./sim -f ./traceprogs/tr-simpleloop.ref -m <50-200> -s 961 -a <alg>

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| FIFO | MEM | 50 | 100 | 150 | 200 |
| Hit count | 7270 | 7485 | 7525 | 7533 |
| Miss count | 2970 | 2755 | 2715 | 2707 |
| Clean evictions | 327 | 162 | 133 | 129 |
| Dirty evictions | 2593 | 2493 | 2432 | 2378 |
| Total references | 10240 | 10240 | 10240 | 10240 |
| Hit rate | 70.9961 | 73.0957 | 73.4863 | 73.5645 |
| Miss rate | 29.0039 | 26.9043 | 26.5137 | 26.4355 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RAND | MEM | 50 | 100 | 150 | 200 |
| Hit count | 7249 | 7480 | 7529 | 7526 |
| Miss count | 2991 | 2760 | 2711 | 2714 |
| Clean evictions | 350 | 164 | 132 | 129 |
| Dirty evictions | 2591 | 2496 | 2429 | 2385 |
| Total references | 10240 | 10240 | 10240 | 10240 |
| Hit rate | 70.7910 | 73.0469 | 73.5254 | 73.4961 |
| Miss rate | 29.2090 | 26.9531 | 26.4746 | 26.5039 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| LRU | MEM | 50 | 100 | 150 | 200 |
| Hit count | 7462 | 7558 | 7559 | 7559 |
| Miss count | 2778 | 2682 | 2681 | 2681 |
| Clean evictions | 205 | 117 | 116 | 116 |
| Dirty evictions | 2523 | 2465 | 2415 | 2365 |
| Total references | 10240 | 10240 | 10240 | 10240 |
| Hit rate | 72.8711 | 73.8086 | 73.8184 | 73.8184 |
| Miss rate | 27.1289 | 26.1914 | 26.1816 | 26.1816 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CLOCK | MEM | 50 | 100 | 150 | 200 |
| Hit count | 7463 | 7553 | 7558 | 7558 |
| Miss count | 2777 | 2687 | 2682 | 2682 |
| Clean evictions | 201 | 120 | 116 | 116 |
| Dirty evictions | 2526 | 2467 | 2416 | 2366 |
| Total references | 10240 | 10240 | 10240 | 10240 |
| Hit rate | 72.8809 | 73.7598 | 73.8086 | 73.8086 |
| Miss rate | 27.1191 | 26.2402 | 26.1914 | 26.1914 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ARC | MEM | 50 | 100 | 150 | 200 |
| Hit count |  |  |  |  |
| Miss count |  |  |  |  |
| Clean evictions |  |  |  |  |
| Dirty evictions |  |  |  |  |
| Total references |  |  |  |  |
| Hit rate |  |  |  |  |
| Miss rate |  |  |  |  |

./sim -f ./traceprogs/tr-matmul.ref -m <50-200> -s 961 -a <alg>

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| FIFO | MEM | 50 | 100 | 150 | 200 |
| Hit count | 1760622 | 1804347 | 2853480 | 2854001 |
| Miss count | 1127266 | 1083541 | 34408 | 33887 |
| Clean evictions | 1083358 | 1061341 | 33063 | 32553 |
| Dirty evictions | 43858 | 22100 | 1195 | 1134 |
| Total references | 2887888 | 2887888 | 2887888 | 2887888 |
| Hit rate | 60.9657 | 62.4798 | 98.8085 | 98.8266 |
| Miss rate | 39.0343 | 37.5202 | 1.1915 | 1.1734 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RAND | MEM | 50 | 100 | 150 | 200 |
| Hit count | 1892750 | 2563321 | 2791370 | 2831556 |
| Miss count | 995138 | 324567 | 96518 | 56332 |
| Clean evictions | 955698 | 316967 | 94132 | 54582 |
| Dirty evictions | 39390 | 7500 | 2236 | 1550 |
| Total references | 2887888 | 2887888 | 2887888 | 2887888 |
| Hit rate | 65.5410 | 88.7611 | 96.6578 | 98.0494 |
| Miss rate | 34.4590 | 11.2389 | 3.3422 | 1.9506 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| LRU | MEM | 50 | 100 | 150 | 200 |
| Hit count | 1846665 | 1881435 | 2855003 | 2855014 |
| Miss count | 1041223 | 1006453 | 32885 | 32874 |
| Clean evictions | 1040197 | 1005393 | 31775 | 31714 |
| Dirty evictions | 976 | 960 | 960 | 960 |
| Total references | 2887888 | 2887888 | 2887888 | 2887888 |
| Hit rate | 63.9452 | 65.1492 | 98.8613 | 98.8617 |
| Miss rate | 36.0548 | 34.8508 | 1.1387 | 1.1383 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CLOCK | MEM | 50 | 100 | 150 | 200 |
| Hit count | 1846660 | 1886093 | 2853174 | 2855001 |
| Miss count | 1041228 | 1001795 | 34714 | 32887 |
| Clean evictions | 1040202 | 1000733 | 33603 | 31727 |
| Dirty evictions | 976 | 962 | 961 | 960 |
| Total references | 2887888 | 2887888 | 2887888 | 2887888 |
| Hit rate | 63.9450 | 65.3105 | 98.7979 | 98.8612 |
| Miss rate | 36.0550 | 34.6895 | 1.2021 | 1.1388 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ARC | MEM | 50 | 100 | 150 | 200 |
| Hit count |  |  |  |  |
| Miss count |  |  |  |  |
| Clean evictions |  |  |  |  |
| Dirty evictions |  |  |  |  |
| Total references | 2887888 | 2887888 | 2887888 | 2887888 |
| Hit rate |  |  |  |  |
| Miss rate |  |  |  |  |

./sim -f ./traceprogs/tr-blocked.ref -m <50-200> -s 961 -a <alg>

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| FIFO | MEM | 50 | 100 | 150 | 200 |
| Hit count | 2411657 | 2413818 | 2413928 | 2414980 |
| Miss count | 6495 | 4334 | 4224 | 3172 |
| Clean evictions | 4306 | 2878 | 2773 | 1996 |
| Dirty evictions | 2139 | 1356 | 1301 | 976 |
| Total references | 2418152 | 2418152 | 2418152 | 2418152 |
| Hit rate | 99.7314 | 99.8208 | 99.8253 | 99.8688 |
| Miss rate | 0.2686 | 0.1792 | 0.1747 | 0.1312 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RAND | MEM | 50 | 100 | 150 | 200 |
| Hit count | 2409718 | 2412925 | 2413766 | 2414294 |
| Miss count | 8434 | 5227 | 4386 | 3858 |
| Clean evictions | 5937 | 3520 | 2896 | 2444 |
| Dirty evictions | 2447 | 1607 | 1340 | 1214 |
| Total references | 2418152 | 2418152 | 2418152 | 2418152 |
| Hit rate | 99.6512 | 99.7838 | 99.8186 | 99.8405 |
| Miss rate | 0.3488 | 0.2162 | 0.1814 | 0.1595 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| LRU | MEM | 50 | 100 | 150 | 200 |
| Hit count | 2412940 | 2414370 | 2414385 | 2414458 |
| Miss count | 5212 | 3782 | 3767 | 3694 |
| Clean evictions | 2944 | 2722 | 2677 | 2554 |
| Dirty evictions | 2218 | 960 | 940 | 940 |
| Total references | 2418152 | 2418152 | 2418152 | 2418152 |
| Hit rate | 99.7845 | 99.8436 | 99.8442 | 99.8472 |
| Miss rate | 0.2155 | 0.1564 | 0.1558 | 0.1528 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CLOCK | MEM | 50 | 100 | 150 | 200 |
| Hit count | 2412393 | 2413843 | 2414373 | 2414944 |
| Miss count | 5759 | 4309 | 3779 | 3208 |
| Clean evictions | 3412 | 2733 | 2689 | 2059 |
| Dirty evictions | 2297 | 1476 | 940 | 949 |
| Total references | 2418152 | 2418152 | 2418152 | 2418152 |
| Hit rate | 99.7618 | 99.8218 | 99.8437 | 99.8673 |
| Miss rate | 0.2382 | 0.1782 | 0.1563 | 0.1327 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| ARC | MEM | 50 | 100 | 150 | 200 |
| Hit count |  |  |  |  |
| Miss count |  |  |  |  |
| Clean evictions |  |  |  |  |
| Dirty evictions |  |  |  |  |
| Total references | 2418152 | 2418152 | 2418152 | 2418152 |
| Hit rate |  |  |  |  |
| Miss rate |  |  |  |  |

Comparing the various algorithms:

When it comes to performance (Hit rates) we can see that the trend is the following:

RAND < FIFO < LRU ~= CLOCK

We can also notice that as the MEM size increases, so does the hit rate, which is to be expected due to the fact that it captures more memory and reduce the dirty evictions.

So, we can deduct that having a more optimal replacement policy has more effects on the performance when the memory size is lower.

Explaining the data as the size of memory increases:

For LRU we can see that as the memory size increases, the hit rate increases as well.

Also, we can see that the miss count, dirty eviction and clean eviction decreases.

An anomaly happens in matmul, while hit count is always increasing as the memory increases but there is a large sudden jump between memory size 100 and 150, from 65.14 to 98.86, which is considerably larger than the increase from 150 to 20. Although this jump can also be seen in other algorithms.