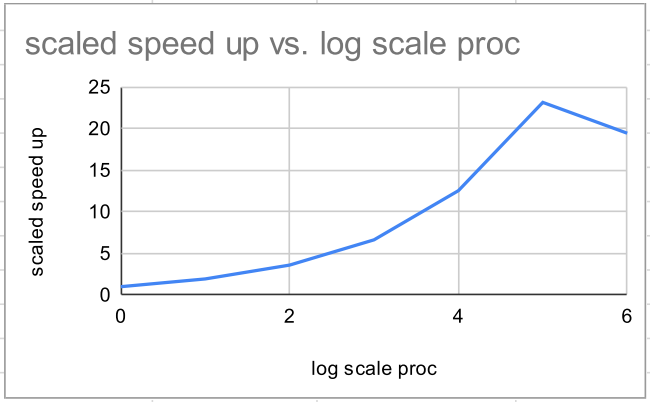
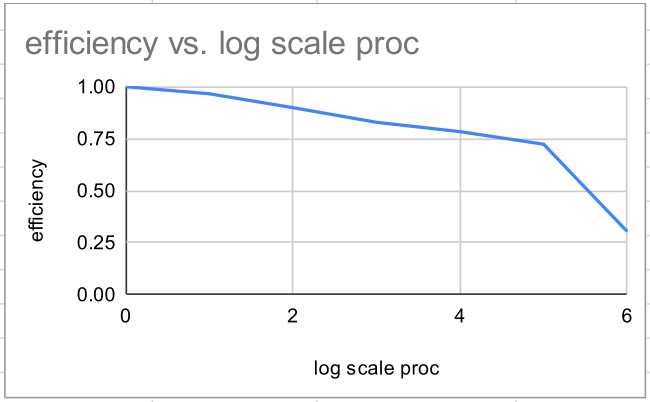
part 2 weak scalability study				I think here you just multiply the speedup by number of processes (at least this is what my math reduced down to	
processes	local list size	time	speedup	scaled speed up	efficiency
1	20480000	1.639426	1	1	1
2	20480000	1.696857	0.9661544844	1.932308969	0.9661544844
4	20480000	1.822741	0.899428937	3.597715748	0.899428937
8	20480000	1.977497	0.8290409543	6.632327634	0.8290409543
16	20480000	2.091089	0.7840058458	12.54409353	0.7840058458
32	20480000	2.265382	0.7236863363	23.15796276	0.7236863363
64	20480000	5.394263	0.3039202946	19.45089885	0.3039202946

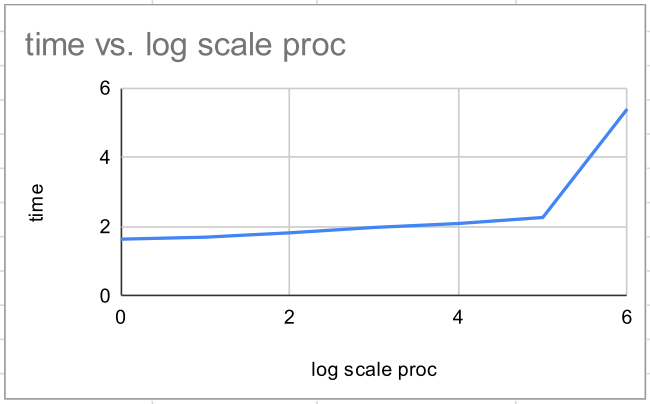
log scale proc	scaled speed up
0	1
1	1.932308969
2	3.597715748
3	6.632327634
4	12.54409353
5	23.15796276
6	19.45089885



log scale proc	efficiency
0	1
1	0.9661544844
2	0.899428937
3	0.8290409543
4	0.7840058458
5	0.7236863363
6	0.3039202946



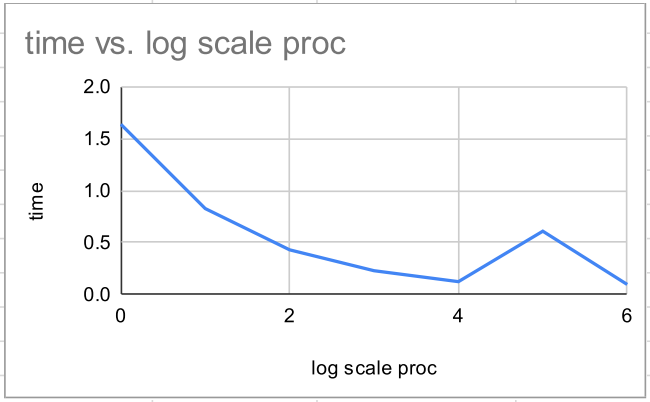
log scale proc	time
0	1.639426
1	1.696857
2	1.822741
3	1.977497
4	2.091089
5	2.265382
6	5.394263



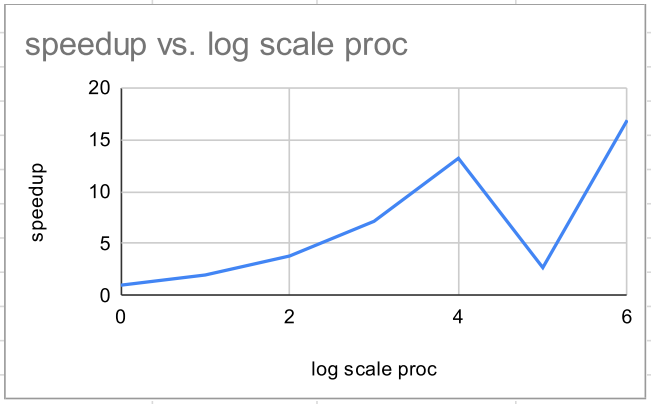
part 3 strong scalability study

processes	local list size	time	speedup	efficiency
1	20480000	1.637743	1	1
2	20480000	0.826882	1.980624805	0.9903124025
4	20480000	0.430047	3.808288396	0.9520720991
8	20480000	0.229257	7.143698993	0.8929623741
16	20480000	0.124029	13.20451669	0.8252822929
32	20480000	0.609333	2.687763505	0.08399260954
64	20480000	0.097109	16.86499707	0.2635155791

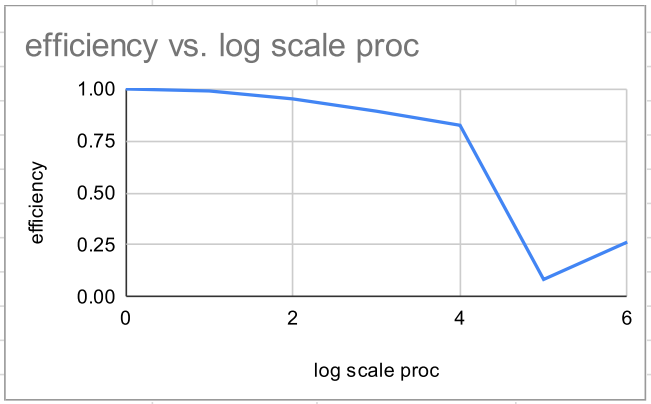
log scale proc	time
0	1.637743
1	0.826882
2	0.430047
3	0.229257
4	0.124029
5	0.609333
6	0.097109



log scale proc	speedup
0	1
1	1.980624805
2	3.808288396
3	7.143698993
4	13.20451669
5	2.687763505
6	16.86499707



log scale proc	efficiency
0	1
1	0.9903124025
2	0.9520720991
3	0.8929623741
4	0.8252822929
5	0.08399260954
6	0.2635155791



Note:

p = 32 has a large drop in performance, I ran the experiment several times and it is not an anomoly.

The only explaination I have for this is that grace has two cpus per node each with 24 cores. using 32 processes requires communication between the two cpus in the node, adding overhead

Ok actually i asked the professor about this and he says he doesn't think this is the reason, crossing cpu boundaries shouldn't add enough overhead to cause this.

He said likely it is an artifact of my set up how how grace allocates processes to cores. I think I'm just not gonna worry about it. If you ignore the spike at p=32 then the curves look fine.