体系结构Gem5-Lab1

PB19051183 吴承泽

实验过程

在本地下载gem5，使用指令`scons build/X86/gem5.opt -j9 CPU_MODELS=AtomicSimpleCPU,TimingSimpleCPU,O3CPU,MinorCPU`进行编译，编译完成后如下所示：

```
[   SHCXX] nomali/lib/mmu.cc -> .os
[      AR]  -> drampower/libdrampower.a
[   SHCXX] nomali/lib/nomali_api.cc -> .os
[  RANLIB]  -> drampower/libdrampower.a
[    SHCC] fputils/fp64.c -> .os
[    SHCC] fputils/fp80.c -> .os
[   SHCXX] iostream3/zfstream.cc -> .os
[    SHCC] libfdt/fdt.c -> .os
[    SHCC] libfdt/fdt_ro.c -> .os
[    SHCC] libfdt/fdt_rw.c -> .os
[    SHCC] libfdt/fdt_sw.c -> .os
[      AR]  -> fputils/libfputils.a
[    SHCC] libfdt/fdt_wip.c -> .os
[    SHCC] libfdt/fdt_empty_tree.c -> .os
[  RANLIB]  -> fputils/libfputils.a
[    SHCC] libfdt/fdt_strerror.c -> .os
[      AR]  -> nomali/libnomali.a
[      AR]  -> libfdt/libfdt.a
[  RANLIB]  -> nomali/libnomali.a
[  RANLIB]  -> libfdt/libfdt.a
[      AR]  -> iostream3/libiostream3.a
[  RANLIB]  -> iostream3/libiostream3.a
[    LINK]  -> X86/gem5.opt
scons: done building targets.
*** Summary of Warnings ***
Warning: Header file <png.h> not found.
         This host has no libpng library.
         Disabling support for PNG framebuffers.
Warning: Couldn't find HDF5 C++ libraries. Disabling HDF5 support.
```

创建在路径./configs/tutorial/创建simple.py，按照gem5文档中的配置，将simple.py配置完毕后，运行指令`build/X86/gem5.opt configs/tutorial/part1/simple.py`，运行结果如下所示：

```
mospic@ubuntu:~/ComputerArchitecture/camospic@ubuntu:~/ComputerArchitecture/camospic@ubuntu:~/ComputerArchitmospic@ubuntu:~/ComputerAr
terArchitecturmospic@ubuntu:~/ComputerArchitectmospic@ubuntu:~/ComputerArchitemospic@ubuntu:~/ComputerArchitecture/calab-gem5/lab1/gem
alab-gemmospic@ubuntu:~/ComputerArchitecture/calab-gem5/lab1/gem5-stable$ build/X86/gem5.opt configs/tutorial/simple.py
gem5 Simulator System.  http://gem5.org
gem5 is copyrighted software; use the --copyright option for details.

gem5 version 21.2.1.0
gem5 compiled Mar  2 2022 07:11:04
gem5 started Mar  4 2022 01:21:33
gem5 executing on ubuntu, pid 21661
command line: build/X86/gem5.opt configs/tutorial/simple.py

Global frequency set at 1000000000000 ticks per second
warn: No dot file generated. Please install pydot to generate the dot file and pdf.
build/X86/mem/mem_interface.cc:791: warn: DRAM device capacity (8192 Mbytes) does not match the address range assigned (512 Mbytes)
0: system.remote_gdb: listening for remote gdb on port 7000
Beginning simulation!
build/X86/sim/simulate.cc:194: info: Entering event queue @ 0.  Starting simulation...
Hello world!
Exiting @ tick 454646000 because exiting with last active thread context
```

以下开始配置caches.py，以各种参数描述caches的类后，配置two_level.py。连接caches.py中类所表示的caches并生成多级结构，完成一个system的拼装。在之后添加了一些参数接收与赋值函数，并修改了部分Caches的参数和类函数，运行two_level.py，指令如下：

```
build/X86/gem5.opt configs/tutorial/two_level.py --l2_size='1MB' --l1d_size='128kB'
```

结果如下所示：

```
mospic@ubuntu:~/ComputerArchitecture/calab-gem5/lab1/gem5-stable$ build/X86/gem5.opt configs/learning_gem5/part1/two_level.py --l2_size='1MB' --l1d_size='128kB'
gem5 Simulator System.  http://gem5.org
gem5 is copyrighted software; use the --copyright option for details.

gem5 version 21.2.1.0
gem5 compiled Mar  2 2022 07:11:04
gem5 started Mar 20 2022 18:31:08
gem5 executing on ubuntu, pid 68978
command line: build/X86/gem5.opt configs/learning_gem5/part1/two_level.py --l2_size=1MB --l1d_size=128kB

Global frequency set at 1000000000000 ticks per second
warn: No dot file generated. Please install pydot to generate the dot file and pdf.
build/X86/mem/mem_interface.cc:791: warn: DRAM device capacity (8192 Mbytes) does not match the address range assigned (512 Mbytes)
0: system.remote_gdb: listening for remote gdb on port 7000
Beginning simulation!
build/X86/sim/simulate.cc:194: info: Entering event queue @ 0.  Starting simulation...
Hello world!
Exiting @ tick 58645000 because exiting with last active thread context
```