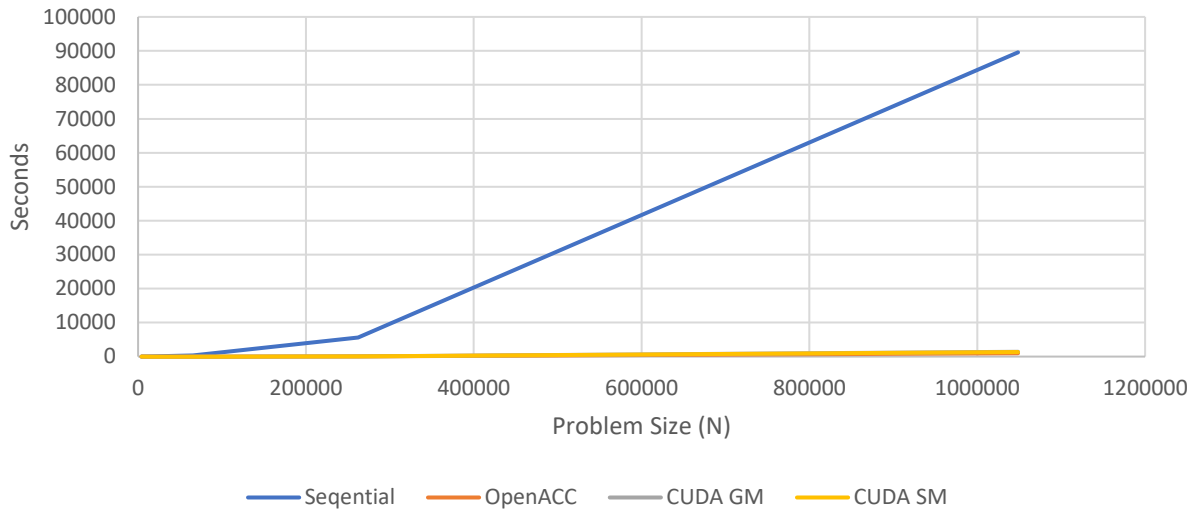


| Size/System      | Intel Core i3-7100 Dual Core @ 3.90GHz (CPU)<br>Nvidia Geforce GTX 1050 TI (GPU) |                |                   |
|------------------|--|----------------|-------------------|
|                  | Method   | Speed(seconds) | Speedup(Ts/Tp)    |
| <b>4,096</b>     | Sequential   | 1.907368       |                   |
|                  | OpenACC  | 0.1283052      | 14.865 (1456.5 %) |
|                  | CUDA Global Memory   | 0.04443002     | 42.929 (4292.9 %) |
|                  | CUDA Shared Memory   | 0.04316807     | 44.184 (4418.6 %) |
| <b>16,384</b>    | Sequential   | 24.24149       |                   |
|                  | OpenACC  | 0.456187       | 53.139 (5313.9 %) |
|                  | CUDA Global Memory   | 0.477581       | 50.758 (5075.8 %) |
|                  | CUDA Shared Memory   | 0.3654189      | 66.338 (6633.8 %) |
| <b>65,536</b>    | Sequential   | 355.5284       |                   |
|                  | OpenACC  | 3.937445       | 90.294 (9029.4 %) |
|                  | CUDA Global Memory   | 5.696616       | 62.41 (6241 %)    |
|                  | CUDA Shared Memory   | 5.450865       | 65.224 (6522.4 %) |
| <b>262,144</b>   | Sequential   | 5617.434       |                   |
|                  | OpenACC  | 61.06935       | 91.984 (9198.4 %) |
|                  | CUDA Global Memory   | 88.55316       | 63.435 (6343.5 %) |
|                  | CUDA Shared Memory   | 83.92049       | 66.936 (6393.7 %) |
| <b>1,048,576</b> | Sequential   | 89563.81       |                   |
|                  | OpenACC  | 979.6323       | 91.425 (9142.5 %) |
|                  | CUDA Global Memory   | 1415.992       | 63.251 (6325.1 %) |
|                  | CUDA Shared Memory   | 1343.394       | 66.669 (6666.9 %) |

There is a very significant speedup with the massively parallel approach (up to 91.9x) when using CUDA and shared memory in the GPU as recorded in the table above. The openACC approach exceeded expectations by being very competitive to the CUDA approaches. Sometimes, openACC was significantly faster.

Additionally, using shared memory to solve the problem did not provide a significant performance boost. However, it did provide a minor boost (1.3x faster than the global memory code).

Radix-2 FFT Computation Time vs Problem Size Growth



Radix-2 FFT Computation Time vs Problem Size Growth

