Introduction

Amir Masoumzadeh

CSI 333 – System Fundamentals

UNIVERSITY
AT ALBANY
State University of New York

Aug. 22, 2023

Welcome to System Fundamentals!

UNIVERSITY AT ALBANY
State University of New York

Prof. Amir Masoumzadeh (amasoumzadeh@albany.edu)

- Office Hours: Tuesday/Thursday 4:30pm–5:30pm (UAB 422), or by appointment

TA Ferhat Demirkiran (fdemirkiran@albany.edu)

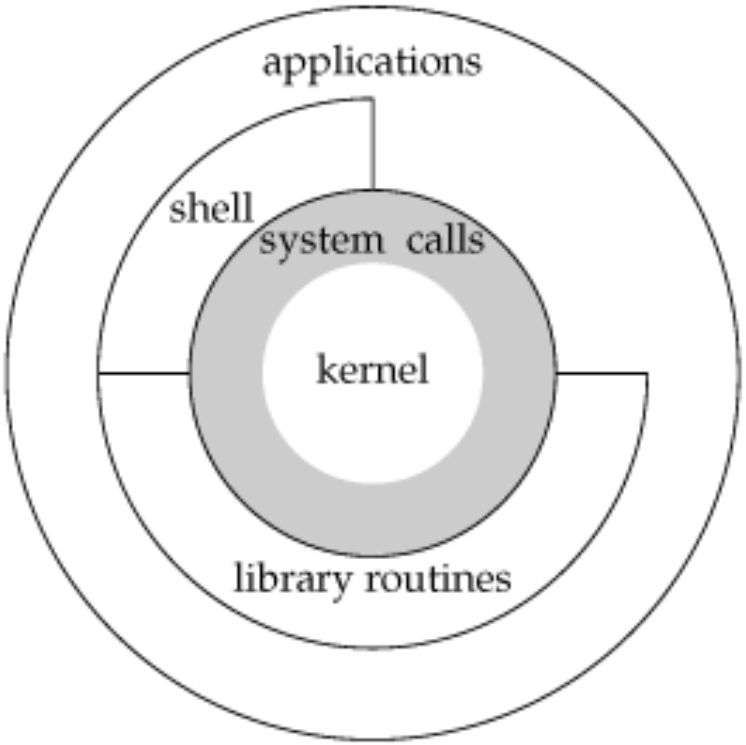
- Office Hours: Monday/Wednesday 2pm–3pm (TBA), or by appointment

Systems software

- Primarily provide services to other software
- Often developed for performance
- Typically tied to underlying hardware
- Examples:
  - Operating systems
  - Web browsers
  - Game engines
  - Industrial control systems

Operating systems

- Written for specific (class of) hardware
- Provides services to applications such as sharing hardware resources
- Linux architecture (simplified):



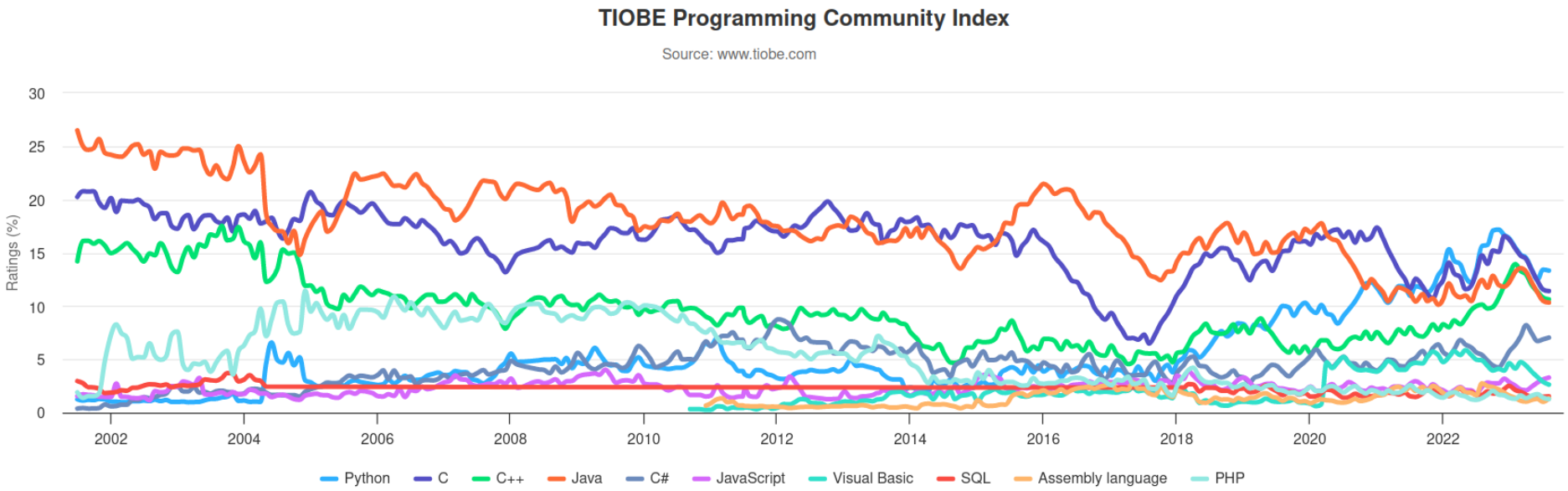
Why learn low-level programming?

UNIVERSITY AT ALBANY
State University of New York

- Someone needs to build system software!
  - Need to provide an interface for a hardware your company develops
  - Need the best performance possible (lowest overhead) and willing to forgo niceties of higher-level languages (like Java)
  - Need to develop for a resource-constrained environment
  - To learn how the computer really works without the fancy layers and abstractions

Why C?

- Still very popular



*TIOBE ratings are based on the number of skilled engineers world-wide, courses and third party vendors

Learning modules

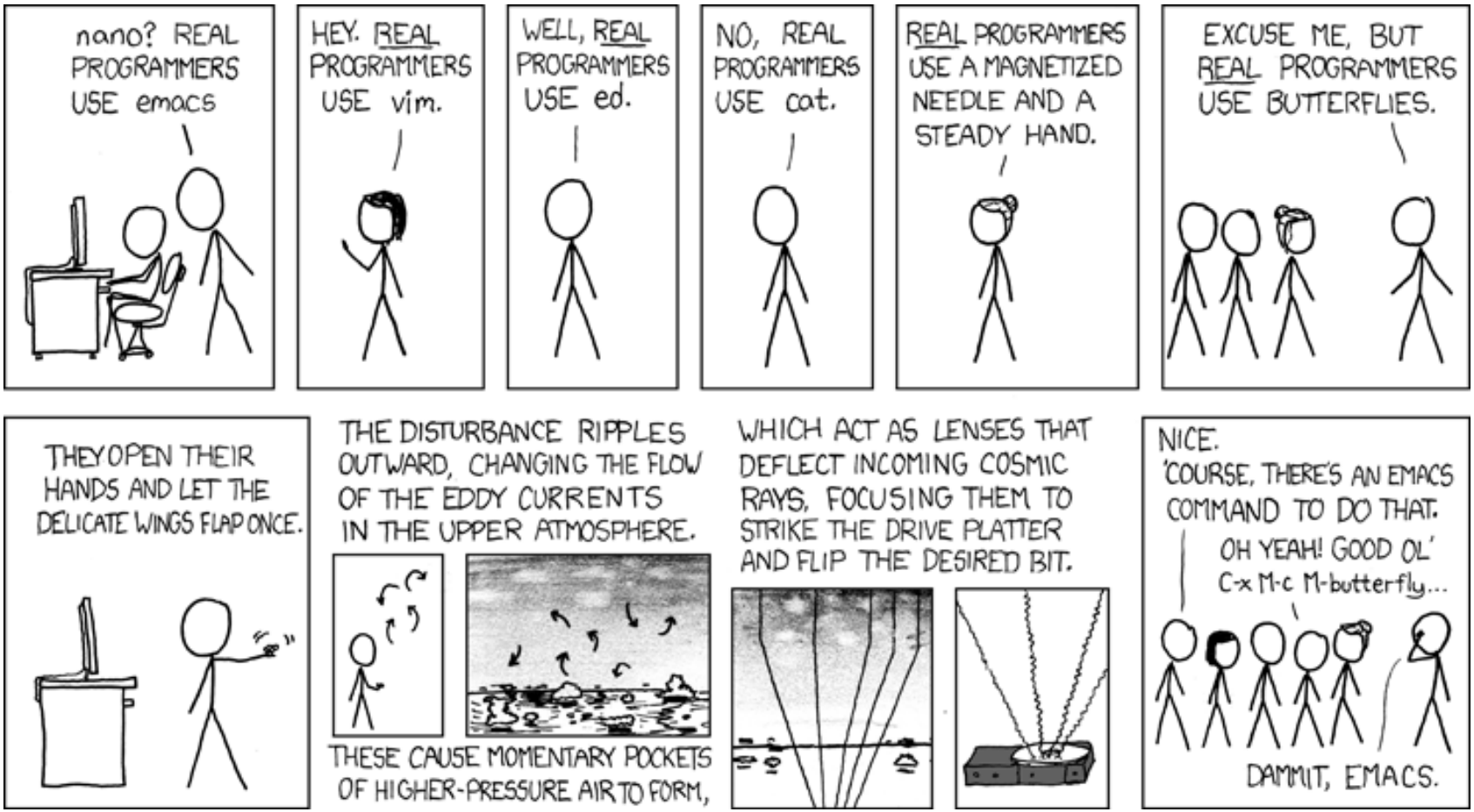
1. Shell/Git
2. C programming
3. POSIX/Linux programming
4. Misc. topics

Set up your environment: shell

- You need a POSIX shell for this class
  - Your primary OS is Linux? Awesome!
  - Mac OS? Should work too
  - Windows? Windows Subsystem for Linux
  - Virtual machine (VirtualBox + Install your favorite Linux distro)
- Will be your first lab

Set up your environment: editor

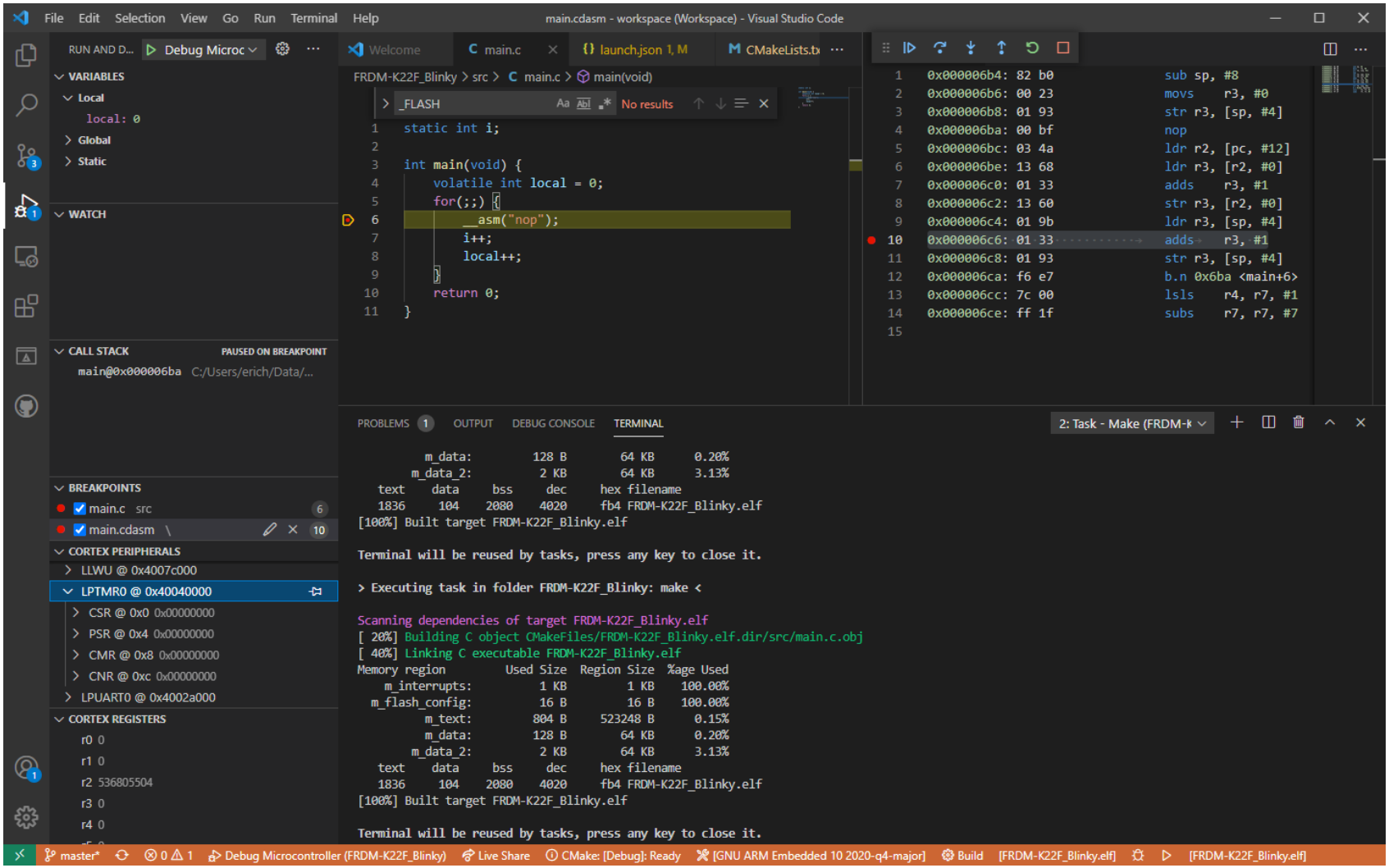
- Choose your favorite editor
  - Popular editors in Linux: Emacs, Vim, nano, ...



credit: xkcd.com

Set up your environment: IDE

- Use Visual Studio Code for debugging larger C program



Set up your environment: git

UNIVERSITY AT ALBANY
State University of New York

- Git and GitHub
  - Lecture slides, assignments, questions, feedback, ...
  - You'll practice it in the first lab
  - We need to know your github username. Let's take care of it!
    - Sign up for GitHub if you don't have an account
    - Go to course Blackboard page, navigate to Course Materials
    - Complete GitHub Info

Labs

- Schedule: Labs meet on Friday and Monday
  - Friday is first lab to cover a particular assignment. You work on first lab this Friday.
- Short self-paced exercises
- One lab assignment each week
- Should be able to finish them when attending your lab session (in most cases)

Projects

- (Mini-)Project are more significant programming assignments than labs
- About 4 of them during the semester
- You will have about 2 weeks to complete each

Submissions/Grades

- You submit your work on GitHub
  - We collect them from there at the deadline
  - More on that in the next session
- Grades will be recorded in Brightspace
  - You have 5 business days to create an issue in your assignment repository on Github if there is any issue with your grade
  - We will not re-grade after this 5-day period

Exams

- 2 exams
  - Midterm: Module 1 & 2 (Shell, Git, C programming)
  - Final: Module 3 (POSIX/Linux programming)

Policy highlights

- No tolerance for academic dishonesty: cheating, plagiarism, ...
- No late submission (generally)
  - Passed 11:59pm on the day of the deadline and you will receive no point
  - All sort of software and hardware problems may occur
  - Plan ahead and do not leave it to last minute
- Can ask for one-time late lab submission
  - If granted, you can submit 3 days late
- Up to 10% of in-class exercises will be dropped
- 5-day period to inform us about any grading issue

How to succeed in this class

- Read ahead and exercise!
  - Assigned readings are short
  - Read them before coming to class
  - Read the freaking manual!
  - OK to research online about best practices. But refer to manuals again to fully understand what you find based on your research

- Participate in class activities
  - Bring your laptop, or team up with a friend who can bring their laptop
- Get help from us!
  - Office hours, GitHub, email, ...