

Microbenchmark Execution on Normal Machine:

```
vt-cs@OptiPlex-7020:~/raghavs/openpitonHawkFpga/openpitonHawk/openpitonHawk/piton/verif/diag/c/riscv/ariane$ gcc hawk_demo.c -o hawk_demo.o
vt-cs@OptiPlex-7020:~/raghavs/openpitonHawkFpga/openpitonHawk/openpitonHawk/piton/verif/diag/c/riscv/ariane$ /usr/bin/time -v ./hawk_demo.o
Performing HAWK Test ..
-----
Start of Array1=0x601060
End of Array1=0x3afdf060
-----
Start of Array2=0x3afdf060
End of Array2=0x5367f060
-----
Computing on Array1...!
Working on Page 1 to Page 50001..
Working on Page 50001 to Page 100001..
Working on Page 100001 to Page 150001..
Working on Page 150001 to Page 200001..
Working on Page 200001 to Page 250001..
-----
Computed Value On Array1=28825085405
-----
Computing on Array2...!
Working on Page 1 to Page 50001..
Working on Page 50001 to Page 100001..
-----
Computed Value On Array2=255997450000
-----
Re-Computing on Array1...!
Working on Page 1 to Page 50001..
Working on Page 50001 to Page 100001..
Working on Page 100001 to Page 150001..
Working on Page 150001 to Page 200001..
Working on Page 200001 to Page 250001..
-----
Re-Computed Value On Array1=28825085405
-----
Completed HAWK Test!
Command being timed: "./hawk_demo.o"
User time (seconds): 1.19
System time (seconds): 0.21
Percent of CPU this job got: 100%
Elapsed (wall clock) time (h:mm:ss or m:ss): 0:01.40
Average shared text size (kbytes): 0
Average unshared data size (kbytes): 0
Average stack size (kbytes): 0
Average total size (kbytes): 0
Maximum resident set size (kbytes): 1361672
Average resident set size (kbytes): 0
Major (requiring I/O) page faults: 0
Minor (reclaiming a frame) page faults: 340156
Voluntary context switches: 1
Involuntary context switches: 3
Swaps: 0
File system inputs: 0
File system outputs: 0
Socket messages sent: 0
Socket messages received: 0
Signals delivered: 0
Page size (bytes): 4096
Exit status: 0
```

Microbenchmark Execution on FPGA programmed with HAWK integrated Openpiton:

```
[INFO] pitonstream,1.0:402: Running hawk_demo.c: 1 out of 1 test
[INFO] pitonstream,1.0:287: Compiling hawk_demo.c
sims -sys=manycore -novcs_build -midas_only -midas_args='-DUAR
[INFO] pitonstream,1.0:294: Compiling C test from mem.image for hawk_demo.c
[INFO] pitonstream,1.0:300: Creating addr:data map for the test
[INFO] pitonstream,1.0:268: Found 1 sections
[INFO] pitonstream,1.0:314: Extracting test sections
[INFO] make_mem_map.py:387: Checking correctness of section mapping...
[INFO] make_mem_map.py:400: Correct!
[INFO] make_mem_map.py:318: Used 62 out of 16777216 blocks of storage
Loading a test...
100%
TEST OUTPUT >>>
Performing HAWK Test ..
-----
Start of Array1=0x80000f68
End of Array1=0xba9def68
-----
Start of Array2=0xba9def68
End of Array2=0xd307ef68
-----
Computing on Array1...!
Working on Page 1 to Page 50001..
Working on Page 50001 to Page 100001..
Working on Page 100001 to Page 150001..
Working on Page 150001 to Page 200001..
Working on Page 200001 to Page 250001..
-----
Computed Value On Array1=28825085405
-----
Computing on Array2...!
Working on Page 1 to Page 50001..
Working on Page 50001 to Page 100001..
-----
Computed Value On Array2=2559974500000
-----
Re-Computing on Array1...!
Working on Page 1 to Page 50001..
Working on Page 50001 to Page 100001..
Working on Page 100001 to Page 150001..
Working on Page 150001 to Page 200001..
Working on Page 200001 to Page 250001..
-----
Re-Computed Value On Array1=28825085405
-----
Completed HAWK Test!
AC
```

Conclusion : System with HAWK computes the same computation values as that of a normal machine which consumes 1.36 GB memory but using only 1GB available memory on genesys2 kintex FPGA board.

Compression and Decompression Count during execution:

ZsPgCnt: ZssPage Count. One ZsPage can hold 3 compressed pages

DeCompPgCnt: Decompression Page count

Name	Value	
> debug_cmp_mgr[zsPgCnt][31:0]	184216	0 500 1,000 184216
> debug_decmp_mgr[DeCompPgCnt][31:0]	240094	240094