Day 1 Stuff

First lecture - MATH 371

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What is this course about?

Topics:

Fundamentals of machine learning (/data science).

Basics of Python, implementing machine learning (on data) in Python.

More specifically, we will cover:

- A working knowledge of Python.
- Basic (linear) models for *regression* and *classification*.
- Training and testing models.
- Feature selection.
- Some learning theory, avoiding overfitting, and model evaluation.
- Potentially: support vector machines, clustering, or tree-based methods.

Course on Blackboard

Below,

Assignments and Grades

Below,

Course on Github

So far,

Discord channel

When you want

Class structure

Some of class will be lecture and we will usually have time for group work (for submission) and coding.

- Bring a laptop to class if able; the classroom also has computers available.
- I will be available to give direction with group assignments and assigned notebooks.
- Occasionally, instead of group work questions the questions will be individually completed (without the internet). This will be announced beforehand.

Exams

The course has two midterm exams and a final exam. The exams will be written by hand and are closed book. Exam questions will be related to what has been emphasized in class and has been asked on assignments. Furthermore, as an exam date nears, we will discuss what to expect on the exam questions.

- Midterm 1: planned for Thursday, March 6.
- Midterm 2: planned for Thursday, April 17.
- Final exam: Will take place on Thursday, May 15, 12:30am-2:30pm.

Office hours

Running Python and Jupyter

Working in Python throughout the semester.

- Often interact with Python through Jupyter notebooks (`.ipynb` files – *IPython notebook*).

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Two approaches to run and work with Jupyter notebooks.

1. Google's Colaboratory – *easiest startup*, done in the cloud, extra effort to interact with other files.
2. Install and run Python and Jupyter on your computer – *installation steps to get started*, can work offline, easy to interact with other files.

Instructions for the two approaches.

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Jupyter notebooks in a nutshell: Markdown cells and Code cells.

- Markdown cells, for text: can use HTML code; syntax shortcuts for formatting & styling. A guide for writing in Markdown.

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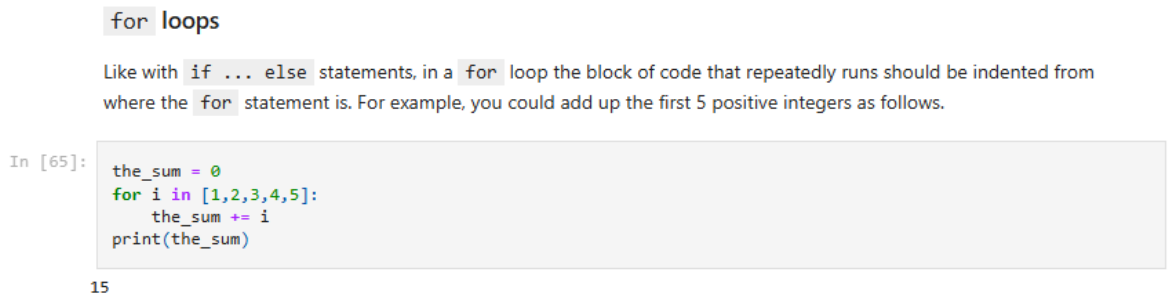
- Code cells: write lines of Python code. The notebook has a Python kernel (session) running; when you "Run" or execute a Code cell, the notebook works in that Python session and displays the output (if any).



`for` loops

Like with `if ... else` statements, in a `for` loop the block of code that repeatedly runs should be indented from where the `for` statement is. For example, you could add up the first 5 positive integers as follows.

In [65]:

```
the_sum = 0
for i in [1,2,3,4,5]:
    the_sum += i
print(the_sum)
```

```
15
```

Figure: A Markdown cell followed by a Code cell in a Jupyter notebook