CSE 220: Systems Programming

Introduction

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Welcome to CSE 220

My name is Ethan Blanton.

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Office Hours: Monday 14:00-15:00
            Wednesday 10:00-11:00
            or by appointment

The syllabus is available on the course web page, at
https://www.cse.buffalo.edu/~eblanton/course/cse220/.

So are these — and all other — slides!
Systems Programming

This course is concerned with systems programming.

You will learn:

- More about the structure and properties of computer systems
- How architecture affects programs
- How to effectively write efficient and correct programs
- The C programming language and POSIX API
Programming in Context

Programming doesn’t occur in a vacuum.

Computer systems have greatly influenced our:

- Programming languages
- Development tools
- Preferred algorithms

This course will help you understand that context.

This may be one of the hardest classes you take at UB.
Expectations

For this course, I expect that you:

- Will be respectful to me, TAs, classmates
- Attend every lecture
- Attend every lab
- Adhere strictly to the academic integrity policy
- Will seek assistance early if necessary
- Meet prereqs; among other things:
  - Have some experience programming
  - Understand linked lists and object references

Most of all, behave as adults and strive to maximize your and your classmates’ learning experience in this course.
Attendance

Lecture attendance is mandatory.
- I will not repeat lectures.
- Recitations will not repeat lectures.
- You are expected to catch up on your own if you skip.

Lab attendance is mandatory.
- Lab attendance will be tracked.
- You will practice what you learn in class.
- You will be frequently tested on your understanding.
- Labs plus lab exams are 30% of your grade.
Ways to Fail this Class

- Miss lectures or labs
- Start assignments at the last minute
- Not visiting office hours
- Not asking questions on Piazza
- Don’t commit to git
- Don’t submit to Autograder early
- Cheat
Academic Integrity

I take academic integrity very seriously.

Violators will
  ■ fail this course, and
  ■ be referred upward for further sanctions.

I and the TAs will watch for violations.

Automated tools will be used to identify shared code.

Online resources (e.g., Stack Overflow, GitHub) will be monitored for copying.
Academic Integrity (continued)

You **may**:

- Seek help from instructors
- Discuss *concepts* with classmates
- Use anything from the text with clear attribution

You **MAY NOT**:

- Share code with classmates
- Use code from *anywhere else*
- Discuss *implementation* with classmates
- Use *for-hire* code or answers
Academic Integrity Policy

First offense:
- Failure in this course
- Offense recorded at the University level

Second and subsequent offenses (in any course):
- Permanent transcript notation
- Possible recommendation for expulsion

Sharing isn’t caring:
- If someone else submits your code, you will also be penalized
Academic Integrity — Good Practices

To avoid AI questions, please:

- **Be careful** with permissions on code on GitHub, Bitbucket, shared UB filesystems, *etc.*
- **Don’t even look** at each others’ code!
- **Cite everything**
- Review the department and University policies

*If in doubt, ask!*
Questions

Any questions so far?
Having a Pleasant Semester

I intend for this course to be fun and rewarding.

You’ll get out of it what you put in; no more, no less.

I do not take well to grade negotiation.

If you want a better grade, do better work.

If you’re willing to put in the time, I’m willing to help.
Other Policies

Entire submissions or exams will be re-graded only for grading errors.

No incompletes will be given.

No makeup exams will be given.

No grades will be changed for any reason other than grading error.
Course Materials and Activities I

Materials to learn from:

- Lectures
- The secondary text *The C Programming Language (Second Edition)* by Kernighan and Ritchie [3].
- Assigned (required) readings
- Suggested (optional) readings
Activities to learn from:

- Projects
- Lab activities
- Homeworks (assigned but not graded)
- Lab Exams
- Exams
Readings

Most lectures will have both **required** and **optional** readings.

Readings will appear at the end of the slides.

You must read the required readings **even if I do not mention them in class**.

You may wish to read the optional readings:

- to expand your understanding of related topics
- to help you understand the required material
Our primary forum for assistance will be Piazza.

You should have been added to our course Piazza.

Please consult existing postings before asking a question!

- However, if you’re not sure your question is answered, ask!
- If you wish to include code, solutions, etc., send a private message to the instructors!

I will post important course announcements and materials to Piazza.
Platform

We will be learning about Linux on x86-64.

This is a very common and easily obtainable platform.

To help you, I have prepared a virtual machine image.

You should use this image if possible. You are not required to use it, but your submissions are required to work on it!
Programming Projects

A significant portion of your course grade will be projects.

- These are individual projects.
- Projects will be written in C.

Projects must run on the course VM image. You should download and configure this image in a VM.
GitHub Classroom

We will use GitHub Classroom
  ■ for assignment distribution
  ■ for providing assistance

You must have (or create!) a GitHub account.

You are expected to use git and GitHub for development.

E.g., TAs won’t look at code unless it’s on GitHub!

Info:
  ■ Git help: [Git book](#), [tutorial](#), [Google](#)
Project Assistance

Your TAs will be your primary source of help for projects.

To get the most out of your TAs, do:
- try the obvious things first,
- create minimal examples to show problems, and
- consult the documentation.

To avoid wasting TA time and failing to get help, don’t:
- ask for help before you’ve tried to understand the problem
- start at the last minute.
Programming Tools

I will talk a lot about tools this semester.

You will be expected to use a few tools for this course:

- The C compiler
- make
- The gdb symbolic debugger
- A programmer’s editor
- Others …

We will help you learn these tools.
Editors

I don’t care what editor you use, but it must be a programmer’s editor, and be capable of:

- Syntax highlighting
- Automatic indentation
- Brace/parenthesis/etc.matching
- Extensibility

Neither I nor the TAs will help you if you are not using an appropriate environment when you seek help!

My personal recommendation is Emacs. Emacs is installed and configured on the VM image.
Project Submission

We will submit using Autograder.

Submission rules:

- Submitted w/in 24 hours of the deadline: -20%
  - Doesn’t count Saturday or Sunday
  - Doesn’t count University holidays
- Projects submitted after 24 hours will not be accepted

Example 1: Project is due Friday at 11:59 PM, turned in Monday at 3 PM — 20% penalty.

Example 2: Project is due Monday at 11:59 PM, turned in Wednesday at 12:15 AM — not accepted.
Grading

Passing this course requires **three extra conditions**:
- Completion of the AI quiz with perfect score
- Completion of Lab 01 with perfect score
- At least a 60% average on all exams and lab exams

Failure to achieve **any of these three points** will result in failure in the course.

Your course grade will be calculated per the information in the Syllabus.
Today’s Assignments

Immediately:
- Read the Syllabus.
- Join our Piazza instance.

By Beginning of lab this week:
- Create a GitHub account if you don’t already have one.
- Download and install the course VM.

By next Friday:
- Complete the Academic Integrity Quiz and turn it in on Autograder.
- Complete and turn in Programming Assignment 0.
Lab

We have labs this week!
Next Time ...

- An overview of C
- An overview of the POSIX API
- A little bit about data types
References I

Required Readings


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