

## Performance Analysis

1. Tile size vs. iteration time. This test was run on phongMatScene.txt in release mode. The image resolution is 800 x 800.

Tilesizes v Iterations		
tilesizes	seconds/iteration	iterations/second
1	0.567	1.76
2	0.147	6.80
4	0.046	21.74
8	0.035	28.57
16	0.032	31.25

2. Shared memory vs. global memory. This test was run on phongMatScene.txt in release mode at 800x800 resolution. The tile size is 8. The number of iterations used is 200.

a. For the first part of the test, I recorded the time per iteration by reading from global memory only (this is what the base code does). I changed the number of lights in each test scene. Here are the results:

All data read from global memory	seconds/iteration	iterations/second
1 light, 9 geometry total	0.0331	30.21
2 lights, 9 geometry total	0.0361	27.70
3 lights, 9 geometry total	0.0394	25.38
6 lights, 9 geometry total	0.0453	22.08
9 lights, 9 geometry total	0.0254	39.37

b. I then tested the time by storing the lightID array into shared memory. Geometry is still read from global memory. Performance slows when you store more than 6 light indices into shared memory.

Light ID in shared, geometry in global	Seconds/iteration	Iterations/second
1 light in shared memory	0.032	30.86
2 lights in shared memory	0.035	28.25
3 lights in shared memory	0.038	26.18
6 lights in shared memory	0.044	22.64
9 lights in shared memory	0.025	39.92

c. Next I tested the effect of storing geometry in global versus shared memory.

All read from global memory (base cod)	Seconds/iteration	Iterations/second
1 light, 2 geometry total	0.018	56.34
1 light, 3 geometry total	0.022	44.76
1 light, 4 geometry total	0.023	43.29
1 light, 5 geometry total	0.0253	39.53
1 light, 6 geometry total	0.0289	34.60

d. Now I tried storing geometry in shared memory. I don't think shared memory has enough space to store all the geometry data since the performance is slower than reading from global memory.

	Seconds/iteration	Iterations/second
1 light in global, 2 geometry in shared	0.024	42.55
1 light in global, 3 geometry in shared	0.029	34.84
1 light in global, 4 geometry in shared	0.035	28.49
1 light in global, 5 geometry in shared	0.039	25.64
1 light in global, 6 geometry in shared	0.044	22.93
1 light in global, 9 geometry in shared	0.060	16.56