Computational Skills Training

Curtin Institute for Computation
What do you do as a researcher?

Problem + Data = Insights

Report + Insights = Researcher

Report, Insights, Problem, Data
A computer language for researchers

Human thought → Machine language
A computer language for researchers
A computer language for researchers

High level/interpreted language

C++

Human thought

Machine language
What do you do as a researcher?

Problem + Data + Python = Insights

Why should you learn programming?

- Fast
- Reproducible
- Automate your analysis
- Data Agnostic
- Lots of Data
- Supports various OS
- Open Source
- Free
Why Python?
Python is readable

JAVA

```java
public class Main {
    public static void main(String[] args) {
        System.out.println("hello world");
    }
}
```

PYTHON

```python
print('hello world')
```
Python is scalable

```python
fig = plt.figure(figsize=(20, 10))
markersize = 1
markertype = 'o'  # pixel
markercolor = 'blue'
markeralpha = .8  # a bit of transparency

m = Basemap(
    projection='mill', lon_0=0, lat_0=0,
    llcrnrlon=0, llcrnrlat=0,
    urcrnrlon=360, urcrnrlat=90)

# Avoid border around map.
m.drawmapboundary(fill_color='ffaaaa', linewidth=0)

# Convert locations to x/y coordinates and plot them as dots.
 lon, lat = zip(*locations)
x, y = m(lon, lat)
m.scatter(x, y, markersize, marker=markertype, color=markercolor, alpha=markeralpha)

# Set the map title.
plt.annotate('Britain & Ireland drawn from pubs', xy=(0, .05),
             size=10,
             xycoords='axes fraction',
             color='0.5',
             family='Gloria')

# Set the map footer.
plt.annotate('Author: Ramiro Oñez - ramiro.org  Data: OpenStreetMap - openstreetmap.org',
             xy=(.05, .05),
             size=8,
             xycoords='axes fraction',
             color='grey',
             family='Droid Sans')

plt.savefig('img/britain-ireland-drawn-from-pubs.png', bbox_inches='tight')
```

http://ramiro.org/notebook/mapping-pubs/
Python is a community

Python is a dynamic and strongly typed programming language designed to emphasize usability. Two similar but mostly incompatible versions of Python are in widespread use (2 and 3). If you have a version-specific Python question consider using the [python-2.7] or [python-3.x] tags in addition to the [python] tag. If you are using a python variant such as pypy, iron-python, etc., please tag appropriately.

Python is a dynamic and strongly typed programming language that is used for a wide range of applications. It is a general-purpose, high-level programming language that is designed to emphasize usability.

Python allows programmers to express concepts in fewer lines of code than would be possible in many other languages such as C, and the language has constructs intended to be used to create clear programs in a variety of domains.

Python was created by Guido van Rossum.
Python is Free

• No paywalls
• No subscription costs
• Free means everyone can afford vegetables this week!
Why R?
R is simple
R is shareable

R is a community

- R - 147,761 answered questions on StackOverflow.com
- SPSS - 3,365 answered
• ...I feel like this doesn’t need another dot-point
Initiate and foster collaborative, interdisciplinary research and education programs that apply computational methods across all faculties to provide innovative solutions to complex problems.
Computational Specialists

Dan Marrable
• Submitted PhD in remote sensing
• Worked for Landgate, ESA
• Software dev and ML on marine app

Dr Kevin Chai
• PhD in CS
• Postdoc in health informatics
• Recruited from CITS where he predicted student attrition

Dr Rebecca Lange
• PhD in astronomy
• Previous RA in scientific imaging for art conservation and archeology

Shiv Meka
• B. Eng (elec)
• Masters in Mat Sci and Eng
• HPC support at Case Western Reserve University
Support from the CIC!

• Hacky Hour
  • Every Wednesday 3pm-4pm
  • Common Ground or Library Makerspace
    • Follow @CUHackyHour

• Software Carpentry
  • March 19 & 20
  • April 23 & 24
  • One R and one Python

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