Welcome to the gem5 bootcamp!

About the overall structure of the bootcamp

These slides and are available at https://bootcamp.gem5.org/ for you to follow along.

(Note: They will be archived at https://gem5bootcamp.github.io/2024)

The source for the slides, and what you'll be using throughout the bootcamp can be found on github at https://github.com/gem5bootcamp/2024

Note: Don't clone that repo, yet. We'll do that in a bit.

A bit about me

I am **Prof. Jason Lowe-Power** (he/him).
I am an associate professor in the Computer Science Department and
the *Project Management Committee chair* for the gem5 project.

I lead the Davis Computer Architecture Research (DArchR) Group.

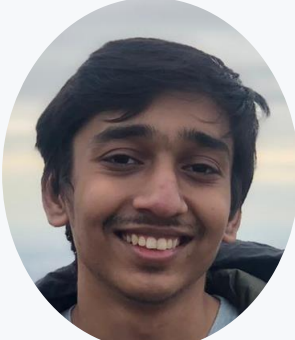https://arch.cs.ucdavis.edu

The bootcamp team

Bobby Bruce

Ivana Mitrovic

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William Shaddix

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Alyssa Vallejo

Noah Krim

Saili Karkare

Matt Sinclair

Plan for the week

Day 1

Introduction
- Background on simulation
- Getting started with gem5
- Background on Python and gem5

Using gem5
- gem5's standard library
- gem5 resources

Day 2

Using gem5
- Running things in gem5
- Modeling cores in gem5
- Modeling caches in gem5
- Modeling memory in gem5
- Full system simulation

Day 3

Using gem5
- Accelerating simulation
- Sampled simulation with gem5
- Power modeling
- Multisim

Developing gem5 models
- SimObject intro
- Debugging and debug flags
- Event-driven simulation

Day 4

Developing gem5 models
- Modeling Cores
- Modeling cache coherence with Ruby and SLICC
- Extending gem5

GPU modeling

Day 5

Developing gem5 models
- Ports and memory-based SimObjects
- Using the CHI protocol
- Modeling the on-chip network with Garnet

Other simulators
- SST
- DRAMSim/DRAMSys
- SystemC

Contributing to gem5
- gem5 contributing process
- gem5 testing

Our goals for the gem5 bootcamp

- Make gem5 less painful and flatten the learning curve
- Give you a vocabulary for asking questions
- Provide a reference for the future
- Give you material to take back and teach your colleagues

Other likely outcomes

- You will be overwhelmed by the amount of information and how large gem5 is
  - That's OK! You can take these materials with you and refer back to them
- You will not understand everything
  - That's OK! You can ask questions as we go

How this is going to work

- We'll be going mostly top-down
    1. How to use gem5
    2. How to each model can be used
    3. How to develop your own models and modify existing models
- Highly iterative:
    - You'll see the same thing over and over
    - Each time it will be one level deeper
- Lots of coding examples
    - Both live coding and practice problems

Coding examples

You can write the following code

```python
print("Hello, world!")
print("You'll be seeing a lot of Python code")
print("The slides will be a reference, but we'll be doing a lot of live coding!")
```

And you'll see this output.

```
Hello, world!
You'll be seeing a lot of Python code
The slides will be a reference, but we'll be doing a lot of live coding!
```

Bootcamp logistics

We'll be here from 9am - 4pm each day.

Lunch will be ~12 - 1pm.

We'll have a breaks in the morning and afternoon.

Afternoon break will have coffee/snacks.

Tonight: Reception at [Dunloe Brewing](#) (Olive Drive Brewery)
5:30pm - 8:00pm. Walking over at 5pm from here.

Wednesday: Social event at UC Davis ["Games Area"](#) (Bowling, pool, video games, etc.)
6:30pm - 9:30pm.

Other admin things

Important resources

Bootcamp links

- [Bootcamp website](#) (Maybe you're here now)
  - [Bootcamp archive](#) (If you're coming to this later)
- [Source for bootcamp materials](#) (You'll work here)
- [GitHub Classroom](#) (Needed to use codespaces)

gem5 links

- [gem5 code](#)
- [gem5 website](#)
- [gem5 YouTube](#)
- [gem5 Slack](#) (for asking offline questions)