MY470 Computer Programming

Welcome to Computer Programming

Week 1 Admin

Overview

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

Why Do Social Scientists Need Computer Programming?

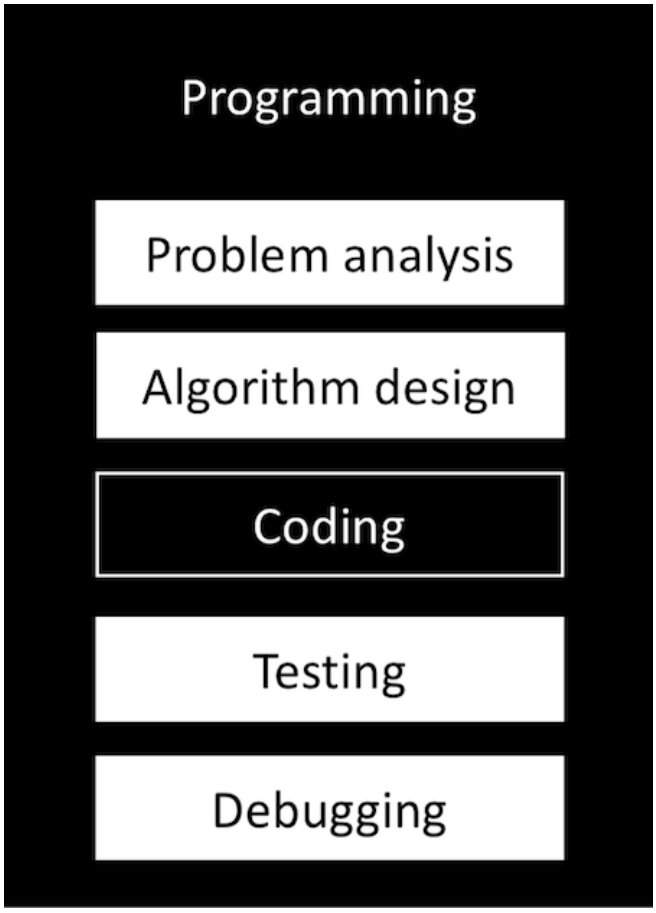
Why Do Social Scientists Need Computer Programming?

- 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. Patrick Gildersleve, `p.gildersleve@lse.ac.uk`
- Wendy Wang (GTA)

Course administrator

- Serena Ngai, `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
  - **Visual Studio Code** 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

- Guttag, 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

- MY470 additional resources (https://github.com/lse-my470/lectures/blob/master/resources.md)

Course Procedure

1. Read required readings
2. Attend lecture
3. Attend class
4. 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 feedback)
- (Post and answer clarifying questions about assignments on Moodle)
- (E-mail Milena if you have an urgent problem, e.g. cannot access GitHub)
- (E-mail methodology.admin@lse.ac.uk (mailto:methodology.admin@lse.ac.uk) if you require a deadline extension)
- (Use additional resources to practice more)

Course Meetings

- Ten 2-hour lectures
  - Mondays 13:00–15:00 in CKK.2.04
- Ten 1.5-hour seminars
  - Tuesdays 10:00–11:30 in CKK.2.13
  - Tuesdays 11:30–13:00 in CKK.2.13
  - Tuesdays 15:00–16:30 in 32L.LG.18
  - Tuesdays 16:30–18:00 in 32L.LG.18
- No lecture/seminar in Week 6
- Office hours
  - Milena: Fridays 14:30–16:30, CON.2.11 or Zoom
  - Patrick: Tuesdays 12:45–14:45, CON.1.07G or Zoom

Assessment

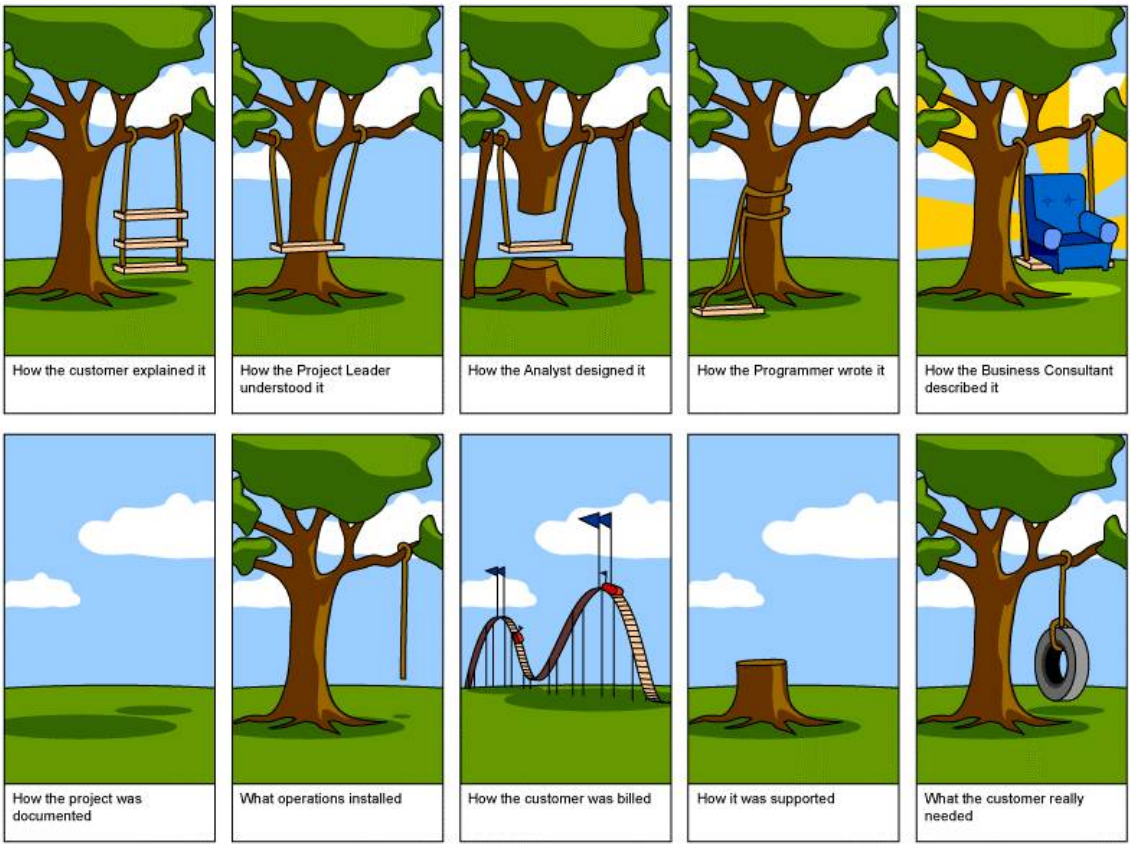
- In-class assessment (50%)
  - 5 problem sets (due at 12:00 on Mondays of weeks 4, 5, 6, 8, and 10)
  - We will try to give you grades and comments by Friday

- 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 Milena
  - Due at 12:00 noon on Monday, January 15, 2024

Assessment Criteria

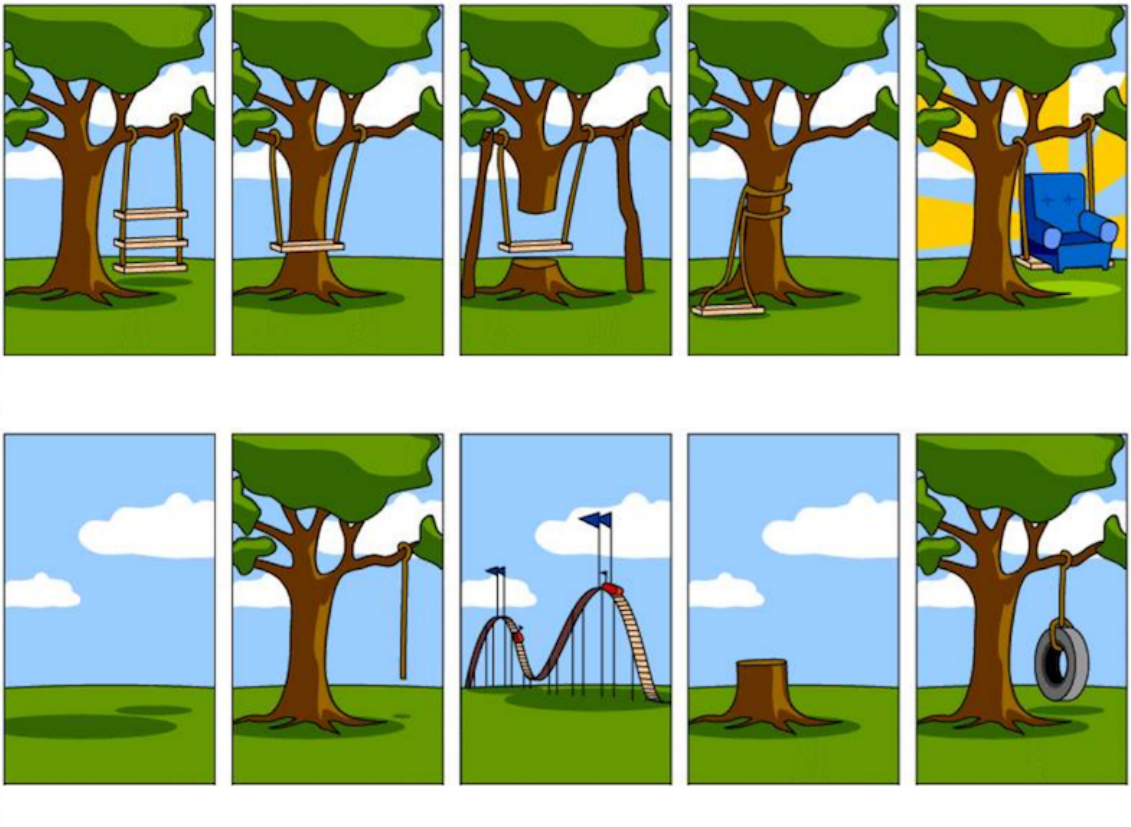
- The code runs and does what it is expected to
- The code is written using the concepts, paradigms, and best practices covered in the course
  - 📖 Legibility
  - ⚙️ Modularity
  - ⚡ Optimization

A Classic Software Development Joke



Source: Reddit

Assignment to Design a Swing: Submissions



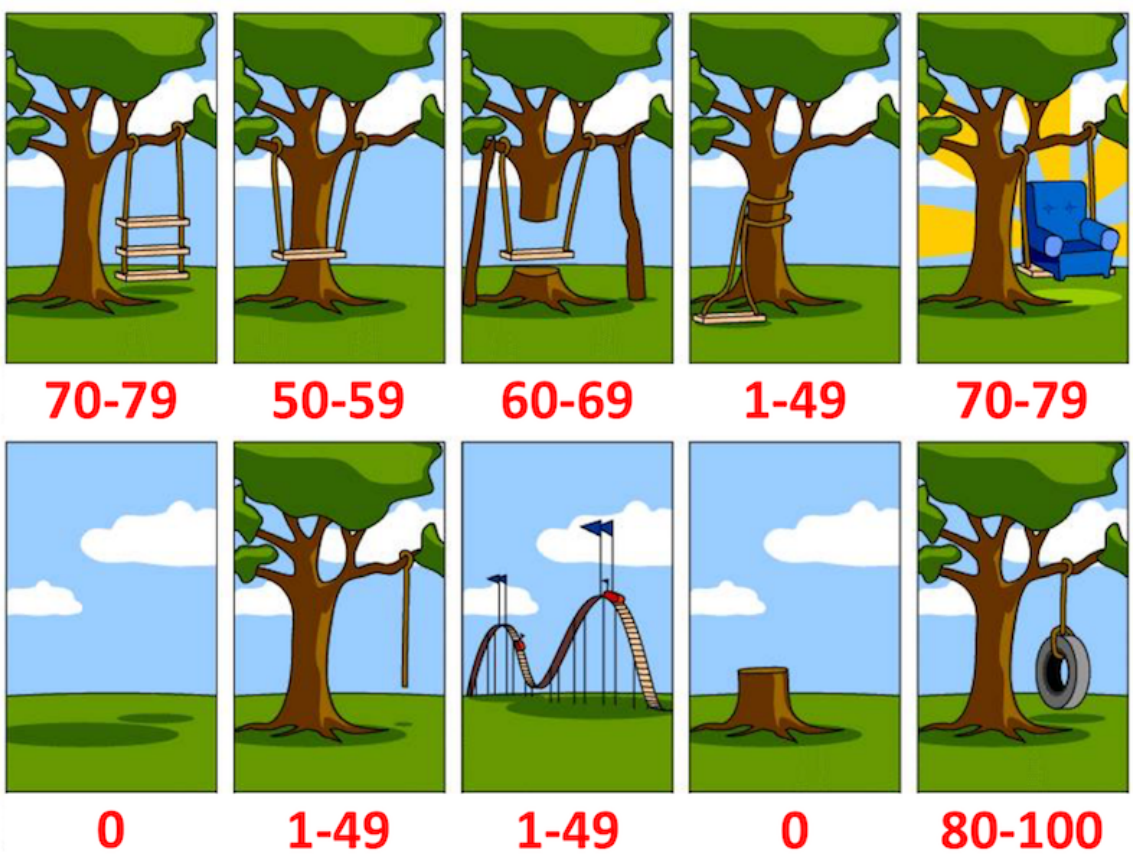
Marks at LSE

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

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 are not allowed to use AI tools such as ChatGPT and Copilot
- 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 the forum "Clarifying Questions about Assignments" on **Moodle** to ask questions about the assignment instructions (no code allowed, however)

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) 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