Welcome to Bristol!
COMSM1302 Overview of Computer Architecture

John Lapinskas, University of Bristol

What is architecture?

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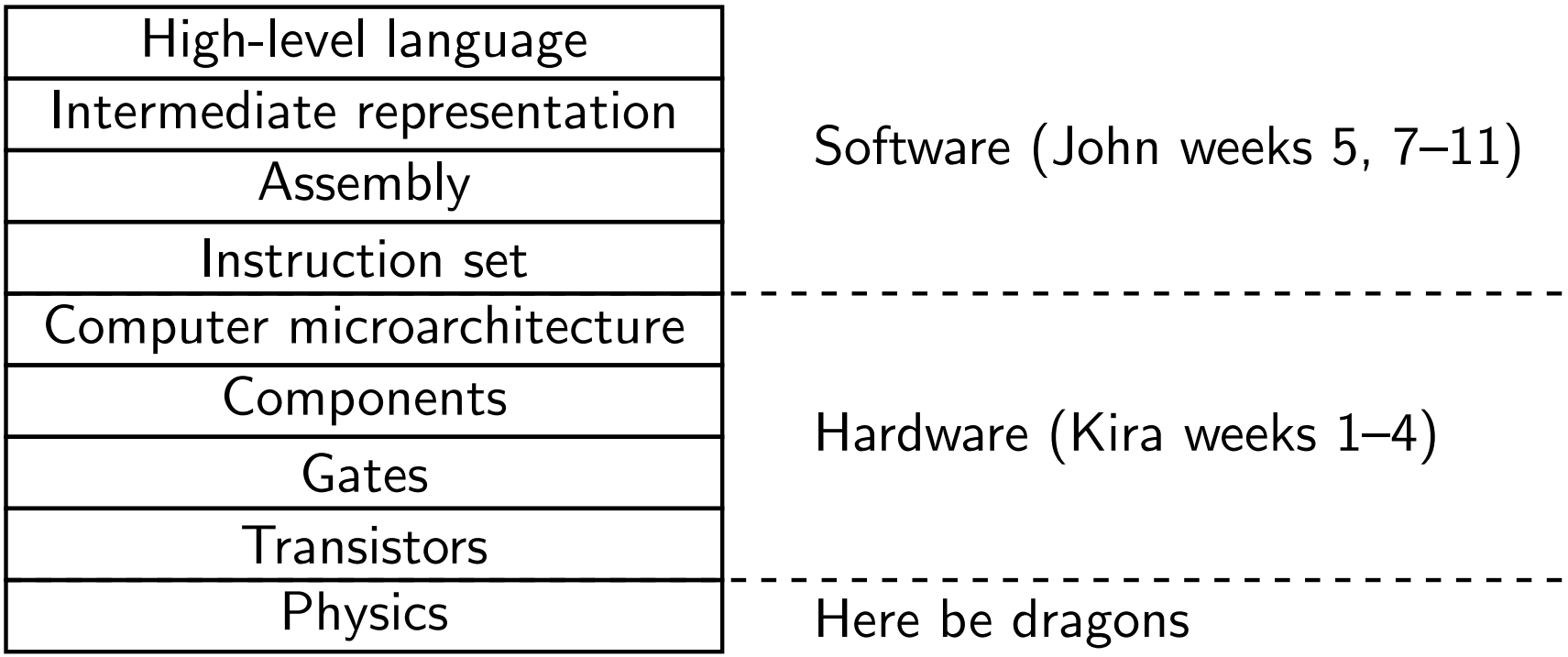
Programming in C starts out with a "Hello, world!" program...
but there's a lot going on under the surface!



This unit is about filling in that gap and understanding what's going on between writing a program in C and having it execute on your PC.

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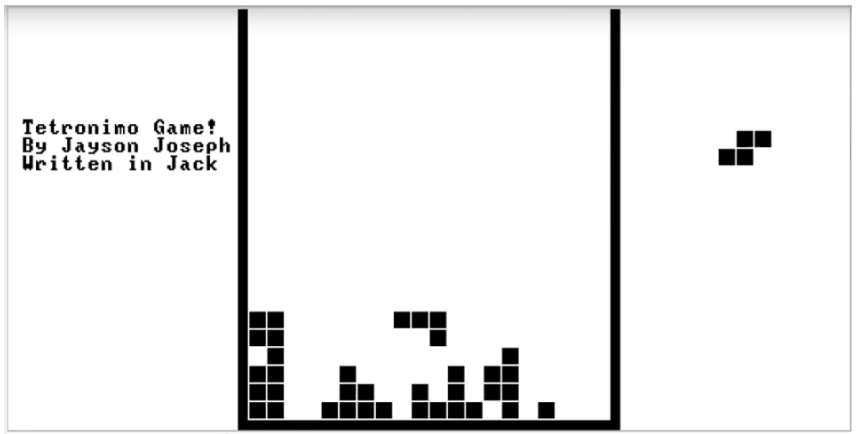
By the end of this unit, you'll have built a working CPU and created a compiler for a high-level language.

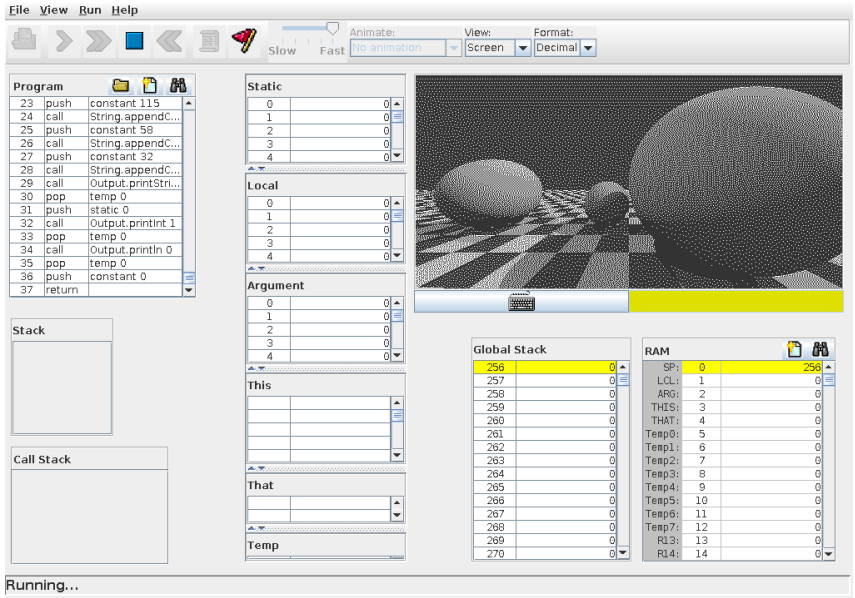
It won't be as powerful as C, but it will be powerful enough to demystify C and get a good sense of what the C compiler is actually doing.

Hack and Nand2Tetris

The CPU we'll be building runs on an architecture called Hack, designed to be simple enough for educational use but powerful enough to run Tetris.



Source: Jayson Joseph (here)



Source: Alex Quach (here)

We very loosely follow the Nand2Tetris model, originally developed for Herzliya and Jerusalem universities and subsequently released free online.

Both courses build up a Hack CPU in a similar fashion, but apart from that they're quite different — we cover things they don't and vice versa.

The bad news: What we expect from you

This is a hard degree programme with a significant failure rate.

You should put in ∼40 hours/week total, and ∼15 hours/week in this unit.

The unit runs as a flipped classroom. We release new videos every Monday morning along with an assignment for the week, which will take most of your time. The following Tuesday, we meet for a problem-solving session. (Attendance will be taken via the app!)

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You might not be able to finish the assignments, and that's OK — we've erred towards making them longer so you have more revision material.

But you should always make sure you're putting your 15 hours in. Each week builds on the last, so while we do release solutions, if you fall behind then you're in trouble.

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- Online resources — Hack is popular with hobbyists!
  - Avoid ChatGPT though, it's often confidently wrong.

Assessment and exams

- The unit will have two in-person two-hour exams.
  - The first exam will take place Wednesday of week 6 and be worth 40%.
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If you have AEAs (e.g. extra time), please get in touch with us early! We don't make decisions on who gets AEAs (the Disability Office does), but it'll be really helpful to have an idea of numbers for week 6.

Bristol culture

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- We **like** getting questions!
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- This unit is exam-only, but for units with coursework, we take academic misconduct and plagiarism very seriously.

A warning

Early in Programming in C, you will run into “pointers”.

They will look disconnected from what you’ve learned so far, especially if you have previous programming experience in a higher-level language like Python. They will also be hard to understand.

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DO NOT DO THIS!

Pointers are the standard example of memory indirection, which is vital not just to C, but to every programming language under the hood.

C is not going to move on from pointers. C is going to stay on pointers, and then Architecture is going to start using them as well!

Good luck!

Any questions?