CS622A

Advanced Computer Architecture

Assignment 2

Memory Reuse and Sharing Profile Analysis

GROUP 16

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1 Introduction

In this assignment, we use PIN tool to instrument a set of parallel programs and collect thread-wise memory access trace and break it down to x86 machine accesses. Then with the resultin trace, we analyze the sharing profile and memory reuse for the given parallel programs.

2 Analysis Results

PART 1: Collection of machine-access traces

The results were varying across individual runs. Hence, we have collected 5 results for a particular program and picked *addrtrace.out* corresponding to the middle value (highlighted).

Programs	**Run 1**	**Run 2**	**Run 3**	**Run 4**	**Run 5**
prog1.c	**128988038**	128988149	128987956	128988046	128987901
prog2.c	2528955	2513452	2521172	**2524574**	2532314
prog3.c	**9508261**	9510696	9501049	9497081	9521463
prog4.c	1061544	1061507	1061492	1061525	**1061515**

Table 1: Machine accesses count across 5 runs

PART 4: Sharing profile analysis

The sharing profile for each of the 4 target programs is given below. The trace corresponding to the highlighted values in part1 were selected for the result analysis.

	prog1.c	**prog2.c**	**prog3.c**	**prog4.c**
Private	388	384	386	8573
2-Shared	63	8255	56	57403
3-Shared	1872	16384	0	6
4-Shared	32456	40958	1	0
5-Shared	143251	5	1	0
6-Shared	244970	0	0	0
7-Shared	173831	0	0	1
8-Shared	124527	9	65545	10

Table 2: Sharing profile analyis for 8 threads

PART 2: Access distance analysis

PART 3: Access distance filtered by LRU cache

	prog1.c	**prog2.c**	**prog3.c**	**prog4.c**
Hits	122297455	2295505	8862896	930888
Misses	6690582	229068	645364	130626

Table 3: Result of modelling a 2MB 16-Way cache on the traces