

Report for Lab 3

Task 1 – ERT

- a) Text...
- b) Text...

Task 2 – Calculating AI using SDE

- a) According to the INTEL SDE tool, the total number of FLOPS for different numbers of threads and problem sizes is given in Table 1.

Threads	Problem Sizes			
	0.5 M	1 M	10 M	100 M
1	9 000 942 FLOP	18 000 974 FLOP	180 000 950 FLOP	1 800 000 934 FLOP
2	9 000 926 FLOP	18 000 974 FLOP	180 000 918 FLOP	1 800 000 914 FLOP
4	9 000 906 FLOP	18 000 942 FLOP	180 000 926 FLOP	1 800 000 918 FLOP

Table 1: FLOP numbers for different configurations.

- b) Furthermore, the total number of bytes (read and write) is given in Table 2.

Threads	Problem Sizes			
	0.5 M	1 M	10 M	100 M
1	120 896 483 B	240 897 640 B	2 400 901 149 B	24 000 894 174 B
2	126 182 868 B	246 130 313 B	2 408 254 332 B	24 012 186 264 B
4	145 309 375 B	260 864 133 B	2 426 388 194 B	24 034 106 726 B

Table 2: Number of Bytes for different configurations.

- c) According to the INTEL SDE tool, the running times of the `stream` benchmark for different configurations is given in Table 3.

Threads	Problem Sizes			
	0.5 M	1 M	10 M	100 M
1	0.051 645 s	0.101 378 s	0.878 443 s	8.699 119 s
2	0.040 350 s	0.060 514 s	0.467 490 s	4.452 410 s
4	0.045 516 s	0.057 817 s	0.275 754 s	2.329 622 s

Table 3: Running times for different configurations.

- d) The arithmetic intensity (AI) can then calculated by

$$AI = \frac{\text{FLOP}}{\text{Bytes}} . \quad (1)$$

The arithmetic intensities for different configurations are given in Table 4.

Threads	Problem Sizes			
	0.5 M	1 M	10 M	100 M
1	0.074 451 FLOP/B	0.074 724 FLOP/B	0.074 972 FLOP/B	0.074 997 FLOP/B
2	0.071 332 FLOP/B	0.073 136 FLOP/B	0.074 743 FLOP/B	0.074 962 FLOP/B
4	0.061 943 FLOP/B	0.069 005 FLOP/B	0.074 185 FLOP/B	0.074 893 6 FLOP/B

Table 4: Arithmetic Intensities for different configurations.

e) The performance is then

$$\text{Perf} = \frac{\text{FLOP}}{s} . \quad (2)$$

The performances for different configurations are given Table 5.

Threads	Problem Sizes			
	0.5 M	1 M	10 M	100 M
1	0.174 285 GFLOP/s	0.177 563 GFLOP/B	0.204 909 GFLOP/s	0.206 918 GFLOP/s
2	0.223 071 GFLOP/s	0.297 468 GFLOP/s	0.385 037 GFLOP/s	0.404 276 GFLOP/s
4	0.197 753 GFLOP/s	0.311 343 GFLOP/s	0.652 759 GFLOP/s	0.772 658 GFLOP/s

Table 5: Performances for different configurations.

Task 3 – Performance Analysis Results

a) Text...