Homework 7

1. Given an algorithm where the fraction that the program is serial (*f*) is .15, what is the speedup on 2, 4, 8, 16 and an infinite number of processors. You may ignore communication costs and the problem size is fixed.
2. What is the efficiency at 2, 4, 8 and 16 processes?

p	2	4	8	16	∞
speedup					
efficiency					

3. Solve problem 1 for a non-infinite number of processors where the serial portion *s* of a parallel execution is .15
4. What is the efficiency of each?

p	2	4	8	16
speedup				
efficiency				

5. Given a 1000 machine cluster, what must *s* and *f* be to obtain an efficiency of 80%?
6. Given the following two tables, what can you say about the scalability of the two programs that yield these results? If the scaling is poor, is it a result of Amdahl's Law or an increasing degree of sequential execution/overhead in the program? If the scaling is good, why do you think it is?

p	2	4	8	16	32	64
Ψ	1.8	3.6	7.2	14.4	28.8	57.6
e	0.111	0.037	0.0158	0.007	0.004	0.002

p	**2**	**4**	**8**	**16**	**32**	**64**
Ψ	1.9	3	4	5	5.5	5.7
e	0.053	0.111	0.143	0.147	0.155	0.162