Programming Thinking

Introduction

Pepe García

SCHOOL OF SCIENCE & TECHNOLOGY

About

The Professor

Pepe García

About

The Professor

Pepe García
jgarciah@faculty.ie.edu

SCHOOL OF SCIENCE & TECHNOLOGY

About

The Professor

Pepe García
jgarciah@faculty.ie.edu
Ask me anything

SCHOOL OF SCIENCE & TECHNOLOGY

About

The Course

- 7 sessions

SCHOOL OF SCIENCE & TECHNOLOGY

About

The Course

- 7 sessions
- 1 final exam

About

Grading

This course is graded as NGS/NGU, and the note will depend on the final exam.
The final exam consists of multiple choice/multiple answer questions, and is open book.

Criteria	Score %
Final Exam	100 %

SCHOOL OF SCIENCE & TECHNOLOGY

About

Grading

The grading for this course will either be **Non Graded Satisfactory** or **Non Graded Unsatisfactory**.
If you get 50% or more in the overall score, you get **NGS**, and **NGU** otherwise.

SCHOOL OF SCIENCE & TECHNOLOGY

About

Participation

Please, raise your hand at any point in class if you want to ask something, make an useful comment, or answer a question. (if remote, use Zoom's raise hand feature, so that it's easier to track it)

SCHOOL OF SCIENCE & TECHNOLOGY

Learning Objectives

In this course we will build the fundamentals for the rest of the courses in the masters that rely on programming. We will:

Learning Objectives

In this course we will build the fundamentals for the rest of the courses in the masters that rely on programming. We will:

- Learn What's programming

SCHOOL OF SCIENCE & TECHNOLOGY

Learning Objectives

In this course we will build the fundamentals for the rest of the courses in the masters that rely on programming. We will:

- Learn What's programming
- Understand how computers execute programs

SCHOOL OF SCIENCE & TECHNOLOGY

Learning Objectives

In this course we will build the fundamentals for the rest of the courses in the masters that rely on programming. We will:

- Learn What's programming
- Understand how computers execute programs
- Learn the basics of Python

SCHOOL OF SCIENCE & TECHNOLOGY

Plan for this session

- Know each other a little bit!

Plan for this session

- Know each other a little bit!
- Learn about software

SCHOOL OF SCIENCE & TECHNOLOGY

Plan for this session

- Know each other a little bit!
- Learn about software
- Understand what are algorithms and data structures

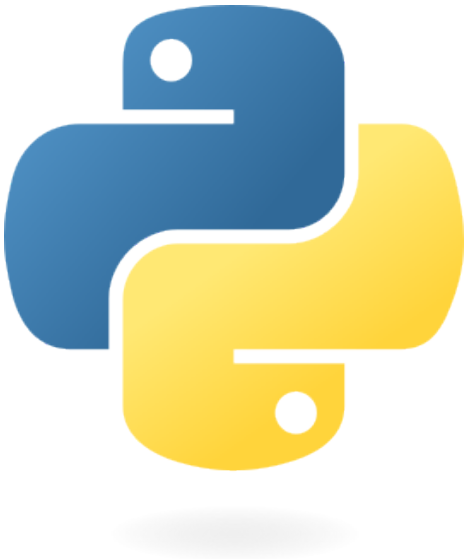
SCHOOL OF SCIENCE & TECHNOLOGY

Plan for this session

- Know each other a little bit!
- Learn about software
- Understand what are algorithms and data structures
- Install Anaconda

SCHOOL OF SCIENCE & TECHNOLOGY

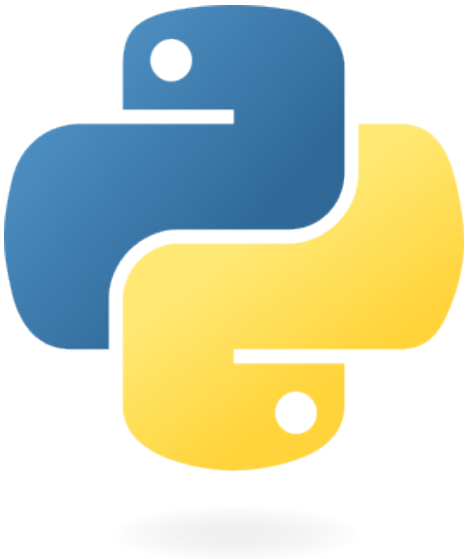
Languages



Throughout this course we will use Python as our programming language, but there are many more!

SCHOOL OF SCIENCE & TECHNOLOGY

Languages



Throughout this course we will use Python as our programming language, but there are many more!

What programming languages have you heard of?

SCHOOL OF SCIENCE & TECHNOLOGY

Languages

There are several ways of classifying programming languages.

Languages classification

Language	Paradigm	Execution	Purpose
Python	imperative	interpreted	general
Java	object oriented	compiled	general
Javascript	imperative	interpreted	general
Haskell	functional	compiled	general
SQL	declarative	interpreted	specific
HTML	declarative	interpreted	specific

SCHOOL OF SCIENCE & TECHNOLOGY

Languages

There are several ways of classifying programming languages.

Languages classification

Language	Paradigm	Execution	Purpose
Python	**imperative**	**interpreted**	**general**
Java	object oriented	compiled	general
Javascript	imperative	interpreted	general
Haskell	functional	compiled	general
SQL	declarative	interpreted	specific
HTML	declarative	interpreted	specific

SCHOOL OF SCIENCE & TECHNOLOGY

Languages

Python

Python is one of the most used languages right now. Its applications range from Data Science to Web servers

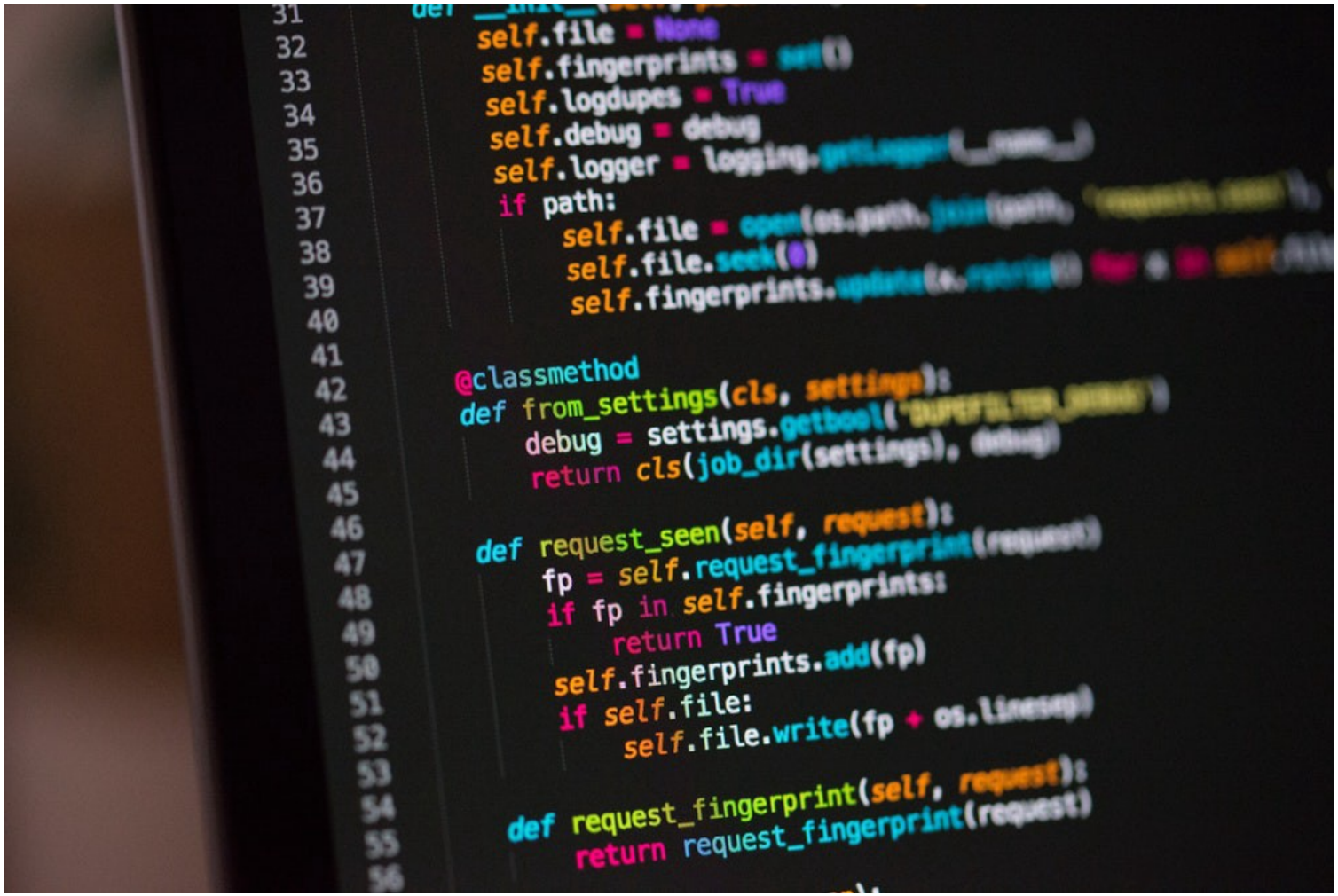
How do we write code?

How do we write code?

Coding is basically putting words together following a programming language specification.

How do we write code?

Usually, we put these words directly in a text file and then execute it as a program.



SCHOOL OF SCIENCE & TECHNOLOGY

How do we write code?

But we can feed these words directly into the programming language **console**.

Demo

Python console

Let's see how we can use the console to code!

Install Anaconda platform

Now we will install the Anaconda platform in our computers.

1. go to https://www.anaconda.com/download
2. Download Anaconda distribution for your computer.

SCHOOL OF SCIENCE & TECHNOLOGY

Install Anaconda platform

Checkpoint

Is anybody lost or has problems installing the software?

SCHOOL OF SCIENCE & TECHNOLOGY

Programs

SCHOOL OF SCIENCE & TECHNOLOGY

Programs

What is a program?

A program is a piece of software with a specific task.

Programs

What is a program?

A program is a piece of software with a specific task.
This task can be something **big**, like handling a nuclear reactor, or something **small** like Ctrl-c/Ctrl-v.

SCHOOL OF SCIENCE & TECHNOLOGY

Programs

What is a program?

A program is a piece of software with a specific task.
This task can be something **big**, like handling a nuclear reactor, or something **small** like Ctrl-c/Ctrl-v.
There are two main components of programs, **algorithms** & **data structures.**

SCHOOL OF SCIENCE & TECHNOLOGY

Algorithms

SCHOOL OF
SCIENCE &
TECHNOLOGY

Algorithms

What is an algorithm?

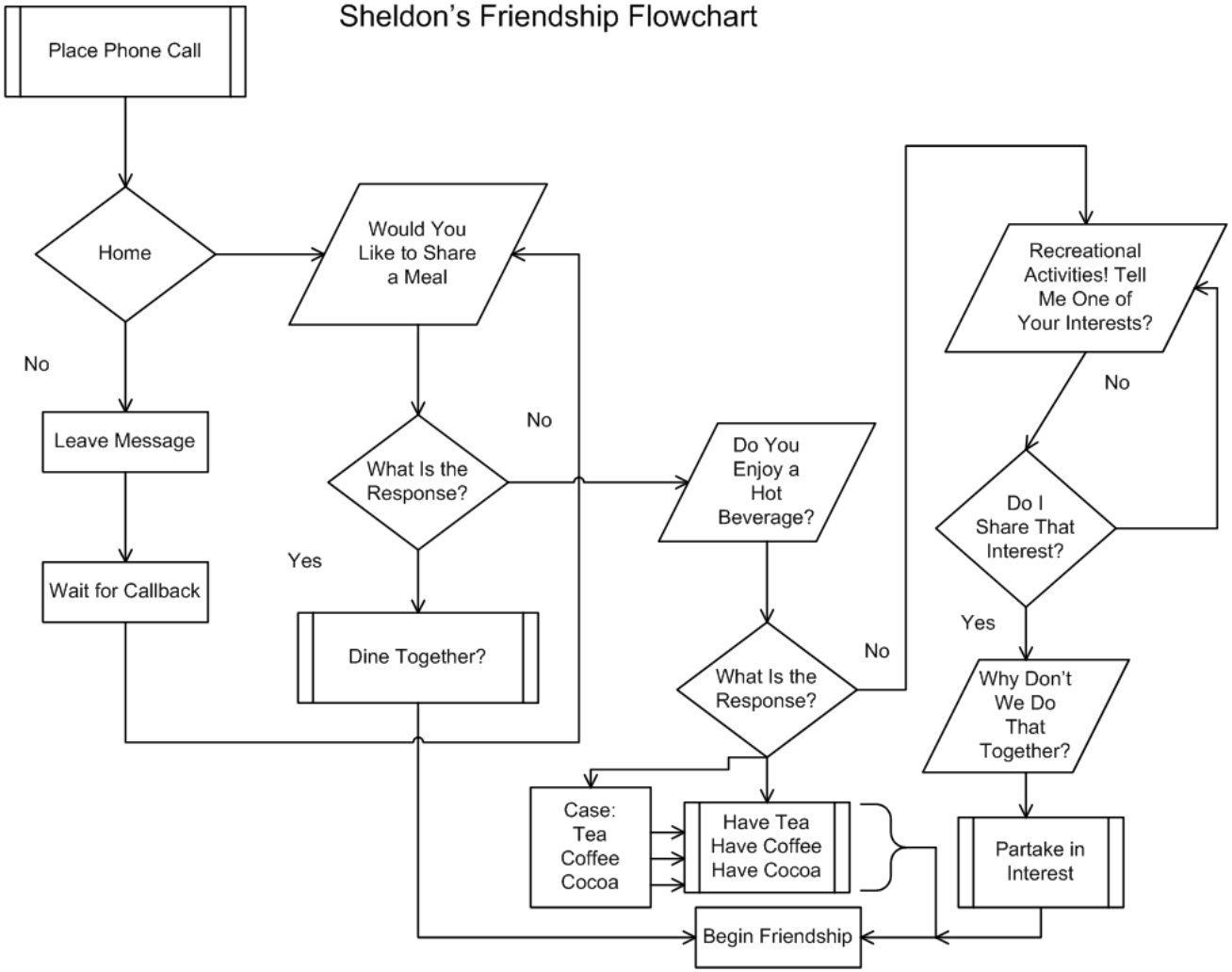
Algorithms

What is an algorithm?

An algorithm is a sequence of steps that guide the computer in how to solve a problem

SCHOOL OF SCIENCE & TECHNOLOGY

link to the video



SCHOOL OF SCIENCE & TECHNOLOGY

Algorithms

What's wrong with this algorithm? why did Wolowitz need to fix it?

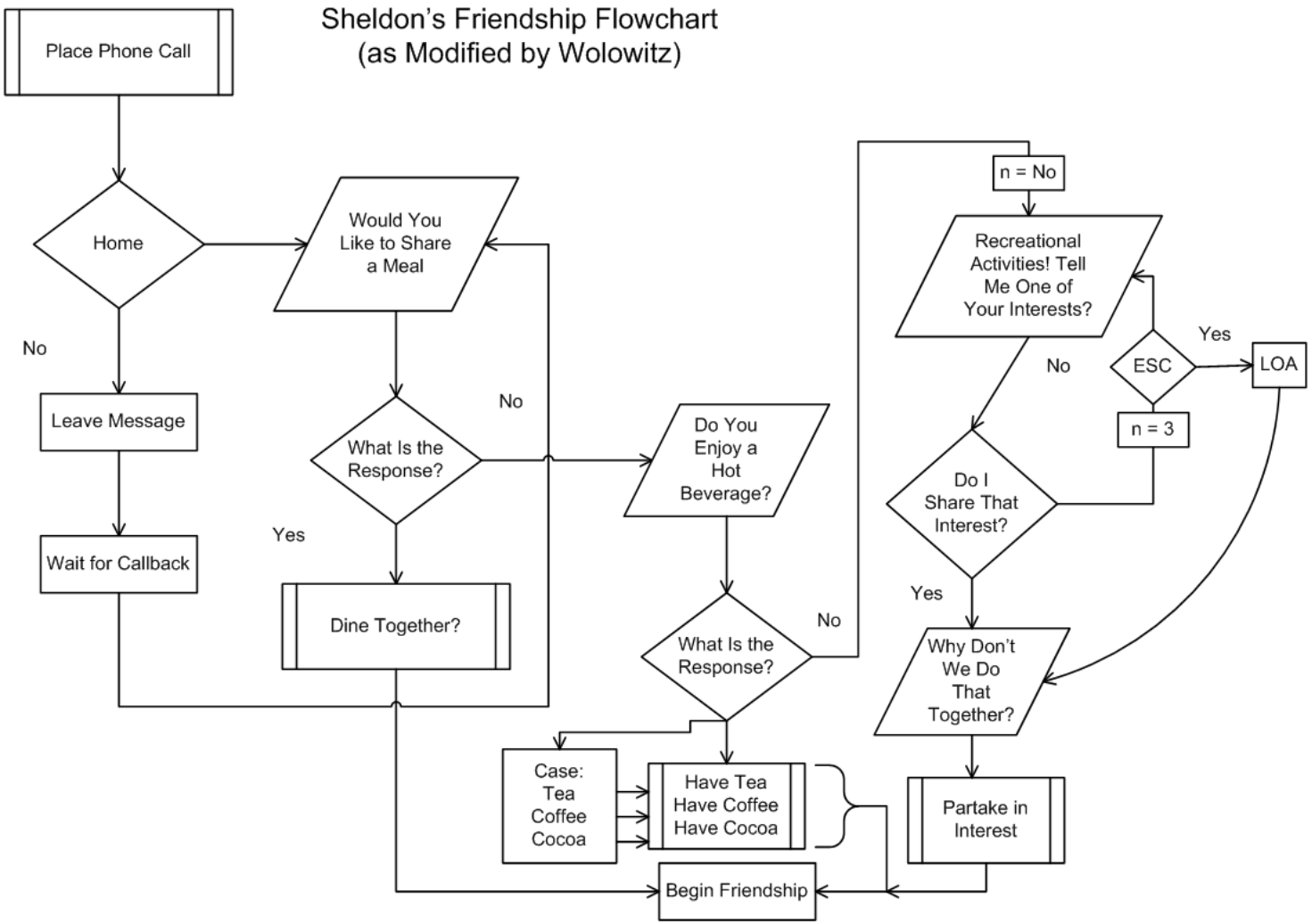
Algorithms

What's wrong with this algorithm? why did Wolowitz need to fix it?

There was a **bug**, an infinite loop

SCHOOL OF SCIENCE & TECHNOLOGY

Algorithms



SCHOOL OF SCIENCE & TECHNOLOGY

Algorithms

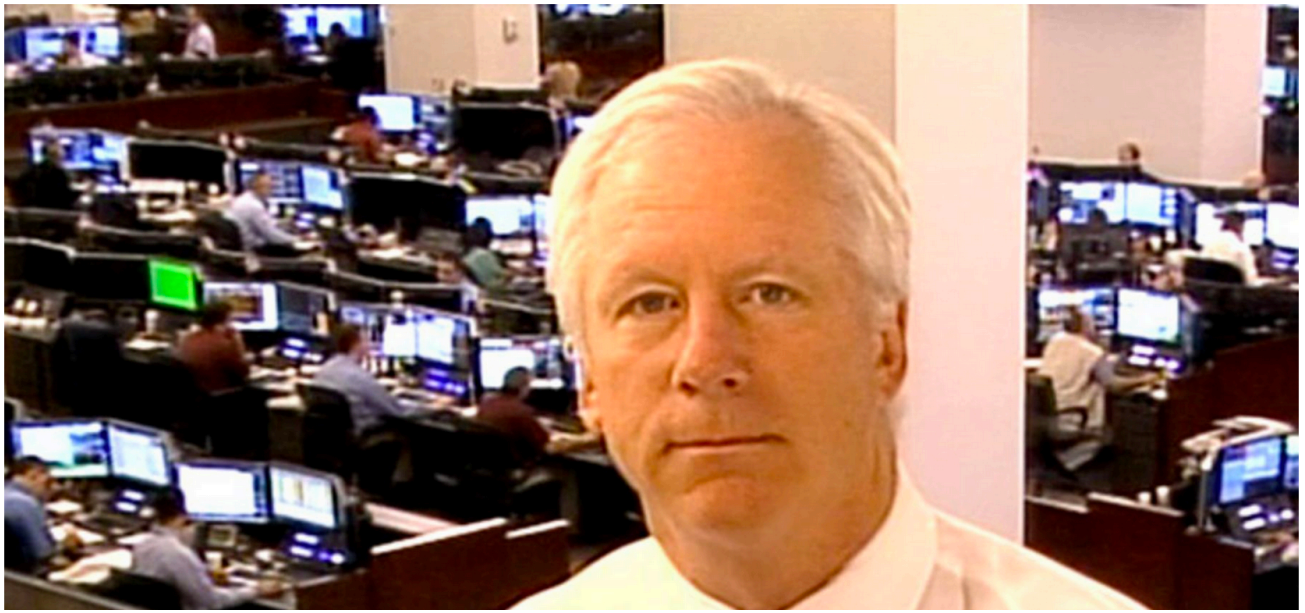
What other cases of bugs do we know?

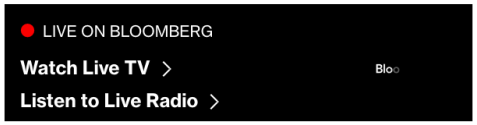
Business

Knight Shows How to Lose $440 Million in 30 Minutes

By Matthew Philips

August 2, 2012, 11:10 PM GMT+1





https://www.bloomberg.com/news/articles/2012-08-02/knight-shows-how-to-lose-440-million-in-30-minutes

Data structures

We use different data structures depending what we want to represent.

- Strings: text
- Lists: Twitter's timeline
- Dictionaries: phonebook, DNS
- Stacks: undo/redo ...

SCHOOL OF SCIENCE & TECHNOLOGY

Recap

Recap

- We'll use Python for learning programming in this course.

Recap

- We'll use Python for learning programming in this course.
- Algorithms, like cooking recipes, will guide our program to perform what we want.

Recap

- We'll use Python for learning programming in this course.
- Algorithms, like cooking recipes, will guide our program to perform what we want.
- Different data structures will be used depending on the purpose of our program.

SCHOOL OF SCIENCE & TECHNOLOGY

Recommended reading

What Is Code is a great essay by Paul Ford. (it's a bit long, you don't need to read it for tomorrow)

https://www.bloomberg.com/graphics/2015-paul-ford-what-is-code/

Netflix' explained (Coding episode)

SCHOOL OF SCIENCE & TECHNOLOGY