

CES560M - HW1

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$$t_{execution_time} = (numberofinstructions) \times (CPI) \times t_{clk}$$

sim-seconds=sim-ticks/sim-freq

daxpy in x86

```
[yifu.w@linuxlab002 hwl]$ $GEM5/build/X86/gem5.opt --outdir="daxpy_x86" x86_vs_arm.py --prog="daxpy"
gem5 Simulator System.  http://gem5.org
gem5 is copyrighted software; use the --copyright option for details.

gem5 compiled Sep 20 2018 14:37:28
gem5 started Oct 19 2018 22:09:48
gem5 executing on linuxlab002.seas.wustl.edu, pid 9641
command line: /project/linuxlab/gem5/gem5/build/X86/gem5.opt --outdir=daxpy_x86 x86_vs_arm.py --prog=daxpy

Global frequency set at 1000000000000 ticks per second
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!
info: Entering event queue @ 0.  Starting simulation...
warn: readlink() called on '/proc/self/exe' may yield unexpected results in various settings.
    Returning '/project/linuxlab/gem5/test_progs/daxpy/daxpy_x86'
info: Increasing stack size by one page.
warn: ignoring syscall access(...)
7425.000000
Exiting @ tick because
[yifu.w@linuxlab002 hwl]$
```

```

----- Begin Simulation Statistics -----
sim_seconds                0.000947                # Nu
mber of seconds simulated
sim_ticks                  947095000                # Nu
mber of ticks simulated
final_tick                 947095000                # Nu
mber of ticks from beginning of simulation (restored from checkpoints and never
reset)
sim_freq                   1000000000000            # F
requency of simulated ticks
host_inst_rate             105754                  # Si
mulator instruction rate (inst/s)
host_op_rate              203833                    # Si
mulator op (including micro ops) rate (op/s)
host_tick_rate            9785327321               # Si
mulator tick rate (ticks/s)
host_mem_usage             787996                   # Nu
mber of bytes of host memory used
host_seconds              0.10                      # Re
al time elapsed on the host
sim_insts                 10233                     # Nu
mber of instructions simulated
"stats.txt" 434L, 51045C                                11,1        Top

```

daxpy in arm

```

[yifu.w@linuxlab002 hwl]$ $GEM5/build/ARM/gem5.opt --outdir="daxpy_arm" x86_vs_arm.py --prog="daxpy"
gem5 Simulator System.  http://gem5.org
gem5 is copyrighted software; use the --copyright option for details.

gem5 compiled Sep 25 2018 14:08:26
gem5 started Oct 19 2018 22:12:15
gem5 executing on linuxlab002.seas.wustl.edu, pid 9816
command line: /project/linuxlab/gem5/gem5/build/ARM/gem5.opt --outdir=daxpy_arm
x86_vs_arm.py --prog=daxpy

Global frequency set at 1000000000000 ticks per second
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!
info: Entering event queue @ 0.  Starting simulation...
info: Increasing stack size by one page.
warn: readlink() called on '/proc/self/exe' may yield unexpected results in various settings.
    Returning '/project/linuxlab/gem5/test_progs/daxpy/daxpy_arm'
7425.000000
Exiting @ tick because
[yifu.w@linuxlab002 hwl]$

```

```

----- Begin Simulation Statistics -----
sim_seconds                0.000663                # Nu
mber of seconds simulated
sim_ticks                  662861416                # Nu
mber of ticks simulated
final_tick                 662861416                # Nu
mber of ticks from beginning of simulation (restored from checkpoints and never
reset)
sim_freq                   1000000000000             # F
requency of simulated ticks
host_inst_rate             153868                   # Si
mulator instruction rate (inst/s)
host_op_rate               179127                   # Si
mulator op (including micro ops) rate (op/s)
host_tick_rate             10891241933              # Si
mulator tick rate (ticks/s)
host_mem_usage             784436                   # Nu
mber of bytes of host memory used
host_seconds               0.06                     # Re
al time elapsed on the host
sim_insts                  9361                     # Nu
mber of instructions simulated
"stats.txt" 540L, 63688C                                     9,1         Top

```

queens in x86

```
[yifu.w@linuxlab002 hwl]$ $GEM5/build/X86/gem5.opt --outdir="queens_x86" x86_vs_arm.py --prog="queens"
gem5 Simulator System.  http://gem5.org
gem5 is copyrighted software; use the --copyright option for details.

gem5 compiled Sep 20 2018 14:37:28
gem5 started Oct 19 2018 22:13:06
gem5 executing on linuxlab002.seas.wustl.edu, pid 9877
command line: /project/linuxlab/gem5/gem5/build/X86/gem5.opt --outdir=queens_x86
x86_vs_arm.py --prog=queens

Global frequency set at 1000000000000 ticks per second
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!
info: Entering event queue @ 0.  Starting simulation...
warn: readlink() called on '/proc/self/exe' may yield unexpected results in various settings.
    Returning '/project/linuxlab/gem5/test_progs/queens/queens_x86'
info: Increasing stack size by one page.
warn: ignoring syscall access(...)
10 queens on a 10x10 board...
  Q - - - - -
- - Q - - - - -
- - - - - Q - - - -
- - - - - - Q - -
- - - - - - - Q
- - - - Q - - - -
- - - - - - Q -
- Q - - - - -
- - - Q - - - -
- - - - - Q - -
Exiting @ tick because
[yifu.w@linuxlab002 hwl]$
```

```

----- Begin Simulation Statistics -----
sim_seconds                      0.003933                # Nu
mber of seconds simulated
sim_ticks                       3933477000              # Nu
mber of ticks simulated
final_tick                      3933477000              # Nu
mber of ticks from beginning of simulation (restored from checkpoints and never
reset)
sim_freq                        10000000000000            # F
requency of simulated ticks
host_inst_rate                  118030                  # Si
mulator instruction rate (inst/s)
host_op_rate                    254756                  # Si
mulator op (including micro ops) rate (op/s)
host_tick_rate                 11251183516              # Si
mulator tick rate (ticks/s)
host_mem_usage                  788140                # Nu
mber of bytes of host memory used
host_seconds                    0.35                   # Re
al time elapsed on the host
sim_insts                      41261                   # Nu
mber of instructions simulated
"stats.txt" 429L, 50418C                                1,0-1      Top

```

queens in arm

```

[yifu.w@linuxlab002 hwl]$ $GEM5/build/ARM/gem5.opt --outdir="queens_arm" x86_vs_
arm.py --prog="queens"
gem5 Simulator System.  http://gem5.org
gem5 is copyrighted software; use the --copyright option for details.

gem5 compiled Sep 25 2018 14:08:26
gem5 started Oct 19 2018 22:13:44
gem5 executing on linuxlab002.seas.wustl.edu, pid 9924
command line: /project/linuxlab/gem5/gem5/build/ARM/gem5.opt --outdir=queens_arm
x86_vs_arm.py --prog=queens

Global frequency set at 1000000000000 ticks per second
warn: DRAM device capacity (8192 Mbytes) does not match the address range assign
ed (512 Mbytes)
0: system.remote_gdb: listening for remote gdb on port 7000
Beginning simulation!
info: Entering event queue @ 0. Starting simulation...
info: Increasing stack size by one page.
warn: readlink() called on '/proc/self/exe' may yield unexpected results in vari
ous settings.
    Returning '/project/linuxlab/gem5/test_progs/queens/queens_arm'
10 queens on a 10x10 board...
Q - - - - -
- - Q - - - - -
- - - - - Q - - - - -
- - - - - - - Q - -
- - - - - - - - Q
- - - - - Q - - - - -
- - - - - - - Q -
- Q - - - - -
- - - Q - - - - -
- - - - - Q - - -
Exiting @ tick because
[yifu.w@linuxlab002 hwl]$ █

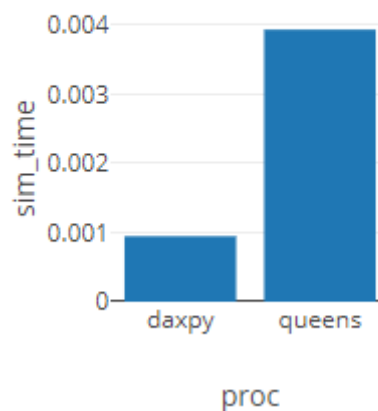
```

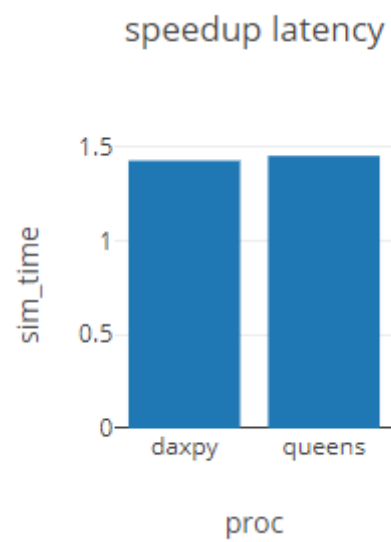
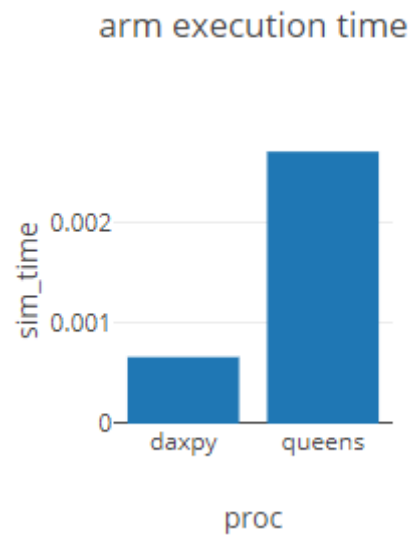
```

----- Begin Simulation Statistics -----
sim_seconds                0.002705                # Nu
mber of seconds simulated
sim_ticks                  2704954252              # Nu
mber of ticks simulated
final_tick                 2704954252              # Nu
mber of ticks from beginning of simulation (restored from checkpoints and never
reset)
sim_freq                   10000000000000           # F
requency of simulated ticks
host_inst_rate             163485                  # Si
mulator instruction rate (inst/s)
host_op_rate               185788                  # Si
mulator op (including micro ops) rate (op/s)
host_tick_rate             11704545077             # Si
mulator tick rate (ticks/s)
host_mem_usage             784612                  # Nu
mber of bytes of host memory used
host_seconds               0.23                    # Re
al time elapsed on the host
sim_insts                  37778                   # Nu
mber of instructions simulated
"stats.txt" 536L, 63190C                                1,0-1    Top

```

x86 execution time





	x86 execution time	arm execution time	speedup latency
daxpy	0.000947	0.000663	1.428355958
queens	0.003933	0.002705	1.453974122

ARM is faster