

GEOG 399L: Programming for Spatial Data Science

Lecture 1: Introduction



Welcome

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- MPhil in Polar Studies at University of Cambridge, UK
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- Postdoc at the Institute at Brown for Environment and Society, RI, USA

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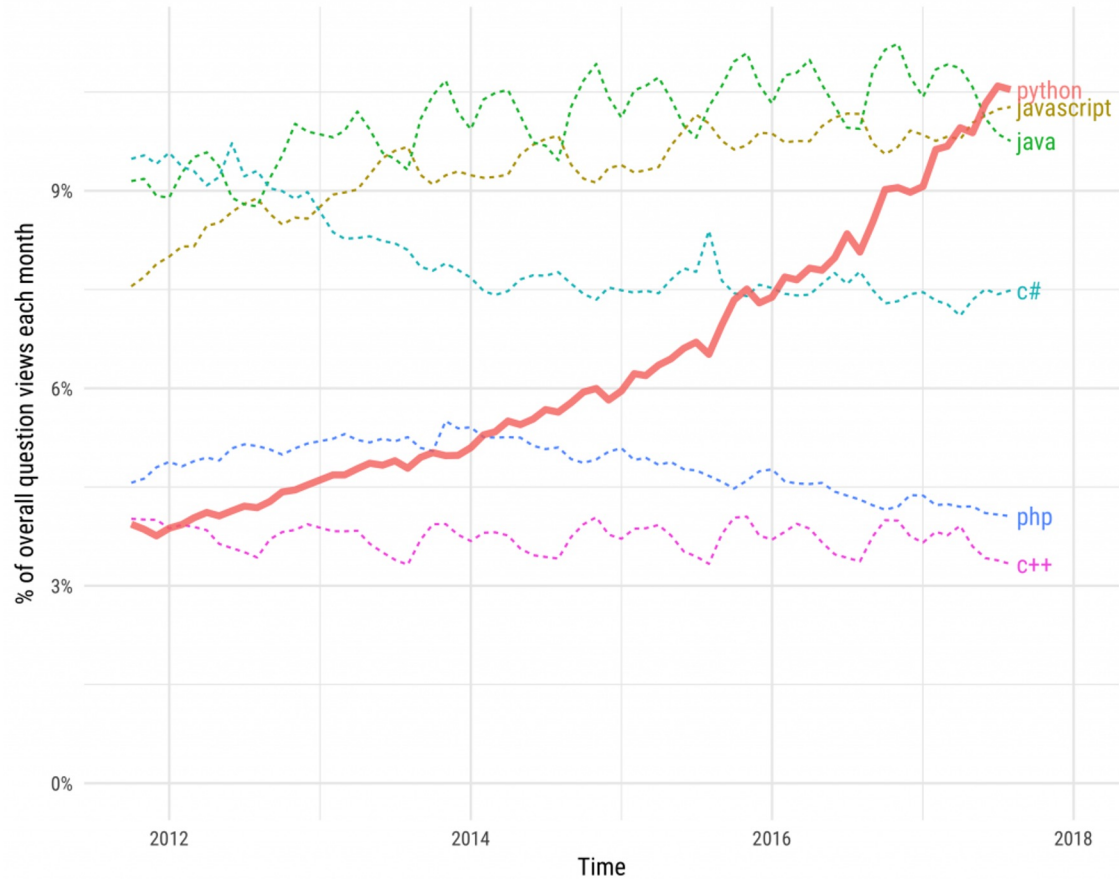
Overview

- The goal of this course is to introduce students to basic programming concepts in Python and apply these skills to various geospatial problems.

Python

Growth of major programming languages

Based on Stack Overflow question views in World Bank high-income countries



- Popular high-level programming language
- Easy-to-read
- Extensive and mature libraries
- Free and open-source
 - Accessible
 - Can be examined, modified, and improved
- Constantly evolving



Course schedule

- **Lectures:** Tuesday @ 12:00 in 229 MCK
 - Ten lectures
- **Labs:** Wednesdays at 11:00-12:50 or Thursdays at 14:00-15:50 in 442 MCK
 - Ten lab assignments
- **Activities:** Thursday @ 12:00 in 229 MCK
 - Nine activities
 - No activity in Week 1

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Course evaluation

- Lab assignments (60%)
 - due the following **Wednesday 11:59 pm**
- Activities (30%)
 - due the next day (i.e. **Friday 11:59 pm**) except Week 1
- Participation (10%)
 - Credit can be earned through attendance in lectures, visiting Professor and GE during office hours, and helping other students in labs/activities.

Course schedule

Week	Date	Lecture x 1 hour	Lab x 2 hours
1	Apr 2	Introduction	Assignment 1
	Apr 4	Variables, data types, and structures	
2	Apr 8	NumPy arrays + Tidy outputs	Assignment 2
	Apr 11	Practice activity: checkerboard	
3	Apr 16	For loops + Conditional statements	Assignment 3
	Apr 18	Practice activity: melt model	
4	Apr 23	Pandas DataFrames	Assignment 4
	Apr 25	Practice activity: TBD	
5	Apr 30	Functions + Time	Assignment 5
	May 2	Practice activity: TBD	

Course schedule

Week	Date	Lecture x 1 hour	Lab x 2 hours
6	May 7	Plotting	Assignment 6
	May 9	Practice activity: TBD	
7	May 14	Analyze table data	Assignment 7
	May 16	Practice activity: TBD	
8	May 21	Vector data analysis	Assignment 8
	May 23	Practice activity: TBD	
9	May 28	Raster data analysis	Assignment 9
	May 30	Practice activity: TBD	
10	Jun 4	Combining vector and raster data	Assignment 10
	Jun 6	Practice activity: TBD	
No final exam			

Get to know your neighbours!

- Please introduce yourself with your:
 - name
 - year
 - where you're from
 - favourite place to eat in Eugene

Some course themes

- Everything is open-source
 - All software we use is freely available
 - Labs can be completed anytime, anywhere from any OS
 - Course materials are publicly-available on the internet



Some course themes

- Don't try and write perfect code, if it works, it works
- It's not always necessary to write code, adapting code is quite normal
- Make use of stackoverflow
- Don't be afraid to ask (peers or instructors)

when stack overflow doesn't help solve your problems



Some course themes

- Take responsibility for learning
- Organize your files
- Check Canvas regularly



You can lead a horse to water,
but you can't make him drink.

Some course themes

Learn by **DOING**.



By the end of this course you will...

- Have confidence using Python specifically for GIS and other geospatial data science applications
 - In doing so, you will also be comfortable using Python for other things as well
- Be able to download, process, analyze, and visualize the main types of geospatial data
- Automate boring GIS tasks (no more clicking!)

By the end of this course you will...

- Acquire basic Python coding skills
- Implement common programming techniques (e.g. conditional statements, loops, functions).
- Become familiar with object-oriented programming
- Identify common geospatial data formats and appropriate Python packages to work with them
- Perform basic data analysis on table, vector, and raster data
- Visualize different types of data
- Recognize the importance of open-source software

Getting started on this week's lab

- Go to course page:
 - <https://cleo-lab.github.io/programming-for-sds-site/assignments/01-assignment.html>
Also see Canvas for links

