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315 Lab 4 Writeup

Data for Arm Mul

	16	64	256	1024
Clock Frequency	0.804GHz	1.781GHz	1.981GHz	1.993 GHz
Instructions	561251	15659541	814904666	49280526873
Time Elapsed	.0041s	.017s	.728s	44.254s
Instructions per cycle	.6	.87	.57	.54

Data for intmul

	16	64	256	1024
Clock Frequency	1.883GHz	1.997Ghz	1.998 GHz	1.999
Instructions	23,971,557	1,589,626,106	100,691,247,693	6519978571923
Time Elapsed	0.011672000	0.662164000	42.581528881	2728.947772579
Instructions per cycle	1.18	1.19	1.18	1.2

Intmul implementation calculations:

16:

$\frac{23,971,557}{1.18\times1883000000} = 0.0107885708$ The percent difference is 8.19%

64

$\frac{1,589,626,106}{1.19\times1997000000}$ = .6689134988 ; 1.09% difference

256

$\frac{100,691,247,693}{1.18\times1998000000}$= 42.70849141 .29% difference

1024

$\frac{6519978571923}{1.2\times1999000000}$=2718.016747 .4% difference

Mul implementation calculations:

16:

$\frac{561251}{.6\times804000000} = 0.001163455638$ The percent difference is 252%

64

$\frac{15659541}{.87\times1781000000} = 0.01010638541$; 68% difference

256

$\frac{814904666}{.57\times1981000000}$= .7216846586 .875% difference

1024

$\frac{49280526873}{.54\times1993000000}$=45.79038382 3.35% difference

Speed Up and Amdahl's Law:

16

$\frac{0.011672000}{.0041}$ = 2.846829268 = $\frac{1}{1-F+\frac{F}{100}}$; F = .6544

64

$\frac{.662164000}{.017}$ = 38.95 = $\frac{1}{1-F+\frac{F}{100}}$; F = .9841

256

$\frac{42.581528881}{.728}$=58.49 = $\frac{1}{1-F+\frac{F}{100}}$; F = .993

1024

$\frac{2728.947772579}{44.254} = 61.66556$ = $\frac{1}{1-F+\frac{F}{100}}$; F = .994