Rand				
Simpleloop				
Memory Size	50	100	150	200
Hit rate	71.7289	74.0102	74.293	74.3307
Hit count	7609	7851	7881	7885
Miss count	2999	2757	2727	2723
Overall evictions count	2949	2657	2577	2523
Clean evictions	154	37	13	11
Dirty evictions	2795	2620	2564	2512
Matmul				
Memory Size	50	100	150	200
Hit rate	65.5239	88.8005	96.6836	98.0297
Hit count	1892418	2564680	2792354	2831230
Miss count	995718	323456	95782	56906
Overall evictions count	995668	323356	95632	56706
Clean evictions	478248	158138	46822	27709
Dirty evictions	517420	165218	48810	28997
Blocked				
Memory Size	50	100	150	200
Hit rate	99.6568	99.7857	99.8205	99.8423
Hit count	2409933	2413050	2413891	2414418
Miss count	8299	5182	4341	3814
Overall evictions count	8249	5082	4191	3614
Clean evictions	3004	1806	1535	1303
Dirty evictions	5245	3276	2656	2311
Interesting				
Memory Size	50	100	150	200
Hit rate	34.2487	35.6893	36.232	36.4796
Hit count	13694	14270	14487	14586
Miss count	26290	25714	25497	25398
Overall evictions count	26240	25614	25347	25198
Clean evictions	318	159	90	68
Dirty evictions	25922	25455	25257	25130

FIFO				
Simpleloop				
Memory Size	50	100	150	200
Hit rate	71.9646	73.9725	74.359	74.4344
Hit count	7634	7847	7888	7896
Miss count	2974	2761	2720	2712
Overall evictions count	2924	2661	2570	2512
Clean evictions	132	33	8	6
Dirty evictions	2792	2628	2562	2506
Matmul				
Memory Size	50	100	150	200
Hit rate	60.9695	62.4829	98.8087	98.8267
Hit count	1760883	1804590	2853729	2854250
Miss count	1127253	1083546	34407	33886
Overall evictions count	1127203	1083446	34257	33686
Clean evictions	541686	530670	16663	16248
Dirty evictions	585517	552776	17594	17438
Blocked				
Memory Size	50	100	150	200
Hit rate	99.7346	99.822	99.826	99.8693
Hit count	2411814	2413927	2414025	2415071
Miss count	6418	4305	4207	3161
Overall evictions count	6368	4205	4057	2961
Clean evictions	2086	1380	1356	994
Dirty evictions	4282	2825	2701	1967
Interesting				
Memory Size	50	100	150	200
Hit rate	34.4338	35.8143	36.2345	36.4546
Hit count	13768	14320	14488	14576
Miss count	26216	25664	25496	25408
Overall evictions count	26166	25564	25346	25208
Clean evictions	303	131	83	61
Dirty evictions	25863	25433	25263	25147

LRU				
Simpleloop				
Memory Size	50	100	150	200
Hit rate	73.7462	74.6512	74.6795	74.6795
Hit count	7823	7919	7922	7922
Miss count	2785	2689	2686	2686
Overall evictions count	2735	2589	2536	2486
Clean evictions	68	2	0	0
Dirty evictions	2667	2587	2536	2486
Matmul				
Memory Size	50	100	150	200
Hit rate	63.9483	65.1522	98.8614	98.8618
Hit count	1846914	1881683	2855252	2855264
Miss count	1041222	1006453	32884	32872
Overall evictions count	1041172	1006353	32734	32672
Clean evictions	520110	502789	16016	15983
Dirty evictions	521062	503564	16718	16689
Blocked				
Memory Size	50	100	150	200
Hit rate	99.7877	99.8436	99.8442	99.8472
Hit count	2413099	2414449	2414465	2414538
Miss count	5133	3783	3767	3694
Overall evictions count	5083	3683	3617	3494
Clean evictions	1408	1325	1316	1279
Dirty evictions	3675	2358	2301	2215
Interesting				
Memory Size	50	100	150	200
Hit rate	36.9173	37.0698	37.0698	37.0698
Hit count	14761	14822	14822	14822
Miss count	25223	25162	25162	25162
Overall evictions count	25173	25062	25012	24962
Clean evictions	42	0	0	0
Dirty evictions	25131	25062	25012	24962

CLOCK				
Simpleloop				
Memory Size	50	100	150	200
Hit rate	73.5388	74.6324	74.6606	74.6795
Hit count	7801	7917	7920	7922
Miss count	2807	2691	2688	2686
Overall evictions count	2757	2591	2538	2486
Clean evictions	75	3	0	0
Dirty evictions	2682	2588	2538	2486
Matmul				
Memory Size	50	100	150	200
Hit rate	63.9474	63.956	98.8502	98.8608
Hit count	1846888	1847135	2854929	2855233
Miss count	1041248	1041001	33207	32903
Overall evictions count	1041198	1040901	33057	32703
Clean evictions	520117	519978	16122	15987
Dirty evictions	521081	520923	16935	16716
Blocked				
Memory Size	50	100	150	200
Hit rate	99.786	99.8334	99.8376	99.8687
Hit count	2413056	2414204	2414305	2415057
Miss count	5176	4028	3927	3175
Overall evictions count	5126	3928	3777	2975
Clean evictions	1433	1324	1322	1047
Dirty evictions	3693	2604	2455	1928
Interesting				
Memory Size	50	100	150	200
Hit rate	36.8722	37.0598	37.0698	37.0698
Hit count	14743	14818	14822	14822
Miss count	25241	25166	25162	25162
Overall evictions count	25191	25066	25012	24962
Clean evictions	52	2	0	0
Dirty evictions	25139	25064	25012	24962

OPT				
Simpleloop				
Memory Size	50	100	150	200
Hit rate	74.7549	75.1225	75.1225	75.1225
Hit count	7930	7969	7969	7969
Miss count	2678	2639	2639	2639
Overall evictions count	2628	2539	2489	2439
Clean evictions	26	0	0	0
Dirty evictions	2602	2539	2489	2439
Matmul				
Memory Size	50	100	150	200
Hit rate	79.6595	96.787	99.0786	99.3331
Hit count	2300676	2795341	2861524	2868874
Miss count	587460	92795	26612	19262
Overall evictions count	587410	92695	26462	19062
Clean evictions	293420	46010	12928	9237
Dirty evictions	293990	46685	13534	9825
Blocked				
Memory Size	50	100	150	200
Hit rate	99.8471	99.8761	99.8958	99.9061
Hit count	2414535	2415236	2415711	2415961
Miss count	3697	2996	2521	2271
Overall evictions count	3647	2896	2371	2071
Clean evictions	1325	1043	822	653
Dirty evictions	2322	1853	1549	1418
Interesting				
Memory Size	50	100	150	200
Hit rate	37.1123	37.1699	37.1699	37.1699
Hit count	14839	14862	14862	14862
Miss count	25145	25122	25122	25122
Overall evictions count	25095	25022	24972	24922
Clean evictions	13	0	0	0
Dirty evictions	25082	25022	24972	24922

Conclusion:

********** Comparison paragraph**********

#interesting# is the program we wrote to distribute read and write in a very large range of pages, thus our discussion is based on the observation and statistics extracted from the three programs given because they are more common in real world. No algorithms can save #interesting# overhead here. In general, all algorithms' hit rate would increase as memory size increase. Because locality ensure that most pages could stay in the frame space if frame space is large enough and we do not deliberately distribute pages in a wide range. *RANDOM* algorithm behaves decently when memory size is limited within 100 because there is a threshold when exploiting specific strategy to achieve efficiency. *FIFO* does not behave as good as the last three algorithms in #matmul#, because #matmul#'s implementation follows an ordered pattern such that recently accessed memory locations are less likely to be accessed again. *LRU* and *CLOCK* behave quite similar to each other and a little bit better than *FIFO* in #matmul# because they at least will either bring back a page that is going to be evicted if "rescued" in time. As for *OPT*, it is obviously the best algorithm compared to the rest because it's based on the future references.

********** LRU **********

Just like all other algorithms, *LRU* benefits from increasing memory size. Because it holds the records of least recently used pages and would evict it once the frame is being take up, the property of locality of most programs(processes) would help this algorithm to increase its hit rates and thus achieve its efficiency. Frequently accessed pages would stay in the frame, less frequently accessed pages get higher chance to be kicked out and of course it is less referenced. Besides the general property we inspected from table, we also notice that there is a giant leap of hit rate from 100 to 150 when doing #matmul#, the reason behind this we think is that a hundred and more pages are frequently accessed and not accessed in a good order, making 100 frames hard to maintain hit rate in a high position. Increasing 50 frames would ensure those long-term active pages remain in the frame for a long period. Thus, we have that kind of data shown in our table.