Homework 3

Question 3

*In this problem, you will utilize the OpenBLAS library available on Discovery. To use OpenBLAS, you will need to issue load openblas/0.3.6. Using the malmul.c program, replace the math with a call to appropriate gemm library function. Compare the speed of your solution for problem 2 with the gemm method you used.*

For this section of the assignment, the code of “matmul.c” has been modified to perform the matrix multiplications (sparse and dense) with the gemm function of the openblas library. The resulting code is included in the file “Q3.c”. Results are summarized in Table 1.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Type of multiplication | **OpenBLAS (s)** (“Q3.c”) | **Optimized (s)**  (“Q2.c”/ “Q2\_sparse.cpp” | | **Speedup** | |
| Blocked (32 block size) | Parallel (256 threads) |
| Dense | 0.012 | 3.2 | 0.41 | **3e-4** | **3e-3** |
| Sparse | 0.0046 | 0.5 | | **9e-3** | |

Table 1: Performance comparison of the matrix multiplication implementation using OpenBLAS and the implemented optimization

From the results in Table 1 we can observe that the gemm implementation of OpenBLAS is way superior to the ones proposed.