Multi-core and Multi-processor Architecture (CS423A), Spring 2023
Indian Institute of Technology Kanpur
Assignment 2

REPORT 2

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Group Number: 10
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Contents

1 Program 1

1.1 Number of Machine Accesses: 140 526 301

1.2 Access distance analytics

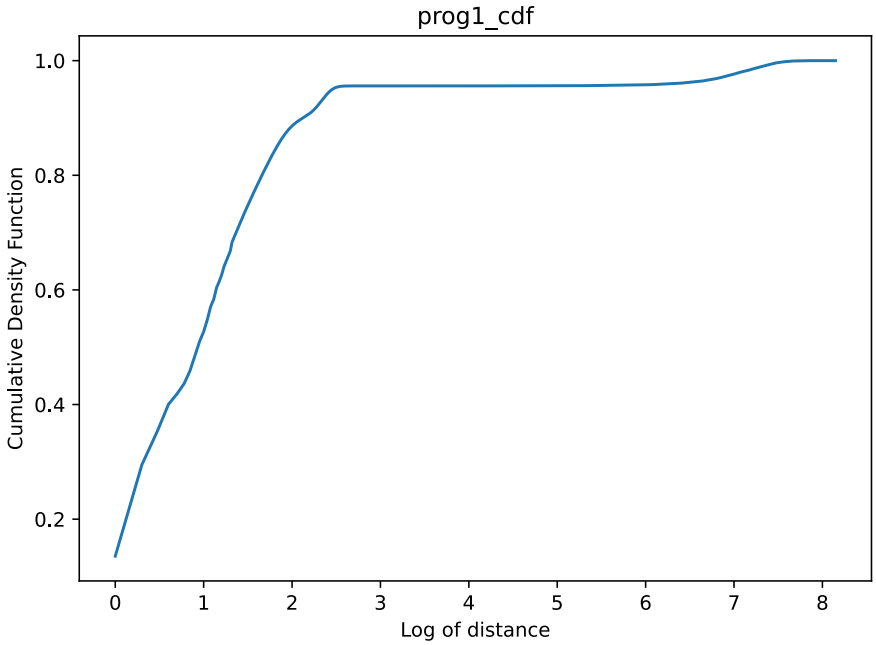

Figure 1: CDF vs Log of distance for Program 1

1.3 Access distance filtered by LRU cache

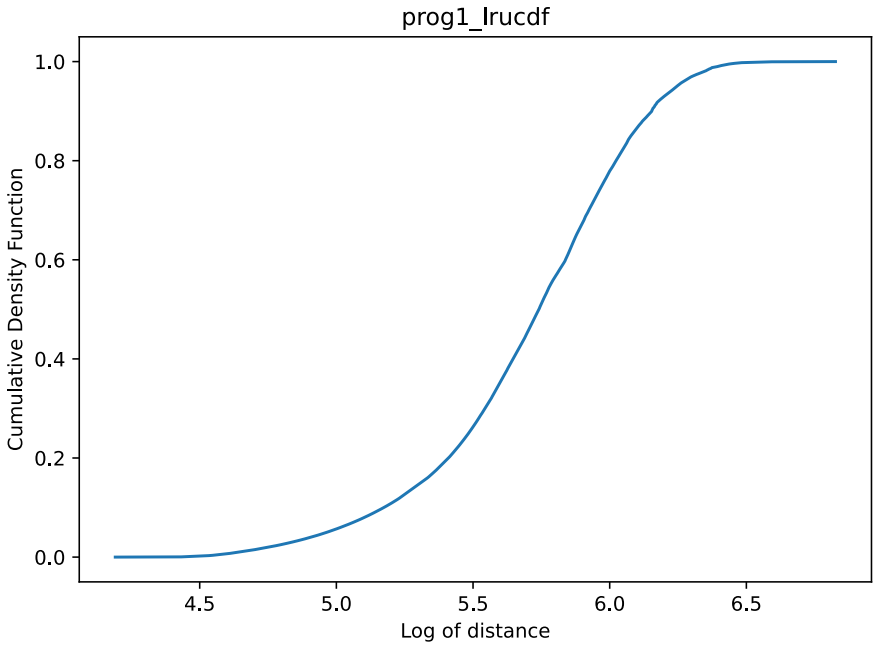

Figure 2: CDF vs Log of distance for Program 1 with LRU cache

1.4 Hits and Misses for each trace when passed on LRU Cache

- Hits: 133 827 577
- Misses: 6 698 724

1.5 Observations

- In the first plot, we observe that $F(2.5) \approx 0.9$. After $d = 2.5$, the CDF saturates and it increases later after $d = 5$. So, most of the machine accesses have a distance of around 300 and most of rest of accesses have a distance greater than 100000.
- After passing the trace through a layer of LRU Cache, we observe that machine accesses for small distances are filtered out. In essence, the second plot is a magnified version of the top right region of the first plot.

1.6 Sharing Profile

# Threads Shared	1	2	3	4	5	6	7	8
1	440	70	1872	32456	143251	244970	173832	124528

2 Program 2

2.1 Number of Machine Accesses: 2 511 043

2.2 Access distance analytics

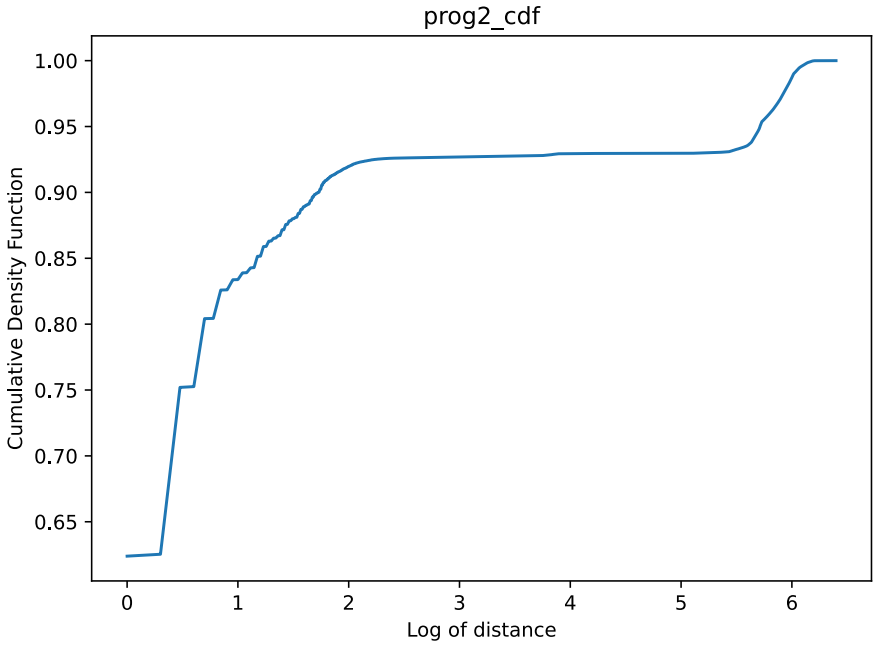

Figure 3: CDF vs Log of distance for Program 2

2.3 Access distance filtered by LRU cache

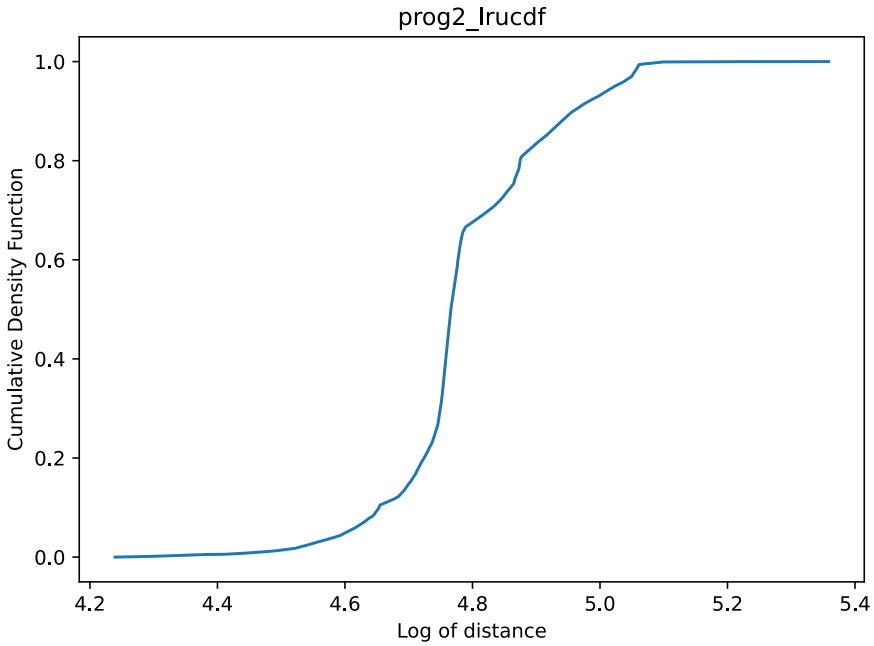

Figure 4: CDF vs Log of distance for Program 2 with LRU cache

2.4 Hits and Misses for each trace when passed on LRU Cache

- Hits: 2 282 709
- Misses: 228 334

2.5 Observations

- In the first plot, we observe that $F(2) \approx 0.9$. After $d = 2$, the CDF saturates and it increases later after $d = 5.5$. So, most of the machine accesses have a distance of around 100 and most of rest of accesses have a distance greater than 300000.
- After passing the trace through a layer of LRU Cache, we observe that machine accesses for small distances are filtered out. In essence, the second plot is a magnified version of the top right region of the first plot.

2.6 Sharing Profile

# Threads Shared	1	2	3	4	5	6	7	8
2	438	8262	16384	40958	5	0	1	11

3 Program 3

3.1 Number of Machine Accesses: 9 609 095

3.2 Access distance analytics

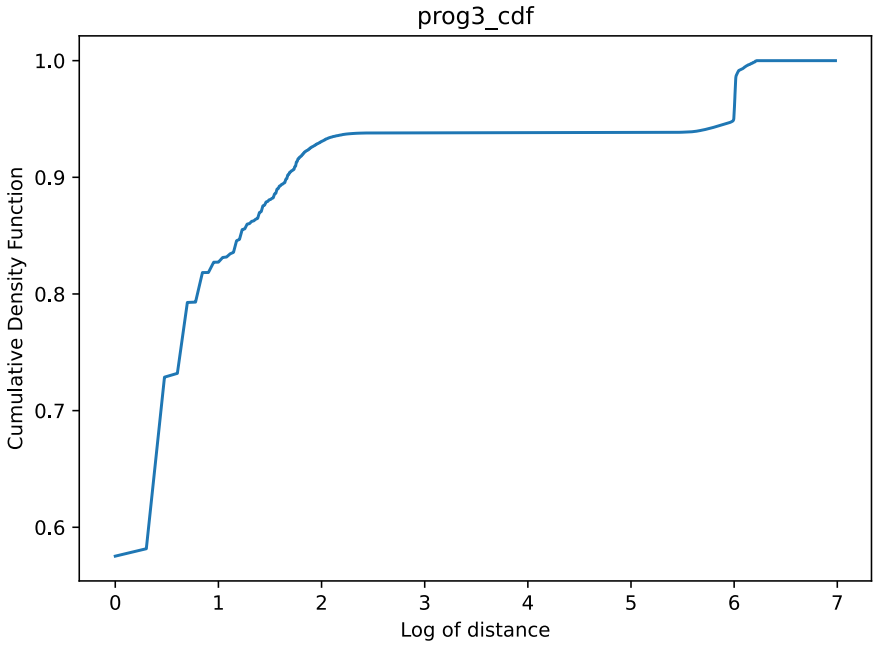

Figure 5: CDF vs Log of distance for Program 3

3.3 Access distance filtered by LRU cache

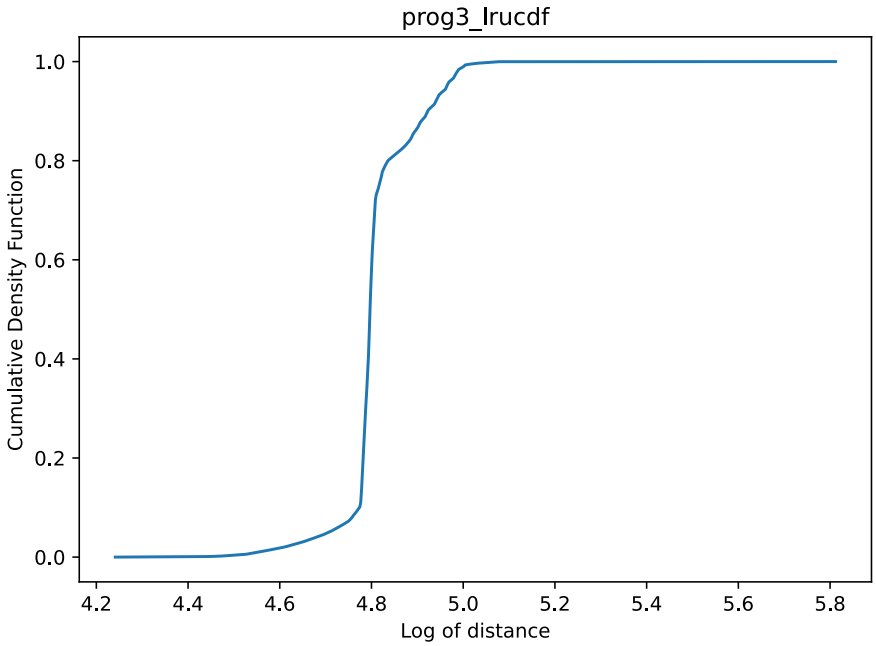

Figure 6: CDF vs Log of distance for Program 3 with LRU cache

3.4 Hits and Misses for each trace when passed on LRU Cache

- Hits: 8 960 747
- Misses: 648 348

3.5 Observations

- In the first plot, we observe that $F(2) \approx 0.9$. After $d = 2$, the CDF saturates and it increases sharply later after $d = 6$. So, most of the machine accesses have a distance of around 100 and most of rest of accesses have a distance greater than 1000000.
- After passing the trace through a layer of LRU Cache, we observe that machine accesses for small distances are filtered out. In essence, the second plot is a magnified version of the top right region of the first plot.
- For the second plot, there is a sharp increase at $d = 4.8$.

3.6 Sharing Profile

# Threads Shared	1	2	3	4	5	6	7	8
3	444	63	0	1	1	0	1	65546

4 Program 4

4.1 Number of Machine Accesses: 1 065 642

4.2 Access distance analytics

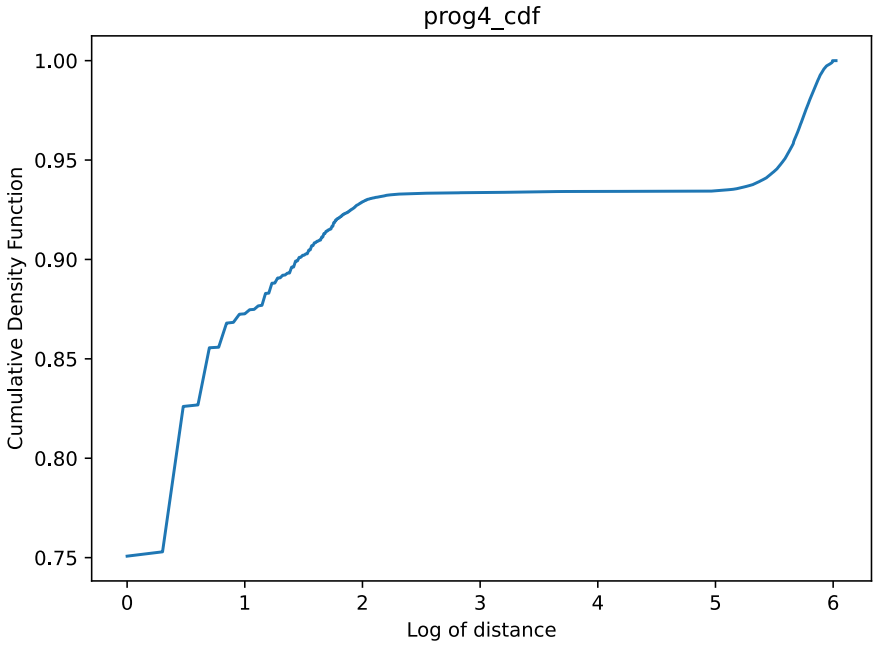

Figure 7: CDF vs Log of distance for Program 4

4.3 Access distance filtered by LRU cache

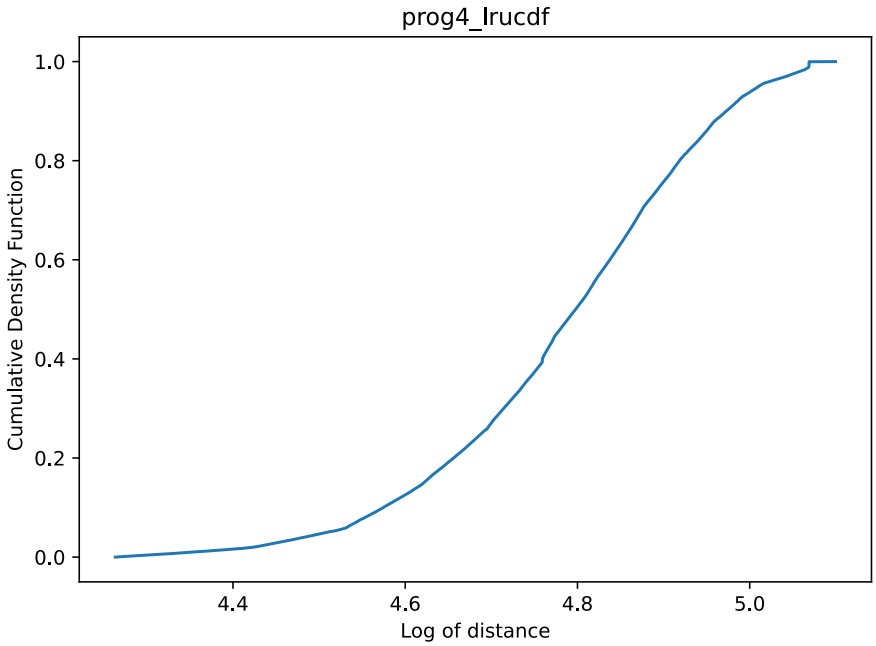

Figure 8: CDF vs Log of distance for Program 4 with LRU cache

4.4 Hits and Misses for each trace when passed on LRU Cache

- Hits: 939 845
- Misses: 125 797

4.5 Observations

- In the first plot, we observe that $F(2) \approx 0.93$. After $d = 2$, the CDF saturates and it increases later after $d = 5.5$. So, most of the machine accesses have a distance of around 100 and most of rest of accesses have a distance greater than 300000.
- After passing the trace through a layer of LRU Cache, we observe that machine accesses for small distances are filtered out. In essence, the second plot is a magnified version of the top right region of the first plot.

4.6 Sharing Profile

# Threads Shared	1	2	3	4	5	6	7	8
4	8628	57410	6	0	0	0	2	12