CS 2080: PROGRAMMING WITH UNIX

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UNIVERSITY OF COLORADO COLORADO SPRINGS (UCCS)

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LECTURE 1: INTRODUCTION TO THE COURSE

- Outline:
  - Overview
  - Description and prerequisites
  - Goals
  - Textbooks
  - Organization
  - About us
  - Project ideation

LECTURE 1: INTRODUCTION TO THE COURSE

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- Already familiar with UNIX or a UNIX-based OS?
- Why UNIX or UNIX-based OSs?
- Why UNIX or UNIX-based programming?

OVERVIEW

- Course number: CS 2080
- Course name: Programming with UNIX
- Number of credit units: 3
- Professor: Dr. Armin Moin, email: amoin@uccs.edu (Please always keep “CS 2080” in your subject line!)

OVERVIEW

- Class schedule: Tuesdays and Thursdays, 9:25 a.m.-12:05 p.m. (June 11 - August 1, 2024)
- Classroom: AEC 103
- Regular office hours: Tuesdays and Thursdays, 8 a.m.-9:15 a.m.
- Office location: ENGR 283
- Web: We will use Canvas (https://canvas.uccs.edu/) as the learning management system. You can also check out the course website at https://faculty.uccs.edu/amoin/teaching/.
- Note that some in-class exercises may not be included in the shared slides.
- Communication: UCCS email!

OVERVIEW

- TA: Michael Conner
- TA's Email: mconner@uccs.edu
- TA's hours: Wednesdays and Fridays, 3-4:30 p.m.
- TA's location:
  - Wednesday: Kraemer Family Library (please email the TA if you can't find him in the library)
  - Friday: Online (Zoom/Teams/Discord; please email the TA if you can't find him)

DESCRIPTION

- CS 2080:
  - An introduction to the UNIX Operating System (OS)
  - With an emphasis on the development of command shell programs
  - Focus on GNU/Linux as a popular, open-source UNIX-based OS

PREREQUISITES

- CS 2080:
  - Prer., CS 1450 (Data Structures and Algorithms) or GDD 2200 with a grade of "C" or better.
  - College of Engineering students only.

COURSE GOALS

1. Understanding the basics of Operating Systems (OS)
2. Learning the UNIX philosophy, some basics of open-source software development, and Free Libre Open-Source Software (FLOSS)
3. Understanding the basics of UNIX and GNU/Linux
4. Getting familiar with Amazon Web Services (AWS), in particular, EC2.
5. Being able to install a GNU/Linux distribution (Ubuntu) in a native way or using virtualization.
6. Being able to connect to a GNU/Linux server via SSH and use it in the terminal and through VNC (remote desktop)
7. Learning the basic shell commands

COURSE GOALS

8. Installing some applications in UNIX/Linux
9. Learning some editors in UNIX/Linux
10. Setting up a programming environment in UNIX/Linux (including Makefiles, compilers, version control systems, etc.)
11. Learning the basics of UNIX/Linux shell scripting
12. Learning some Linux system administration tasks, such as network, security, and web server setup.
13. Getting familiar with containers (with a focus on Docker).

TEXTBOOK

- 1. A. Robbins, Unix in a Nutshell, 4th Edition, O'Reilly, 2005, ISBN: 978-0596100292.
- 2. Richard Blum and Christine Bresnahan, Linux Command Line and Shell Scripting Bible, 4th Edition, John Wiley & Sons, 2020, ISBN: 978-1119700913.

ORGANIZATION

- Assignments:
  - All assignments must be handed in electronically on Canvas before the mentioned deadline. No late submissions will be accepted.
- Plagiarism:
  - Work on the assignments and the exams individually (unless explicitly labeled as a group assignment).
  - If the exam is “open-book / open-Internet,” this will be explicitly mentioned.
  - Plagiarism will result in a grade of zero for the respective assignment or exam and other possible consequences according to the policies of the department and the university.

ORGANIZATION

CS department's policy

- If there is evidence that:
  - You have copied your answer from a student or a website or from an AI tool (without citing it);
  - or that you have allowed another student to copy your code

  (Both students will be held responsible).
- Then:
  - You will receive a grade of zero for the assignment or exam.
  - You will have your name put on the CS department's list of academic violations.

ORGANIZATION

- Using AI tools
  - There exist various interesting AI tools, such as ChatGPT.
  - As a CS student, you should learn and use them.
  - However, please note that:
    - You must always cite them if you use their output anywhere;
    - You are not allowed to use them to solve your assignments, answer your exam questions, or generate your final project reports;
    - In general, anything generated by AI can be considered to have been plagiarized!
- Oral quizzes (rare)

ORGANIZATION

- Semester Project:
  - Must be done in a team
  - Propose your topics and teams (in principle, three people)
  - Must involve some UNIX/Linux programming or any tasks relevant to this course.
  - Please talk to me ASAP so that I can help you choose a suitable topic and a proper scope.
  - Please email me your proposals ASAP (Your first assignment will ask you about this. So, please be prepared!).

ORGANIZATION

- Semester Project:
  - A mid-term presentation in the class on the progress
  - A final presentation in the class about the deliverable (including a live demo), your contributions, and the teamwork experience.
  - A final report on the project (one report per individual, not per team)
    - Max. 2 pages PDF
    - Include your name, project description, and team members on the first page.
    - LaTeX (bonus): PDF + source files (e.g., .tex) as one ZIP or TAR archive

ORGANIZATION

- Grading:
  - The final grade will be calculated as follows:
    - Assignments: 25%
    - Mid-term exam: 25%
    - Semester project: 25%
    - Final exam: 25%
  - Bonus (up to 10%) for class participation (class participation ≠ class attendance)
  - Bonus (up to 5%) for regular attendance (< 2 absences)
  - Grades will be “normalized” (separately for each category and for each class section)

ORGANIZATION

- CS Department policy: “Students in 1000 and 2000 level CS courses can have at most four absences, after which they would lose at least one letter grade.”
- Please email me if you have legitimate reasons, such as sickness, and provide extra documentation, such as a doctor’s note.

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- Grading Scale
  - 94% < {A} ≤ 100%; A = superior/excellent;
  - 90% < {A-} ≤ 94%;
  - 87% < {B+} ≤ 90%;
  - 83% < {B} ≤ 87%; B = good/better than average;
  - 80% < {B-} ≤ 83%;
  - 77% < {C+} ≤ 80%;

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- Grading Scale
  - 73% < {C} ≤ 77%; C = competent/average;
  - 70% < {C-} ≤ 73%;
  - 67% < {D+} ≤ 70%;
  - 63% < {D} ≤ 67%;
  - 60% ≤ {D-} ≤ 63%; D- = minimum passing;
  - 0% ≤ {F} < 60%; F = failing;

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- Students with disabilities:
  - You are encouraged to contact Disability Services (dservice@uccs.edu).
- Military-affiliated students:
  - You are encouraged to contact the Office of Veteran and Military Student Affairs (military@uccs.edu).
- Religious accommodation: Email me ASAP. I will work with you and the Office of University Counsel (contact person: Mandy Hull, ahull3@uccs.edu, 719-255-3820).
- Mental Health and Wellbeing: 719-255-4444, TELUS Health App

ORGANIZATION

- Great resources for all:
  - The Office of Institutional Equity: https://equity.uccs.edu
  - The Office of the Dean of Students: https://dos.uccs.edu
  - The Recreation and Wellness Center: https://recwellness.uccs.edu
  - The Excel Centers: https://excel.uccs.edu
  - The Center for Student Research: https://studentresearch.uccs.edu
  - The Multicultural Office for Student Access, Inclusiveness, and Community (MOSAIC) and the Lesbian, Gay, Bisexual, Trans, Queer (LGBTQ+) Resource Center: https://lgbtresourcecenter.uccs.edu
  - The College of Engineering and Applied Science (EAS) Career and Industry Outreach Program: https://eas.uccs.edu/career-office

ABOUT US

- Professor
- TA
- Students

PROJECT IDEATION

- Search for some existing projects on Google or GitHub using relevant keywords
- Get inspired
- You may start from scratch or improve an existing project
- Pay attention to the licenses

GROUP EXERCISE

- Find two peers whom you don’t know yet!
- Talk about your mutual interests, for example, music, sports, technology, entertainment, etc.
- We will soon ask you to find two other peers whom you don’t know or have not yet talked to them…

GROUP EXERCISE

- Now, find two other peers whom you don't know yet!
- Talk about your mutual interests.
- Try to think about potential topics and technologies for your semester projects, such as:
  - Setting up a mailing list service on Linux using mailman, setting up a Content Management System (CMS), such as WordPress or Joomla, with a web server on Linux using the Apache web server, or setting up a J2EE portal on Linux using Apache Tomcat or a "LAMP" (Linux, Apache, MySQL, and PHP/Python/Perl) enterprise solution.
  - Programming with/on Unix-based systems, for example:
    - Linux Bash Shell scripting
    - Developing and running a C/C++, Python, PHP, Perl, or Java program (J2SE/J2EE) on a Linux machine
  - Be mindful of security (e.g., memory safety): https://www.whitehouse.gov/wp-content/uploads/2024/02/Final-ONCD-Technical-Report.pdf

FINAL WORD

- Please read the syllabus!
- Be present and (pro)active in class. Ask questions.
- Do the assignments and submit them on time (and not at the last minute)!
- Go to the TA hours and ask questions.
- Be in touch with your teammates.
- Read the syllabus!
- Have fun!

QUESTIONS?

See you!