

Welcome to Computer Programming

Week 1 Admin

Overview

- Course content
- Prerequisites and materials
- Course meetings
- Assessment and collaboration
- Weekly schedule

Why Do Social Scientists Need Computer Programming?

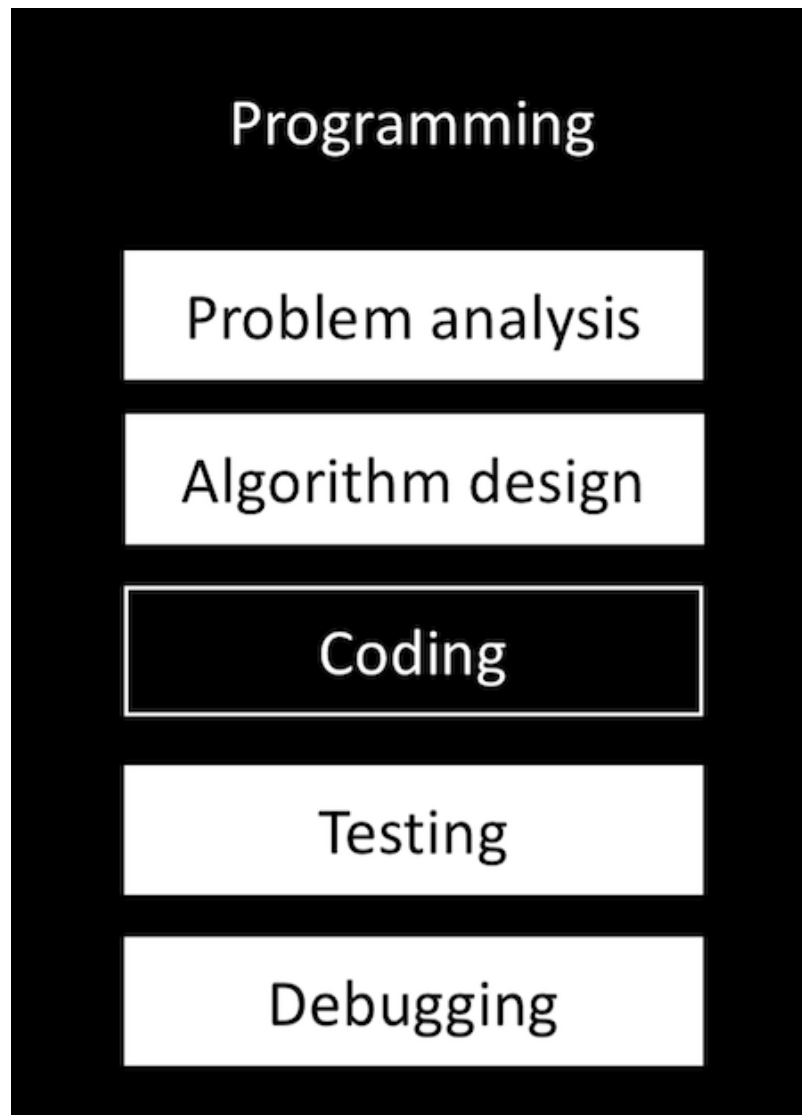


Why Do Social Scientists Need Computer Programming?

- Collect data
 - Crawling websites and using APIs
 - Online surveys and experiments
 - Computational models and simulations
- Manage, analyze, and visualize data
 - Large data
 - Non-rectangular data (e.g. networks, text)
- Be autonomous and work independently
- Learn from and collaborate with engineers and scientists

- Generate and share reproducible workflows

Coding vs. Programming



Course Content

- Introduce the fundamentals of computer programming
- Cover the foundations of computer languages, object-oriented programming, and algorithms
- Learn how to design, write, and debug computer programs and how to evaluate algorithms
- Practice on applications from computational social science and social data science

Instructors

- Dr. Milena Tsvetkova, m.tsvetkova@lse.ac.uk
- Dr. Sian Brooke, s.j.brooke@lse.ac.uk
- Dr. Patrick Gildersleve, p.gildersleve@lse.ac.uk
- Yuanmo He (GTA)

Course administrator

- Lucia Pedrioli, methodology.admin@lse.ac.uk

Prerequisites and Software

- Introductory course — no prerequisites
- Laptop for in-person classes
- Software
 - **Python** (Anaconda distribution) to learn basic concepts in computer science
 - **R** to experience another common programming language
 - **Jupyter** web app and **RStudio** to write code
 - **GitHub** to share course documents and assignments

Course Materials

Lecture/seminar materials and sample answers to assignments

- <http://github.com/lse-my470/lectures> (<http://github.com/lse-my470/lectures>)
- <https://github.com/lse-my470/answers-to-assignments> (<https://github.com/lse-my470/answers-to-assignments>)

Books

- Gutttag, John V. *Introduction to Computation and Programming Using Python: With Application to Understanding Data*. Mit Press, 2016.
- Miller, Bradley N. and David L. Ranum. *Problem Solving with Algorithms and Data Structures Using Python*. Available at <http://interactivepython.org/runestone/static/pythonds/index.html> (<http://interactivepython.org/runestone/static/pythonds/index.html>).
- Grolemund, Garrett and Hadley Wickham. *R for Data Science*. O'Reilly, 2016. Available at <http://r4ds.had.co.nz> (<http://r4ds.had.co.nz>).

Additional resources

- <http://github.com/lse-my470/lectures/resources.md> (<http://github.com/lse-my470/lectures/resources.md>)

Course Procedure

1. Read required readings
 2. Watch prerecorded video lectures (link on Moodle) following lecture materials on GitHub
 3. Attend Q&A online lecture sessions (link on Moodle)
 4. Attend classes
 5. Complete and submit problem set on GitHub
- (Schedule office hours on StudentHub to chat about programming and research, ask questions about the course content, or get clarification about your mark)
 - (Post and answer clarifying questions about assignments on Moodle)
 - (E-mail Milena if you have an urgent individual problem)
 - (Use additional resources to practice more)

Course Meetings

- Ten one-hour lecture sessions
 - Mondays 13:00–14:00 on Zoom
- Ten 1.5-hour seminars
 - Tuesdays 10:00–11:30 in NAR 2 13

- Tuesdays 11:30–13:00 on Zoom in weeks 1–4, then in NAB.2.13
- Tuesdays 15:00–16:30 in CLM.4.02
- Tuesdays 16:30–18:00 in CLM.4.02
- No lecture/seminar in Week 6
- Office hours
 - Milena: Fridays 14:00–16:00, COL.8.06 or Zoom
 - Sian: Fridays 10:00–12:00, COL.7.07 or Zoom
 - Patrick: Tuesdays 14:00–15:00 and Fridays 15:00–16:00, COL.7.07 or Zoom

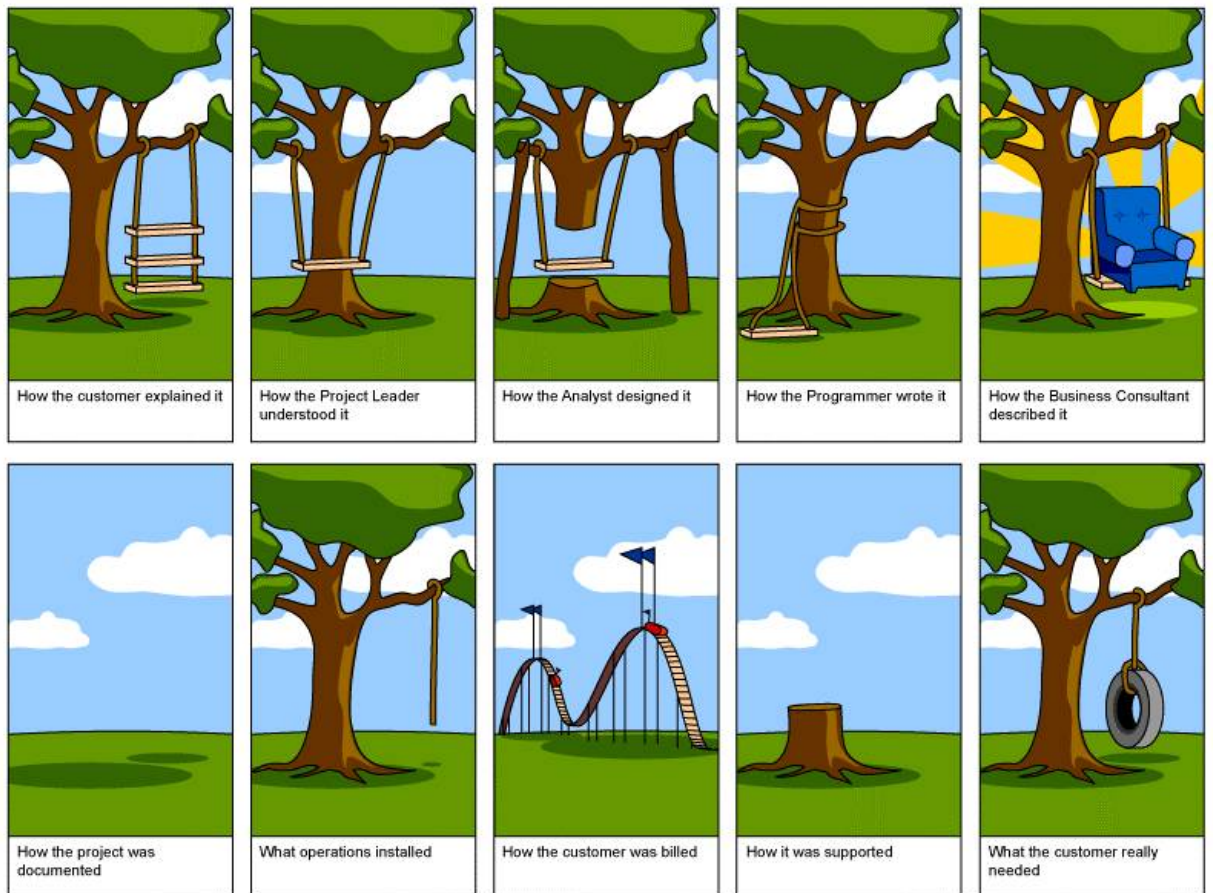
Assessment

- In-class assessment (50%)
 - 8 problem sets (due at 12:00 on Mondays of weeks 3-6 and 8-11)
 - We will try to give you grades and comments by Friday
- Take-home exam (50%)
 - Substantive Python project requiring you to demonstrate concepts and skills learned from the course
 - For students taking MY570: need to come up with own project, talk to us
 - Due at 12:00 on Monday, January 17, 2022

Assessment Criteria

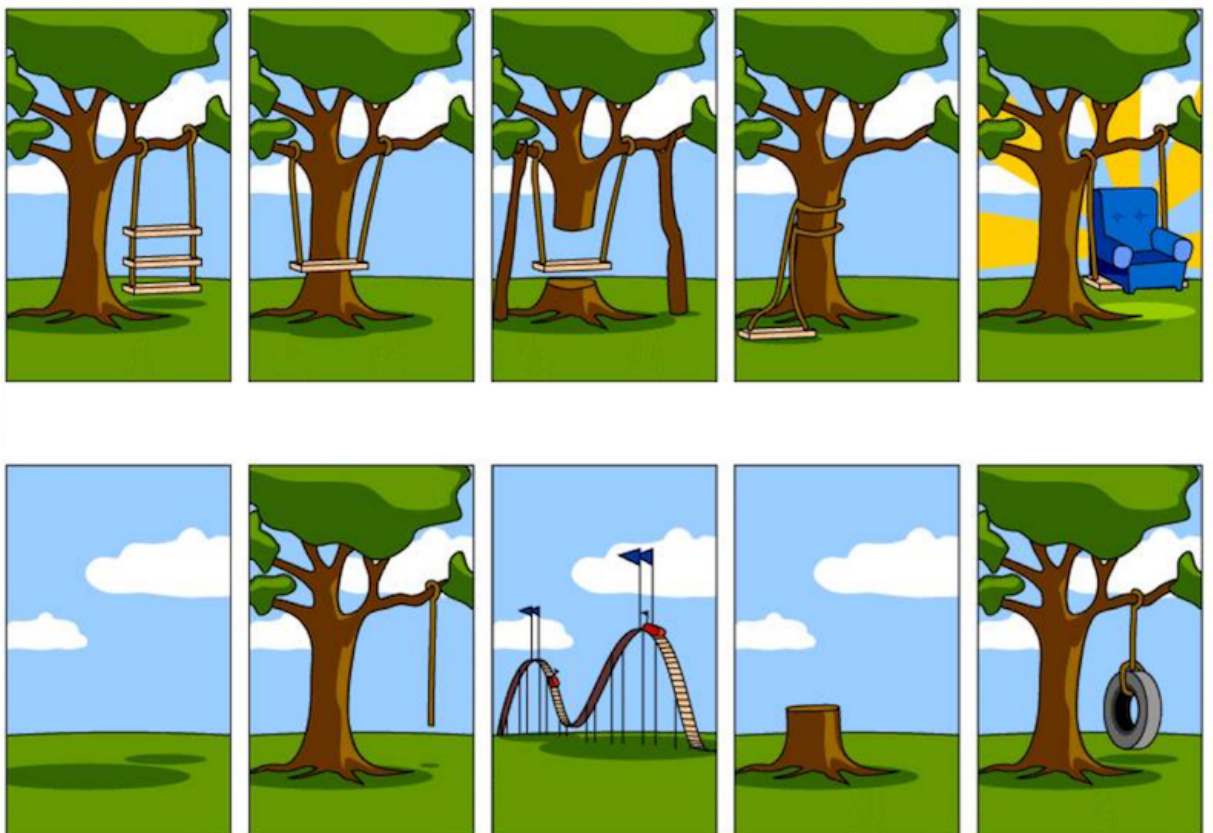
- The code runs and does what it is expected to
- The code is written using the concepts, paradigms, and best practices covered in the course
 - 📖 Legibility
 - ⚙️ Modularity
 - ⚡ Optimization

A Classic Software Development Joke



Source: Reddit

Assignment to Design a Swing: Submissions



Marks at LSE

1. Mark and Grade for a Course:

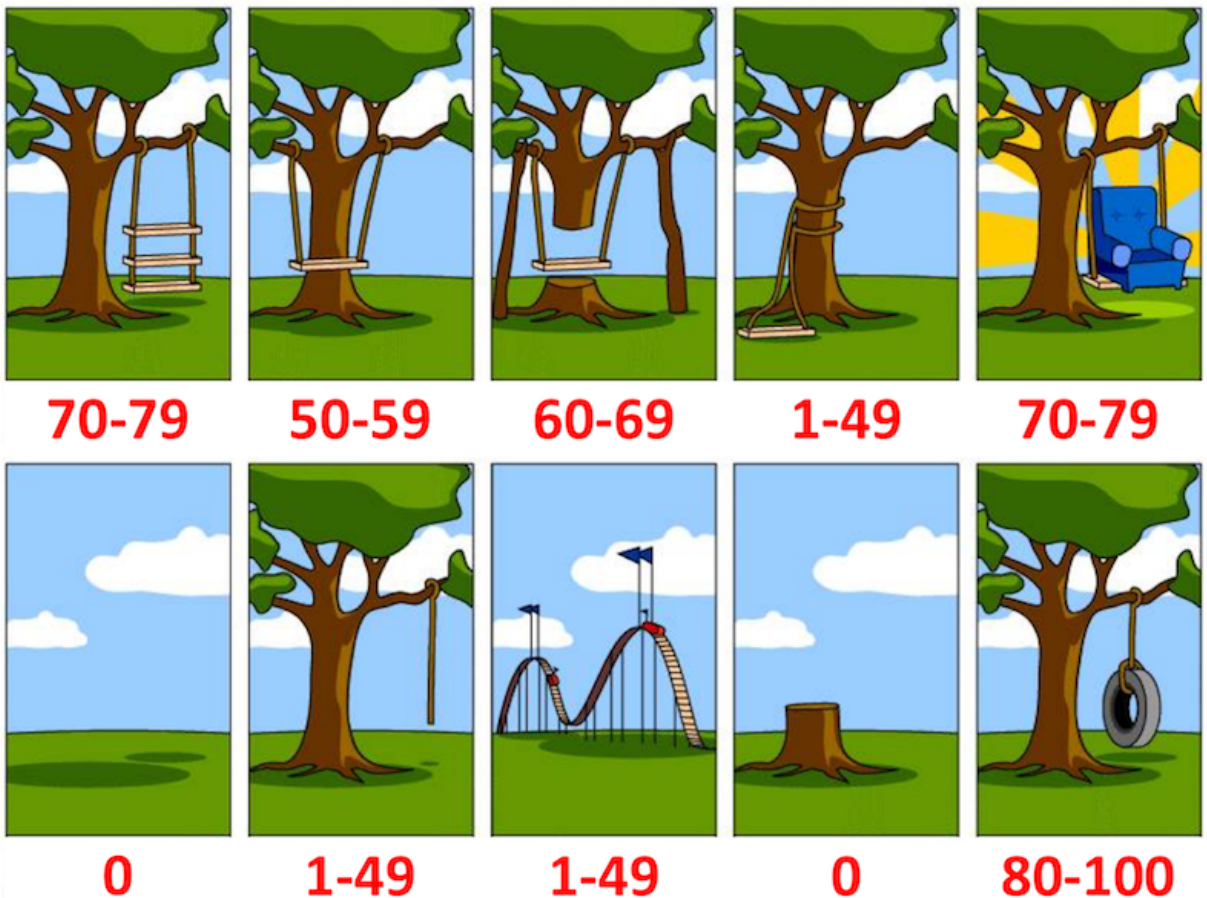
1.1 The examiners for each course will decide a numerical mark for each student using the following scale:

Grade	Mark
Distinction	70 - 100
Merit	60 - 69
Pass	50 - 59
Fail	(x+1) - 49
Bad Fail	0 - x

<https://info.lse.ac.uk/Staff/Divisions/Academic-Registrars-Division/Teaching-Quality-Assurance-and-Review-Office/Assets/Documents/Calendar/SchemeTaughtMasters.pdf>

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Assignment to Design a Swing: Marks



Collaboration and Plagiarism Policy

- Assignments are individual unless we instruct you otherwise
- For individual assignments:
 - You are not allowed to discuss solutions with peers, friends, family, or roommates
 - You are not allowed to show your code or view others' code (including solutions shared by previous students)
 - You are not allowed to ask questions about the assignments on Q&A sites such as Stack Overflow
- You can search for general advice online (e.g. on Stack Overflow) but always give credit in comments if you borrow code
- You can use forum "Clarifying Questions about Assignments" on **Moodle** for clarifying questions about assignments

Anonymity Regarding Marking

- You will use your GitHub username to submit assignments
- GitHub account and activity are checked by employers so good to have an active account
- We use detailed marking criteria to evaluate your work and aim to be objective
- However, if you are worried about anonymity, choose/change your username accordingly
- See [here \(https://help.github.com/en/articles/changing-your-github-username\)](https://help.github.com/en/articles/changing-your-github-username) for issues associated with changing GitHub username

Course Outline

Week	Language	Topic
1	–	What is Computation?
2	Python	Data Types
3	Python	Control Flow
4	Python	Functions
5	Python	Classes
6	–	–
7	Python	Testing and Debugging
8	R	Other Programming Languages
9	Python, R	Algorithms and Order of Growth
10	Python, R	Searching and Sorting Algorithms
11	Python, R	Tree and Graph Algorithms