Data Structures & Programmatic Thinking

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Data Structures & Programmatic Thinking

About the professor

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Ask me anything
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Data Structures & Programmatic Thinking

About the course

- 15 sessions

Data Structures & Programmatic Thinking

About the course

- 15 sessions
- 11 lectures

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About the course

- 15 sessions
- 11 lectures
- 3 lab sessions

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About the course

- 15 sessions
- 11 lectures
- 3 lab sessions
- 2 individual assignments

Data Structures & Programmatic Thinking

About the course

- 15 sessions
- 11 lectures
- 3 lab sessions
- 2 individual assignments
- 1 final quiz

Data Structures & Programmatic Thinking

Evaluation method

- Individual work: 30%

Evaluation method

- Individual work: 30%
- Final exam: 20%

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Evaluation method

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- Final exam: 20%
- Class participation: 20%

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Evaluation method

- Individual work: 30%
- Final exam: 20%
- Class participation: 20%
- Workgroups: 30%

Data Structures & Programmatic Thinking

Learning Objectives

- Learn What's programming

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- Learn What's programming
- Understand data structures

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Learning Objectives

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

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Learning Objectives

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

Session structure

- Lecture ~50 mins
- Guided exercises ~30 mins

Plan for today

- Learn about software
- Understand what are algorithms
- Understand what are data structures

What is code?

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

Programming languages

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

Programming languages

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

Programming languages

Python

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

Programming languages

Java

Java is a very famous language developed by Oracle in the 90s, mostly used in enterprise software.

Programming languages

How do we write code?

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

Programming languages

How do we write code?

We can put these words directly in a text file and let then execute it as a program

Programming languages

How do we write code?

Or we can feed these words directly into the programming language console

How do we code?

Using Python console

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.

What is an algorithm?

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

Algorithms

Algorithms

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

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

Algorithms

What happens when an algorithm doesn't work correctly?

Knight Capital Group

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

What is a data structure?

Data structures are collections of values, relationships between them, and operations that can work on them

Example algorithm

Readings

If you're interested, here are some recommended readings:

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

Python for Everybody: https://www.py4e.com