Welcome to CS *101*!

Introduction to Programming

CS101 Lecture #1

2016-09-26

Class Website

https://relate.cs.illinois.edu/course/zuics101fa16/

Steps for enrolling in the course web:

Step 1. Click the "Sign in >>" button near the top of the course web.

Step 2. Click the second button "Sign in using your email >>".

Step 3. Enter your **Zhejiang University email address** in the Email input box, and then click the "Send sign-in email".

Step 4. Click the URL included in the email titled "Your RELATE sign-in link" (sent to you) to sign in.

Step 5. Change the browser's URL to be `https://relate.cs.illinois.edu/course/zuics101fa16/`

Step 6. Click the "Enroll" button near the top.

Grading

20%	Homework
25%	Labs
10%	Lecture Participation
20%	Midterms
25%	Final Exam

Required Supplies

- CodeLab account
  - Instructions in `hw01`

Homework Policies

No late homework submissions.

Homework Policies

No late homework submissions.

All machine-generated grades are final.

Homework Policies

No late homework submissions.

All machine-generated grades are final.

Late registrants should keep up with work.

Corollary: No extensions or exceptions for late registration.

Homework Policies

No late homework submissions.

All machine-generated grades are final.

Late registrants should keep up with work.

- Corollary: No extensions or exceptions for late registration.

Get help at Blackboard forum.

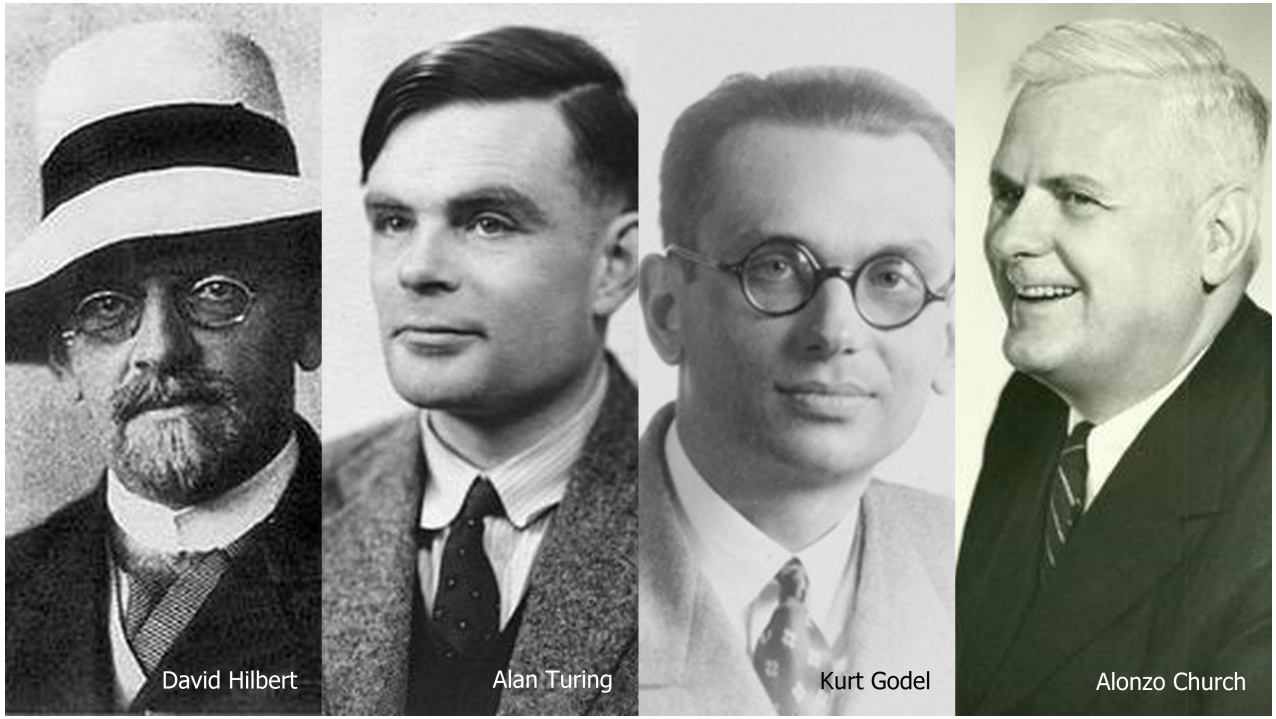
- Be civil to staff and peers.

All posts containing solutions should be marked as private.

Class Website

Lab #1 this Friday!

Modern calculation

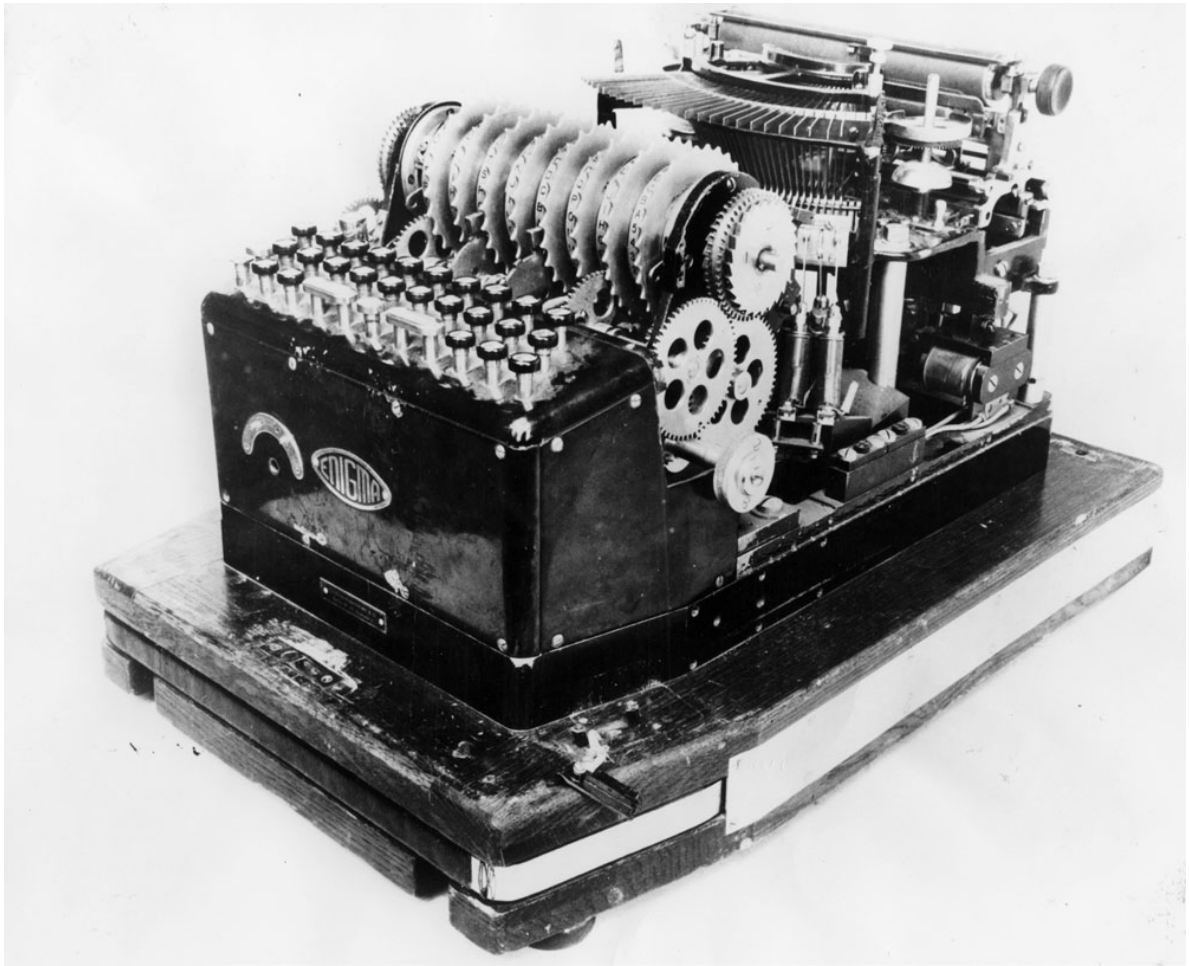


https://en.wikipedia.org/wiki/Church%E2%80%93Turing_thesis

https://www.bigquestionsonline.com/2013/04/30/what-did-turing-establish-about-limits-computers-nature-mathematics/

http://www.alanturing.net/turing_archive/pages/reference%20articles/Bio%20of%20Alan%20Turing.html

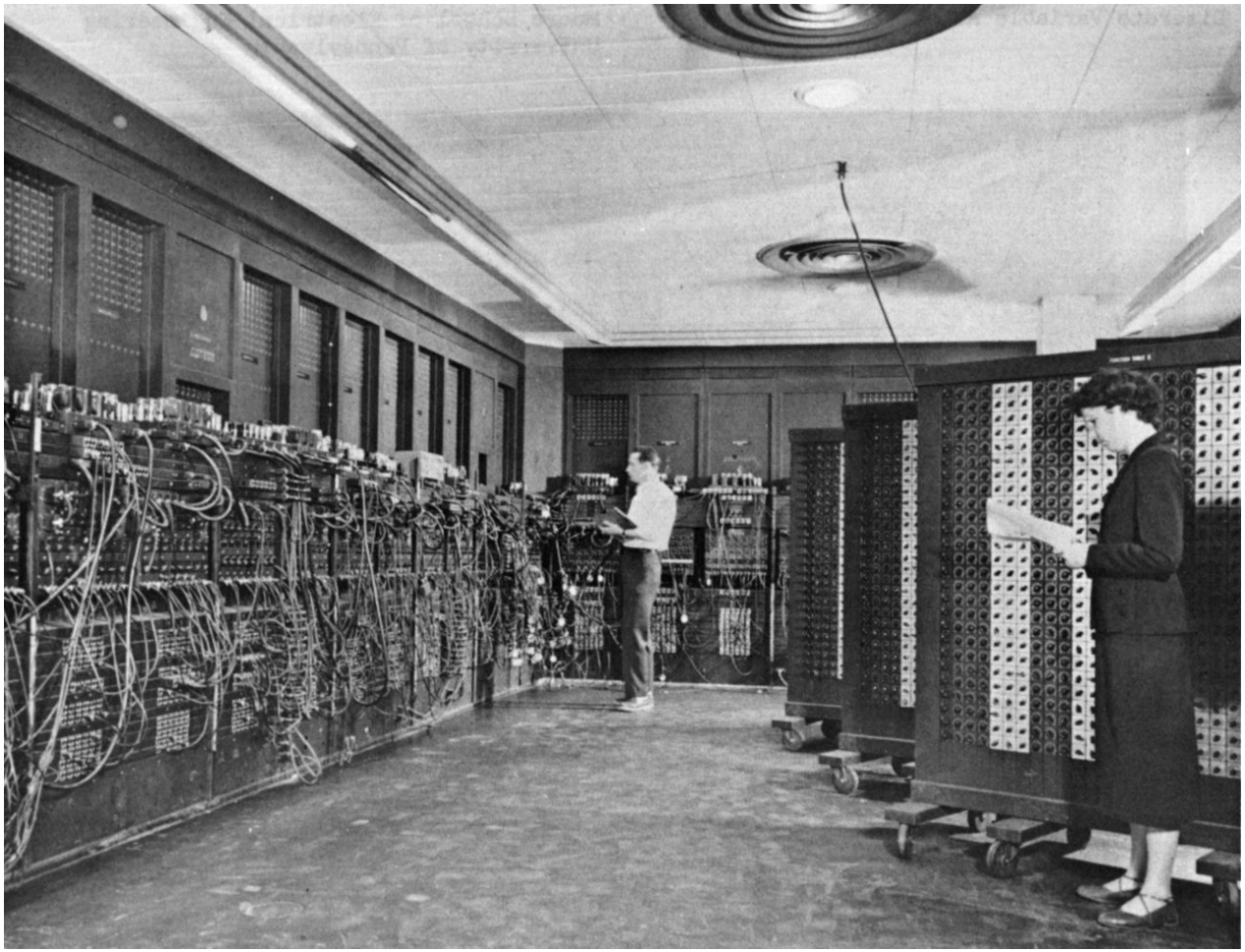
Modern calculation



https://en.wikipedia.org/wiki/Enigma_machine

https://en.wikipedia.org/wiki/Cryptanalysis_of_the_Enigma

Modern calculation



https://en.wikipedia.org/wiki/ENIAC

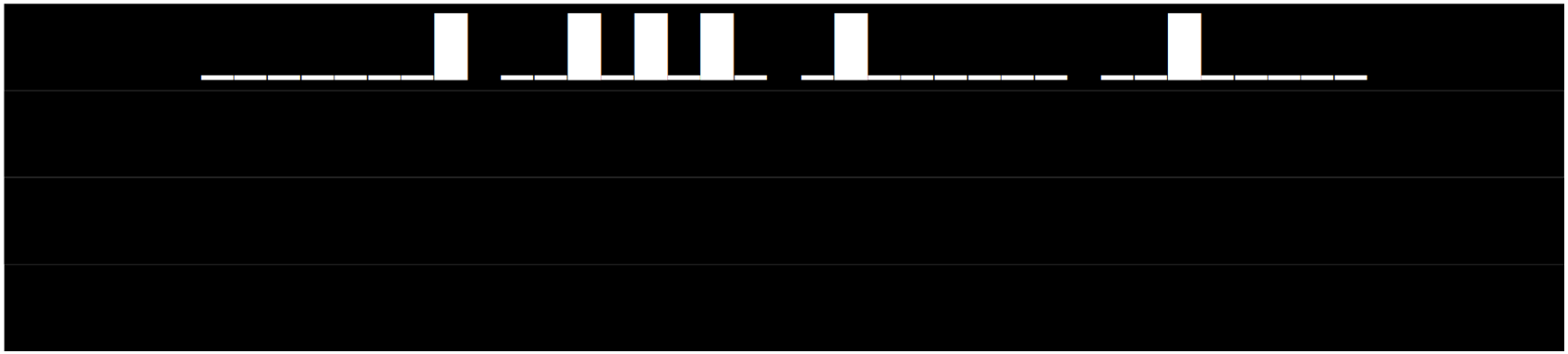
Modern calculation

https://en.wikipedia.org/wiki/ILLIAC

Algorithms

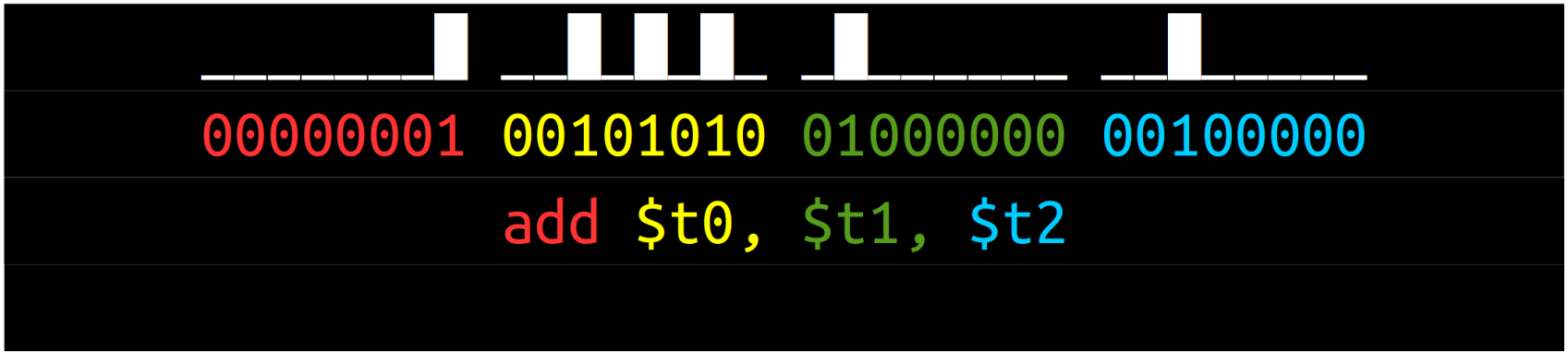
Algorithms

Computing

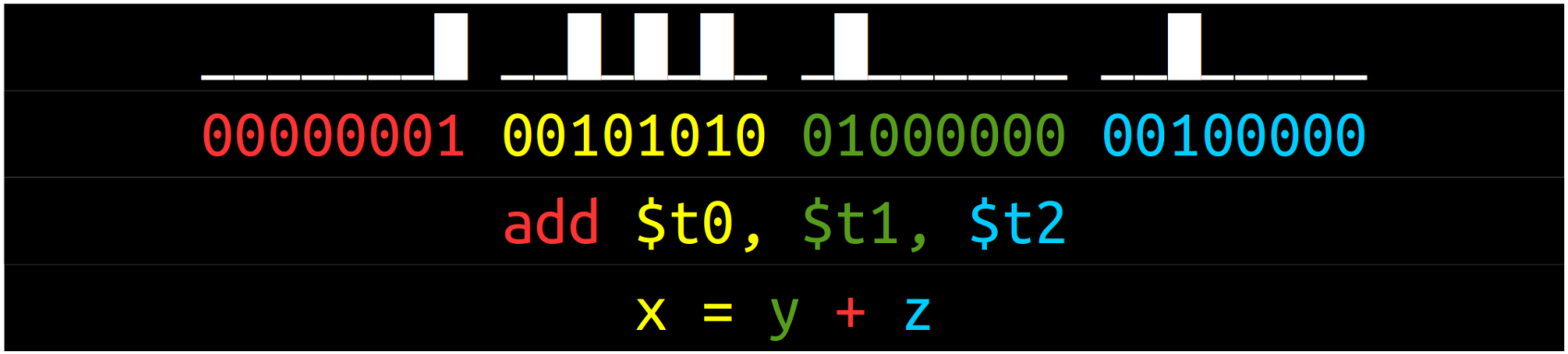


Computing

Computing



Computing



Algorithms

Algorithms

```
depth * area = volume
```

Algorithms

```
depth * area = volume

volume of rain / volume per raindrop
          = number of raindrops
```

Algorithms

```
depth * area = volume

volume of rain / volume per raindrop
          = number of raindrops

volume_rain = area * depth
```

Algorithms

```
depth * area = volume

volume of rain / volume per raindrop
          = number of raindrops

volume_rain = area * depth

n_raindrops = volume_rain / volume_raindrop
```

What is a program?

What is a program?

A set of instructions a computer executes to achieve a goal.

What is data?

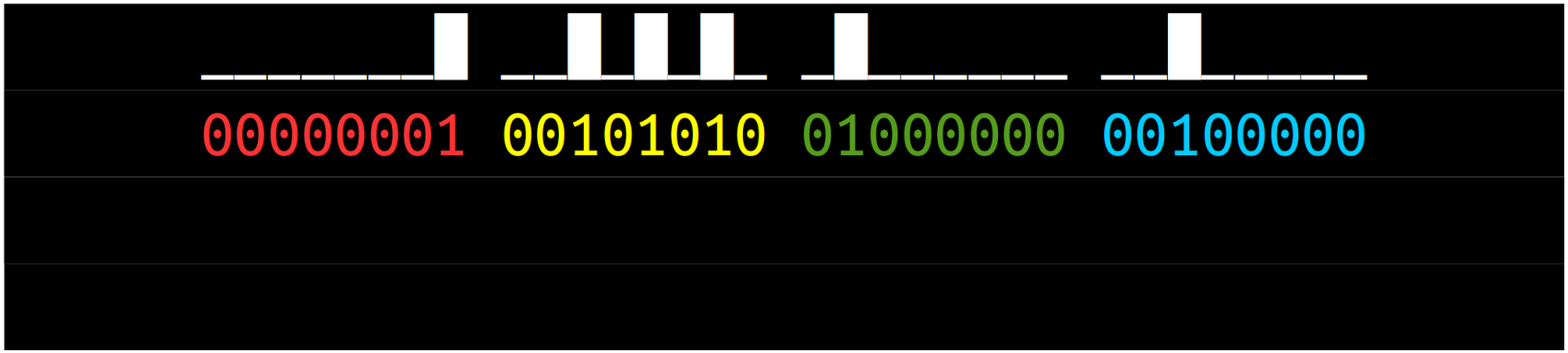
What is data?

Information stored in a computer.

What is data?

Information stored in a computer.

All data is stored in binary.



What is data?

Binary data must be interpreted:

instruction

What is data?

Binary data must be interpreted:

- instruction
- value (number, character)

What is data?

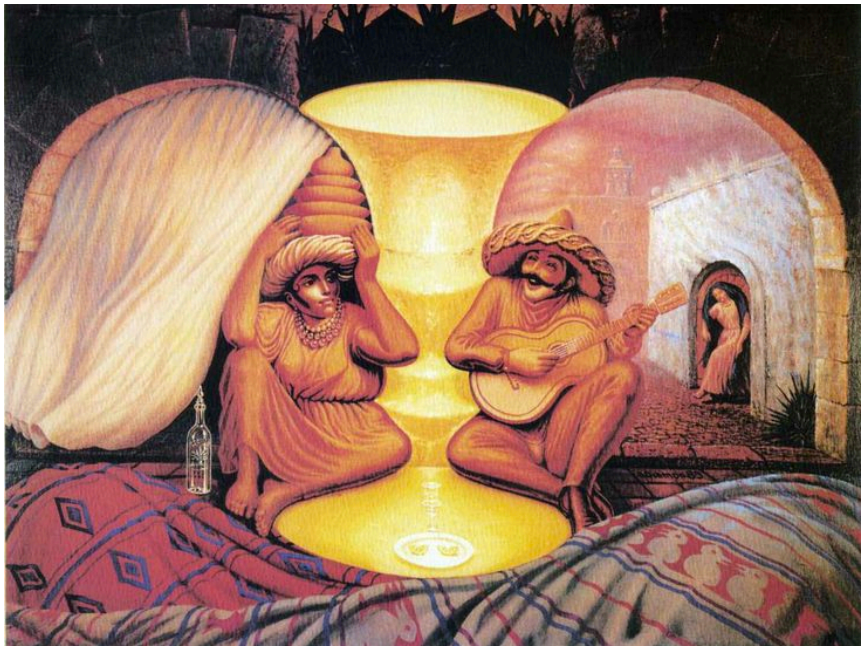
Binary data must be interpreted:

- instruction
- value (number, character)
- memory location

What is data?

Binary data must be interpreted:

- instruction
- value (number, character)
- memory location



What is a program?

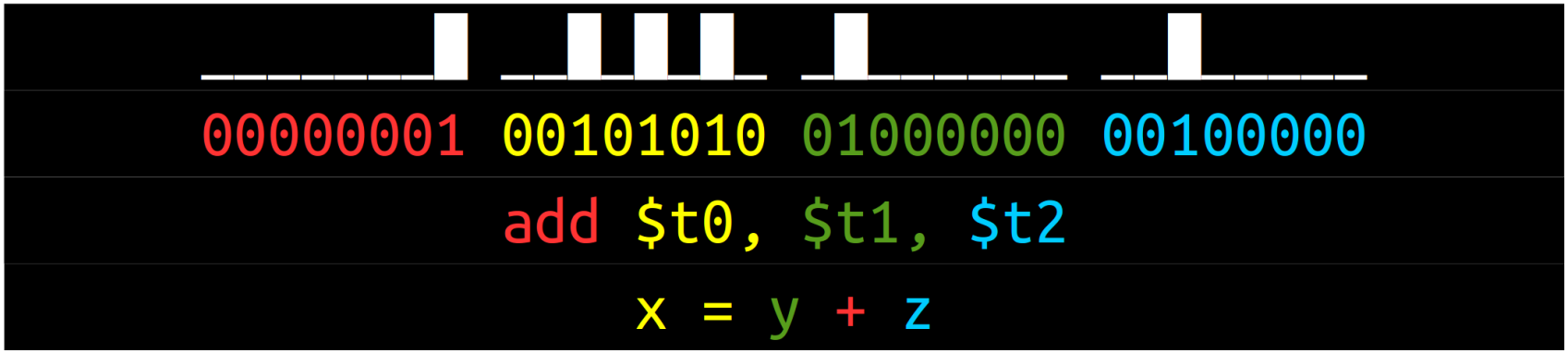
What is a program?

Programs are data!

What is a program?

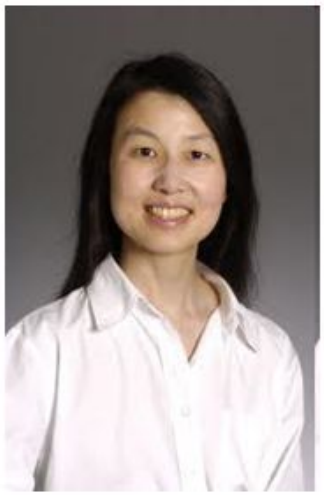
Programs are data!

Instructions are encoded in binary.



Computational Thinking

Computational Thinking



Computational thinking is a fundamental skill for everyone, not just for computer scientists. To reading, writing, and arithmetic, we should add computational thinking to every child's analytical ability. Just as the printing press facilitated the spread of the three Rs, what is appropriately incestuous about this vision is that computing and computers facilitate the spread of computational thinking.

Jeannette M. Wing
Computational Thinking

Engineer Joke: Engineering Thinking

Four engineers traveling in a car an the car breaks down ...

Mechanical engineer: "Sounds to me as if the pistons have seized. We'll have to strip down the engine before we can get the car working again"

Chemical engineer: "it sounded to me as if the fuel might be contaminated. I think we should clear out the fuel system."

Electrical engineer: "I thought it might be an grounding problem or maybe a faulty plug lead."

Software/computer engineer: "Ummm perhaps if we all get out of the car and get back in again?"

Reality in Industry: Engineering Thinking

Researchers working on a robot arm for assembling pens.
They face challenges, e.g., lacking sufficient accuracy.
Any directions for solving the problem?

Reminders

https://relate.cs.illinois.edu/course/zuics101fa16/