DPST1092 24T3 — Course Review, Final Exam

https://www.cse.unsw.edu.au/~dp1092/24T3/

Course Goals

At the end of DPST1092, we hope that you ...

- can think like a *systems programmer*,
  with an understanding of the structure of computer systems;
- can describe how computers/programs work at a low-level,
  with a deep understanding of run-time behaviour; and
- are better able to reason about and debug your C programs

Major themes ...

- software components of modern computer systems
- how C programs execute (at the machine level)
- how to write (MIPS) assembly language
- Unix/Linux system-level programming
- how operating systems are structured
- introduction to concurrency, concurrent programming
- brief overview of virtual memory & caching (not on exam)

Course Syllabus and Topics

- 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 in fixed number of bits
- representation of reals in IEEE754 floating point on
- representation of characters as Unicode (UTF-8)
- systems programming, including:
  - file operations
  - processes
- an introduction to threads/concurrency

Assessment

- 15% Labs
- 10% Weekly Programming Tests
- 15% Assignment 1
- 15% Assignment 2
- 45% Final Exam

... above marks may be scaled to ensure an appropriate distribution.

To pass, you must:

- score 50/100 overall
- score 18/45 on final exam

For example ... 55/100 overall, 17/45 on final exam $\Rightarrow$ **55 UF** not 55 PS

Assessment: Labs, Tests, Code Review

- Labs, in weeks 1-6,8-12:
  - max lab mark: 2 marks with challenge exercises
  - max lab mark ~1.6 marks without challenge exercises
  - best 9 labs marks summed and capped to give mark /15.
  - you can get 99% for lab mark without challenge exercises
  - expectation: most people will get 12+/15
- Tests, in weeks 3-11:
  - max test mark 1.7
  - best 6 of 9 test marks summed and capped to give mark /10.
  - expectation: most people will get 7+/10
- Code Review: 1 Mark
- Please check your marks!

The 24T3 Final Exam

- Final exam **Wednesday 20 November 2:30pm-5:40pm**: 3 Hours + 10 mins reading time
  - closed book exam — no materials allowed.
  - but you will have access to online language cheatsheets, documentation & man pages
    same as weekly tests
- **Held in J17 (Oboe(304), Brass(305), Kora(306), Sitar(307))**
- You will be assigned to a room closer to the date
  - bring your student card (other photo-id if student card lost)
  - phone, smart watch, other electronic devices switched off in your bag
  - you may bring clear water bottle and pen/pens
  - you will need to fill in a name slip and you can do rough working on a piece of paper we will give you

Exam Format

- 10 questions ... *not* of equal difficulty, *not necessarily* worth equal marks.
- Each question answered in a separate file.
- Some questions may involve writing programs ...
  - some questions may ask you to write C;
  - some questions may ask you to write MIPS;
  - other languages *not* permitted (e.g., Python, C++, Java, Rust, ...)
- Answers will be submitted with *give*.

Exam Format — Programming Questions

For questions that require you to write C or MIPS ...

- Questions will usually include examples.
- You may, or may not, be given starting code, test data, or other files.
- Autotests may be available on submission for some questions.
  Passing autotests does not guarantee any marks; do your own testing.
  There may be no submission tests for some questions.
- It is *not* sufficient to match any supplied examples.
- Questions may specify additional restrictions or limitations imposed on your program.

Programming Questions — Assessment and Marking

- Answers will be run through automatic marking software.
  - Please follow the input/output format shown exactly.
  - Please make your program behave exactly as specified.
- Answers that don't pass all automatic marking tests are hand marked, guided by automarking.
  - *no* marks awarded for style or comments ...
    but a human marker will be reading your program.
    and you need to read your program
    so use reasoanle style, variable names, ...
  - The proportion of autotests you pass will not dictate the mark you get
  - comments only necessary to tell the marker something.
  - do not include your name in comments
- Minor errors will result in only a small penalty.
  - e.g., an answer correct except for a missing semi-colon would receive almost full marks.
- No marks will given unless an answer has a substantial part of a solution (> 33%).
- No marks just for starting a question and writing some code.

Special Consideration (“Fit-to-Sit”)

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.
- If you become unwell *during* the exam:
  talk to an exam supervisor ASAP .

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What should you study for?

- Understand bit manipulation
  - bit shifts
  - logic operators &, |, ^
- FILES
  - open and read files
  - understand fread, fgetc, fwrite, fputc
  - stat
- Directories
  - opening directories
- UTF-8 How to extract symbols
- Floating point
- Threads and processes how to create them and how to use them
- MIPS - VERY IMPORTANT!!!

Supplementary Assessment

- If you miss the original exam due to illness/misadventure,
  you may be eligible for a supplementary exam; apply for special consideration.
  Schools and individual courses cannot offer supps.
- Similar format to final exam.
- You must stay in the country so you can do your supplementary exam on campus.

What did you like?

One aim of DPST1092 is to give a taste of many topics:

- liked MIPS, Assembly?
  $\Rightarrow$ COMP3222, COMP3211 ...
- curious about programming languages?
  $\Rightarrow$ COMP3131, COMP3141, COMP3161, COMP6991, ...
- liked operating systems?
  $\Rightarrow$ COMP3231/3891, COMP9242, ...
- liked concurrency?
  $\Rightarrow$ COMP3151, COMP3153, COMP6721, COMP6991, ...
- liked *nix shell?
  $\Rightarrow$ COMP2041

Thanks to:

- Our wonderful tutors
- All of you!

myExperience

- How did we do?
- What worked well?
- What could we do better?
- Let us know: myExperience

And that's all!

Good Luck!

- I hope what you've learnt in this course will be useful.
- I hope you get the mark you're aiming for!