Computational Skills Training

Curtin Institute for Computation
Curtin Institute for Computation

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
The Scientific Process

1. Design Experiment
2. Form Hypothesis
3. Collect Data
4. Communicate Results
5. Explore or Test
A computer language for scientists

Human thought

Machine language
A computer language for scientists
A computer language for scientists

C++

Human thought  C++  Machine language

CC BY-SA RStudio
A computer language for scientists

High level/interpreted language

C++

Machine language

Human thought
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=(30, 30))
m markersize = 1
markertype = '.' # pixel
markercolor = 'blue'
markersalpha = .8 # a bit of transparency

m = Basemap(
    projection='mill', lon_0=0, box['lon'], lat_0=0, box['lat'],
    llcrnrlon=box['ll_lon'], llcrnrlat=box['ll_lat'],
    urcrnrlon=box['ur_lon'], urcrnrlat=box['ur_lat'])

# Avoid border around map.
m.drawmapboundary(fill_color='0.8', linewidth=0)

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

# Set the map title.
plt.annotate('Britain & Ireland drawn from pubs',
             xy=(0.05, 0.95),
             xycoords='axes fraction',
             color='black',
             family='Gloria')

# Set the map footer.
plt.annotate('Author: Ramiro Gómez - ramiro.org - Data: OpenStreetMap - openstreetmap.org',
             xy=(0.03, 0.98),
             xycoords='axes fraction',
             color='silver',
             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 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
R is Free

- ...I feel like this doesn’t need another dot-point
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

@CurtinIC
www.computation.curtin.edu.au
curtinic@curtin.edu.au