Mohammad Javaad Akhtar - akhtar34
Fatima Nadeem - nadeemf4
Filip David Fabiszak - fabiszak

Table 1: FIFO

	Hit rate	**Hit count**	**Miss count**	**Overall eviction count**	**Clean eviction count**	**Dirty eviction count**
blocked (50)	48.8110	1180296	1237800	1237750	1091384	146366
blocked (100)	59.5366	1439651	978445	978345	905754	72591
blocked (150)	63.5665	1537098	880998	880848	818115	62733
blocked (200)	80.1577	1938289	479807	479607	464522	15085
matmul (50)	52.8845	1527284	1360676	1360626	1230698	129928
matmul (100)	58.6803	1694665	1193295	1193195	1113413	79782
matmul (150)	60.5487	1748623	1139337	1139187	1074130	65057
matmul (200)	61.1830	1766941	1121019	1120819	1072354	48465
simpleloop (50)	47.4747	4888	5408	5358	2353	3005
simpleloop (100)	70.5808	7267	3029	2929	276	2653
simpleloop (150)	73.0381	7520	2776	2626	95	2531
simpleloop (200)	73.1255	7529	2767	2567	42	2525
ls (50)	58.9521	16832	11720	11670	10017	1653
ls (100)	77.6688	22176	6376	6276	5326	950
ls (150)	92.9042	26526	2026	1876	1496	380
ls (200)	96.8969	27666	886	686	495	191

Table 2: LRU

	Hit rate	**Hit count**	**Miss count**	**Overall eviction count**	**Clean eviction count**	**Dirty eviction count**
blocked (50)	99.7839	2412871	5225	5175	2822	2353
blocked (100)	99.8433	2414308	3788	3688	2605	1083
blocked (150)	99.8441	2414325	3771	3621	2558	1063
blocked (200)	99.8471	2414398	3698	3498	2435	1063
matmul (50)	63.9459	1846738	1041230	1041180	1040071	1109
matmul (100)	65.1500	1881510	1006458	1006358	1005276	1082
matmul (150)	98.8612	2855080	32888	32738	31656	1082
matmul (200)	98.8616	2855091	32877	32677	31595	1082
simpleloop (50)	72.9215	7508	2788	2738	93	2645
simpleloop (100)	73.9025	7609	2687	2587	2	2585
simpleloop (150)	73.9219	7611	2685	2535	0	2535
simpleloop (200)	73.9219	7611	2685	2485	0	2485
ls (50)	96.4136	27528	1024	974	660	314
ls (100)	98.6061	28154	398	298	75	223
ls (150)	98.9528	28253	299	149	1	148
ls (200)	99.0719	28287	265	65	0	65

Table 3: CLOCK

	Hit rate	**Hit count**	**Miss count**	**Overall eviction count**	**Clean eviction count**	**Dirty eviction count**
blocked (50)	99.7630	2412405	5731	5681	3254	2427
blocked (100)	99.8226	2413847	4289	4189	2616	1573
blocked (150)	99.8435	2414352	3784	3634	2568	1066
blocked (200)	99.8691	2414970	3166	2966	1899	1067
matmul (50)	63.9454	1846717	1041243	1041193	1040088	1105
matmul (100)	65.3117	1886177	1001783	1001683	1000606	1077
matmul (150)	98.8121	2853654	34306	34156	33078	1078
matmul (200)	98.8403	2854467	33493	33293	32212	1081
simpleloop (50)	72.8016	7484	2769	2746	102	2644
simpleloop (100)	74.2704	7635	2645	2545	1	2544
simpleloop (150)	74.3191	7640	2640	2490	0	2490
simpleloop (200)	74.3093	7639	2641	2441	0	2441
ls (50)	96.1229	27445	1107	1057	732	325
ls (100)	98.5745	28145	407	307	72	235
ls (150)	98.9633	28256	296	146	0	146
ls (200)	99.0263	28274	278	78	0	78

Table 4: OPT

	Hit rate	**Hit count**	**Miss count**	**Overall eviction count**	**Clean eviction count**	**Dirty eviction count**
blocked (50)	25.1210	607449	1810647	1810597	1489278	321319
blocked (100)	26.0408	629691	1788405	1788305	1467146	321159
blocked (150)	42.6011	1030136	1387960	1387810	1094396	293414
blocked (200)	46.5574	1125803	1292293	1292093	1006423	285670
matmul (50)	94.3320	251006	15082	15032	14251	781
matmul (100)	95.4113	253878	12210	12110	11373	737
matmul (150)	97.7143	260006	6082	5932	5216	716
matmul (200)	99.1770	263898	2190	1990	1312	678
simpleloop (50)	67.4437	6944	3352	3302	232	3070
simpleloop (100)	74.2704	7635	2645	2545	1	2544
simpleloop (150)	74.3191	7640	2640	2490	0	2490
simpleloop (200)	74.3093	7639	2641	2441	0	2441
ls (50)	51.5003	14589	13739	13689	12766	923
ls (100)	75.8331	21482	6846	6746	6259	487
ls (150)	87.6341	24825	3503	3353	2970	383
ls (200)	92.8410	26300	2028	1828	1525	303

Table 5: RAND

	Hit rate	**Hit count**	**Miss count**	**Overall eviction count**	**Clean eviction count**	**Dirty eviction count**
blocked (50)	99.6575	2409855	8281	8231	5729	2502
blocked (100)	99.7831	2412890	5246	5146	3425	1721
blocked (150)	99.8169	2413709	4427	4277	2797	1480
blocked (200)	99.8425	2414327	3809	3609	2265	1344
matmul (50)	65.5486	1893016	994944	994894	955729	39165
matmul (100)	88.8156	2564960	323000	322900	315482	7418
matmul (150)	96.6571	2791418	96542	96392	94050	2342
matmul (200)	98.0410	2831385	56575	56375	54696	1679
simpleloop (50)	70.9693	7307	2989	2939	236	2703
simpleloop (100)	73.1643	7533	2763	2663	53	2610
simpleloop (150)	73.5723	7575	2721	2571	20	2551
simpleloop (200)	73.7471	7593	2703	2503	13	2490
ls (50)	93.9129	26814	1738	1688	1263	425
ls (100)	97.7900	27921	631	531	232	299
ls (150)	98.5605	28141	411	261	67	194
ls (200)	98.9388	28249	303	103	7	96

One paragraph comparing the various algorithms in terms of the results you see in the tables.

FIFO: For all the trace files that were run, it was noticed that as the memory sized increases, so did the hit rate and hit count. All the hit rate ranged approximately from 48% - 74%; to be more specific as the memory for the blocked trace file increased its rate increased from 48% - 81%, as matmul memory sized increase its hit rate increased from 52% - 61%, simpleloop's hit rate increased from 50% - 72%, and ls traces file increase from 59% - 97%. Another thing to note is that as the memory increases for each of the tracer files, the miss count, overall eviction count and dirty count decreases. And finally, the overall values for simpleloop's hit counter, miscount, overall eviction count, clean eviction count and dirty eviction count are much smaller then blocked and matmul.

CLOCK: The hit rates for the blocked trace file remained consistent, almost a 100% hit rate, the hits counts were also consistent as they were approximately 241,000. Simple loop also had a consistent hit rate of 74% also with hit counts ranging within the 7400-7700. The miss count, overall eviction count, clean eviction count and dirty eviction count decreased as the memory

sized increased for each tracer file. Over all the numbers for each trace file were relatively consistent within each category.

LRU: The LRU have values are very similar to that of the CLOCK algorithm. The hit rates for the blocked trace file were consistent, almost a 100% hit rate. Simple loop also had a consistent hit rate of 73% also with hit counts ranging within the 7400-7700. The miss count, overall eviction count, clean eviction count and dirty eviction count decreased as the memory sized increased for each tracer file. Over all the numbers for each trace file were relatively consistent.

OPT: OPT took the longest to run among all of the algorithm, reason being is that where the pages are storied need to be entirely looped in order to find with page to evict. The data that was able to be extracted from OPT showed that simple loop had a hit count that ranged from 67% - 74%. matmul also had a high hit rate count that increased from 94% - 99% as the memory size increased. Since OPT is one of the longer algorithms, some stats for this algorithm aren't available in the table.

RAND: RAND as well had very similar values to that of the LRU algorithm. The blocked had a consistent hit rate of 99% and simple loop had 73% hit rate as the memory size increased. And like the previous algorithms, the miss count, overall eviction count, clean eviction count and dirty eviction count decrease as the memory increases. The blocked and matmul traces had much larger values in general in comparison to the simpleloop and ls file.

When comparing the algorithms, it's interesting that the values of LRU, CLOCK, and RAND, are very similar, especially their hit rate. Something else that's surprising is the hit rates for the RAND algorithm, its hit rates are much better than that of the FIFO file. In general, FIFO had a much lower hit count among all other algorithms; while other algorithms had a hit rate of 99% with the blocked file, FIFO had hit rates that ranged from 48% - 80%. Throughout all the trace files, no matter which algorithm, the hit rate values would range within the low 70s%. Also, LRU, CLOCK and OPT had 0 clean evictions at some point in their calculation, either with the ls trace file or simpleloop. Overall, among all algorithms and trace files, as the memory sizes the number of evictions decreases and the hit rate and hit count increases, which is to be expected since the more memory/space there is then the lesser the faults will be.

A second paragraph explaining the data you obtained for LRU as the size of memory increases.

It's a general trend with all the algorithms that as the memory size increases then so does the hit rate and hit count. This also holds true for the LRU which isn't a surprise since in lecture we learned that as the memory size/space increases then the hit rate will also increase due to there

being a greater number of pages being stored properly thus having a lower number of faults. Something extra to notice is that the number of dirty evictions is relatively small, in comparison to other algorithms; they are all within a similar range that doesn't exceed 2,600. The trace files have an even smaller number of dirty eviction, ranging in the low hundreds. The simple loop had the smallest numbers of clean evictions, there were 2 incidences where there were 0 clean evictions.