Project Title: OpenCL Matrix Multiplication

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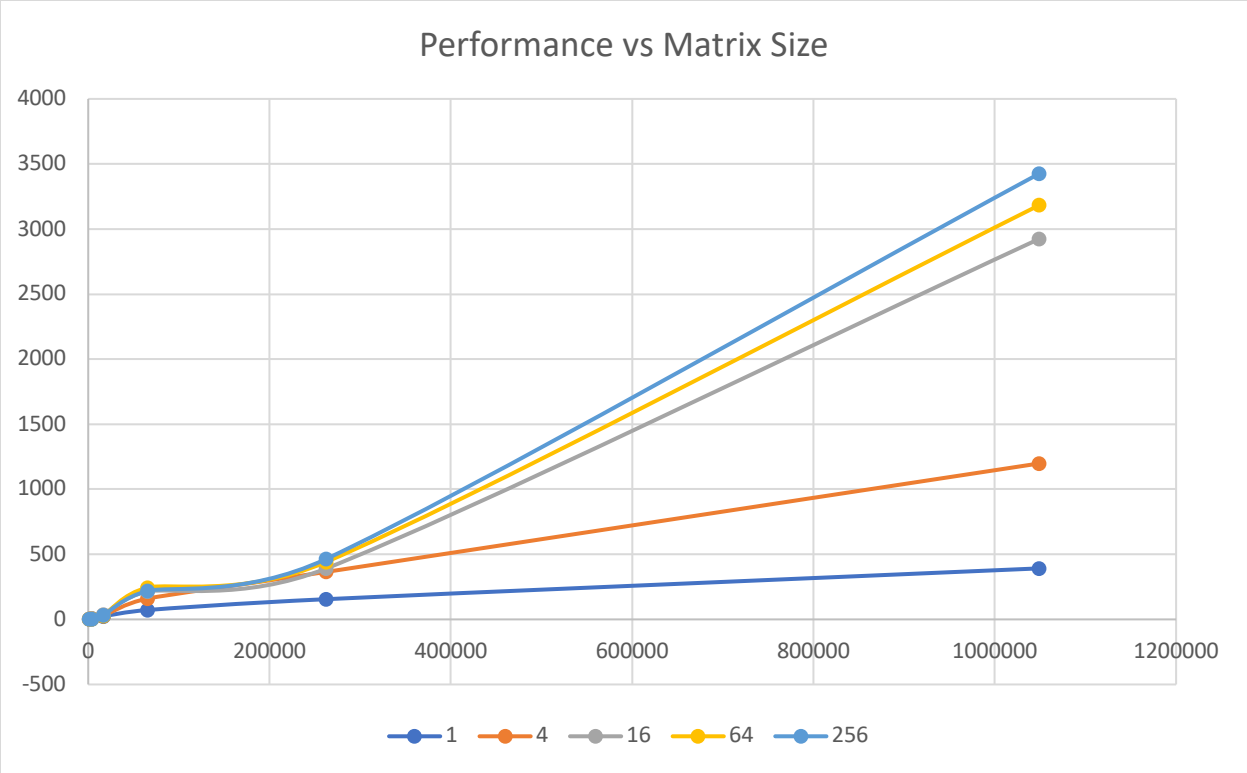
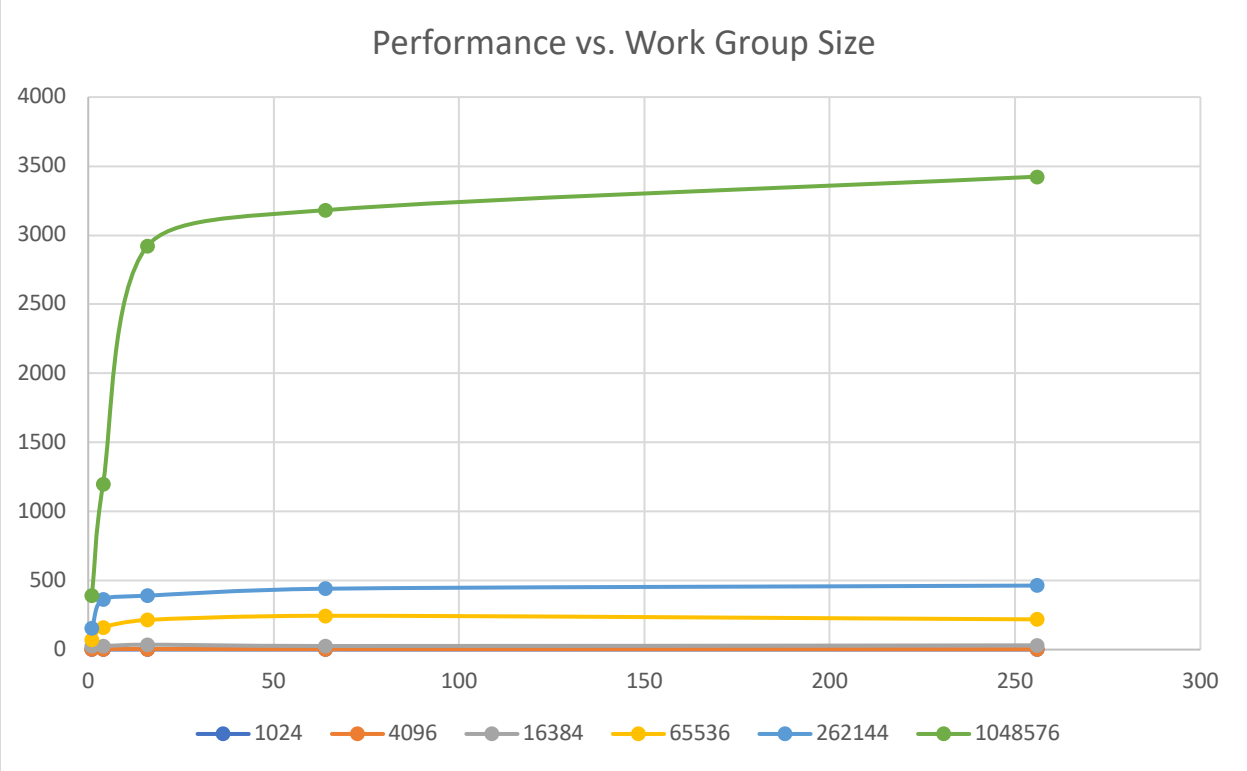
I executed the program on the Rabbit server. The program generated the following data during execution, and the graph below illustrates the results.

Matrix Size	Work Elements	GigaMultsPerSecond
1024	1	0.36
1024	4	0.37
1024	16	0.58
1024	64	0.41
1024	256	0.5
4096	1	3.13
4096	4	4.53
4096	16	4.48
4096	64	3.28
4096	256	2.37
16384	1	23.35
16384	4	25.57
16384	16	35.78
16384	64	26.02
16384	256	30.85
65536	1	72.17
65536	4	160
65536	16	214.87
65536	64	244.93
65536	256	218.76
262144	1	155.24
262144	4	364.6
262144	16	390.27
262144	64	440.73
262144	256	463.53
1048576	1	391.92
1048576	4	1197.93
1048576	16	2922.76
1048576	64	3181.61
1048576	256	3423.98


Performance vs Matrix Size
4000
3500
3000
2500
2000
1500
1000
500
0
-500
0
200000
400000
600000
800000
1000000
1200000
1
4
16
64
256


Performance vs. Work Group Size
4000
3500
3000
2500
2000
1500
1000
500
0
0
50
100
150
200
250
300
1024
4096
16384
65536
262144
1048576

The graph of matrix multiplication performance versus matrix size exhibits interesting trends and patterns. As the matrix size increases, we observe a general increase in performance. This indicates that larger matrices can be processed more efficiently, resulting in higher throughput. However, it's worth noting that the relationship is not strictly linear, as there are fluctuations in performance across different matrix sizes.

Further, the graph of matrix multiplication performance versus work-group size provides insights into the impact of work-group size on performance. In general, we can see that larger work-group sizes tend to result in higher performance. This suggests that utilizing larger work-groups allows for more efficient parallel processing and utilization of computational resources.