^7 or 128
24
25 // Keyboard shortcut:
26 //
27 // To run a playground after making changes to the code, type:
28 //
29 // Command-Shift-Return
```



Automating the Conversion Decimal to Binary

- Let's re-cap the steps to convert from decimal to binary one more time, making clear comments as we go...

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 - Then, apply a function

Automating the Conversion

Decimal to Binary

- Let's re-cap the steps to convert from decimal to binary one more time, making clear comments as we go...
- Now, let's *automate this* by applying abstraction!
 - First, apply a *loop*
 - Then, apply a function
 - The complexity of how the conversion process works is now hidden – abstracted away – to the user of our new function

NumberSystems.playground

Notes > NumberSystems

```
73 // Creates a constant with the value of 17
74 // A constant CANNOT be changed once created
75 let valueToConvert = 17
76 // Create a variable with the value of "valueToConvert"
77 // A variable CAN be changed once created
78 var decimalValueLeftToConvert = valueToConvert
79 // This creates an empty string
80 // A string is just text, like "hello"
81 var binaryRepresentation = ""

82

83 // The abstraction we will use is a LOOP
84 // Our END CONDITION is that the decimalValueLeftToConvert is equal to zero
85 // So long as the CONDITION is true, the block of code surrounded by the { }
     brackets will be run repeatedly
86 while decimalValueLeftToConvert > 0 {

87
88     // Get the next binary digit
89     let nextBinaryDigit = decimalValueLeftToConvert % 2
90
91     // Add that new digit to the binary representation
92     // Swift is a STRICTLY TYPED language
93     // It DOES NOT automatically convert data types
94     // So, to make the Int into a String, we need to specify this
95     binaryRepresentation = String(nextBinaryDigit) + binaryRepresentation
96
97     // Get the decimal value left to convert
98     decimalValueLeftToConvert = decimalValueLeftToConvert / 2
99
100 }

101 binaryRepresentation
```

17

17

"

(5 times)

(5 times)

(5 times)

"10001"

Homework

Decimal to Octal Conversion Program

- Using this video on Decimal to Binary Conversion as a reference

- ... on paper, practice:
 - a) counting in octal
 - b) converting from base 10 / decimal

... to ...

base 8 / octal

HINT: The process is the same, the difference is the base (it's 8, not 2).

- Do part b) three times with different numbers.

A faster way... Same idea
(repeated division by 2) but
without using dots!

$$17_{10} = \underline{\underline{10011}}_2$$

Step

2	2	2	2	2	2 ⁰
16	8	4	2	1	
0					17
1					8
2					4
3					2
4					1

$$17 \div 2 = 8 R1$$
$$8 \div 2 = 4 R0$$
$$4 \div 2 = 2 R0$$
$$2 \div 2 = 1 R0$$
$$\therefore 17_{10} = 10011_2$$

One more example... $27_{10} = ?_2$

27		27 $\div 2 = 13 R1$
13	1	13 $\div 2 = 6 R1$
6	1	6 $\div 2 = 3 R0$
3	0	3 $\div 2 = 1 R1$

Thank-you!