

task1

May 21, 2024

```
[180]: import json
import os
import matplotlib.pyplot as plt
from statistics import geometric_mean
```

```
[ ]: import sys
sys.path.append('../')
import executor
```

```
[27]: ROOT_DIR = "/home/huawei/dev/ChampSim"
TASK_1_DIR = "/home/huawei/dev/ChampSim/tasks/task1"
BIMODAL_CFG = "tasks/task1/configs/bimodal.json"
GAg_CFG = "tasks/task1/configs/GAg.json"
GAp_CFG = "tasks/task1/configs/GAp.json"
TRACES_DIR = "tasks/traces"
RESULTS_DIR = "tasks/task1/results"
WARMUP = 5000000
INSTRS_COUNT = 20000000
```

Run traces

```
[3]: executor.build_sim(BIMODAL_CFG, ROOT_DIR)
```

```
mkdir /home/huawei/dev/ChampSim/.csconfig/fe02659d/obj
mkdir /home/huawei/dev/ChampSim/.csconfig/fe02659d/btbDbasic_btb
mkdir /home/huawei/dev/ChampSim/.csconfig/fe02659d/branchDbimodal
mkdir /home/huawei/dev/ChampSim/.csconfig/fe02659d/prefetcherDno
mkdir /home/huawei/dev/ChampSim/.csconfig/fe02659d/prefetcherDno_instr
mkdir /home/huawei/dev/ChampSim/.csconfig/fe02659d/replacementDlru
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/fe02659d/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/channel.o
/home/huawei/dev/ChampSim/src/channel.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
```

```

/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/fe02659d/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/ptw.o
/home/huawei/dev/ChampSim/src/ptw.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/fe02659d/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/plain_printer.o
/home/huawei/dev/ChampSim/src/plain_printer.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/fe02659d/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/json_printer.o
/home/huawei/dev/ChampSim/src/json_printer.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/fe02659d/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/tracereader.o
/home/huawei/dev/ChampSim/src/tracereader.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/fe02659d/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/ooo_cpu.o
/home/huawei/dev/ChampSim/src/ooo_cpu.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/fe02659d/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/main.o
/home/huawei/dev/ChampSim/src/main.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/fe02659d/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/cache.o
/home/huawei/dev/ChampSim/src/cache.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD

```

```

-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/fe02659d/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/champsim.o
/home/huawei/dev/ChampSim/src/champsim.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/fe02659d/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/dram_controller.o
/home/huawei/dev/ChampSim/src/dram_controller.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/fe02659d/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/vmem.o
/home/huawei/dev/ChampSim/src/vmem.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -Wno-unused-parameter -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/btb/basic_btb -DCHAMPSIM_MODULE
-I/home/huawei/dev/ChampSim/.csconfig/fe02659d/inc -include btbDbasic_btb.inc
-c -o /home/huawei/dev/ChampSim/.csconfig/fe02659d/btbDbasic_btb/basic_btb.o
/home/huawei/dev/ChampSim/btb/basic_btb/basic_btb.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -Wno-unused-parameter -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/branch/bimodal -DCHAMPSIM_MODULE
-I/home/huawei/dev/ChampSim/.csconfig/fe02659d/inc -include branchDbimodal.inc
-c -o /home/huawei/dev/ChampSim/.csconfig/fe02659d/branchDbimodal/bimodal.o
/home/huawei/dev/ChampSim/branch/bimodal/bimodal.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -Wno-unused-parameter -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/prefetcher/no -DCHAMPSIM_MODULE
-I/home/huawei/dev/ChampSim/.csconfig/fe02659d/inc -include prefetcherDno.inc
-c -o /home/huawei/dev/ChampSim/.csconfig/fe02659d/prefetcherDno/no.o
/home/huawei/dev/ChampSim/prefetcher/no/no.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -Wno-unused-parameter -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/prefetcher/no_instr -DCHAMPSIM_MODULE
-I/home/huawei/dev/ChampSim/.csconfig/fe02659d/inc -include
prefetcherDno_instr.inc -c -o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/prefetcherDno_instr/no.o

```

```

/home/huawei/dev/ChampSim/prefetcher/no_instr/no.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -Wno-unused-parameter -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/replacement/lru -DCHAMPSIM_MODULE
-I/home/huawei/dev/ChampSim/.csconfig/fe02659d/inc -include replacementDlru.inc
-c -o /home/huawei/dev/ChampSim/.csconfig/fe02659d/replacementDlru/lru.o
/home/huawei/dev/ChampSim/replacement/lru/lru.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-L/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/lib
-L/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/lib/manual-link
-L/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/lib
-L/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/lib/manual-link -o
/home/huawei/dev/ChampSim/bin/champsim
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/channel.o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/ptw.o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/plain_printer.o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/json_printer.o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/tracereader.o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/ooo_cpu.o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/main.o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/cache.o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/champsim.o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/dram_controller.o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/obj/vmem.o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/btbDbasic_btb/basic_btb.o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/branchDbimodal/bimodal.o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/prefetcherDno/no.o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/prefetcherDno_instr/no.o
/home/huawei/dev/ChampSim/.csconfig/fe02659d/replacementDlru/lru.o -llzma -lz
-lbz2 -lfmt

```

```

[4]: executor.run_traces(TRACES_DIR, f"{RESULTS_DIR}/bimodal", ROOT_DIR, WARMUP,
    ↪ INSTRS_COUNT)

```

Running

tasks/traces/641.leela_s-149B.champsimtrace.xz...

Running

tasks/traces/603.bwaves_s-2931B.champsimtrace.xz...

Running tasks/traces/619.lbm_s-2676B.champsimtrace.xz...

Running

tasks/traces/607.cactuBSSN_s-2421B.champsimtrace.xz...

Running tasks/traces/654.roms_s-293B.champsimtrace.xz...

Running

tasks/traces/649.fotonik3d_s-1176B.champsimtrace.xz...

Running tasks/traces/627.cam4_s-490B.champsimtrace.xz...

Running tasks/traces/605.mcf_s-1536B.champsimtrace.xz...

Running

tasks/traces/620.omnetpp_s-141B.champsimtrace.xz...

Running

tasks/traces/600.perlbench_s-1273B.champsimtrace.xz...

Running tasks/traces/657.xz_s-4994B.champsimtrace.xz...

Running tasks/traces/621.wrf_s-575B.champsimtrace.xz...

Running

tasks/traces/638.imagick_s-10316B.champsimtrace.xz...

Running

tasks/traces/631.deepsjeng_s-928B.champsimtrace.xz...

Running

tasks/traces/644.nab_s-12459B.champsimtrace.xz...

Running

tasks/traces/623.xalancbmk_s-165B.champsimtrace.xz...

The results are recorded in

tasks/task1/results/bimodal/638.imagick_s-10316B.champsimtrace.xz.json.

Running tasks/traces/625.x264_s-12B.champsimtrace.xz...

The results are recorded in

tasks/task1/results/bimodal/600.perlbench_s-1273B.champsimtrace.xz.json.

Running tasks/traces/602.gcc_s-1850B.champsimtrace.xz...

The results are recorded in

tasks/task1/results/bimodal/621.wrf_s-575B.champsimtrace.xz.json.

Running tasks/traces/628.pop2_s-17B.champsimtrace.xz...

The results are recorded in

tasks/task1/results/bimodal/657.xz_s-4994B.champsimtrace.xz.json.

Running

tasks/traces/648.exchange2_s-387B.champsimtrace.xz...

The results are recorded in

tasks/task1/results/bimodal/644.nab_s-12459B.champsimtrace.xz.json.

The results are recorded in

tasks/task1/results/bimodal/607.cactuBSSN_s-2421B.champsimtrace.xz.json.

The results are recorded in

tasks/task1/results/bimodal/627.cam4_s-490B.champsimtrace.xz.json.

The results are recorded in

tasks/task1/results/bimodal/631.deepsjeng_s-928B.champsimtrace.xz.json.

The results are recorded in

tasks/task1/results/bimodal/641.leela_s-149B.champsimtrace.xz.json.

The results are recorded in

tasks/task1/results/bimodal/623.xalancbmk_s-165B.champsimtrace.xz.json.

The results are recorded in

tasks/task1/results/bimodal/654.roms_s-293B.champsimtrace.xz.json.

The results are recorded in

tasks/task1/results/bimodal/625.x264_s-12B.champsimtrace.xz.json.

The results are recorded in

tasks/task1/results/bimodal/649.fotonik3d_s-1176B.champsimtrace.xz.json.

The results are recorded in

tasks/task1/results/bimodal/628.pop2_s-17B.champsimtrace.xz.json.

The results are recorded in
tasks/task1/results/bimodal/648.exchange2_s-387B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/bimodal/603.bwaves_s-2931B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/bimodal/620.omnetpp_s-141B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/bimodal/602.gcc_s-1850B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/bimodal/605.mcf_s-1536B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/bimodal/619.lbm_s-2676B.champsimtrace.xz.json.

[170]: `executor.build_sim(GAg_CFG, ROOT_DIR)`

```
mkdir /home/huawei/dev/ChampSim/.csconfig/dc806640/obj
mkdir /home/huawei/dev/ChampSim/.csconfig/dc806640/btbDbasic_btb
mkdir /home/huawei/dev/ChampSim/.csconfig/dc806640/branchDGAg
mkdir /home/huawei/dev/ChampSim/.csconfig/dc806640/prefetcherDno
mkdir /home/huawei/dev/ChampSim/.csconfig/dc806640/prefetcherDno_instr
mkdir /home/huawei/dev/ChampSim/.csconfig/dc806640/replacementDlru
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/dc806640/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/channel.o
/home/huawei/dev/ChampSim/src/channel.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/dc806640/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/ptw.o
/home/huawei/dev/ChampSim/src/ptw.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/dc806640/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/plain_printer.o
/home/huawei/dev/ChampSim/src/plain_printer.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/dc806640/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/json_printer.o
```

```

/home/huawei/dev/ChampSim/src/json_printer.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/dc806640/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/tracereader.o
/home/huawei/dev/ChampSim/src/tracereader.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/dc806640/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/ooo_cpu.o
/home/huawei/dev/ChampSim/src/ooo_cpu.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/dc806640/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/main.o
/home/huawei/dev/ChampSim/src/main.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/dc806640/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/cache.o
/home/huawei/dev/ChampSim/src/cache.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/dc806640/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/champsim.o
/home/huawei/dev/ChampSim/src/champsim.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/dc806640/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/dram_controller.o
/home/huawei/dev/ChampSim/src/dram_controller.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/dc806640/inc -c -o

```

```

/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/vmem.o
/home/huawei/dev/ChampSim/src/vmem.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -Wno-unused-parameter -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/btb/basic_btb -DCHAMPSIM_MODULE
-I/home/huawei/dev/ChampSim/.csconfig/dc806640/inc -include btbDbasic_btb.inc
-c -o /home/huawei/dev/ChampSim/.csconfig/dc806640/btbDbasic_btb/basic_btb.o
/home/huawei/dev/ChampSim/btb/basic_btb/basic_btb.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -Wno-unused-parameter -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/branch/GAg -DCHAMPSIM_MODULE
-I/home/huawei/dev/ChampSim/.csconfig/dc806640/inc -include branchDGAg.inc -c
-o /home/huawei/dev/ChampSim/.csconfig/dc806640/branchDGAg/GAg.o
/home/huawei/dev/ChampSim/branch/GAg/GAg.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -Wno-unused-parameter -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/prefetcher/no -DCHAMPSIM_MODULE
-I/home/huawei/dev/ChampSim/.csconfig/dc806640/inc -include prefetcherDno.inc
-c -o /home/huawei/dev/ChampSim/.csconfig/dc806640/prefetcherDno/no.o
/home/huawei/dev/ChampSim/prefetcher/no/no.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -Wno-unused-parameter -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/prefetcher/no_instr -DCHAMPSIM_MODULE
-I/home/huawei/dev/ChampSim/.csconfig/dc806640/inc -include
prefetcherDno_instr.inc -c -o
/home/huawei/dev/ChampSim/.csconfig/dc806640/prefetcherDno_instr/no.o
/home/huawei/dev/ChampSim/prefetcher/no_instr/no.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -Wno-unused-parameter -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/replacement/lru -DCHAMPSIM_MODULE
-I/home/huawei/dev/ChampSim/.csconfig/dc806640/inc -include replacementDlru.inc
-c -o /home/huawei/dev/ChampSim/.csconfig/dc806640/replacementDlru/lru.o
/home/huawei/dev/ChampSim/replacement/lru/lru.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-L/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/lib
-L/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/lib/manual-link
-L/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/lib
-L/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/lib/manual-link -o
/home/huawei/dev/ChampSim/bin/champsim
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/channel.o
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/ptw.o

```



```

/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/plain_printer.o
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/json_printer.o
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/tracereader.o
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/ooo_cpu.o
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/main.o
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/cache.o
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/champsim.o
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/dram_controller.o
/home/huawei/dev/ChampSim/.csconfig/dc806640/obj/vmem.o
/home/huawei/dev/ChampSim/.csconfig/dc806640/btbDbasic_btb/basic_btb.o
/home/huawei/dev/ChampSim/.csconfig/dc806640/branchDGAg/GAg.o
/home/huawei/dev/ChampSim/.csconfig/dc806640/prefetcherDno/no.o
/home/huawei/dev/ChampSim/.csconfig/dc806640/prefetcherDno_instr/no.o
/home/huawei/dev/ChampSim/.csconfig/dc806640/replacementDlru/lru.o  -llzma -lz
-lbz2 -lfmt

```

```

[171]: executor.run_traces(TRACES_DIR, f"{RESULTS_DIR}/GAg", ROOT_DIR, WARMUP,
↳ INSTRS_COUNT)

```

Running

tasks/traces/641.leela_s-149B.champsimtrace.xz...Running

tasks/traces/603.bwaves_s-2931B.champsimtrace.xz...

Running tasks/traces/619.lbm_s-2676B.champsimtrace.xz...

Running

tasks/traces/607.cactuBSSN_s-2421B.champsimtrace.xz...

Running tasks/traces/654.roms_s-293B.champsimtrace.xz...

Running

tasks/traces/649.fotonik3d_s-1176B.champsimtrace.xz...

Running tasks/traces/627.cam4_s-490B.champsimtrace.xz...

Running tasks/traces/605.mcf_s-1536B.champsimtrace.xz...

Running

tasks/traces/620.omnetpp_s-141B.champsimtrace.xz...

Running

tasks/traces/600.perlbench_s-1273B.champsimtrace.xz...

Running tasks/traces/657.xz_s-4994B.champsimtrace.xz...

Running tasks/traces/621.wrf_s-575B.champsimtrace.xz...

Running

tasks/traces/638.imagick_s-10316B.champsimtrace.xz...

Running

tasks/traces/631.deepsjeng_s-928B.champsimtrace.xz...

Running

tasks/traces/644.nab_s-12459B.champsimtrace.xz...

Running

tasks/traces/623.xalancbmk_s-165B.champsimtrace.xz...

The results are recorded in

tasks/task1/results/GAg/638.imagick_s-10316B.champsimtrace.xz.json.

Running tasks/traces/625.x264_s-12B.champsimtrace.xz...

The results are recorded in
tasks/task1/results/GAg/644.nab_s-12459B.champsimtrace.xz.json.
Running tasks/traces/602.gcc_s-1850B.champsimtrace.xz...
The results are recorded in
tasks/task1/results/GAg/600.perlbench_s-1273B.champsimtrace.xz.json.
Running tasks/traces/628.pop2_s-17B.champsimtrace.xz...
The results are recorded in
tasks/task1/results/GAg/657.xz_s-4994B.champsimtrace.xz.json.
Running
tasks/traces/648.exchange2_s-387B.champsimtrace.xz...
The results are recorded in
tasks/task1/results/GAg/621.wrf_s-575B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAg/627.cam4_s-490B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAg/607.cactuBSSN_s-2421B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAg/631.deepsjeng_s-928B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAg/641.leela_s-149B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAg/625.x264_s-12B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAg/654.roms_s-293B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAg/649.fotonik3d_s-1176B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAg/623.xalancbmk_s-165B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAg/628.pop2_s-17B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAg/648.exchange2_s-387B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAg/603.bwaves_s-2931B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAg/620.omnetpp_s-141B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAg/602.gcc_s-1850B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAg/605.mcf_s-1536B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAg/619.lbm_s-2676B.champsimtrace.xz.json.

```
[7]: executor.build_sim(GAp_CFG, ROOT_DIR)
```

```
mkdir /home/huawei/dev/ChampSim/.csconfig/39f17161/obj
mkdir /home/huawei/dev/ChampSim/.csconfig/39f17161/btbDbasic_btb
mkdir /home/huawei/dev/ChampSim/.csconfig/39f17161/branchDGAp
```

```

mkdir /home/huawei/dev/ChampSim/.csconfig/39f17161/prefetcherDno
mkdir /home/huawei/dev/ChampSim/.csconfig/39f17161/prefetcherDno_instr
mkdir /home/huawei/dev/ChampSim/.csconfig/39f17161/replacementDlru
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/39f17161/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/channel.o
/home/huawei/dev/ChampSim/src/channel.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/39f17161/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/ptw.o
/home/huawei/dev/ChampSim/src/ptw.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/39f17161/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/plain_printer.o
/home/huawei/dev/ChampSim/src/plain_printer.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/39f17161/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/json_printer.o
/home/huawei/dev/ChampSim/src/json_printer.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/39f17161/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/tracereader.o
/home/huawei/dev/ChampSim/src/tracereader.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/39f17161/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/ooo_cpu.o
/home/huawei/dev/ChampSim/src/ooo_cpu.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include

```

```

-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/39f17161/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/main.o
/home/huawei/dev/ChampSim/src/main.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/39f17161/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/cache.o
/home/huawei/dev/ChampSim/src/cache.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/39f17161/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/champsim.o
/home/huawei/dev/ChampSim/src/champsim.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/39f17161/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/dram_controller.o
/home/huawei/dev/ChampSim/src/dram_controller.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/src
-I/home/huawei/dev/ChampSim/.csconfig/39f17161/inc -c -o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/vmem.o
/home/huawei/dev/ChampSim/src/vmem.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -Wno-unused-parameter -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/btb/basic_btb -DCHAMPSIM_MODULE
-I/home/huawei/dev/ChampSim/.csconfig/39f17161/inc -include btbDbasic_btb.inc
-c -o /home/huawei/dev/ChampSim/.csconfig/39f17161/btbDbasic_btb/basic_btb.o
/home/huawei/dev/ChampSim/btb/basic_btb/basic_btb.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -Wno-unused-parameter -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/branch/GAp -DCHAMPSIM_MODULE
-I/home/huawei/dev/ChampSim/.csconfig/39f17161/inc -include branchDGAp.inc -c
-o /home/huawei/dev/ChampSim/.csconfig/39f17161/branchDGAp/GAp.o
/home/huawei/dev/ChampSim/branch/GAp/GAp.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -Wno-unused-parameter -MMD
-I/home/huawei/dev/ChampSim/inc -isystem

```

```

/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/prefetcher/no -DCHAMPSIM_MODULE
-I/home/huawei/dev/ChampSim/.csconfig/39f17161/inc -include prefetcherDno.inc
-c -o /home/huawei/dev/ChampSim/.csconfig/39f17161/prefetcherDno/no.o
/home/huawei/dev/ChampSim/prefetcher/no/no.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -Wno-unused-parameter -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/prefetcher/no_instr -DCHAMPSIM_MODULE
-I/home/huawei/dev/ChampSim/.csconfig/39f17161/inc -include
prefetcherDno_instr.inc -c -o
/home/huawei/dev/ChampSim/.csconfig/39f17161/prefetcherDno_instr/no.o
/home/huawei/dev/ChampSim/prefetcher/no_instr/no.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -Wno-unused-parameter -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-I/home/huawei/dev/ChampSim/replacement/lru -DCHAMPSIM_MODULE
-I/home/huawei/dev/ChampSim/.csconfig/39f17161/inc -include replacementDlru.inc
-c -o /home/huawei/dev/ChampSim/.csconfig/39f17161/replacementDlru/lru.o
/home/huawei/dev/ChampSim/replacement/lru/lru.cc
g++ --std=c++17 -O3 -Wall -Wextra -Wshadow -Wpedantic -MMD
-I/home/huawei/dev/ChampSim/inc -isystem
/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/include
-L/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/lib
-L/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/lib/manual-link
-L/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/lib
-L/home/huawei/dev/ChampSim/vcpkg_installed/x64-linux/lib/manual-link -o
/home/huawei/dev/ChampSim/bin/champsim
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/channel.o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/ptw.o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/plain_printer.o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/json_printer.o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/tracereader.o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/ooo_cpu.o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/main.o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/cache.o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/champsim.o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/dram_controller.o
/home/huawei/dev/ChampSim/.csconfig/39f17161/obj/vmem.o
/home/huawei/dev/ChampSim/.csconfig/39f17161/btbDbasic_btb/basic_btb.o
/home/huawei/dev/ChampSim/.csconfig/39f17161/branchDGAp/GAp.o
/home/huawei/dev/ChampSim/.csconfig/39f17161/prefetcherDno/no.o
/home/huawei/dev/ChampSim/.csconfig/39f17161/prefetcherDno_instr/no.o
/home/huawei/dev/ChampSim/.csconfig/39f17161/replacementDlru/lru.o -llzma -lz
-lbz2 -lfmt

```

```
[8]: executor.run_traces(TRACES_DIR, f"{RESULTS_DIR}/GAp", ROOT_DIR, WARMUP, ↵  
    ↪ INSTRS_COUNT)
```

```
Running  
tasks/traces/641.leela_s-149B.champsimtrace.xz...  
Running  
tasks/traces/603.bwaves_s-2931B.champsimtrace.xz...  
Running tasks/traces/619.lbm_s-2676B.champsimtrace.xz...  
Running  
tasks/traces/607.cactuBSSN_s-2421B.champsimtrace.xz...  
Running tasks/traces/654.roms_s-293B.champsimtrace.xz...  
Running  
tasks/traces/649.fotonik3d_s-1176B.champsimtrace.xz...  
Running tasks/traces/627.cam4_s-490B.champsimtrace.xz...  
Running tasks/traces/605.mcf_s-1536B.champsimtrace.xz...  
Running  
tasks/traces/620.omnetpp_s-141B.champsimtrace.xz...  
Running  
tasks/traces/600.perlbench_s-1273B.champsimtrace.xz...  
Running tasks/traces/657.xz_s-4994B.champsimtrace.xz...  
Running tasks/traces/621.wrf_s-575B.champsimtrace.xz...  
Running  
tasks/traces/638.imagick_s-10316B.champsimtrace.xz...  
Running  
tasks/traces/631.deepsjeng_s-928B.champsimtrace.xz...  
Running  
tasks/traces/644.nab_s-12459B.champsimtrace.xz...  
Running  
tasks/traces/623.xalancbmk_s-165B.champsimtrace.xz...  
The results are recorded in  
tasks/task1/results/GAp/638.imagick_s-10316B.champsimtrace.xz.json.  
Running tasks/traces/625.x264_s-12B.champsimtrace.xz...  
The results are recorded in  
tasks/task1/results/GAp/627.cam4_s-490B.champsimtrace.xz.json.  
Running tasks/traces/602.gcc_s-1850B.champsimtrace.xz...  
The results are recorded in  
tasks/task1/results/GAp/600.perlbench_s-1273B.champsimtrace.xz.json.  
Running tasks/traces/628.pop2_s-17B.champsimtrace.xz...  
The results are recorded in  
tasks/task1/results/GAp/644.nab_s-12459B.champsimtrace.xz.json.  
Running  
tasks/traces/648.exchange2_s-387B.champsimtrace.xz...  
The results are recorded in  
tasks/task1/results/GAp/621.wrf_s-575B.champsimtrace.xz.json.  
The results are recorded in  
tasks/task1/results/GAp/657.xz_s-4994B.champsimtrace.xz.json.  
The results are recorded in
```

```

tasks/task1/results/GAp/631.deepsjeng_s-928B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAp/607.cactuBSSN_s-2421B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAp/641.leela_s-149B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAp/654.roms_s-293B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAp/625.x264_s-12B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAp/623.xalancbmk_s-165B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAp/628.pop2_s-17B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAp/649.fotonik3d_s-1176B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAp/648.exchange2_s-387B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAp/603.bwaves_s-2931B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAp/620.omnetpp_s-141B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAp/602.gcc_s-1850B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAp/605.mcf_s-1536B.champsimtrace.xz.json.
The results are recorded in
tasks/task1/results/GAp/619.lbm_s-2676B.champsimtrace.xz.json.

```

Collect stats

```

[172]: class Stats:
        mpki: float
        ipc: float

        def __init__(self, instrs, cycles, mispredict):
            self.mpki = mispredict * 1e3 / instrs
            self.ipc = float(instrs) / cycles

stats = {}

```

```

[173]: os.chdir(TASK_1_DIR)
bps = ["bimodal", "GA", "GAp"]
for bp in bps:
    stats_dir_name = f"results/{bp}"
    stats_dir = os.fsencode(stats_dir_name)

    stats.update({bp: {}})
    for file in os.listdir(stats_dir):

```

```

file = file.decode("ascii")
file_path = f"{stats_dir_name}/{file}"
with open(file_path) as f:
    data = json.load(f)[0]["sim"]["cores"][0]

instrs = data["instructions"]
cycles = data["cycles"]
mispredict = sum(data["mispredict"].values())

stats[bp].update({ file: Stats(instrs, cycles, mispredict) })

```

plot stats

```

[175]: tests = []
      mpkis = {}
      ipcs = {}

      for test in stats["bimodal"]:
          tests.append(test)

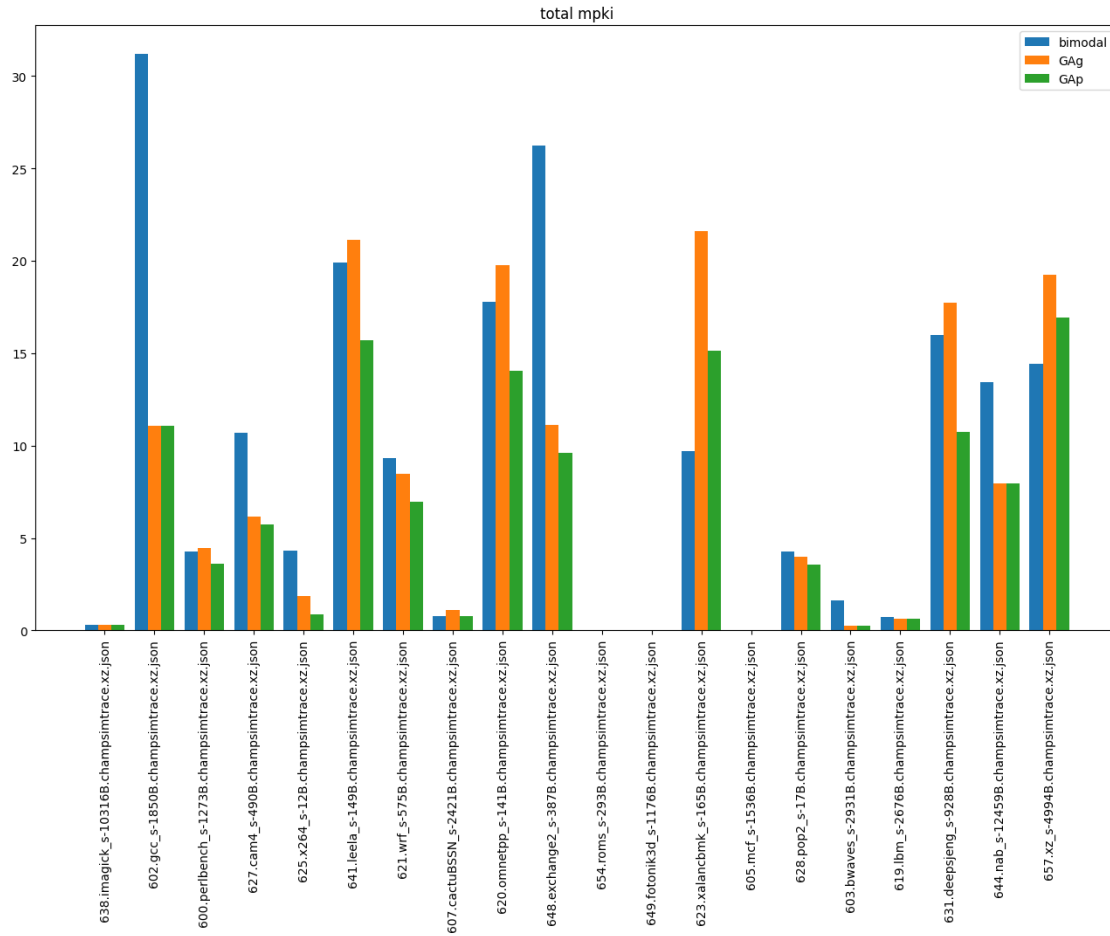
      for bp in stats:
          mpkis.update({bp: []})
          ipcs.update({bp: []})
          for test in stats[bp]:
              mpkis[bp].append(stats[bp][test].mpki)
              ipcs[bp].append(stats[bp][test].ipc)

```

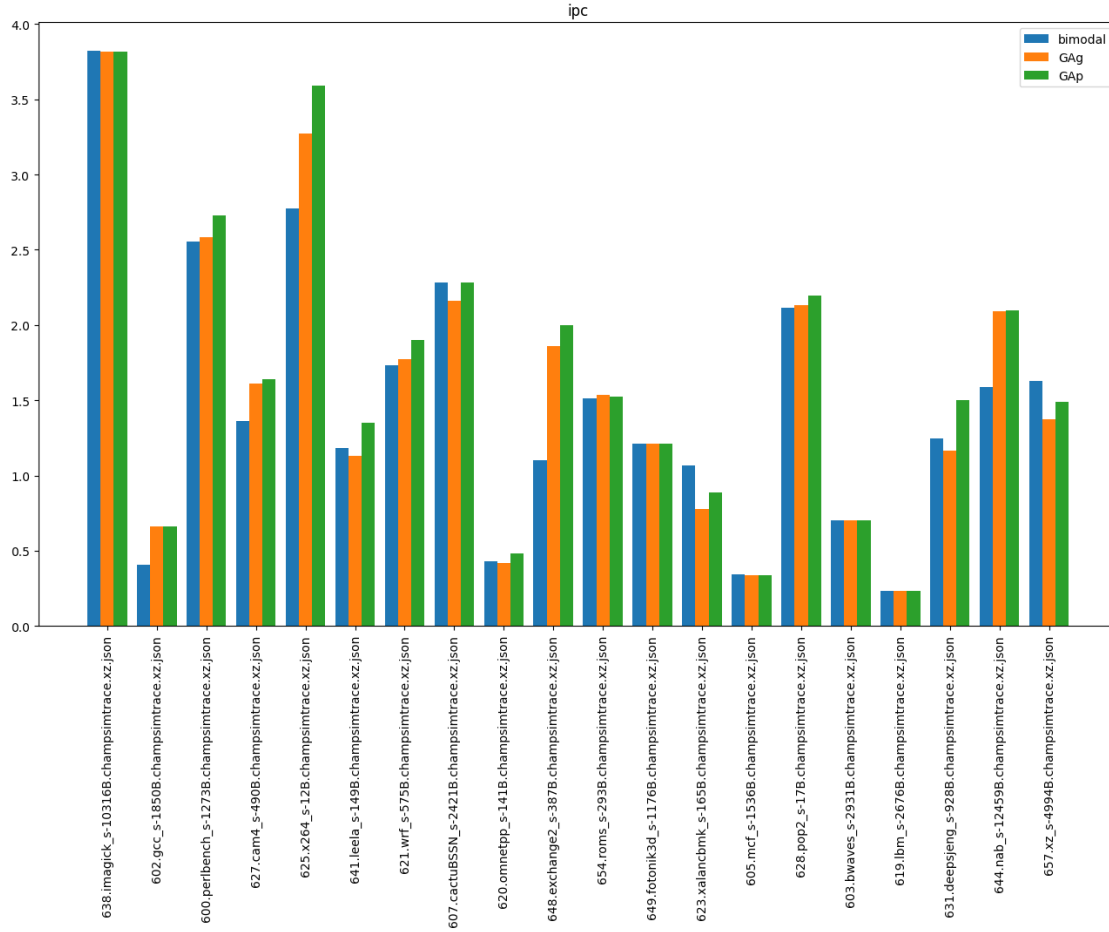
```

[176]: fig, ax = plt.subplots()
      fig.set_figwidth(16)
      fig.set_figheight(9)
      executor.bar_plot(ax, mpkis, title="total mpki", xticks=tests)
      plt.show()

```

```
[177]: fig, ax = plt.subplots()
fig.set_figwidth(16)
fig.set_figheight(9)
executor.bar_plot(ax, ipc, title="ipc", xticks=tests)
plt.show()
```



```
[216]: for bp in ipcs.keys():
        print(f"GMEAN IPC for {bp}: {geometric_mean(ipcs[bp])}")
```

GMEAN IPC for bimodal: 1.1746013523417302

GMEAN IPC for GAg: 1.2339817939005608

GMEAN IPC for GAp: 1.3085142873594222

```
[217]: for bp in mpkis.keys():
        print(f"GMEAN MPKI for {bp}: {geometric_mean(mpkis[bp])}")
```

GMEAN MPKI for bimodal: 2.486299878921603

GMEAN MPKI for GAg: 2.082297794027229

GMEAN MPKI for GAp: 1.6813936713057476