

Hello, World!

An introduction to programming

By the end of this course, you will be able to:

- Think like a programmer
- Understand fundamental concepts every programmer should know
- Write simple programs in code
- Know where to go to continue learning

5CS0

“The new form of literacy is coding”
– Marc Goodman, Cybersecurity Expert

What is Computer Science?

- Mathematics
- Logic
- Engineering
- Philosophy

Q: What are computers?

A: Really dumb machines that are perfectly happy doing the same thing over, and over, and over, and...

COMMON LOGARITHMS

$\log_{10} x$

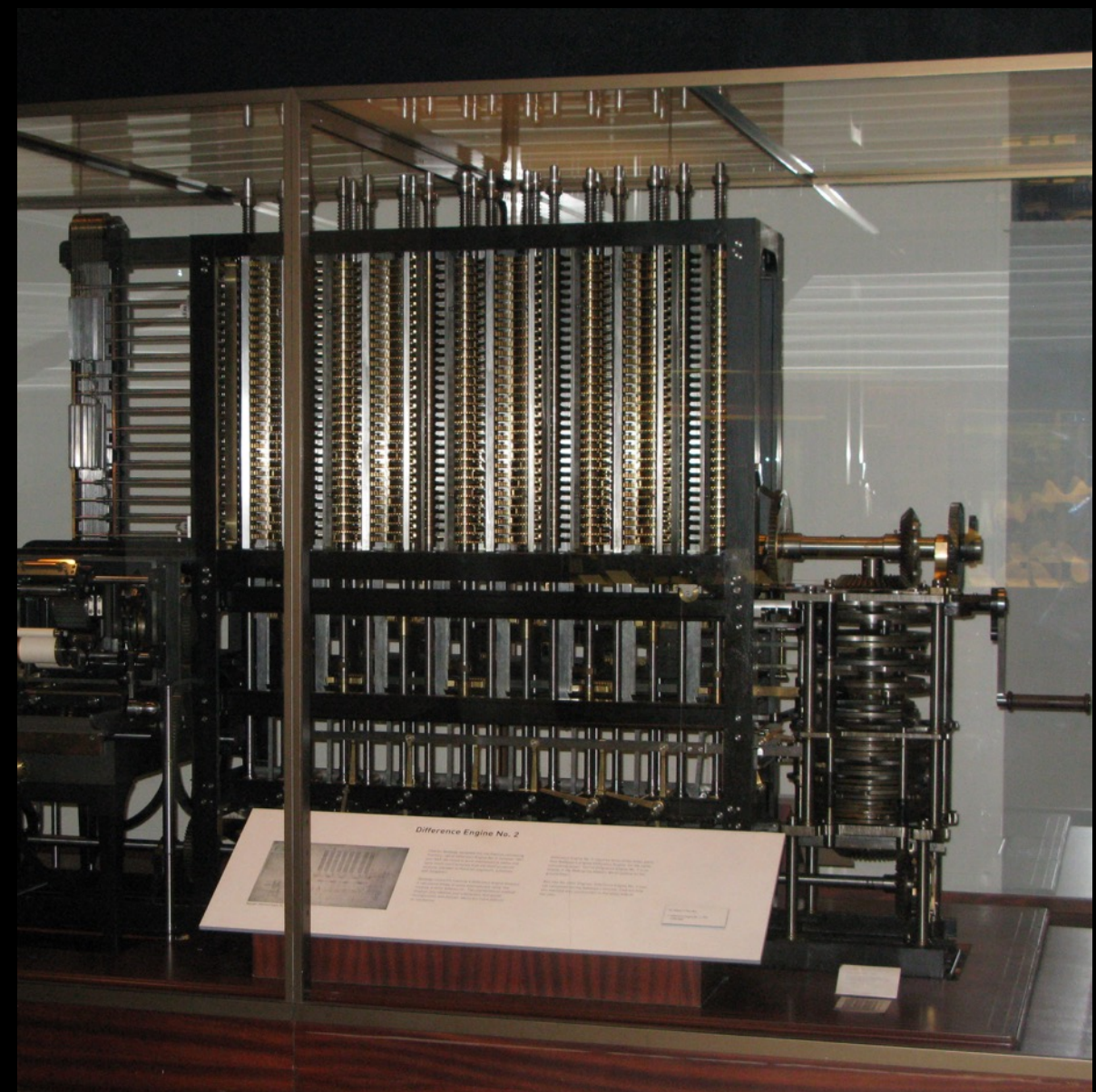
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						0212	0253				40	4	8	12	16	20	24	28	32	36
11	0414	0453	0492	0531	0569	0607		0682	0719	0755	39	4	8	12	16	19	23	27	31	35
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12	0792	0828	0864	0899	0934	0969		1038	1072	1106	35	4	7	11	14	18	21	25	28	32
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13	1139	1173	1206	1239	1271	1303		1367	1399	1430	33	3	7	10	13	16	20	23	26	30
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16	2041	2068	2095	2122	2148	2175	2201	2227	2253	2279	22	2	4	7	9	11	13	15	18	20
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17	2304	2330	2355	2380	2405	2430	2455	2480	2504	2529	20	2	4	6	8	10	12	14	16	18
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18	2553	2577	2601	2625	2648	2672	2695	2718	2742	2765	18	2	4	5	7	9	11	13	15	17
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19	2788	2810	2833	2856	2878	2900	2923	2945	2967	2989	16	2	3	5	6	8	10	11	13	14
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20	3010	3032	3054	3075	3096	3118	3139	3160	3181	3201	14	1	3	4	6	7	8	10	11	13
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21	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404	13	1	3	4	5	6	8	9	10	12
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27	4314	4330	4346	4362	4378	4393	4409	4425	4440	4456	7	1	2	3	4	5	6	7	8	9
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28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609	6	1	2	3	4	5	6	7	8	9
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29	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757	5	1	2	3	4	5	6	7	8	9
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37	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786	0	1	2	3	4	5	6	7	8	9
						5740	5752				0	1	2	3	4	5	6	7	8	9
38	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899	0	1	2	3	4	5	6	7	8	9
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39	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010	0	1	2	3	4	5	6	7	8	9
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46	6628	6637	6646	6656	6665	6675	6684	6693	6702	6712	0	1	2	3	4	5	6	7	8	9
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47	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803	0	1	2	3	4	5	6	7	8	9
						6767	6776				0	1	2	3	4	5	6	7	8	9
48	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893	0	1	2	3	4	5	6	7	8	9
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49	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981	0	1	2	3	4	5	6	7	8	9
						6946	6955				0	1	2	3	4	5	6	7	8	9

$$\begin{aligned} \pi &= 3.14159 & 0.49715 \\ e &= 2.71828 & 0.43429 \end{aligned}$$

$$\begin{aligned} \ln x &= \log_e x = (1/M) \log_{10} x \\ \log x &= \log_{10} x = M \log_e x \end{aligned}$$

$$\begin{aligned} (1/M) &= 2.30259 & 0.36222 \\ M &= 0.43429 & 1.63778 \end{aligned}$$

p	x	a	3	4	5	6	7	8	9	10
$\log e^p$	0.4343	0.8686	1.3029	1.7372	2.1715	2.6058	3.0401	3.4744	3.9087	4.3429
$\log e^{-p}$	1.5657	1.1314	0.6971	0.2628	0.1715	0.0858	0.0401	0.0256	0.013	0.0

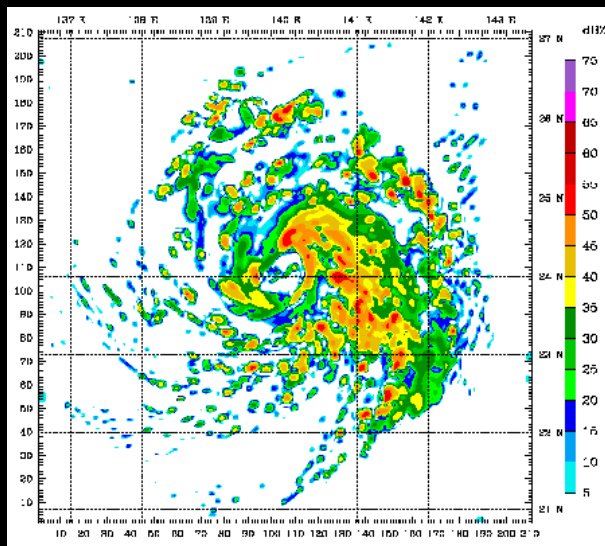


The Difference Engine No.2
Charles Babbage, 1847

Log Tables

In repetition is power

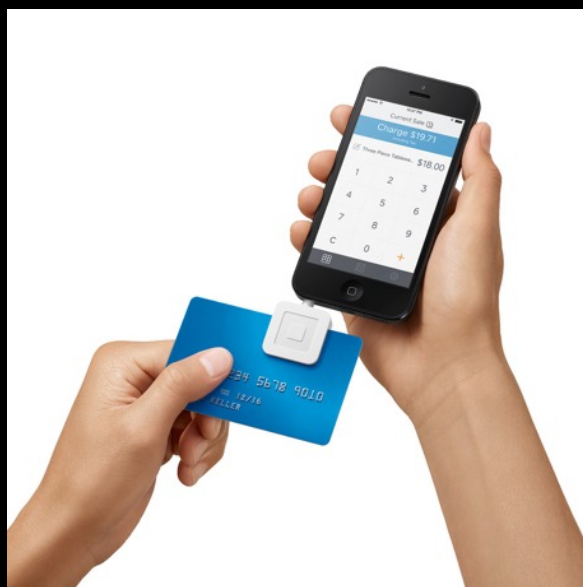
Some applications



Weather



Music



Commerce



Medicine

...and art

```
void loop() {  
  for (int i = 0; i < PIXELS; i++) {  
    strip.setPixelColor(i, BLUE);  
    strip.show();  
    delay(10);  
  }  
  delay(500);  
  for (int i = 0; i < PIXELS; i++) {  
    strip.setPixelColor(i, WHITE);  
    strip.show();  
    delay(10);  
  }  
  delay(500);  
}
```

How non-programmers interact with computers



How programmers interact with computers: Code!

```
@RequestMapping(value = "/register", method = RequestMethod.POST)
    public String register(String userName, String password, String
confirmPassword, Model model) {

        User existingUser = userDao.findByUserName(userName);

        if (!password.equals(confirmPassword)) {
            return this.displayError("Passwords do not match. Try again.",
model);
        } else if (existingUser != null) {
            return this.displayError(
                "The username " + userName + " already exists in the
system. Please select a different username", model);
        }

        User newUser = new User(userName, password);
        userDao.save(newUser);
        return "index";
    }
```

But! But!

Computers don't think in code.

They think in **binary**.

So, what is binary?

Some examples of “Hello, World!”

```
#include <iostream>
public class Hello {
    public static void main(String []args) {
        System.out.println("Hello World");
    }
}

std::cout << "Hello, World.";
```

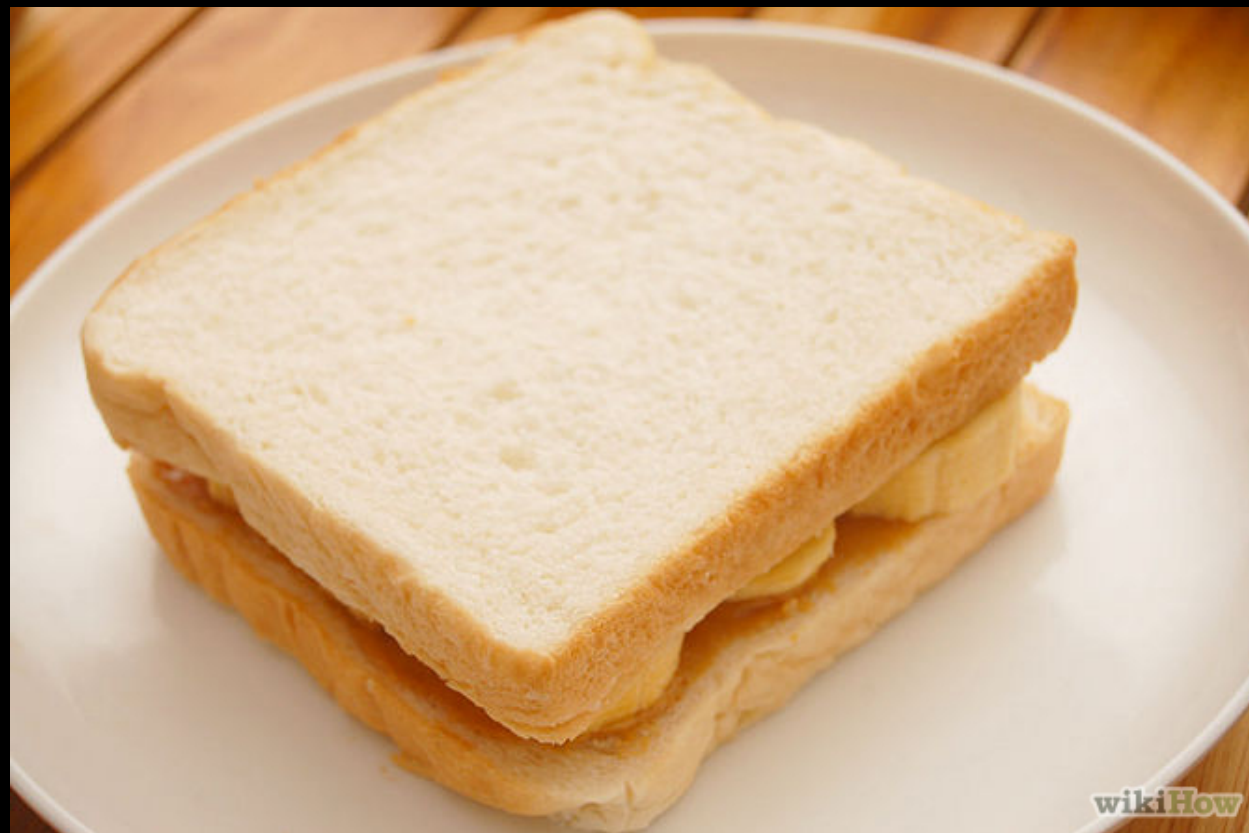
computer program:

A set of instructions in a given programming language

Characteristics of computer programs

- Execute one instruction at a time
- Allow reuse of subsets of instructions
- Can make decisions
- Can store data in “buckets” for use later, and can use the values in those buckets without caring about the specific value
- Can be made up of many algorithms

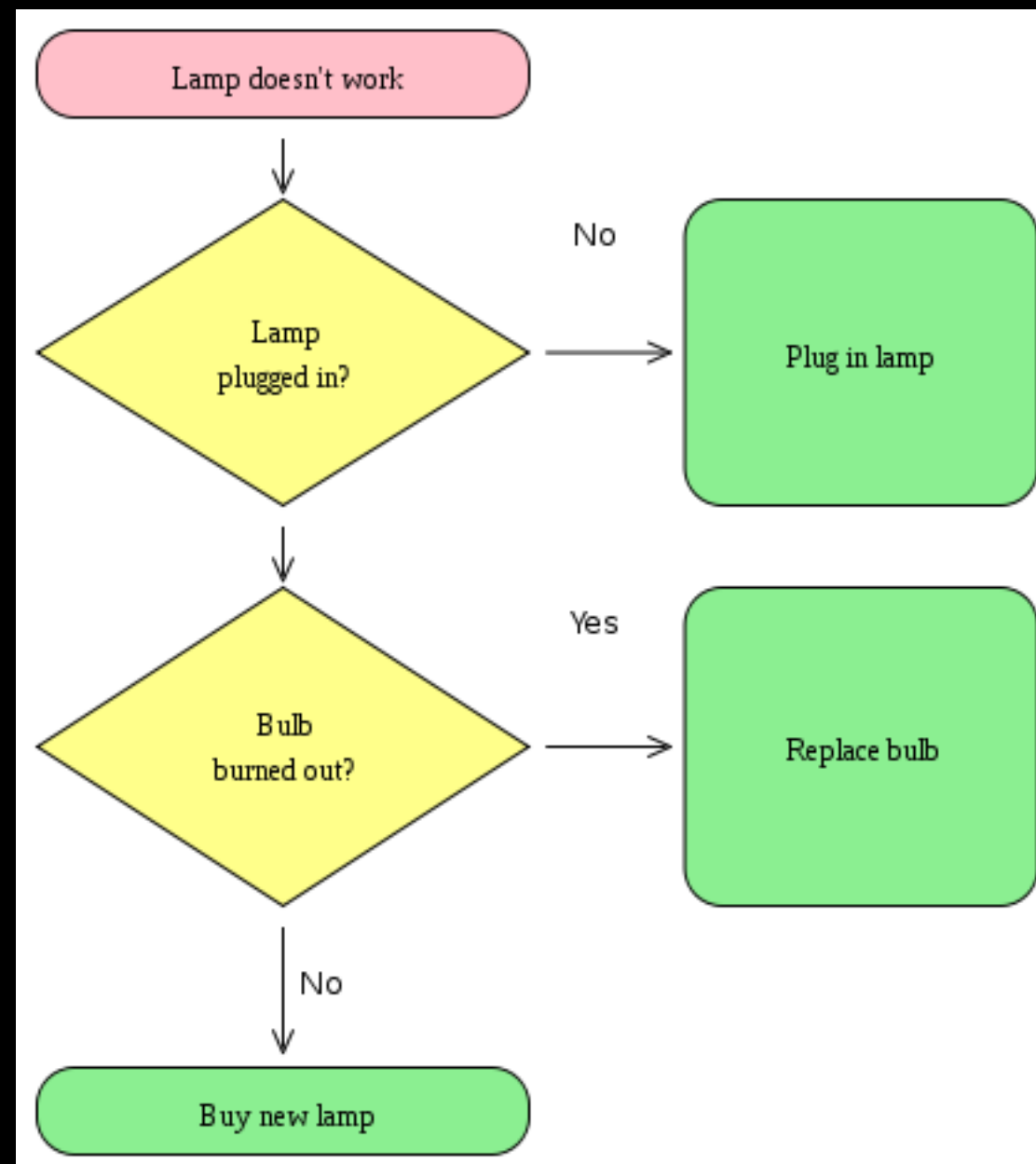
Peanut Butter Sandwiches!



Computers are very explicit

The children made delicious snacks.





Pseudocode

Instructions written out one after the other, like code, employing basic constructs like repetition (i.e. looping) and decision making (i.e. conditionals)

Conditionals

```
IF STUDENT AT LAUNCHCODE  
  LEARN()  
END IF
```

Has the generic form:

```
IF CONDITION  
  // DO SOMETHING  
END IF
```

Variables

A variable stores a value (number, letter, word, etc) that we can use and update later

```
numberOfBurritos = 2
```

```
launchcodeAddress = "4811 Delmar  
Blvd"
```


Loops

```
FOR 1..N LOOP  
  PRINT '#'  
END LOOP
```

“for loop”

```
i = 0  
WHILE i < N  
  PRINT '#'  
  i = i + 1  
END WHILE
```

“while loop”

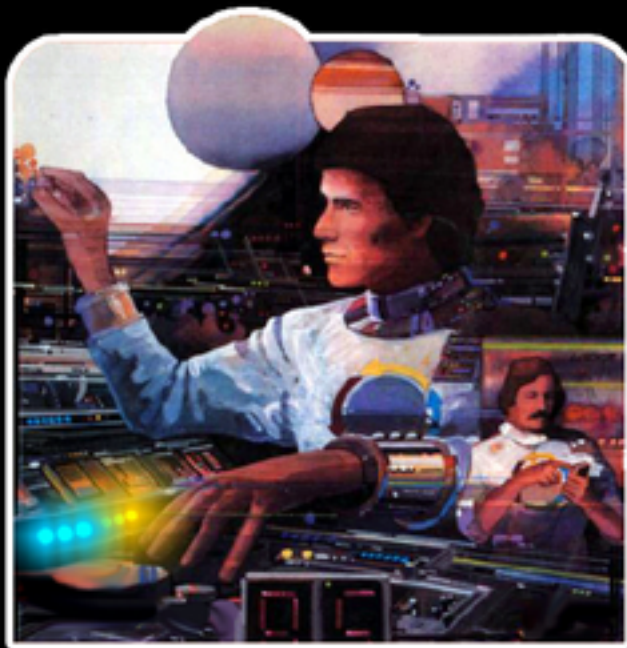
Exercise:

Write a set of instructions that prints out all of the numbers between 1 and 100 that are multiples of 7

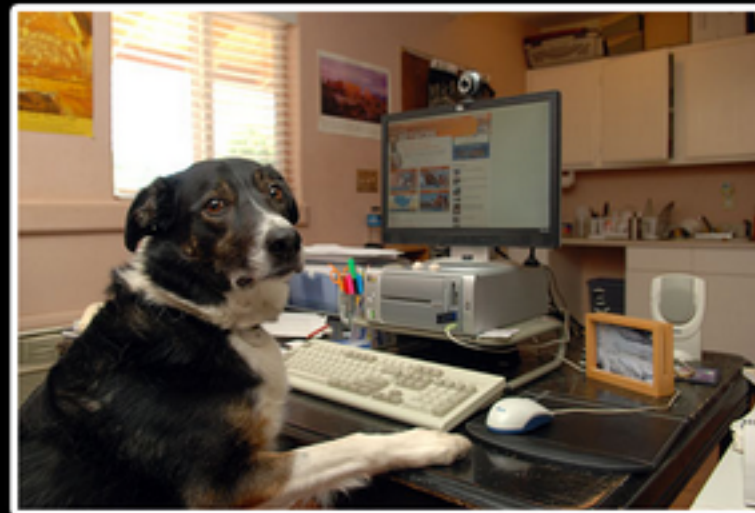
What is code?

<https://vimeo.com/130987431>

THE TWO STATES OF EVERY PROGRAMMER



I AM A GOD.



**I HAVE NO IDEA
WHAT I'M DOING.**

Course Resources

- <http://education.launchcode.org/HelloWorld/>
- Piazza
- Email - helloworld@launchcode.org

Homework

1. Create your Piazza account and answer the poll question
2. Review the prep materials for Week 2