

CDA-5106 Project Phase 2

Installation:

Dependencies installation:

```
sudo apt-get install -y build-essential m4 x11proto-xext-dev libglu1-mesa-dev libxi-dev libxmu-dev libtbb-dev
```

Next, download the Parsec 3.0 from the website using the command:

```
wget http://parsec.cs.princeton.edu/download/3.0/parsec-3.0.tar.gz
```

This link will download everything include the test inputs of all sizes except for the precompiled binaries.

Next, unzip the tarball using:

```
tar xvf parsec-3.0.tar.gz
```

Next we need to add “*parsecmgmt*” to the environment variable in Linux. This can be done using the following command:

```
source env.sh
```

The “*env.sh*” has been provided along with the rest of the Parsec files. Now we can use the executable “*parsecmgmt*” for everything from building to running and even removing built binaries for Parsec.

Build parsec using:

```
time parsecmgmt -a build -p all
```

The time commands outputs the time it took for the command to execute

Errors during build:

"POD document had syntax errors at /usr/bin/pod2man line 68."

The error occurred since Parsec was originally designed to work with older distributions of Linux. There are two ways around this problem, one is to install an older version of Perl. The second, and the one I used, is to update the files to the newer version of Perl. This was done by changing a number of files in the following directory: *"/home/meisam/Downloads/parsec-3.0/pkgs/libs/ssl/src/doc/ssl"* by updating lines according to the following regex *"=item [0-9]the =item C<[0-9]>"*.

I cleaned the working directory by running *"parsecmgmt -a fulluninstall"* and ran the build command again. This time I got another error for unbuilt *freebsd_kern* objects not being built. On investigation, I found that this was because the Parsec definition for *"__mbstate_t"* was conflicting with the system definition. I commented out the definition in the Parsec file

"pkgs/libs/uptcpip/src/include/sys/bsd__types.h" (the path is relative to the Parsec root directory). and tried to build again. This time the build completed successfully and took a time of 5m36.089s.

Although it must be noted that this was because most of the objects had already been built in previous runs and were not removed before running the last build.

Next, I ran the test cases using the command *"parsecmgmt -a run -p all"*. The command's output is somewhat misleading as it does not stop on errors. For instance, the test case

"ext/splash2x/apps/ocean_ncp/inst/amd64-linux.gcc/bin/ocean_ncp -n258 -p1 -e1e-07 -r20000 -t28800" met with a segmentation fault but the commands execution did not stop. With numerous tests

being run, it can tedious to find out if a particular test failed or not. One can use the string matching command from Linux, *grep* to make the job easier. The majority of the test cases ran fine however (see Figure 1 below).

```

meisam@meisam-HP-Z420-Workstation: ~/Downloads/parsec-3.0
Common for 4 siblings: 2372
Common for 3 siblings: 1320
Common for 2 siblings: 574
Common for no sibling: 507
Avg. elements per patch: 5.2
Avg. interactions per patch: 110.7
Avg. interactions per element: 21.4
Number of elements in equivalent uniform mesh: 5710
Elen(hierarchical)/Elen(uniform): 32.99%

real 0m0.189s
user 0m0.165s
sys 0m0.024s
[PARSEC] [----- End of output -----]

[PARSEC] [===== Running benchmark splash2x.radix [2] =====]
[PARSEC] Setting up run directory.
[PARSEC] No archive for input 'test' available, skipping input setup.
[PARSEC] Running 'time /home/meisam/Downloads/parsec-3.0/ext/splash2x/kernels/radix/inst/and64-linux.gcc/bin/run.sh 1 test':
[PARSEC] [----- Beginning of output -----]
Generating input file ...
Running /home/meisam/Downloads/parsec-3.0/ext/splash2x/kernels/radix/inst/and64-linux.gcc/bin/radix -p1 -r4096 -n262144 -m524288:
Integer Radix Sort
262144 Keys
1 Processors
Radix = 4096
Max key = 524288

PROCESS STATISTICS
Total Rank Sort
Time Time Time
Proc 0 3754 536 3216

TIMING INFORMATION
Start time : 1549900517235944
Initialization finish time : 1549900517269760
Overall finish time : 1549900517273514
Total time with initialization : 37570
Total time without initialization : 3754

real 0m0.040s
user 0m0.032s
sys 0m0.008s
[PARSEC] [----- End of output -----]

[PARSEC] [===== Running benchmark splash2x.raytrace [2] =====]
[PARSEC] Setting up run directory.
[PARSEC] Unpacking benchmark input 'test'.
ball4.env
car.env
teapot.env
ball4.geo
car.geo
teapot.geo
[PARSEC] Running 'time /home/meisam/Downloads/parsec-3.0/ext/splash2x/apps/raytrace/inst/and64-linux.gcc/bin/run.sh 1 test':
[PARSEC] [----- Beginning of output -----]
Generating input file ...

```

Figure 1: Sample output from benchmarks test runs

Finally, I ran the x264 test cases since my group was assigned that benchmark. All of the benchmarks kept crashing. After extensive debugging I found the error to be in "*pkgs/apps/x264/src/common/set.c*" in the function "*x264_cqm_delete*". The compiler on my machine "*gcc-5.**" was the root cause so I reverted my compiler to "*gcc-4.7*" after which the problem was solved and the benchmarks ran fine (Refer to Figure 2 below).

The benchmark was run using the following command:

```
parsecgmt -a run -p x264 -i simdev
```

We can change the “-i” option to change the size of the input to the benchmark. We have the option between native, simdev, simsmall, simmedium and simlarge. A more detailed discussion will follow in the next phase of the project.

```
meisam@meisam-HP-Z420-Workstation: ~/Downloads/parsec-3.0
meisam@meisam-HP-Z420-Workstation: ~/Downloads/parsec-3.0
meisam@meisam-HP-Z420-Workstation: ~/Documents/UCF/COAS600
meisam@meisam-HP-Z420-Workstation: ~/Downloads

meisam@meisam-HP-Z420-Workstation:~/Downloads/parsec-3.0$ ls
bin  CHANGELOG  config  CONTRIBUTORS  eledream.264  env.sh  ext  FAQ  LICENSE  log  man  pkgs  README  toolkit  version
(reverse-i-search) 'par': wget http://crsec.cs.princeton.edu/download/
(reverse-i-search) 'x264': sudo apt-get install niktet^C
meisam@meisam-HP-Z420-Workstation:~/Downloads/parsec-3.0$ ^C
meisam@meisam-HP-Z420-Workstation:~/Downloads/parsec-3.0$ parsecngnt -a run -p x264 -l sindev
parsecngnt: command not found
meisam@meisam-HP-Z420-Workstation:~/Downloads/parsec-3.0$ source env.sh
meisam@meisam-HP-Z420-Workstation:~/Downloads/parsec-3.0$ parsecngnt -a run -p x264 -l sindev
[PARSEC] Benchmarks to run: parsec.x264

[PARSEC] [===== Running benchmark parsec.x264 [1] =====]
[PARSEC] Deleting old run directory.
[PARSEC] Setting up run directory.
[PARSEC] Unpacking benchmark input 'sindev'.
eledream_64x36_3.y4m
[PARSEC] Running 'time /home/meisam/Downloads/parsec-3.0/pkgs/apps/x264/inst/and64-linux.gcc/bin/x264 --quiet --qp 20 --partitions b8x8,l4x4 --ref 5 --direct auto --b-pyramid --weightb --mixed-refs --no-f
ast-pskip --ne umh --subme 7 --analyse b8x8,l4x4 --threads 1 -o eledream.264 eledream_64x36_3.y4m':
[PARSEC] [----- Beginning of output -----]
PARSEC Benchmark Suite Version 3.0-beta-20150206
yuv4mpeg: 64x36@25/1fps, 0:0
encoded 3 frames, 2944.06 fps, 125.20 kb/s
0 1
0 2
0 3
4 5
real    0m0.025s
user    0m0.003s
sys     0m0.000s
[PARSEC] [----- End of output -----]
[PARSEC]
[PARSEC] BIBLIOGRAPHY
[PARSEC] [1] Bienta. Benchmarking Modern Multiprocessors. Ph.D. Thesis, 2011.
[PARSEC] Done.
meisam@meisam-HP-Z420-Workstation:~/Downloads/parsec-3.0$ vi env.sh
meisam@meisam-HP-Z420-Workstation:~/Downloads/parsec-3.0$ ls
bin  CHANGELOG  config  CONTRIBUTORS  eledream.264  env.sh  ext  FAQ  LICENSE  log  man  pkgs  README  toolkit  version
meisam@meisam-HP-Z420-Workstation:~/Downloads/parsec-3.0$
```

Figure 2: H264 example run