

[*Note: All data was generated using swap size of 999999999].

Random algorithm

simpleloop	50	100	150	200
Hit rate	70.9950	73.0508	73.6327	73.6908
Hit count	7321	7533	7593	7599
Miss count	2991	2779	2719	2713
Miss rate	29.0050	26.9492	26.3673	26.3092
Total reference count	10312	10312	10312	10312
Clean eviction count	246	69	19	20
Dirty eviction count	2695	2610	2550	2493

matmul	50	100	150	200
Hit rate	65.5259	88.7919	96.6572	98.0462
Hit count	1892426	2564361	2791513	2831628
Miss count	995630	323695	96543	56428
Miss rate	34.4741	11.2081	3.3428	1.9538
Total reference count	2888056	2888056	2888056	2888056
Clean eviction count	956163	316069	94047	54566
Dirty eviction count	39417	7526	2346	1662

blocked	50	100	150	200
Hit rate	99.6485	99.7839	99.8170	99.8412
Hit count	2409701	2412975	2413774	2414359
Miss count	8499	5225	4426	3841
Miss rate	0.3515	0.2161	0.1830	0.1588
Total reference count	2418200	2418200	2418200	2418200
Clean eviction count	5889	3398	2787	2307
Dirty eviction count	2560	1727	1489	1334

FIFO algorithm

simpleloop	50	100	150	200
Hit rate	71.1792	73.2739	73.6715	73.7490
Hit count	7340	7556	7597	7605
Miss count	2972	2756	2715	2707
Miss rate	28.8208	26.7261	26.3285	26.2510
Total reference count	10312	10312	10312	10312
Clean eviction count	209	45	16	12
Dirty eviction count	2713	2611	2549	2495

matmul	50	100	150	200
Hit rate	60.9679	62.4819	98.8087	98.8267
Hit count	1760788	1804513	2853650	2854171
Miss count	1127268	1083543	34406	33885
Miss rate	39.0321	37.5181	1.1913	1.1733
Total reference count	2888056	2888056	2888056	2888056
Clean eviction count	1083225	1061220	32942	32432
Dirty eviction count	43993	22223	1314	1253

blocked	50	100	150	200
Hit rate	99.7312	99.8208	99.8254	99.8689
Hit count	2411700	2413867	2413978	2415030
Miss count	6500	4333	4222	3170
Miss rate	0.2688	0.1792	0.1746	0.1311
Total reference count	2418200	2418200	2418200	2418200
Clean eviction count	4174	2756	2651	1874
Dirty eviction count	2276	1477	1421	1096

LRU algorithm

simpleloop	50	100	150	200
Hit rate	73.1090	73.9818	74.0012	74.0012
Hit count	7539	7629	7631	7631
Miss count	2773	2683	2681	2681
Miss rate	26.8910	26.0182	25.9988	25.9988
Total reference count	10312	10312	10312	10312
Clean eviction count	85	2	0	0
Dirty eviction count	2638	2581	2531	2481

matmul	50	100	150	200
Hit rate	63.9475	65.1512	98.8614	98.8618
Hit count	1846841	1881604	2855172	2855184
Miss count	1041215	1006452	32884	32872
Miss rate	36.0525	34.8488	1.1386	1.1382
Total reference count	2888056	2888056	2888056	2888056
Clean eviction count	1040062	1005274	31656	31594
Dirty eviction count	1103	1078	1078	1078

blocked	50	100	150	200
Hit rate	99.7843	99.8436	99.8443	99.8473
Hit count	2412984	2414419	2414435	2414508
Miss count	5216	3781	3765	3692
Miss rate	0.2157	0.1564	0.1557	0.1527
Total reference count	2418200	2418200	2418200	2418200
Clean eviction count	2818	2603	2557	2434
Dirty eviction count	2348	1078	1058	1058

Clock algorithm

simpleloop	50	100	150	200
Hit rate	73.0217	73.9430	73.9915	73.9915
Hit count	7530	7625	7630	7630
Miss count	2782	2687	2682	2682
Miss rate	26.9783	26.0570	26.0085	26.0085
Total reference count	10312	10312	10312	10312
Clean eviction count	90	4	0	0
Dirty eviction count	2642	2583	2532	2482

matmul	50	100	150	200
Hit rate	63.9471	65.3125	98.7994	98.8613
Hit count	1846828	1886263	2853382	2855171
Miss count	1041228	1001793	34674	32885
Miss rate	36.0529	34.6875	1.2006	1.1387
Total reference count	2888056	2888056	2888056	2888056
Clean eviction count	1040072	1000613	33445	31607
Dirty eviction count	' 1106	1080	1079	1078

blocked	50	100	150	200
Hit rate	99.7618	99.8220	99.8438	99.8674
Hit count	2412440	2413895	2414423	2414994
Miss count	5760	4305	3777	3206
Miss rate	0.2382	0.1780	0.1562	0.1326
Total reference count	2418200	2418200	2418200	2418200
Clean eviction count	3279	2611	2569	1939
Dirty eviction count	2431	1594	1058	1067

OPT algorithm

simpleloop	50	100	150	200
Hit rate	74.1563	74.3988	74.3988	74.3988
Hit count	7647	7672	7672	7672
Miss count	2665	2640	2640	2640
Miss rate	25.8437	25.6012	25.6012	25.6012
Total reference count	10312	10312	10312	10312
Clean eviction count	19	0	0	0
Dirty eviction count	2596	2540	2490	2440

matmul	50	100	150	200
Hit rate	79.6593	96.7870	99.0786	99.3331
Hit count	2300604	2795262	2861445	2868795
Miss count	587452	92794	26611	19261
Miss rate	20.3407	3.2130	0.9214	0.6669
Total reference count	2888056	2888056	2888056	2888056
Clean eviction count	586319	91612	25379	17979
Dirty eviction count	1083	1082	1082	1082

blocked	50	100	150	200
Hit rate	99.8468	99.8757	99.8957	99.9060
Hit count	2414496	2415194	2415677	2415927
Miss count	3704	3006	2523	2273
Miss rate	0.1532	0.1243	0.1043	0.0940
Total reference count	2418200	2418200	2418200	2418200
Clean eviction count	2572	1836	1301	1011
Dirty eviction count	1082	1070	1072	1062

When it comes to the hit rates for simpleloop, we see that OPT has the best rate overall. However, as can be seen from the tables, all of the page replacement algorithms have very similar hit rates across all memory sizes, hovering around 70-74 percent.

When it comes to the hit rates for matmul, OPT again is the best. The rest of the algorithms have very similar hit rates on memory size of 50, within +/- 5 percent. However, on memory size 100, random has a way better hit rate at 88 percent, with the rest of the algorithms (excluding OPT) having hit rates similar to memory size 50. In memory sizes 150 and 200, all the algorithms have a very high hit rate of 98-99 percent.

When it comes to the hit rates for blocked, besides OPT being marginally better than the rest of the algorithms, all the page replacement algorithms also had a very high hit rate, hovering around 98-99 percent across all memory sizes.

The LRU algorithm was ran against three different traces files in order to analyze what happens as the size of memory is increased. Looking across all the three traces; simpleloop, matmul and blocked, increasing the memory size generally increased the hit rate of the algorithm. Another trend is the number of clean evictions generally decreased, and so did the number of dirty evictions with increase in memory size.
