*RAND - BLOCKED*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 94.5046 | 6638 | 386 | 336 | 168 | 168 |
| **100** | 97.4374 | 6844 | 180 | 80 | 7 | 73 |
| **150** | 97.9072 | 6877 | 147 | 0 | 0 | 0 |
| **200** | 97.9072 | 6877 | 147 | 0 | 0 | 0 |

*RAND - SIMPLE LOOP*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 70.7713 | 7230 | 2986 | 2936 | 228 | 2708 |
| **100** | 72.7976 | 7437 | 2779 | 2679 | 59 | 2620 |
| **150** | 73.4338 | 7502 | 2714 | 2564 | 19 | 2545 |
| **200** | 73.4730 | 7506 | 2710 | 2510 | 17 | 2493 |

*RAND - MATMUL*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 94.6013 | 6501 | 371 | 321 | 153 | 168 |
| **100** | 97.4680 | 6698 | 174 | 74 | 5 | 69 |
| **150** | 97.9045 | 6728 | 144 | 0 | 0 | 0 |
| **200** | 97.9045 | 6728 | 144 | 0 | 0 | 0 |

*RAND - FIBONACCI*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 96.4812 | 5758 | 210 | 160 | 54 | 106 |
| **100** | 98.1066 | 5855 | 113 | 13 | 0 | 13 |
| **150** | 98.1736 | 5859 | 109 | 0 | 0 | 0 |
| **200** | 98.1736 | 5859 | 109 | 0 | 0 | 0 |

*FIFO - BLOCKED*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 94.8035 | 6659 | 365 | 321 | 144 | 171 |
| **100** | 97.4943 | 6848 | 176 | 76 | 0 | 76 |
| **150** | 97.9072 | 6877 | 147 | 0 | 0 | 0 |
| **200** | 97.9072 | 6877 | 147 | 0 | 0 | 0 |

*FIFO - SIMPLE LOOP*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 71.0161 | 7255 | 2961 | 2911 | 199 | 2712 |
| **100** | 73.0325 | 7461 | 2755 | 2655 | 44 | 2611 |
| **150** | 73.4143 | 7500 | 2716 | 2566 | 16 | 2550 |
| **200** | 73.4926 | 7508 | 2708 | 2508 | 12 | 2496 |

*FIFO - MATMUL*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 94.8632 | 6519 | 353 | 303 | 138 | 165 |
| **100** | 97.4971 | 6700 | 172 | 72 | 0 | 72 |
| **150** | 97.9045 | 6728 | 144 | 0 | 0 | 0 |
| **200** | 97.9045 | 6728 | 144 | 0 | 0 | 0 |

*FIFO - FIBONACCI*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 96.6823 | 5770 | 198 | 148 | 34 | 114 |
| **100** | 98.0228 | 5850 | 118 | 18 | 0 | 18 |
| **150** | 98.1736 | 5859 | 109 | 0 | 0 | 0 |
| **200** | 98.1736 | 5859 | 109 | 0 | 0 | 0 |

*LRU - BLOCKED*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 96.0564 | 6747 | 277 | 227 | 84 | 143 |
| **100** | 97.8218 | 6871 | 153 | 53 | 0 | 53 |
| **150** | 97.9072 | 6877 | 147 | 0 | 0 | 0 |
| **200** | 97.9072 | 6877 | 147 | 0 | 0 | 0 |

*LRU - SIMPLE LOOP*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 72.8074 | 7438 | 2778 | 2728 | 86 | 2642 |
| **100** | 73.7275 | 7532 | 2684 | 2584 | 2 | 2582 |
| **150** | 73.7471 | 7534 | 2682 | 2532 | 0 | 2532 |
| **200** | 73.7471 | 7534 | 2682 | 2482 | 0 | 2482 |

*LRU - MATMUL*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 96.1438 | 6607 | 265 | 215 | 79 | 136 |
| **100** | 97.8172 | 6722 | 150 | 50 | 0 | 50 |
| **150** | 97.9045 | 6728 | 144 | 0 | 0 | 0 |
| **200** | 97.9045 | 6728 | 144 | 0 | 0 | 0 |

*LRU - FIBONACCI*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 97.4866 | 2518 | 150 | 100 | 14 | 86 |
| **100** | 98.1568 | 5858 | 110 | 10 | 0 | 10 |
| **150** | 98.1736 | 5859 | 109 | 0 | 0 | 0 |
| **200** | 98.1736 | 5859 | 109 | 0 | 0 | 0 |

*CLOCK - BLOCKED*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 95.6435 | 6718 | 306 | 256 | 107 | 149 |
| **100** | 97.7506 | 6866 | 158 | 58 | 0 | 58 |
| **150** | 97.9072 | 6877 | 147 | 0 | 0 | 0 |
| **200** | 97.9072 | 6877 | 147 | 0 | 0 | 0 |

*CLOCK - SIMPLE LOOP*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 72.6018 | 7417 | 2799 | 2749 | 2644 | 105 |
| **100** | 73.6883 | 7528 | 2688 | 2588 | 4 | 2584 |
| **150** | 73.7373 | 7533 | 2683 | 2533 | 0 | 2533 |
| **200** | 73.7373 | 7533 | 2683 | 2483 | 0 | 2483 |

*CLOCK - MATMUL*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 95.8964 | 6590 | 282 | 232 | 90 | 142 |
| **100** | 97.7445 | 6717 | 155 | 55 | 0 | 55 |
| **150** | 97.9045 | 6728 | 144 | 0 | 0 | 0 |
| **200** | 97.9045 | 6728 | 144 | 0 | 0 | 0 |

*CLOCK - FIBONACCI*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 97.3190 | 5808 | 160 | 110 | 19 | 91 |
| **100** | 98.0731 | 5853 | 115 | 15 | 0 | 15 |
| **150** | 98.1736 | 5859 | 109 | 0 | 0 | 0 |
| **200** | 98.1736 | 5859 | 109 | 0 | 0 | 0 |

*OPT - BLOCKED*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 66.1589 | 4647 | 2377 | 2327 | 2121 | 206 |
| **100** | 94.5188 | 6639 | 385 | 285 | 228 | 57 |
| **150** | 97.9072 | 6877 | 147 | 0 | 0 | 0 |
| **200** | 97.9072 | 6877 | 147 | 0 | 0 | 0 |

*OPT - SIMPLE LOOP*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 48.8547 | 4991 | 5225 | 5176 | 2073 | 3102 |
| **100** | 68.2263 | 6970 | 3246 | 3146 | 194 | 2952 |
| **150** | 70.0176 | 7153 | 3063 | 2913 | 19 | 2894 |
| **200** | 66.4290 | 4585 | 2307 | 2257 | 2056 | 201 |

*OPT - MATMUL*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 66.4290 | 4565 | 2307 | 2257 | 2056 | 201 |
| **100** | 94.9360 | 6524 | 348 | 248 | 195 | 53 |
| **150** | 97.9045 | 6728 | 144 | 0 | 0 | 0 |
| **200** | 97.9045 | 6728 | 144 | 0 | 0 | 0 |

*OPT - FIBONACCI*

| | HIT RATE | HIT COUNT | MISS COUNT | OVERALL EVICTION COUNT | CLEAN EVICTION COUNT | DIRTY EVICTION COUNT |
|---|---|---|---|---|---|---|
| **50** | 68.5154 | 4089 | 1879 | 1829 | 1682 | 147 |
| **100** | 98.0395 | 5851 | 117 | 17 | 5 | 12 |
| **150** | 98.1736 | 5859 | 109 | 0 | 0 | 0 |
| **200** | 98.1736 | 5859 | 109 | 0 | 0 | 0 |

## Algorithm Comparisons

Somewhat surprisingly, the random algorithm has relatively good miss and hit rates, particularly with smaller memory sizes. The higher the reference count, the better the random algorithm performed. On the other hand, it's rate of evictions is higher than some of the other algorithms. The clock algorithm, as it scans for for potential evictees, at smaller memory sizes has approximately the same hit rate as the random algorithm. The FIFO algorithm for smaller programs may not be such a bad choice, but as soon as the reference count climbs, it's miss rate begins to increase.

## 4th Program of Choice

We chose to trace out a fibonacci program that generates a Fib sequence up to and including the integer limit the user provides as input. We find these types of programs interesting, since the confines of the program are establish at compile time. We can be assured that dynamic allocation of memory will not be a concern. The fixed sized array storing the sequence will be consistently accessed, limiting the amount of paging that is required.

## LRU Analysis

The LRU algorithm as one would be expect, performed much better when a large memory size was used. The hit rate stayed consistent when memory size was increased. We suspect that for a larger trace, LRU would outperform other algorithms as the gravitation towards certain pages and resources throughout a long running process would lend itself well to how LRU retains most used pages in memory.