Problem 1

Runtime	Test 1	Test 2	Test 3	Test 4
p = 1	2.4327	6.3341	10.4682	10.9201
p = 2	1.2522	2.9856	5.4347	6.4642
p = 4	0.6676	1.5536	3.2606	3.5327
p = 8	0.5844	1.3602	2.5842	2.7501

Speedup (folds) $S = \frac{T_{\text{serial}}}{T_{\text{parallel}}}$

Speedup	Test 1	Test 2	Test 3	Test 4
p = 1	1	1	1	1
p = 2	1.9427	2.1215	1.9261	1.6893
p = 4	3.6439	4.0770	3.2105	3.0911
p = 8	4.1627	4.6567	4.0500	3.9708

Efficiency $E = \frac{S}{p} = \frac{\left(\frac{T_{\text{serial}}}{T_{\text{parallel}}}\right)}{p}$

Efficiency	Test 1	Test 2	Test 3	Test 4
p = 1	1	1	1	1
p = 2	0.9713	1.0607	0.9630	0.8446
p = 4	0.9109	1.0192	0.8026	0.7727
p = 8	0.5203	0.5820	0.5062	0.4963

When more processors are used, the matrix multiplication is faster. However, the efficiency is best at 1-4 cores. It becomes inefficient at 8. The speed up is highest at 8 cores. This is scalable at with large matrixes however, I believe a 50,000x50,000 would become unreasonable to compute.