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1.Table in Task2

./sim -f ./traceprogs/tr-simpleloop.ref -m -s

Memory size	50					
	Hit rate	Hit count	Miss count	Overall eviction count	Clean eviction count	Dirty eviction count
RAND	70.8822	7247	2977	2927	345	2582
FIFO	70.8725	7246	2978	2928	333	2595
LRU	72.7895	7442	2782	2732	207	2525
CLOCK (1 ref-bit)	72.7700	7440	2784	2734	206	2528
OPT	73.8948	7555	2669	2619	113	2506

Memory size	100					
	Hit rate	Hit count	Miss count	Overall eviction count	Clean eviction count	Dirty eviction count
RAND	72.7993	7443	2781	2681	180	2501
FIFO	73.0340	7467	2757	2657	163	2494
LRU	73.7258	7538	2686	2586	120	2466
CLOCK (1 ref-bit)	73.6796	7533	2691	2591	123	2468
OPT	74.1491	7581	2643	2543	43	2500

Memory size	150					
	Hit rate	Hit count	Miss count	Overall eviction count	Clean eviction count	Dirty eviction count
RAND	73.4742	7512	2712	2562	137	2425
FIFO	73.4253	7507	2717	2567	135	2432
LRU	73.7578	7541	2683	2533	118	2415
CLOCK (1 ref-bit)	73.7578	7541	2683	2533	118	2415
OPT	74.1491	7581	2643	2493	2	2491

Memory size	200					
	Hit rate	Hit count	Miss count	Overall eviction count	Clean eviction count	Dirty eviction count
RAND	73.4742	7512	2712	2512	134	2378
FIFO	73.5035	7515	2709	2509	131	2378
LRU	73.7578	7541	2683	2483	118	2365
CLOCK (1 ref-bit)	73.7480	7540	2684	2484	118	2366
OPT	74.1491	7581	2643	2443	2	2441

./sim -f ./traceprogs/tr-matmul.ref -m -s

Memory size	50					
	Hit rate	Hit count	Miss count	Overall eviction count	Clean eviction count	Dirty eviction count
RAND	65.5255	1892818	995854	995804	956318	39486
FIFO	60.9766	1761415	1127257	1127207	1083214	43993
LRU	63.9452	1846682	1041230	1041180	1040201	979
CLOCK (1 ref-bit)	63.9451	1846679	1041233	1041183	1040205	978
OPT	79.6581	2300455	587457	587407	586445	962

Memory size	100					
	Hit rate	Hit count	Miss count	Overall eviction count	Clean eviction count	Dirty eviction count
RAND	88.8008	2565163	323509	323409	315974	7435
FIFO	62.4898	1805124	1083548	1083448	1061223	22225
LRU	65.1494	1881456	1006456	1006356	1005396	960
CLOCK (1 ref-bit)	65.3106	1886113	1001799	1001699	1000736	963
OPT	96.7867	2795114	92798	92698	91738	960

Memory size	150					
	Hit rate	Hit count	Miss count	Overall eviction count	Clean eviction count	Dirty eviction count
RAND	96.6826	2792842	95830	95680	93386	2294
FIFO	98.8089	2854264	34408	34258	32943	1315
LRU	98.8612	2855025	32887	32737	31777	960
CLOCK (1 ref-bit)	98.7980	2853198	34714	34564	33603	961
OPT	99.0784	2861297	26615	26465	25505	960

Memory size	200					
	Hit rate	Hit count	Miss count	Overall eviction count	Clean eviction count	Dirty eviction count
RAND	98.0462	2832232	56440	56240	54606	1634
FIFO	98.8269	2854785	33887	33687	32433	1254
LRU	98.8616	2855036	32876	32676	31716	960
CLOCK (1 ref-bit)	98.8611	2855023	32889	32689	31729	960
OPT	99.3329	2868647	19265	19065	18105	960

./sim -f ./traceprogs/tr-blocked.ref -m -s

Memory size	50					
	Hit rate	Hit count	Miss count	Overall eviction count	Clean eviction count	Dirty eviction count
RAND	99.6530	2409745	8391	8341	5962	2379
FIFO	99.7381	2411651	6485	6435	4310	2125
LRU	99.7842	2412917	5219	4469	2249	2220
CLOCK (1 ref-bit)	99.7616	2412371	3428	5715	3428	2287
OPT	99.8466	2414426	3710	3660	2700	960

Memory size	100					
	Hit rate	Hit count	Miss count	Overall eviction count	Clean eviction count	Dirty eviction count
RAND	99.7785	2412780	5356	5256	3609	1647
FIFO	99.8206	2413798	4338	4238	2881	1357
LRU	99.8434	2414349	3787	3687	2727	960
CLOCK (1 ref-bit)	99.8235	2413869	4267	4167	2747	1420
OPT	99.8755	2415125	3011	2911	1963	948

Memory size	150					
	Hit rate	Hit count	Miss count	Overall eviction count	Clean eviction count	Dirty eviction count
RAND	99.8168	2413707	4429	4279	2910	1369
FIFO	99.8252	2413909	4227	4077	2776	1301
LRU	99.8441	2414366	3770	3620	2680	940
CLOCK (1 ref-bit)	99.8436	2414354	3782	3632	2692	940
OPT	99.8954	2415607	2529	2379	1427	952

Memory size	200					
	Hit rate	Hit count	Miss count	Overall eviction count	Clean eviction count	Dirty eviction count
RAND	99.8405	2414280	3856	3656	2434	1222
FIFO	99.8686	2414959	3177	2977	2001	976
LRU	99.8471	2414439	3697	3497	2557	940
CLOCK (1 ref-bit)	99.8673	2414926	3210	3010	2059	951
OPT	99.9058	2415857	2279	2079	1139	940

2. Fourth program: traffic in Assignment2-synchronization

When the memory size is 50, the difference of the hit rates is relatively big. It is obvious that OPT > CLOCK ~= LRU >FIFO>RAND. When the memory size reaches 150 and 200, the hit rates of RAND, FIFO, LRU, CLOCK, OPT are very close.

Memory size	50					
	Hit rate	Hit count	Miss count	Overall eviction count	Clean eviction count	Dirty eviction count
RAND	94.6936	8530	478	428	364	64
FIFO	95.2376	8579	429	379	315	64
LRU	96.5142	8694	314	264	232	32
CLOCK (1 ref-bit)	96.5142	8694	314	264	231	33
OPT	97.7353	8804	204	154	133	21

./sim -f ./traceprogs/tr-traffic.ref -m -s

Memory size	100					
	Hit rate	Hit count	Miss count	Overall eviction count	Clean eviction count	Dirty eviction count
RAND	97.3579	8770	238	138	111	27
FIFO	97.8020	8810	198	98	78	20
LRU	98.0906	8836	172	72	64	8
CLOCK (1 ref-bit)	98.0129	8829	179	79	71	8
OPT	98.2238	8848	160	60	57	3

Memory size	150					
	Hit rate	Hit count	Miss count	Overall eviction count	Clean eviction count	Dirty eviction count
RAND	98.1905	8845	163	13	11	2
FIFO	98.1461	8841	167	17	13	4
LRU	98.2238	8848	160	10	9	1
CLOCK (1 ref-bit)	98.1572	8842	166	16	13	3
OPT	98.2238	8848	160	10	9	1

Memory size	200					
	Hit rate	Hit count	Miss count	Overall eviction count	Clean eviction count	Dirty eviction count
RAND	98.2238	8840	160	0	0	0
FIFO	98.2238	8840	160	0	0	0
LRU	98.2238	8840	160	0	0	0
CLOCK (1 ref-bit)	98.2238	8840	160	0	0	0
OPT	98.2238	8840	160	0	0	0

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

By comparing the hit rates in the tables, we find FIFO hit rate < LRU hit rate ~= CLOCK hit rate < OPT hit rate. OPT always gives the best hit rate. It makes sense because OPT uses future information. It replaces the page that will not be referenced for the longest time thus always making the most optimal choice. I also find when the memory size is 50, the difference of the hit rates is relatively big. It is obvious that OPT > CLOCK ~= LRU >FIFO>RAND. When the memory size reaches 150 and 200, the hit rates of RAND, FIFO, LRU, CLOCK, OPT are very close. It gives me a sense that a good replacement policy has better performance for improving the hit rate when the memory size is relatively small.

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

LRU hit rate increase as the size of memory increases. In LRU, the page that is used least recently will be replaced. When the size of memory increases, we can get more information about the recently used pages thus improving the performance of the LRU policy. Also, we can find that the increasing speed slows down as the memory size increases. The hit rate at the memory size 150 is very close to the hit rate at the memory size 200.