COMP1521 25T2

Week 10 Lecture 2: The Final Lecture

Review and Exam

Adapted from Angela Finlayson, Andrew Taylor and John Shepherd's slides

Announcements

- Assignment 2: Due Friday 16:00
- Week 9 Test: Due Thursday 21:00:00 (tomorrow!)
- Week 10 lab:
  - Practice exam in CSE labs worth 0 marks
  - Regular lab due Monday next week 12:00
- Week 10 Test: Due Thursday 21:00 next week

Assignment tips

- We check for memory leaks during marking
  - Ensure you free and malloced memory.
- Don’t forget to close files

Help Sessions and Revision Sessions

- Extra Help Sessions online

- Revision Session: Date/Time TBA
  - Focus on Files
    - Demonstration of some examples
  - Threads, Processes
  - You can also get help with bitwise operators revision questions from the previous revision session.

Course Goal

- Transform you from software programmer into a systems programmer; understanding how a computer fundamentally works

- You can now
  - Describe how programs work at a low level, with a deep understanding of runtime behaviour
  - Better reason about and debug your programs
    - Also security -- trying to understand how things could go wrong

Course themes

Goal: you are able to understand execution of software in detail

- Software components of modern computer systems
- How C programs execute (at the machine level)
- How to write (MIPS) assembly language
- How computers represent data including integers & floats & emoji 😀 🎈 💻
- How operating systems are structured
- Unix/Linux system-level programming particularly file operations
- Introduction to processes, thread and concurrency

Syllabus

- The basic components of a (MIPS) CPU
- How to write programs in (MIPS) assembler
  - How *C* data structures are represented at machine level
  - How *C* programming language constructs are implemented as (MIPS) assembler
- Bit-level operations, Representation of integers
- Representation of reals as floating point (IEEE754)
- Representation of characters as Unicode (UTF-8)
- Systems programming, including: file operations processes
- An introduction to threads/concurrency (pthreads)
- An introduction to virtual memory

Questions we can now (hopefully) answer

- What's in a compiled file?
- How does your CPU run a compiled file? (and what if we write those instructions ourselves 😳 ??)
- How are variables represented on our computer?
- What magic are the functions in stdio.h doing?
- Why ❓ and how 🤯 do emojis 🥺 even 😳 exist 😍 ??
- How computers multitask

Assessment

- 15% labs
- 10% weekly tests
- 15% assignment 1 (flood)
- 15% assignment 2 (titanic)
- 45% final exam

To pass, you **must**:

- score 50/100 overall
- score 18/45 (40%) on the final exam component

(For example, 55/100 overall, 17/45 on final exam would result in 55 UF not 55 PS)

Pass Rate

- We manually inspect the work of students just below the pass threshold
    - If we see many students who’ve sufficiently shown competency with basic course material but not passing, the exam mark or other components may be scaled up

- COMP1521 is a challenging course, but pass rate is around the same as the average for level 1 UNSW courses

Lab Marking

- Labs in weeks 1-5, 7-10
- Each week's lab (regular + challenges) is worth 2 marks
  - There are 9 labs, which means there are 18 marks.
  - If you receive more than 15 marks, your mark will be capped at 15.
- These 2 marks are allocated such that:
  - 1.6 marks are split evenly between each of the regular lab exercises.
  - 0.4 marks are split evenly between each of the challenges.
- This means that if you scored full marks on every regular lab exercise this term, you could score a maximum of
  - 9 * 1.6 = 14.4 marks - very close to 15!
- Most students usually get 12+/15

Weekly Test

- Max test mark each week:
  - 1.7 marks
- Best 6 of 8 marks summed and capped to give mark out of 10
- Most people usually get 7+/10

Exam Details

COMP1521
Date : Mon 25th August (Tentative)
Times: 09:45-13:00, 13:25-16:40 (Tentative) with corralling
Sessions : 2
Duration : 3 hours, 10 minutes reading time

- Check your student ID cards and get a new one if it is lost or expired.
  - a passport or an Australian driver's licence are also acceptable forms of ID, must not be digital.

The Final Exam: When and Where

Invigilated and held in CSE labs

Morning and afternoon sessions available

- You have been asked to indicate a preference
- We tried to allocate you to your preferred session where possible
- If you have a clash, the CSE exams team has already accounted for this
- You have received an email confirming your final allocation

Exam Seating

- Your allocation information will be available here: https://cgi.cse.unsw.edu.au/~exam/25T2/seating/register.cgi/allocations/

- The exact time and location of your exam should be available soon.
  - Please look out for email confirmation
  - Please make careful note of the information,
  - Arriving at the incorrect time or location may result in you being unable to sit the exam.
  - If there is any issue with your allocation please contact <cse.exams@unsw.edu.au> ASAP.

The Final Exam: When and Where

Afternoon session starts before morning session finishes

- This is so that we can gather and isolate afternoon students to ensure they cannot communicate with morning students

- Morning session attendees may not leave early
- Afternoon session attendees must not be late

The Final Exam: The rules

- UNSW on-campus exam rules apply
  - see https://www.student.unsw.edu.au/exam/rules
- You must:
  - **Bring your student card**
    if student card lost bring hard copy of government photo ID
  - Have your phone, other electronic devices and watches switched off and in your bag
  - Have a completely clear water bottle if you choose to bring one
  - Not bring your own keyboard/mouse or other hardware
- Deliberate violation of exam conditions will be treated as serious misconduct, and may be referred to the student conduct and integrity unit (SCIU).

The Final Exam: Exam Clashes

- UNSW policy is that you may be required to take two exams in one day.
- Exams Unit generally don’t consider all-day exams a clash and special consideration is not generally offered.
- All known clashes have been allocated to a non-clashing session by the CSE Exams team.

The Final Exam: Special Consideration

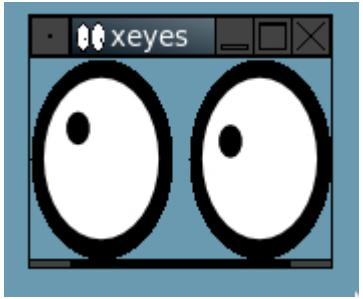
- This exam is covered by UNSW's Fit-to-Sit policy.
- By starting the exam, you are saying "**I am well enough to finish the exam.**"
- If you are unwell before the exam: see a doctor, apply for Special Consideration, and don't attend.
- If you become unwell during the exam: **talk to an exam supervisor ASAP**

The Final Exam: The exam environment

- Closed book exam - no materials allowed
- Restricted exam environment. **Not your** cse account.
- No access to
  - dcc-help or dcc-sidekick commands
  - Internet
  - Course website
  - Your own files
    - This means no personal editor configuration files

The Final Exam: The exam environment

- You will have access to
  - MIPS documentation and C and Linux cheatsheet (the same docs as in weekly tests)
  - Command line man
  - gedit, vim, emacs, nano, VSCode all provided as editors
- VSCode comes with
  - Xavier's mipsy extension
  - clangd, clang-format, syntax highlighters
- Standard CSE lab machine commands available
  - Including dcc, mipsy, man, python3, xeyes
- mipsy_web provided to use in-browser



The Final Exam: The Format

- 10 minutes reading time, 3 hours working time
- 10 questions … *not* of equal difficulty, not *necessarily* worth equal marks
    - Generally, easier questions are towards the start of the exam, harder questions towards the end.
    - But difficulty is subjective, of course.

The Final Exam: The Format

- Each question answered in a separate file.
- Most questions will involve writing programs
  - Some questions may ask you to write **C** (a .c file)
  - Some questions may ask you to write **MIPS** (a .s file)
  - Other languages are **not** permitted
- Answers will be submitted using a command (similar to give)
- Questions will include examples.
- You may, or may not, be given starter code or other files.
  - If you are not given starter code, you must create your own files.
  - The file name will be specified in the question.

The Final Exam: The Format

- Autotests will be available for most/all coding questions.
  - **Passing autotests does not guarantee any marks** - do your own testing.
    - It is **not** sufficient to just match supplied examples.
  - Autotests are usually run automatically when you give, but in the last 15 minutes, this is sometimes turned off. You can still run them manually yourself.

The Final Exam: The Format

- Questions may specify additional limitations or restrictions imposed on your programs.
  - You must follow these restrictions or limitations otherwise you will not receive any marks.
  - Questions will be reviewed by a human to ensure you have followed them.

The Final Exam: Marking

- No marks awarded for style or comments.
  - But a human marker may *need* to be able to deduce the behaviour of your program
  - And you should probably be able to read your own code
  - Please use reasonable style, variable names, so that we can give you the mark that you deserve
  - Comments only necessary to tell the marker something
  - Do not include identifying info in comments

The Final Exam: Marking

- Answers will be run through automatic marking software.
  - Please follow the input/output format shown exactly - autotest is a guide to help you achieve this.
  - Please make your program behave as specified.
- Answers that don't pass **all** automarking tests are handmarked, guided by automarking.

The Final Exam: Marking

- Minor errors will only result in a small penalty.
    - Eg. an answer correct except for missing whitespace would receive almost full marks.
- No marks given unless an answer shows substantial progress towards a solution (>33%)
- No marks just for starting a question and writing some generic code.
- Zero marks for submitting starter code.

The Final Exam: Special Conditions

- Any ELS extra time has been handled by the CSE exam team - you should see this on the allocations page
- All students see the same exam question text.
- The text shows the standard exam deadline, any extra time is additional to it.
    - If in doubt, talk to the exam supervisor.
- Email us if you have any concerns regarding ELS conditions.
    - cs1521@cse.unsw.edu.au

Past Papers

- Previous Final Exam papers will be released
    - A section on the forum will be made available if you wish to discuss the contents - however, please keep any spoilers **out** of the title and hidden inside the post, so that other students can try the past paper blind.
- Autotests will be available.
    - Submitting your answers with give won't work.
- Sample answers released later.

Past Papers

- The practice exam from the week 10 lab will not be released outside of the lab
    - So please attend an in person lab today or tomorrow to see the environment.
- 25T2 exam will use a format similar for at least some of the questions.

What should you aim to study for

Focus on

- Areas covered by standard lab exercises
- Areas covered by the weekly tests
- Areas covered by the assignment

The first 7-8 questions on the exam will focus on concepts seen here.

What should you aim to study for

- Concepts seen in challenge exercises
- Topics not covered by labs/tests/assignments
- Complex aspects of creating processes/threads
    - this includes pipes.

These topics may show up in the final 2 questions of the exam.

Note: The last question in the exam is considered to be a challenge exam question. Don’t be stressed or upset if you don’t finish it (or get up to it).

Timeline Provisional Results

- Assignment 2 automarking available by Monday 18th
- You will have most lab and test results back before the exam
  - (for students without extensions)
- This means you should have a reasonable estimate of your course work mark before the exam.
  - (for students without extensions)

Timeline Provisional Results

- **TENTATIVELY** When marking is complete, exam marks will be made available on the course “submissions” page. We’ll make a forum announcement when this occurs.
- **TENTATIVELY** You’ll receive raw marks for each individual question.
- You’ll have an opportunity have your marking reviewed.
    - Reviews are only if there’s an issue with the marking, not because you disagree with the mark you received.
- Final results will appear on myUNSW on release of results day.

Supplementary Exams

- If you miss the original exam due to illness/misadventure, you may be eligible for a supplementary exam; apply for special consideration.
- Students with borderline results are **not** offered supps.
  (… except potential graduands.)
- Similar format to final exam.
- Supp exams will be in 25T3 0 Week in cse labs

What did you like?

One aim of COMP1521 is to give a taste of many topics:

- liked **MIPS, Assembly** and hardware?
  - COMP3222, COMP3211…
- curious about **programming languages**?
  - COMP3131 (compilers), COMP3141 (functional Programming), COMP3161(theoretical), COMP6991 (Rust + concurrency), …

What did you like?

One aim of COMP1521 is to give a taste of many topics:

- liked **operating systems**?
  - COMP3231/3891 (OS and EXT OS), COMP9242 (Advanced OS), …
- liked **concurrency**?
  - COMP3151(theoretical concurrency),
  - COMP3153 (algorithmic verification),
  - COMP6721 (informal methods - program correctness),
  - COMP6991 (Rust)
- liked ***nix shell**?
  - COMP2041

COMP1521 - the bad

- More time to get into interesting things
  - More weeks for more tutorial and lab time with processes and concurrency
  - No time to talk about what underlies file systems
  - No time to talk about caching

- Labs: a decent bit of work, but hopefully you learned a lot
- Assignments: a **lot** of work, but hopefully you learned a lot

COMP1521 - the Good

- Generally comprehensive lab exercises and test questions
- Our amazing tutors!!
- The hardworking students!!!!!

myExperience

- How did we do?
- What worked well?
- What could work better?
- Let us know!
    - myexperience.unsw.edu.au

- Please also give your tutors feedback - myExperience is the best way to give them feedback, and it will more likely than not make their day.

Revision Questions

And that’s a wrap

- **Good luck** 🎉
- We hope you’ve learnt useful things in this course.
- We hope you get the mark you’re aiming for!
- We hope you have enjoyed the course.

- You are nearly there!!! Then you can get a nice break!!!

Reach Out

Content Related Questions:
Forum

Admin related Questions email:
cs1521@cse.unsw.edu.au

Student Support | I Need Help With…

My Feelings and Mental Health
Managing Low Mood, Unusual Feelings & Depression

- **Mental Health Connect** — student.unsw.edu.au/**counselling** Telehealth
- **Mind HUB** — student.unsw.edu.au/**mind-hub** Online Self-Help Resources

In Australia Call Afterhours UNSW Mental Health Support Line — 1300 787 026 5pm-9am

Outside Australia Afterhours 24-hour Medibank Hotline — +61 (2) 8905 0307

Uni and Life Pressures
Stress, Financial, Visas, Accommodation & More

- **Student Support** — student.unsw.edu.au/**advisors**
- **Indigenous Student Support**

Reporting Sexual Assault/Harassment

- **Equity Diversity and Inclusion (EDI)** — edi.unsw.edu.au/**sexual-misconduct**

Educational Adjustments
To Manage my Studies and Disability / Health Condition

- **Equitable Learning Service (ELS)** — student.unsw.edu.au/**els**

Academic and Study Skills

- **Academic Language Skills** — student.unsw.edu.au/**skills**

Special Consideration
Because Life Impacts our Studies and Exams

- Special Consideration — student.unsw.edu.au/**special-consideration**