PART A

FOR PART 1

|  |  |  |
| --- | --- | --- |
| n (=size) | Fill time (in seconds) | Calc time (in seconds) |
| 50 | 4.333 | 5.51 |
| 100 | 16.721 | 19.703 |
| 200 | 66.599 | 78.208 |
| 400 | 267.546 | 313.644 |

FOR PART 2

|  |  |  |
| --- | --- | --- |
| n (=size) | Fill time (in seconds) | Calc time (in seconds) |
| 50 | 4.482 | 5.185 |
| 100 | 17.590 | 20.712 |
| 200 | 66.520 | 78.129 |
| 400 | 269.260 | 314.885 |

PART B

a.)

PART 1 ALGORITHM

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| n (=size) | Cache size | Block size | Miss rate (%) | # of misses |
| 50 | 4 | 8 | 13 | 4308 |
| 50 | 8 | 8 | 23 | 7491 |
| 50 | 16 | 8 | 14 | 4568 |
| 50 | 32 | 8 | 5 | 1721 |
| 50 | 64 | 8 | 6 | 1984 |
| 50 | 4 | 16 | 11 | 3746 |
| 50 | 8 | 16 | 7 | 2220 |
| 50 | 16 | 16 | 4 | 1461 |
| 50 | 32 | 16 | 3 | 1061 |
| 50 | 64 | 16 | 3 | 869 |
| 50 | 4 | 32 | 11 | 3468 |
| 50 | 8 | 32 | 6 | 1919 |
| 50 | 16 | 32 | 3 | 1129 |
| 50 | 32 | 32 | 2 | 734 |
| 50 | 64 | 32 | 2 | 603 |
| 50 | 4 | 64 | 10 | 3322 |
| 50 | 8 | 64 | 5 | 1749 |
| 50 | 16 | 64 | 3 | 959 |
| 50 | 32 | 64 | 2 | 604 |
| 50 | 64 | 64 | 1 | 441 |
| 50 | 4 | 128 | 10 | 3236 |
| 50 | 8 | 128 | 5 | 1665 |
| 50 | 16 | 128 | 3 | 893 |
| 50 | 32 | 128 | 1 | 485 |
| 50 | 64 | 128 | 1 | 253 |

GRAPH (miss rate vs block size , parametrized by cache size)

b.) Good cache 64 Block 128 Medium cache 4 block 64 Poor block 8 cache 8

|  |  |  |  |
| --- | --- | --- | --- |
|  | Direct Mapped  good | Direct Mapped  medium | Direct Mapped  poor |
| Miss rate | 1 | 10 | 23 |
| # of misses | 253 | 3322 | 7491 |
| LRU | Fully Assoc.  good | Fully Assoc.  medium | Fully Assoc.  poor |
| Miss rate | 0 | 10 | 5 |
| # of misses | 121 | 3151 | 1631 |
| Random | Fully Assoc.  good | Fully Assoc.  medium | Fully Assoc.  poor |
| Miss rate | 0 | 10 | 6 |
| # of misses | 121 | 3224 | 1957 |

c.)Good cache 64 Block 128 Medium cache 4 block 64 Poor block 8 cache 8

Medium

|  |  |  |  |
| --- | --- | --- | --- |
| Set size | Hit rate | Miss Rate | Number of Misses |
| 1 | 90 | 10 | 3322 |
| 2 | 90 | 10 | 3168 |
| 4 | 90 | 10 | 3151 |
| 8 | 90 | 10 | 3151 |

Good

|  |  |  |  |
| --- | --- | --- | --- |
| Set size | Hit rate | Miss Rate | Number of Misses |
| 1 | 99 | 1 | 253 |
| 2 | 100 | 0 | 124 |
| 4 | 100 | 0 | 123 |
| 8 | 100 | 0 | 121 |

Poor

|  |  |  |  |
| --- | --- | --- | --- |
| Set size | Hit rate | Miss Rate | Number of Misses |
| 1 | 77 | 23 | 7491 |
| 2 | 94 | 6 | 1962 |
| 4 | 95 | 5 | 1631 |
| 8 | 95 | 5 | 1631 |

PART C

Good cache 64 Block 128 / 8-way set assoc

|  |  |  |
| --- | --- | --- |
| n (=size) | Hit Rate | Miss Count |
| 50 | 100 | 121 |
| 200 | 99 | 3131 |

PART D

|  |  |  |
| --- | --- | --- |
| n (=size) | Fill time (in seconds) | Calc time (in seconds) |
| 50 | 4.49 | 4.762 |
| 100 | 16.123 | 18.989 |
| 200 | 62.694 | 73.733 |
| 400 | 256.31 | 302.908 |