

SEPTEMBER 2ND 2020

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# ELEMENTARY PROGRAMMING

## SOME COVID BEST PRACTICES BEFORE WE START

- ▶ If you feel ill, go home
- ▶ Keep your distance to others
- ▶ Wash or sanitise your hands
- ▶ Disinfect table and chair
- ▶ Respect guidelines and restrictions

## HELLO, I'M EMANUELE

- ▶ My name is Emanuele Ianni
- ▶ You can write me at [emia@dtu.dk](mailto:emia@dtu.dk)
- ▶ The course website is at <https://cn.inside.dtu.dk/cnnet/element/623027>
- ▶ Ask the questions on the forum so that others can see the answer as well, especially if it's about programming: let's build a community

## ANOTHER THING OR TWO BEFORE STARTING

- ▶ I would really like for you to take a survey at the end of the session
- ▶ Feedback is important, please take the time to do it
- ▶ Pretty please <3
- ▶ Type this in your browser <http://bit.ly/elemprg>

### ABOUT ME

- ▶ I work at Maersk on IoT and monitoring
- ▶ I'm a Software Engineer
- ▶ You can spy me at <https://github.com/invasionofsmallcubes>
- ▶ I'm an External Lecturer
- ▶ If you need a project/thesis in the future you can write me at [emanuele.ianni@maersk.com](mailto:emanuele.ianni@maersk.com), I will try to connect you with other colleagues if they have the need

## I'M A FAST SPEAKER

**Raise your hand (on Zoom as well) and tell me to slow down**

## ABOUT THE FIRST LESSON

- ▶ Today's lesson is heavily inspired by **CS50** from **Harvard**
- ▶ I strongly recommend, if you like Computer Science, to take the course online
- ▶ It's probably the best course on the subject I ever followed (after getting the degree) or recommended
- ▶ Link is <https://www.edx.org/course/cs50s-introduction-to-computer-science>

## WE SOLVE PROBLEMS





## WE SOLVE PROBLEMS

- ▶ The **input** is the problem
- ▶ The **output** is the answer
- ▶ In the middle **something** happens  
( we will talk about it later)

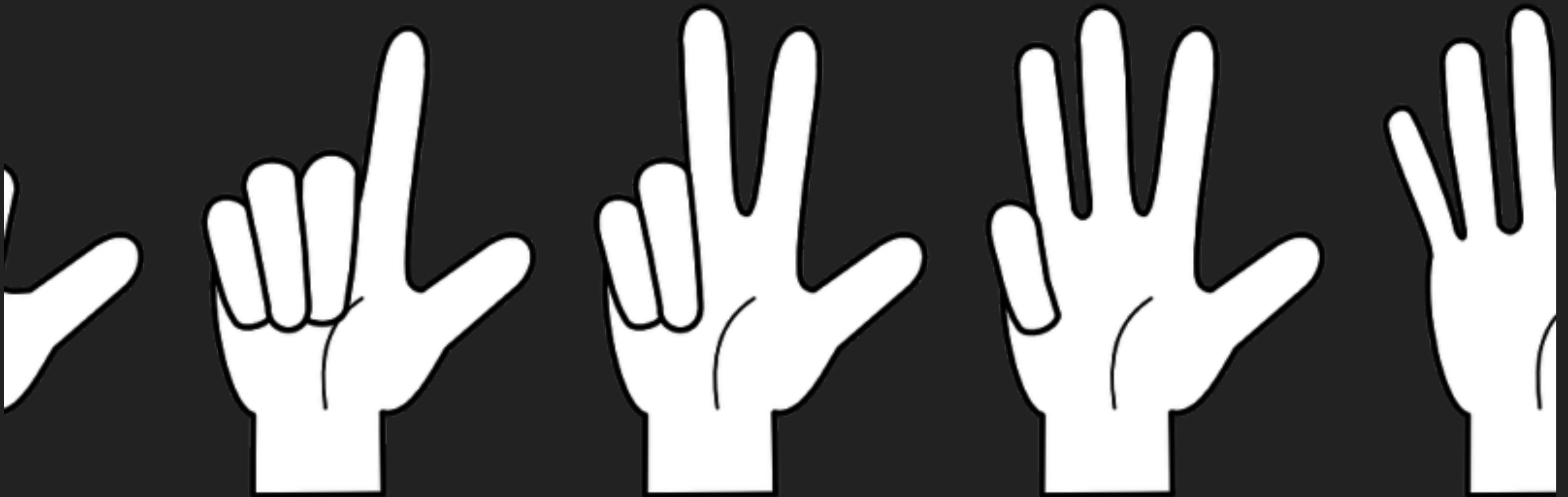
## PROBLEM REPRESENTATION

- ▶ We need to **decide** on a how to **represent** the problem
- ▶ eg: let's say we want to count the number of people in a room
- ▶ **How** can we represent a number?

## COUNTING PEOPLE – FIRST APPROACH



## COUNTING PEOPLE - SECOND APPROACH



## COUNTING PEOPLE - SECOND APPROACH

- ▶ Are we **limited** by using one hand?
- ▶ Can we still use a hand but count **more** than 5 people?
- ▶ What if we take into account not only fingers but finger **patterns** as well?

## HOW DOES A COMPUTER SPEAK?

- ▶ They speak through electricity
- ▶ Power **on**
- ▶ Power **off** (not really off)
- ▶ It's **binary**

## A COMPUTER CAN DO A LOT OF THINGS

- ▶ How is possible to do so many things with just **two states**?
- ▶ Humans have **conventions**
- ▶ How can we **express** alphabet?

## CONVENTIONS

# ASCII TABLE

[Click here](#)



## HOW DO YOU SAY “HEJ?”

H

E

J

!

72

69

74

33

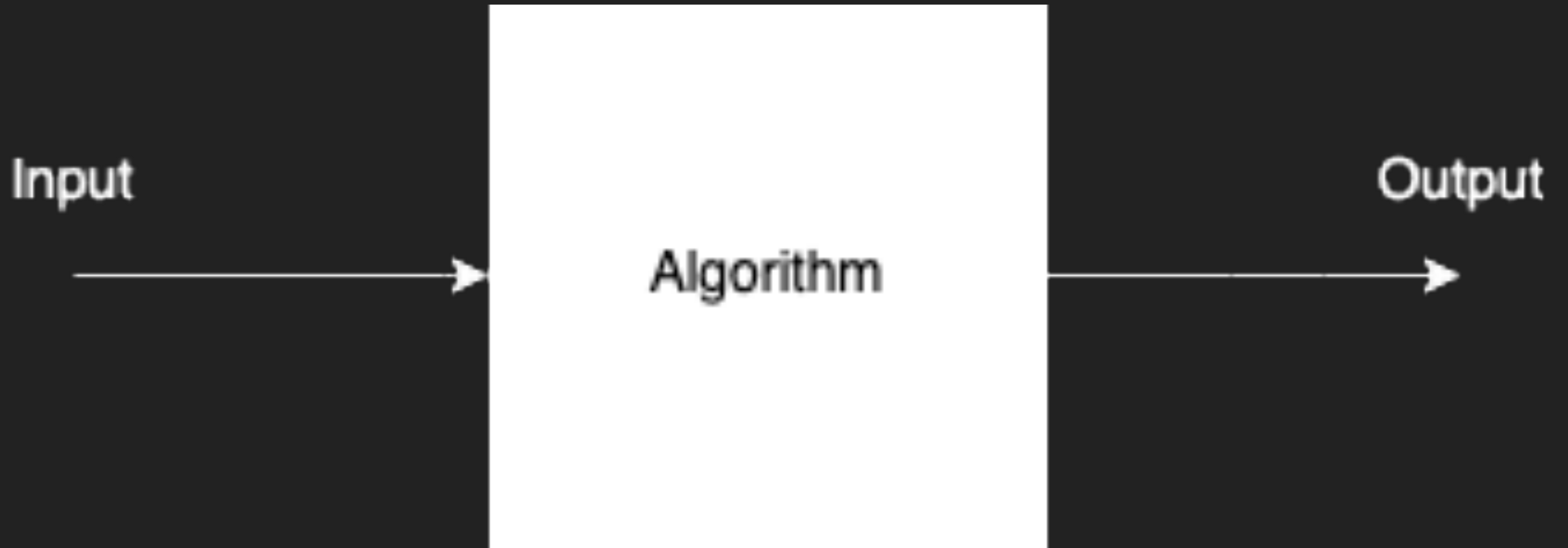
1001000

1000101

1001010

100001

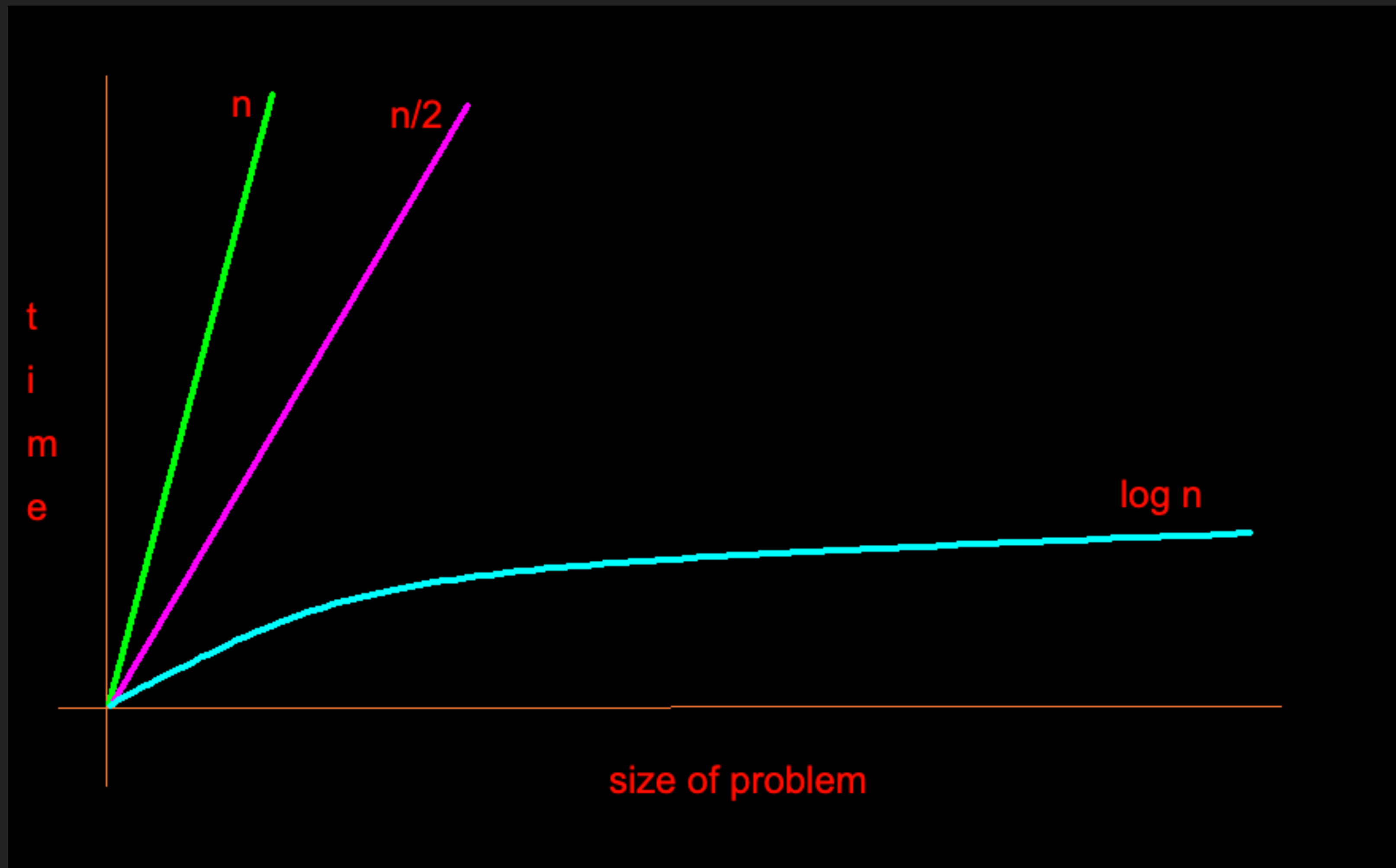
## HOW DO WE SOLVE THE PROBLEM?



## WHAT IS AN ALGORITHM?

Let's **find** a person on a phonebook!

## DID WE GET BETTER?



## HOW CAN WE DESCRIBE THE ALGORITHM?

1. open the middle of the phonebook
2. look at the page
3. if Emanuele is on page
4.     call Emanuele
5. else if Emanuele is earlier in book
6.     remove left side of phonebook
7.     open middle of the right side
8.     go back to line 2
9. else if Emanuele is later in book
10.     remove right side of phonebook
11.     open middle of the left side
12.     go back to line 2

## HOW CAN WE DESCRIBE THE ALGORITHM?

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12.     **go back to** line 2

**C TIME!**



## WHAT'S NEXT - LESSON #2

- ▶ We will start learning C
- ▶ All the information regarding assignments will be disclosed
- ▶ Please give feedback <http://bit.ly/elemprg>



## SOME COVID BEST PRACTICES BEFORE WE LEAVE

- ▶ Disinfect table and chair
- ▶ Maintain your distance to others
- ▶ Wash or sanitise your hands
- ▶ Respect guidelines and restrictions outside