In the name of God

Multicore Programming Course

homework 3

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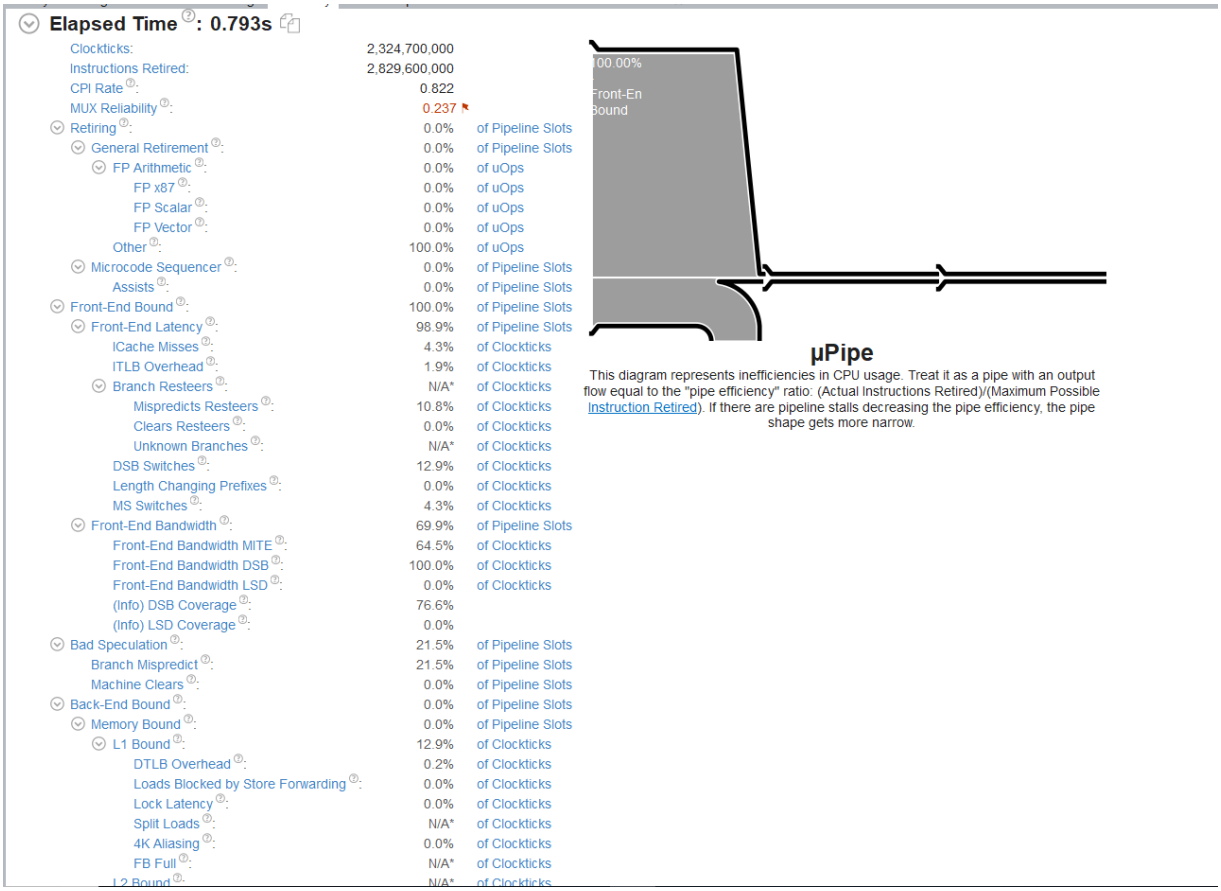
1- Elapsed time: 2.573088 seconds program: 1.cu

2- Miss prediction: 21.5 % program: 2-a.cpp

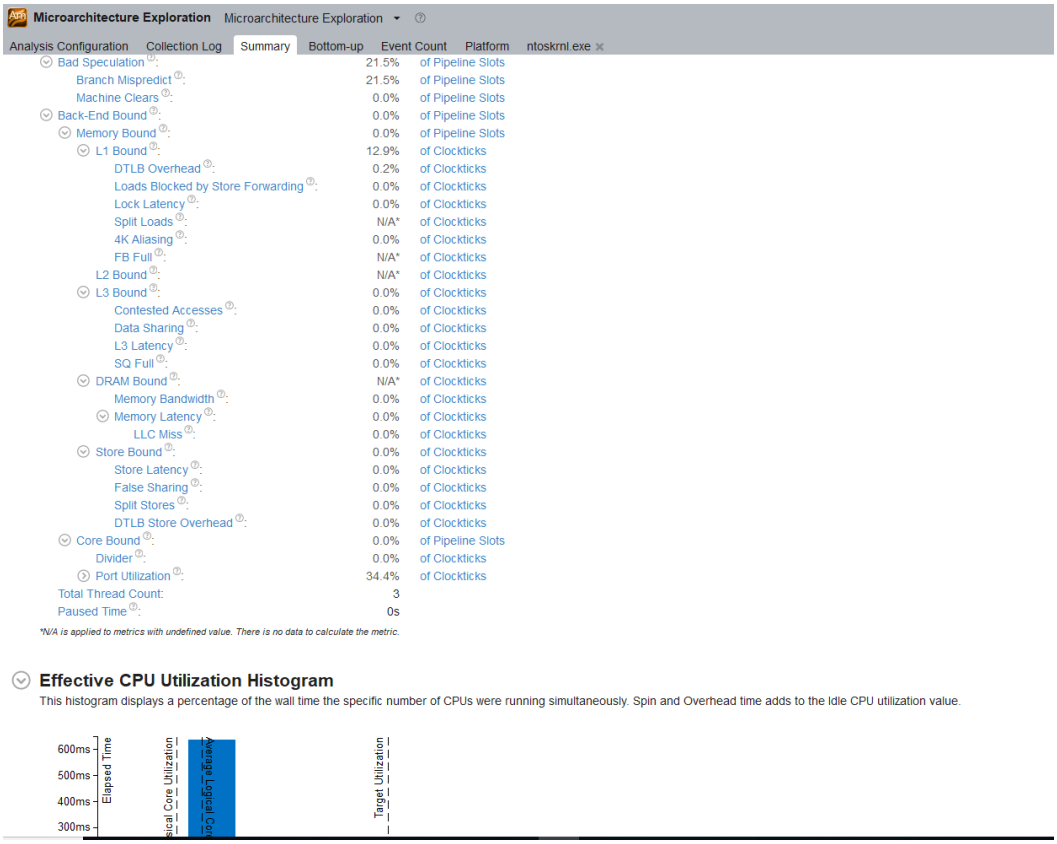


Elapsed Time: 0.793s

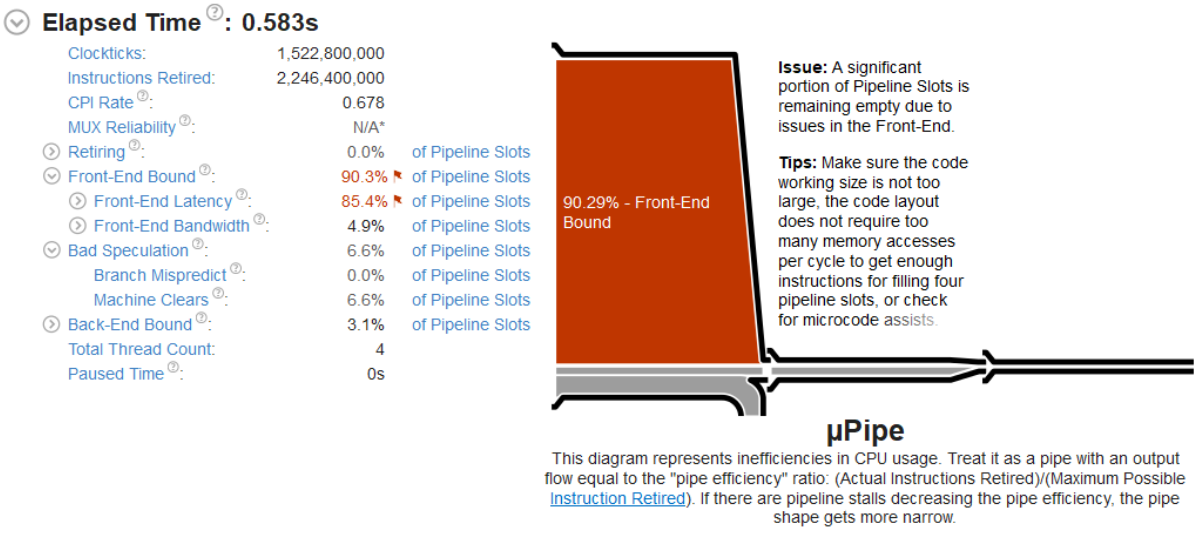
Clockticks:	2,324,700,000	
Instructions Retired:	2,829,600,000	
CPI Rate:	0.822	
MUX Reliability:	0.237	
Retiring:	0.0%	of Pipeline Slots
General Retirement:	0.0%	of Pipeline Slots
FP Arithmetic:	0.0%	of uOps
FP x87:	0.0%	of uOps
FP Scalar:	0.0%	of uOps
FP Vector:	0.0%	of uOps
Other:	100.0%	of uOps
Microcode Sequencer:	0.0%	of Pipeline Slots
Assists:	0.0%	of Pipeline Slots
Front-End Bound:	100.0%	of Pipeline Slots
Front-End Latency:	98.9%	of Pipeline Slots
ICache Misses:	4.3%	of Clockticks
ITLB Overhead:	1.9%	of Clockticks
Branch Resteers:	N/A*	of Clockticks
Mispredicts Resteers:	10.8%	of Clockticks
Clears Resteers:	0.0%	of Clockticks
Unknown Branches:	N/A*	of Clockticks
DSB Switches:	12.9%	of Clockticks
Length Changing Prefixes:	0.0%	of Clockticks
MS Switches:	4.3%	of Clockticks
Front-End Bandwidth:	69.9%	of Pipeline Slots
Front-End Bandwidth MITE:	64.5%	of Clockticks
Front-End Bandwidth DSB:	100.0%	of Clockticks
Front-End Bandwidth LSD:	0.0%	of Clockticks
(Info) DSB Coverage:	76.6%	
(Info) LSD Coverage:	0.0%	
Bad Speculation:	21.5%	of Pipeline Slots
Branch Mispredict:	21.5%	of Pipeline Slots
Machine Clears:	0.0%	of Pipeline Slots
Back-End Bound:	0.0%	of Pipeline Slots
Memory Bound:	0.0%	of Pipeline Slots
L1 Bound:	12.9%	of Clockticks
DTLB Overhead:	0.2%	of Clockticks
Loads Blocked by Store Forwarding:	0.0%	of Clockticks
Lock Latency:	0.0%	of Clockticks
Split Loads:	N/A*	of Clockticks
4K Aliasing:	0.0%	of Clockticks
FB Full:	N/A*	of Clockticks
L2 Bound:	N/A*	of Clockticks

µPipe

This diagram represents inefficiencies in CPU usage. Treat it as a pipe with an output flow equal to the "pipe efficiency" ratio: (Actual Instructions Retired)/(Maximum Possible Instruction Retired). If there are pipeline stalls decreasing the pipe efficiency, the pipe shape gets more narrow.



3- Elapsed time: 0.583 seconds program: 2-b.cpp
Miss prediction: 0.0 %

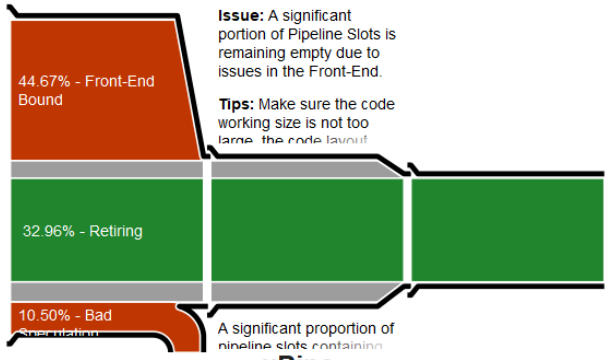


4- Elapsed time: 3.741 seconds

Miss prediction: 10.5 % program: 2-c.cpp

Elapsed Time: 3.741s

Clockticks:	30,723,300,000	
Instructions Retired:	26,441,100,000	
CPI Rate:	1.162	
MUX Reliability:	0.933	
Retiring:	33.0%	of Pipeline Slots
Front-End Bound:	44.7%	of Pipeline Slots
Front-End Latency:	31.2%	of Pipeline Slots
ICache Misses:	1.1%	of Clockticks
ITLB Overhead:	0.2%	of Clockticks
Branch Resteers:	9.3%	of Clockticks
Mispredicts Resteers:	5.9%	of Clockticks
Clears Resteers:	0.0%	of Clockticks
Unknown Branches:	3.4%	of Clockticks
DSB Switches:	13.3%	of Clockticks
Length Changing Prefixes:	0.0%	of Clockticks
MS Switches:	2.0%	of Clockticks
Front-End Bandwidth:	13.4%	of Pipeline Slots
Front-End Bandwidth MITE:	24.7%	of Clockticks
Front-End Bandwidth DSB:	15.3%	of Clockticks
Front-End Bandwidth LSD:	0.0%	of Clockticks
(Info) DSB Coverage:	58.5%	
(Info) LSD Coverage:	0.0%	
Bad Speculation:	10.5%	of Pipeline Slots
Branch Mispredict:	10.5%	of Pipeline Slots
Machine Clears:	0.0%	of Pipeline Slots
Back-End Bound:	11.9%	of Pipeline Slots
Total Thread Count:	6	
Paused Time:	0s	



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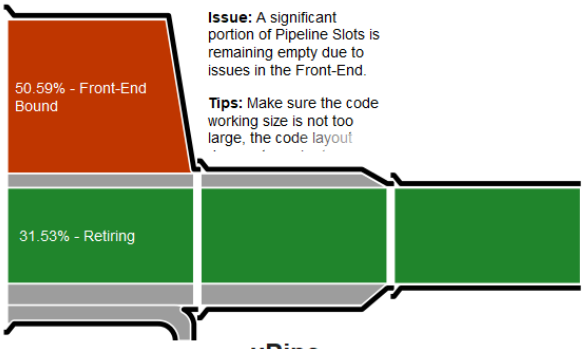
5- Elapsed time: 2.112 seconds

Miss prediction: 6.1 % program: 2-d.cpp

Elapsed Time: 2.112s

Clockticks:	21,249,000,000	
Instructions Retired:	20,703,600,000	
CPI Rate:	1.026	
MUX Reliability:	0.621	
Retiring:	31.5%	of Pipeline Slots
Front-End Bound:	50.6%	of Pipeline Slots
Front-End Latency:	33.9%	of Pipeline Slots
ICache Misses:	0.0%	of Clockticks
ITLB Overhead:	0.3%	of Clockticks
Branch Resteers:	N/A*	of Clockticks
DSB Switches:	8.5%	of Clockticks
Length Changing Prefixes:	0.0%	of Clockticks
MS Switches:	2.8%	of Clockticks
Front-End Bandwidth:	16.7%	of Pipeline Slots
Front-End Bandwidth MITE:	14.1%	of Clockticks
Front-End Bandwidth DSB:	28.7%	of Clockticks
Front-End Bandwidth LSD:	0.0%	of Clockticks
(Info) DSB Coverage:	73.3%	
(Info) LSD Coverage:	0.0%	
Bad Speculation:	6.1%	of Pipeline Slots
Branch Mispredict:	6.1%	of Pipeline Slots
Machine Clears:	0.0%	of Pipeline Slots
Back-End Bound:	11.8%	of Pipeline Slots
Total Thread Count:	7	
Paused Time:	0s	

*N/A is applied to metrics with undefined value. There is no data to calculate the metric.



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6-