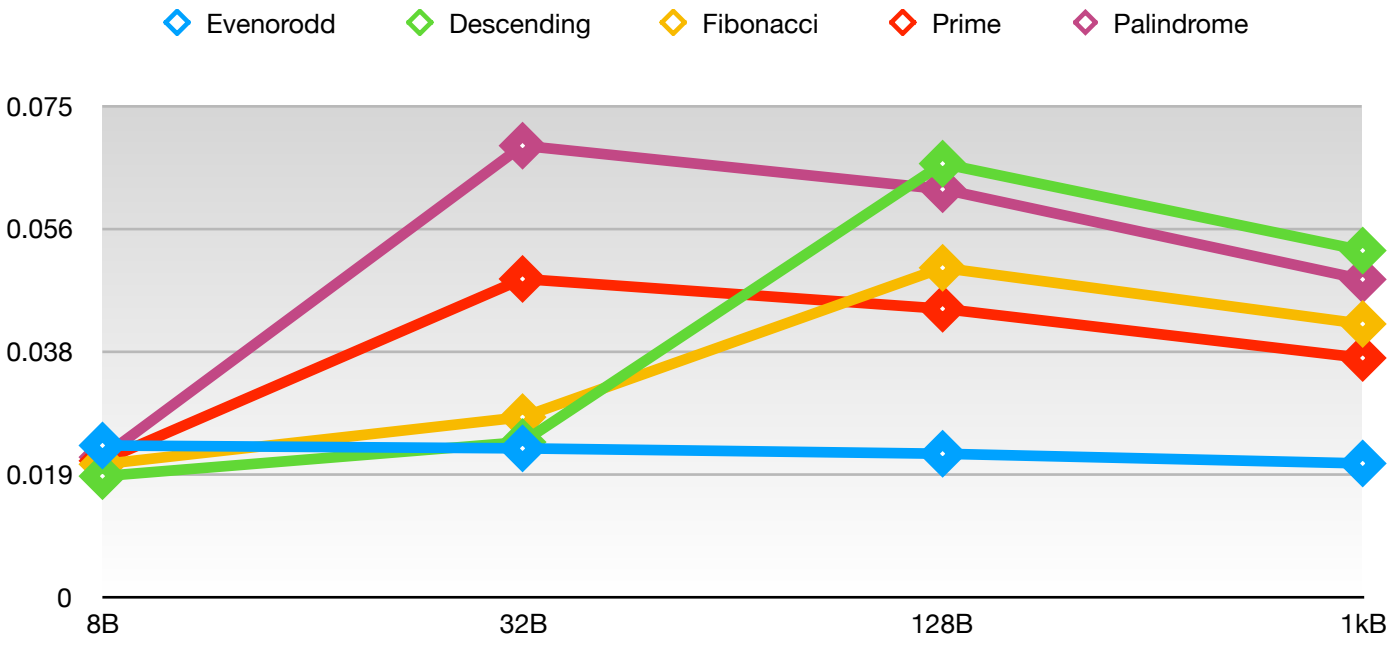
CS 311: Computer Architecture Lab

LAB 6 REPORT

BASE ASSUMPTIONS:
Main Memory Latency: 40

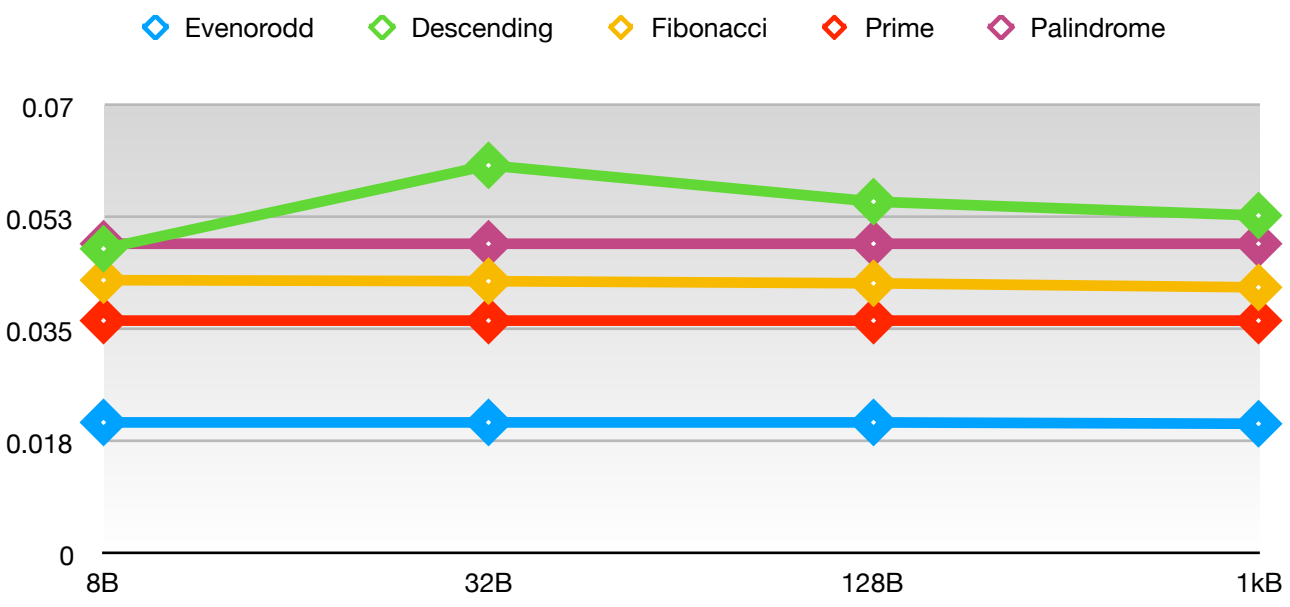
For CacheLd = 1kB

	Evenorodd	Descending	Fibonacci	Prime	Palindrome
Static Instructions	9	21	21	16	16
Dynamic Instructions	6	277	78	29	49
Assignment 5 Cycles	244	14604	3764	1364	2244
Throughput (IPC)	0.02459	0.01897	0.02072	0.02126	0.02184
CacheLi Size					
8B	260	15057	3858	1398	2300
Throughput (IPC)	0.02308	0.01840	0.02022	0.02074	0.02130
32B	265	11737	2846	598	712
Throughput (IPC)	0.02264	0.02360	0.02741	0.04849	0.06882
128B	275	4192	1554	660	788
Throughput (IPC)	0.02182	0.06608	0.05019	0.04394	0.06218
1kB	295	5244	1874	796	1012
Throughput (IPC)	0.02034	0.05282	0.04162	0.03643	0.04842



For CacheLi = 1kB

	Evenorodd	Descending	Fibonacci	Prime	Palindrome
Static Instructions	9	21	21	16	16
Dynamic Instructions	6	277	78	29	49
Assignment 5 Cycles	244	14604	3764	1364	2244
Throughput (IPC)	0.02459	0.01897	0.02072	0.02126	0.02184
CacheLd Size					
8B	292	5815	1825	796	1012
Throughput (IPC)	0.02055	0.04764	0.04274	0.03643	0.04842
32B	292	4567	1832	796	1012
Throughput (IPC)	0.02055	0.06065	0.04258	0.03643	0.04842
128B	292	5037	1846	796	1012
Throughput (IPC)	0.02055	0.05499	0.04225	0.03643	0.04842
1kB	295	5244	1874	796	1012
Throughput (IPC)	0.02034	0.05282	0.04162	0.03643	0.04842



OBSERVATIONS

3. When CacheLd is constant and CacheLi is varying, Evenorodd.asm has only 6 dynamic instructions and there are no loops, and hence the IPC decreases on increase of cache size (since it increases latency also). For the remaining benchmarks, the IPC changes based on the number of loops in the benchmark.

When CacheLi is constant and CacheLd is varying, all benchmarks except descending.asm have constant IPC. This is because descending.asm has multiple instances of writing and reading from main memory whereas the other benchmarks do not.

4. Descending.asm. Refer above for detailed statistics.

5. Memory access order: 0, 8, 4, 0, 8, 4, 0, 8, 4… and so on (19 times, followed by end instruction, thus 58 instructions).

CacheLi Size: 8B

CacheLd Size: 32B — Cycles taken: 2531 IPC: 0.02292

CacheLd Size: 128B — Cycles taken: 2423 IPC: 0.02393

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