COMP10020
Introduction to Programming II

Dr. Brian Mac Namee

brian.macnamee@ucd.ie

School of Computer Science

University College Dublin

MODULE REVIEW

Module Outline

1. Python

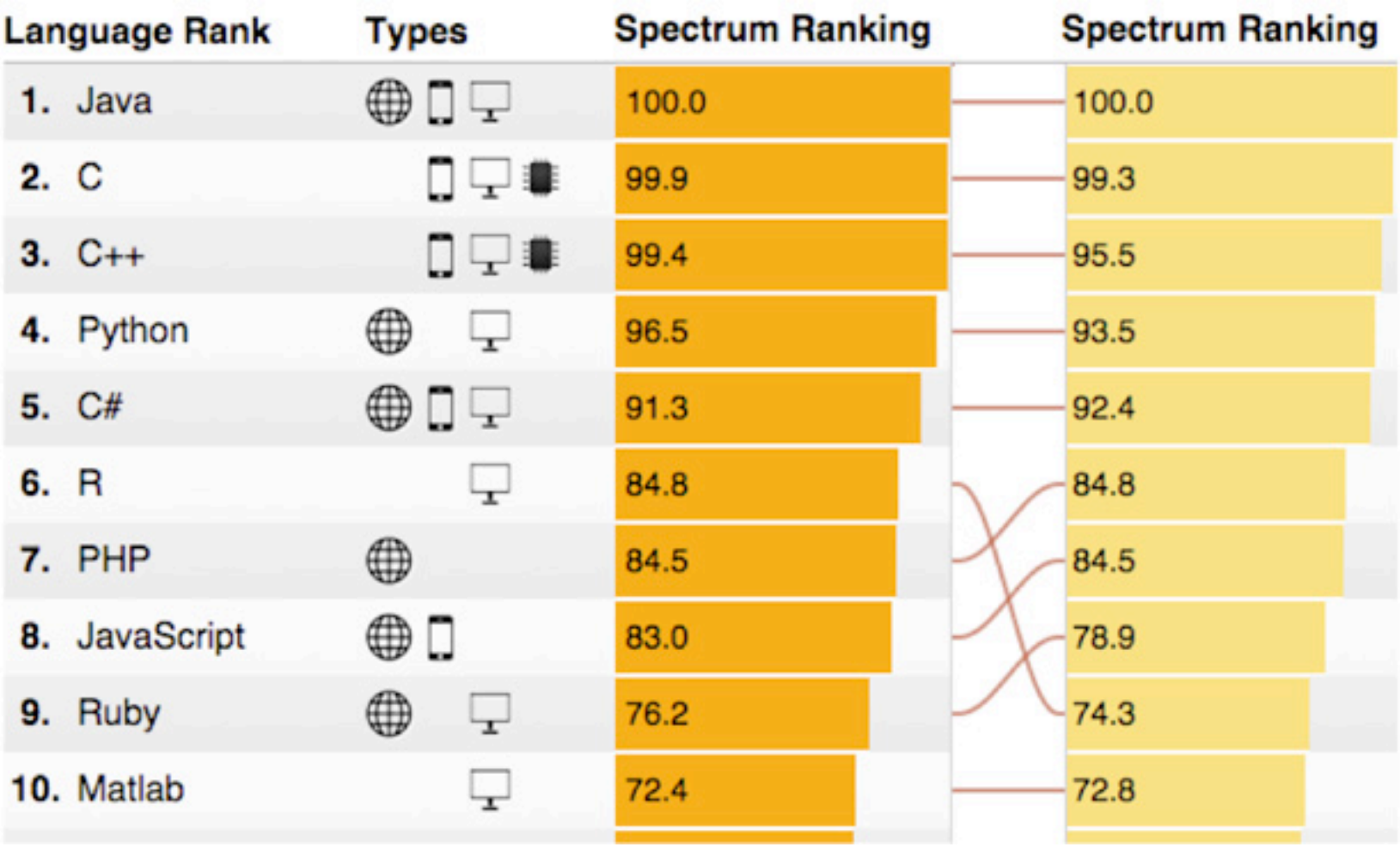
- Revision
- Object oriented (OO) programming

2. Algorithms

- Searching & ranking
- Data analysis

3. Data Science

- Data access
- Data manipualtion
- Data analysis
- Data visualsiation



http://spectrum.ieee.org/computing/software/the-2015-top-ten-programming-languages
http://spectrum.ieee.org/static/interactive-the-top-programming-languages-2015

Why Python?

Open source and well supported by freely available tools

Clean, concise, unambiguous syntax

Supports a variety of programming paradigms

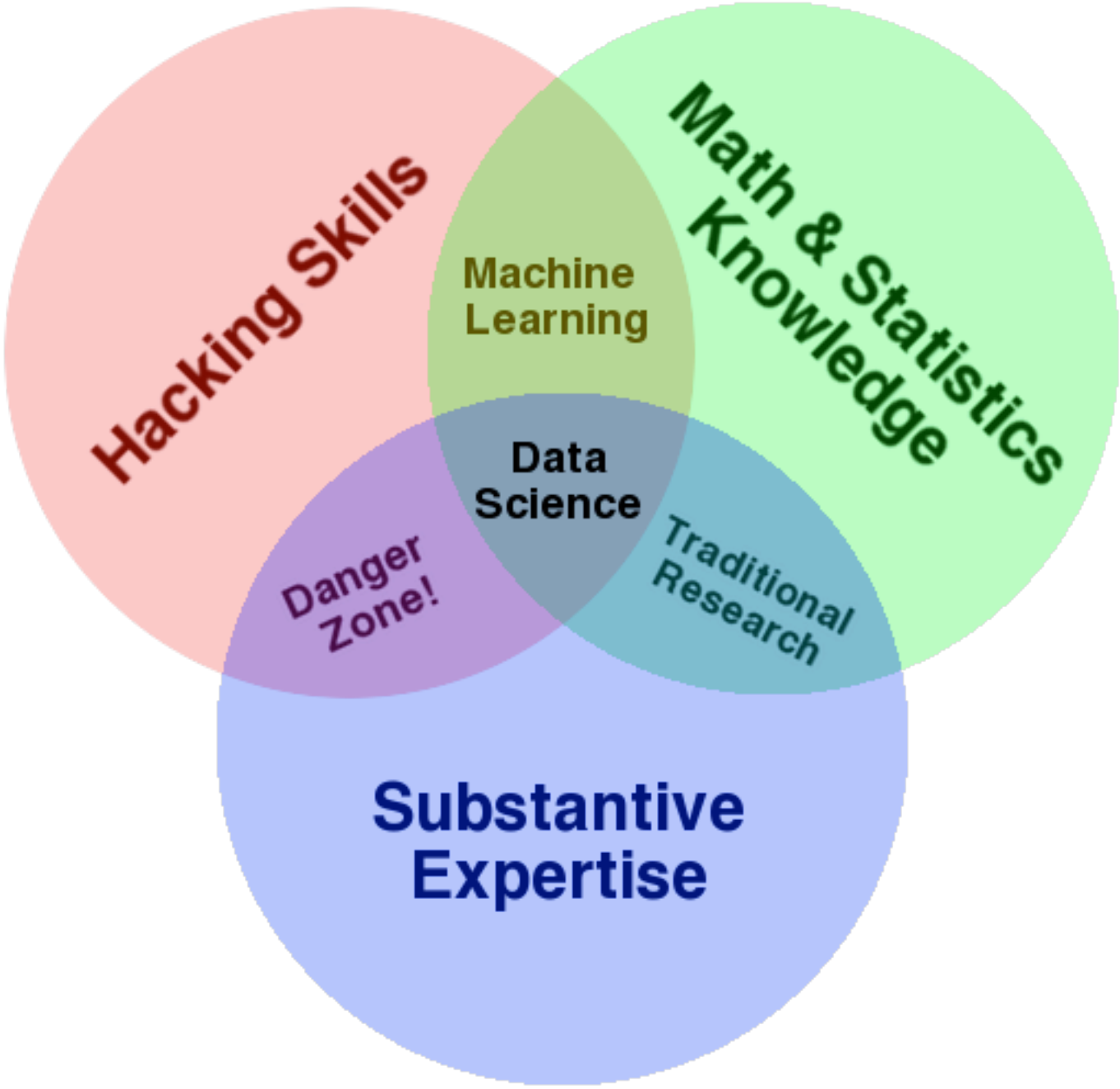
- Simple scripts
- Object-oriented programming
- Interactive notebooks

Strong library support

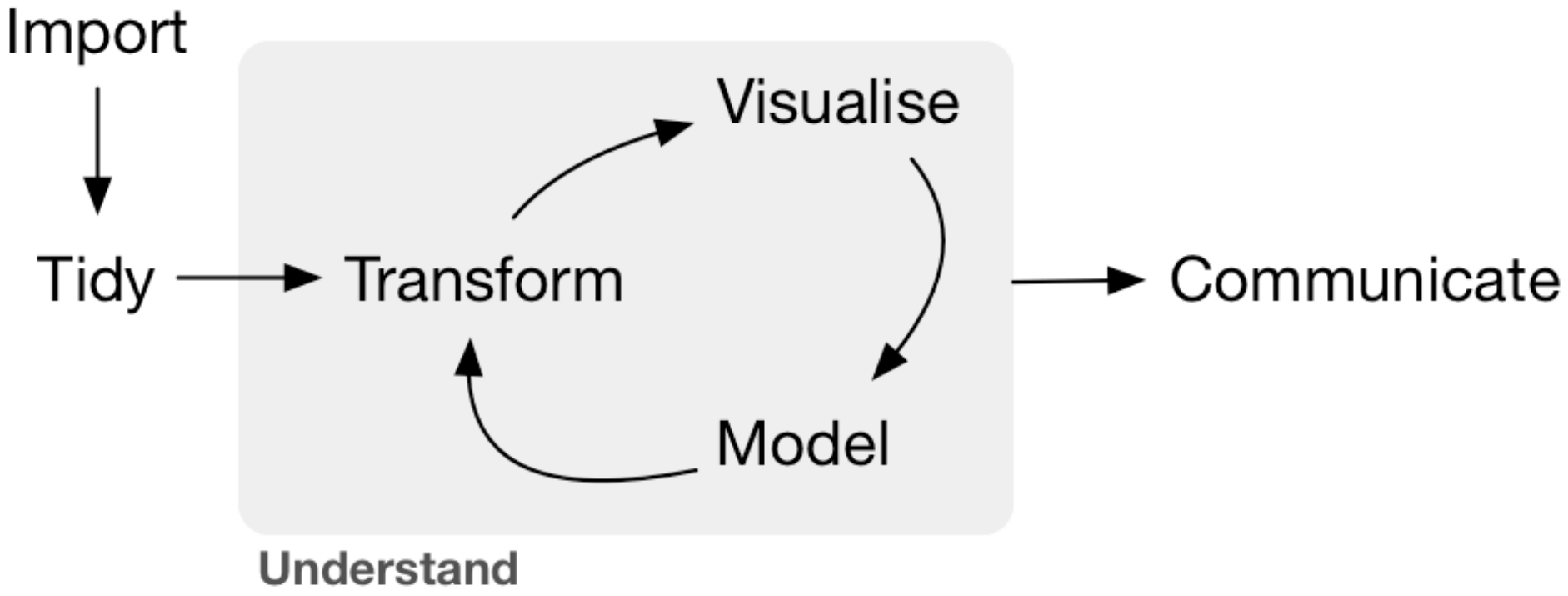
Strong online community support

What Is Data Science?

At it's core Data Science is about developing the infrastructure and processes for dealing with data at scale, recognising and understanding patterns within large, diverse datasets, generating predictions based on these patterns, and creating revealing visualizations and crafting compelling narratives with and about data



http://drewconway.com/zia/2013/3/26/the-data-science-venn-diagram



https://ismayc.github.io/moderndiver-book/2-intro.html

Assessment

Continuous assessment

- 60% of final mark
- A series of programming assignments in labs (each worth equal share)

End of semester exam

- 40% of final mark
- Exam covering practical and theoretical issues discussed in class

Assessment

End of semester exam

- The exam paper has four questions you **must do question 1** and **any two other questions**
- The duration of the exam is one hour
- Question 1 contains ten short questions about **all aspects of Python programming**
- Question 2 is about **object oriented programming**.
- Question 3 will be about **algorithm design**
- Question 4 is about **data science**

Revision

Question 1 - General

- Question 1 questions will be similar to the questions in the multiple choice test given early in the course
- The multiple choice questions at http://www.cs.armstrong.edu/liang/py/test.html (especially Chapters 2, 3, 4, 5, 6, 7, 10, 12, and 14) would also be a good study aid.

Question 2 - OOP

- Students should focus on writing classes - we did not focus as much on inheritance this year as other years.

Revision

Question 3 - Algorithms

- In particular students should be able to describe the operation of the Bubble Sort, Insertion Sort, Breadth-first Search and Depth-first Search algorithms

Question 4 - Data Science

- Data visualizations will be important here (esp scatter plot matrix)
- Also revise how to do data analysis in pandas

Plagiarism & UCD Computer Science

- **Plagiarism is a serious academic offence**
  - [Student Code, section 6.2] or [UCD Registry Plagiarism Policy] or [CS Plagiarism policy and procedures]
- Our staff and demonstrators are **proactive** in looking for possible plagiarism in all submitted work
- Suspected plagiarism is reported to the CS Plagiarism subcommittee for investigation
  - Usually includes an interview with student(s) involved
  - 1st offence: **usually** 0 or NG in the affected components
  - 2nd offence: referred to the **University disciplinary committee**
- Student who enables plagiarism is equally responsible

http://www.ucd.ie/registry/academicsecretariat/docs/plagiarism_po.pdf

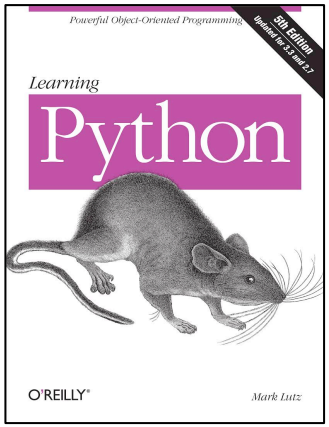
http://www.ucd.ie/registry/academicsecretariat/docs/student_code.pdf

http://libguides.ucd.ie/academicintegrity

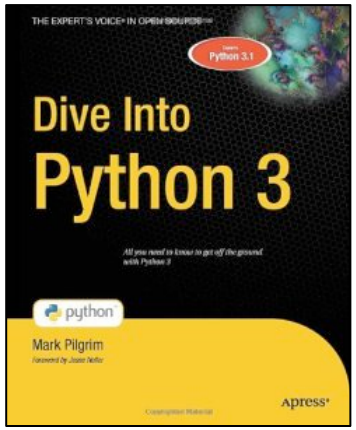
BOOKS & OTHER RESOURCES

Books & Other Resources

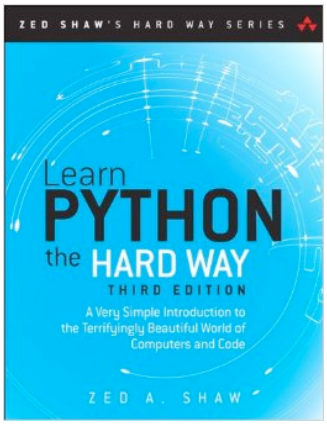
No specific textbook for this module



Learning Python
Mark Lutz
O'Reilly Media
www.learning-python.com/books/



Dive Into
Python 3
Mark Pilgrim
Apress
www.diveintopython3.net



Learn Python the
Hard Way
Zed A. Shaw
www.learnpythonthehardway.org

Books & Other Resources

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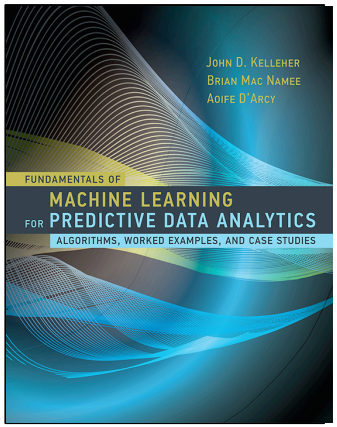
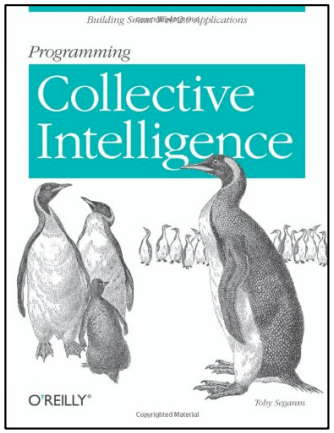


Fundamentals of Machine Learning for Predictive Data Analytics
John D. Kelleher, Brian Mac Namee, Aoife D'Arcy
MIT Press
www.machinelearningbook.com



Programming Collective Intelligence
Toby Segaran
O'Reilly Media
www.kiwitobes.com