

Machine 1: Joey16 with Intel® Core™ i7-4790 CPU @ 3.60 GHz – 4 cores/8 threads

Memory: 31.3 GB Available

Machine 2: Babbage20 with Intel® Core™ i7-4790 CPU @ 3.60 GHz – 4 cores/8 threads

Memory: 15.1 GB Available

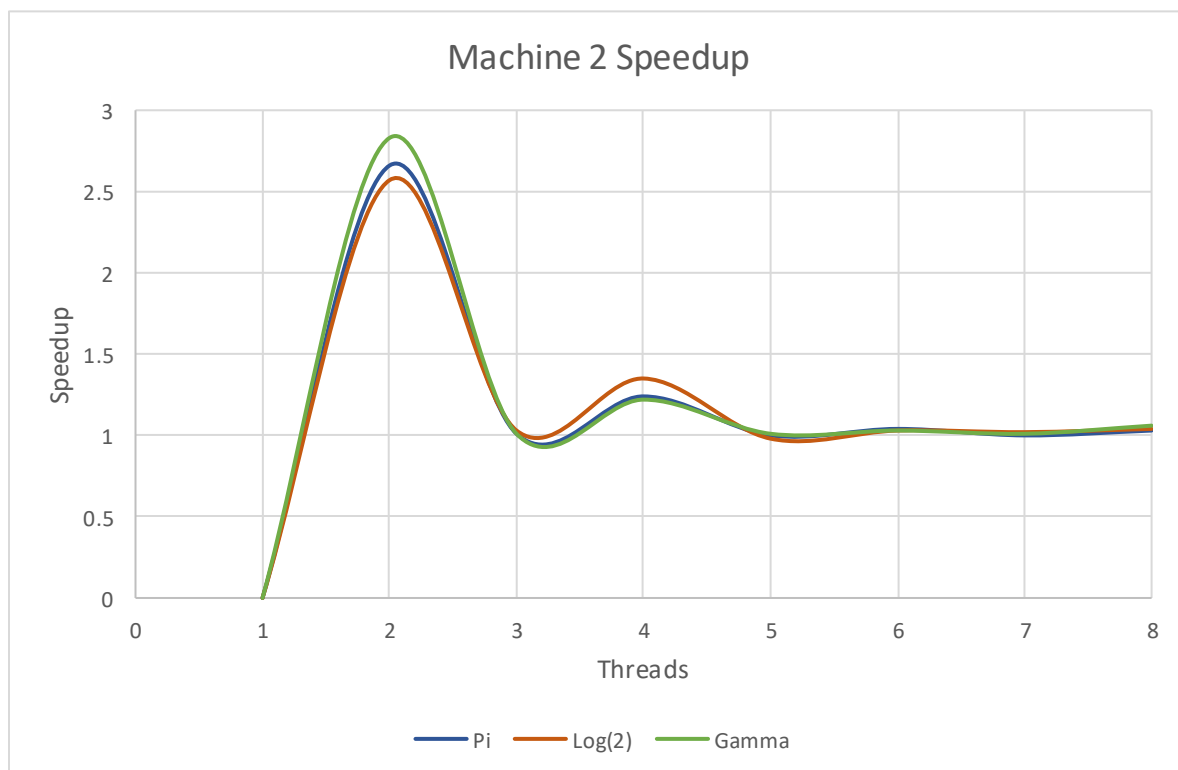
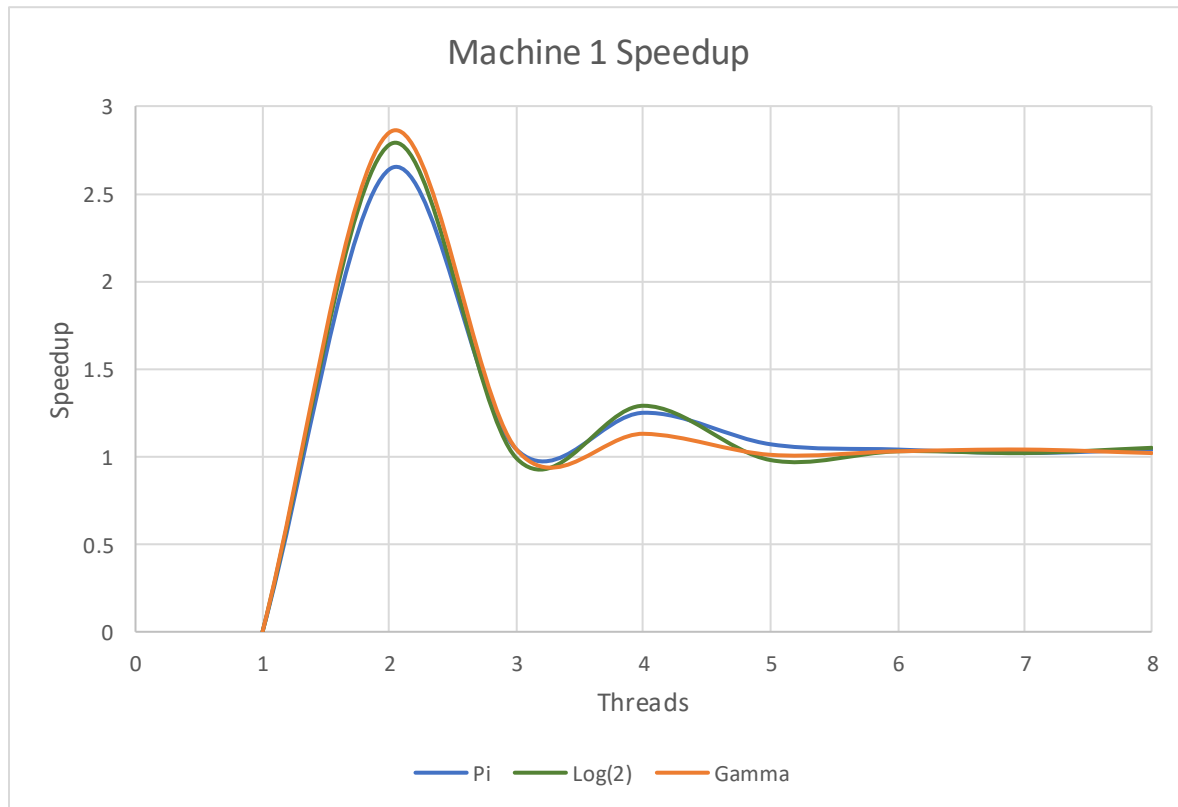
**Execution Times (in seconds):**

	Pi		Log2		Gamma	
	Machine 1	Machine 2	Machine 1	Machine 2	Machine 1	Machine 2
TD: 1	15.585 s	14.362 s	39.981 s	40.414 s	364.440 s	364.158 s
TD: 2	5.908 s	5.393 s	14.359 s	15.703 s	128.029 s	128.803 s
TD: 3	5.693 s	5.343 s	14.549 s	15.215 s	122.751 s	127.654 s
TD: 4	4.537 s	4.306 s	11.285 s	11.267 s	108.174 s	104.465 s
TD: 5	4.251 s	4.304 s	11.492 s	11.460 s	107.253 s	103.5 s
TD: 6	4.091 s	4.121 s	11.165 s	11.180 s	104.086 s	100.473 s
TD: 7	4.016 s	4.109 s	10.994 s	11.004 s	99.875 s	99.600 s
TD: 8	3.862 s	3.995 s	10.502 s	10.575 s	97.719 s	94.089 s

**Speedup:**

TD	Pi Machine 1	Pi Machine 2	Log2 Machine 1	Log2 Machine 2	Gamma Machine 1	Gamma Machine 2
TD: 0-1	0	0	0	0	0	0
TD: 1-2	2.64	2.66	2.78	2.57	2.85	2.83
TD: 2-3	1.04	1.01	0.99	1.03	1.04	1.01
TD: 3-4	1.25	1.24	1.29	1.35	1.13	1.22
TD: 4-5	1.07	1.00	0.98	0.98	1.01	1.01
TD: 5-6	1.04	1.04	1.03	1.03	1.03	1.03
TD: 6-7	1.02	1.00	1.02	1.02	1.04	1.01
TD: 7-8	1.04	1.03	1.05	1.04	1.02	1.06

**Speedup Charts:**



### **Analysis:**

Both machines used the same CPU, but machine 2 had half the total RAM available compared to machine 1. This did not seem to be a detriment to the execution times of machine 2, as majority of machine 2's average execution times were actually faster than those of machine 1 with higher RAM.

Most notable pieces of data from this experiment were the following:

- The speedup from 1 thread to 2 threads far exceeded the speedup of adding any other number of threads to the execution time.
- Both machines did not see a positive impact after going from 2-3 threads, from 4-5 threads, and 6-7 threads, with some of the execution times going up after adding an extra thread to work on. It seems that an even number of threads is more efficient for execution and adding a pair of threads will increase execution time as opposed to only adding one thread (aside from going from 1 thread to 2).
- The overall execution times from 5 threads to 8 threads were relatively the same and did not have much impact over the final execution time. While 8 threads is definitely faster than 5 threads, the end-impact would be negligible if someone were not looking to speed up executions by half a second.
- The comparisons in speedup from 1 to 8 threads across all three data types ( $\pi$ ,  $\log(2)$ , and  $\gamma$ ) all had similar ratio increases. No matter the data type or execution type, going from 1 thread to 8 threads will increase execution time by a speedup of about 3 every time.