gem5 at home (or work/school)



Getting help

gem5 has lots of resources to get help:

- 1. Documentation at <u>gem5 doxygen</u>
- 2. Ways to reach out for help:
 - Github discussions This is the main place for questions
 - gem5 Slack channel
 - Join our mailing lists:
 - gem5-dev@gem5.org : For discussions regarding gem5 development
 - gem5-users@gem5.org : For general discussions about gem5 and its use
 - gem5-announce@gem5.org : For general gem5 announcements

3. <u>Youtube videos</u>

These links and more information are also available at https://www.gem5.org/ask-a-question/

We do our best to get to questions, but they often go unanswered. This isn't because it's not a good question, but because we don't have enough volunteers.



Running gem5 at home

- gem5 performance qualities
 - Single threaded
 - Consumes lots of RAM (if you want to model 32 GB of memory, it needs 32 GB of memory to model it)
 - Can take a lot of time
- Because of this its best to run multiple experiments in parallel
- Recommended hardware:
 - High single thread performance
 - Doesn't need many cores
 - LOTS OF RAM



System software requirements

- Ubuntu 22.04+ (at least GCC 10)
 - 20.04 works, but there are bugs in GCC 8 (or 9, whatever the default is) and you have to upgrade the GCC version.
- Python 3.6+
- SCons
- Many optional requirements.

This should work on most Linux systems and on MacOS.

See our Dockerfiles for the most up-to-date version information:

gem5/util/dockerfiles/



Using dockerfiles

If you have trouble, we have docker images.

Here's a generic docker command that should work.

```
docker \ run \ --rm \ -v \ \$(pwd) : \$(pwd) \ -w \ \$(pwd) \ ghcr.io/gem5/ubuntu-24.04\_all-dependencies : v24-0 \ < your \ command > to the command of the c
```

- Runs the image at [https://ghcr.io/gem5/ubuntu-24.04_all-dependencies:v24-0].
- Automatically removes the docker image ([--rm])
- Sets it up so that the current directory (-v \$(pwd):\$(pwd)] is available inside the docker container
- Sets the working directory to the current directory (-w \$(pwd))
- Runs a command.
- Every command will now need to run with this to make sure the libraries are set up correctly.

I cannot **strongly enough** emphasize that you should not run interactively in the docker container. Use it to just run one command at a time.



The devcontainer

The devcontainer we've been using is based off of ghcr.io/gem5/ubuntu-24.04_all-dependencies:v24-0, but also includes some gem5 binaries.

You can find it at [ghcr.io/gem5/devcontainer:bootcamp-2024].

The source is at gem5/utils/dockerfiles/devcontainer.



Recommended practices

- Unless planning on contributing to gem5 or you need to use recently developed work, use the stable branch.
- Create branches off of stable.
- Don't modify parameters of python files in src/. Instead create *extensions* of stdlib types or SimObjects.
- Don't be afraid to read the code. The code is the best documentation.



gem5 Cheat Sheet

Downloading

git clone https://github.com/gem5/gem5

Building

scons build/ALL/gem5.opt -j\$(nproc)

Customizing the build

scons menuconfig build/ALL

Running

build/ALL/gem5.opt <your script>

Example scripts

configs/examples/gem5_library

Debugging

build/ALL/gem5.opt --debug-flags=<debug flags> <your script> build/ALL/gem5.opt --debug-help



More cheat sheet

Creating a disk image

See https://github.com/gem5/gem5-resources/. Use the packer files already available or create your own.

packer build <packer json file>

Take a checkpoint

sim.save_checkpoint('checkpoint')

Restore a checkpoint

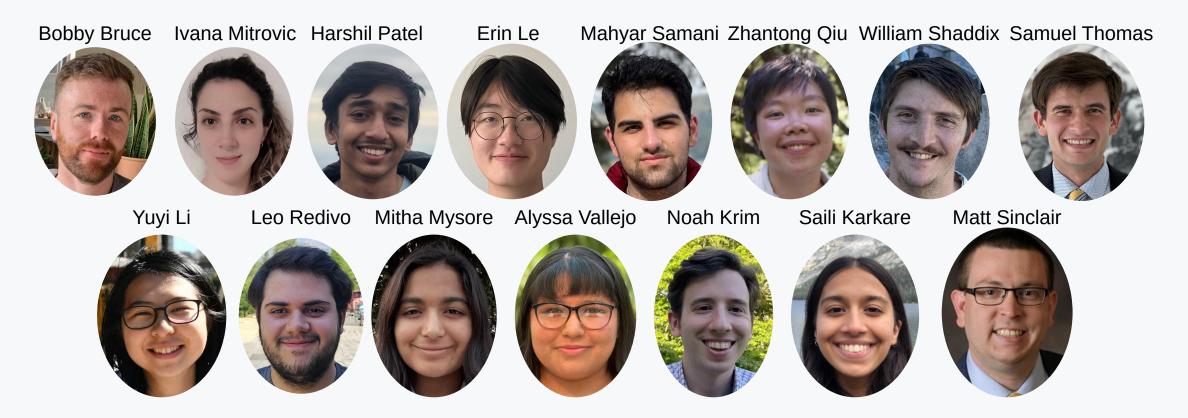
sim = Simulator(checkpoint_path='checkpoint')



Final things



Big thanks





Big thanks to you all!

[▶]Group photo

Please let us know how we did:

https://forms.gle/M6HZHxGjXpcdw4kZ8

