

Tips on using gem5

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Before we start...

- ▶ It's just a brief talk about tips, more for you to learn on your own.
- ▶ Does not contain the answer for lab1. **lab1 due: 2024-3-25 AM1:00**

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Programming languages used by gem5

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introduction

As we know, gem5 is a hybrid cpp/python programming project:

- ▶ Using cpp to create a runtime environment.
- ▶ Use python to set up parameters, write scripts, and orchestrate the system model.
- ▶ The python settings are dynamically bound to the cpp (via pybind11).

cpp pre-knowledge

Simply using gem5 doesn't require a foundation in cpp, if you want to extend gem5 (as we did in lab1) or study gem5's source code, you'll need a bit of a foundation in cpp. They should be:

- ▶ Object oriented programming concepts, class definition, inheritance (polymorphism).
- ▶ Templates (if you want to study the source code).

python pre-knowledge

python is a language that is easy to pick up but hard to master. Luckily for us, it's just a matter of getting started:

- ▶ Object oriented programming concepts, class definition, inheritance.
- ▶ Python python data model.
- ▶ Python metaprogramming with metaclass(if you want to understand why there are some fixed parameters set in classes).

If you don't know how to use python, it's best to find a quick rookie tutorial.

scons

scons is just a build system, and like cmake, xmake, and makefile, it essentially specifies how the project will be compiled.

- ▶ You think it's unfamiliar, that's because it's relatively little used...
- ▶ It's essentially a module for python, so it uses python's syntax, and how you treat python allows you to treat scones in the same way (e.g., using pdb debugging).
- ▶ To understand more about the compilation process please check the scones documentation.

Coding Skills

- ▶ Use **clangd** to provide some hints (cpp).
- ▶ Make good use of the editor's global search.

Finds the configuration parameters of the component

- ▶ As you know, the parameters you can use are those specified in the python file...
- ▶ The only way to find the configuration parameters you want is to open a component-related python file and look directly at the source code.

debug

- ▶ You can use `gdb` to debug `gem5` (after all, `gem5` itself is an executable), and you can use `pdb` to debug python scripts (by using `-pdb` during execution or by setting breakpoints directly in the python file).
- ▶ Using `print` to record logs.

Think of gem5 as a "python interpreter".

I have enough reasons to justify this...