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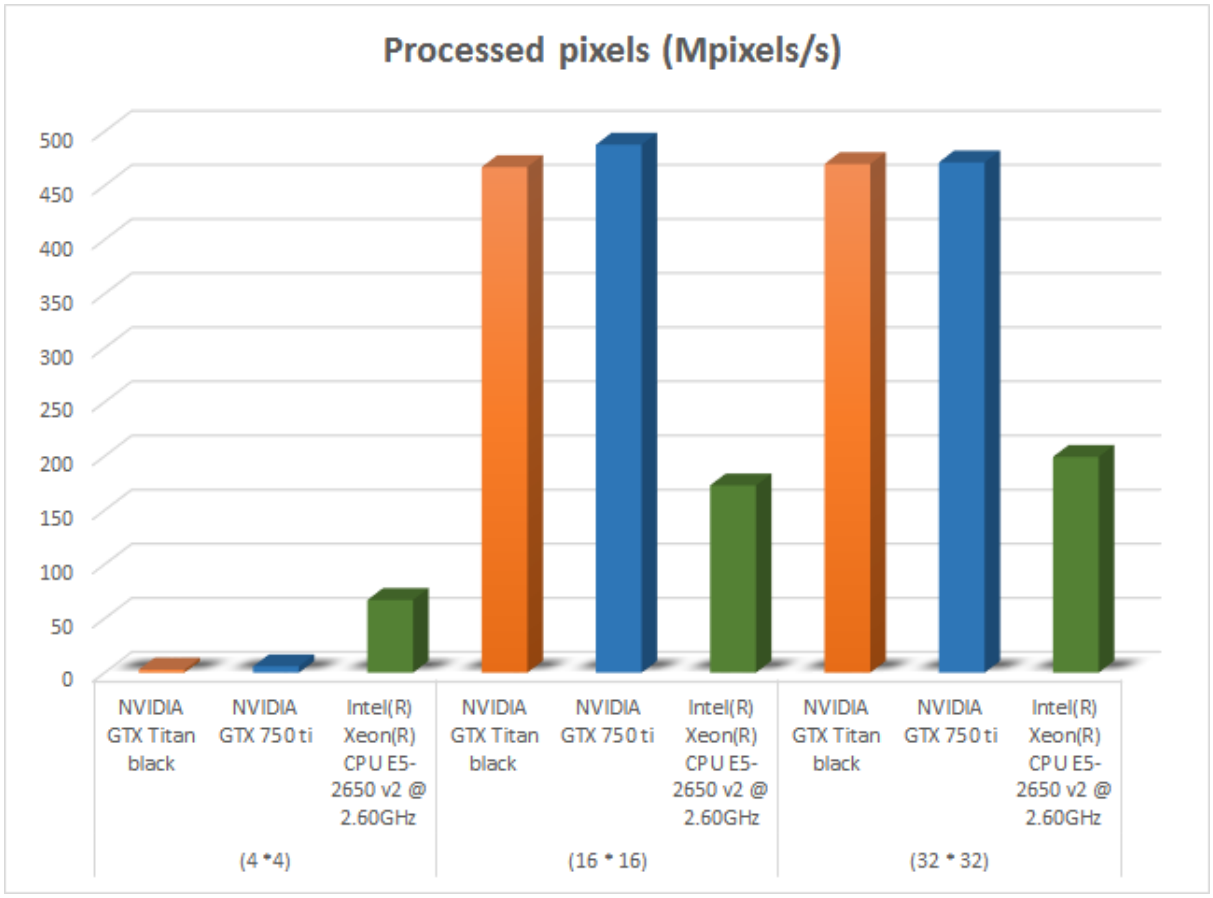
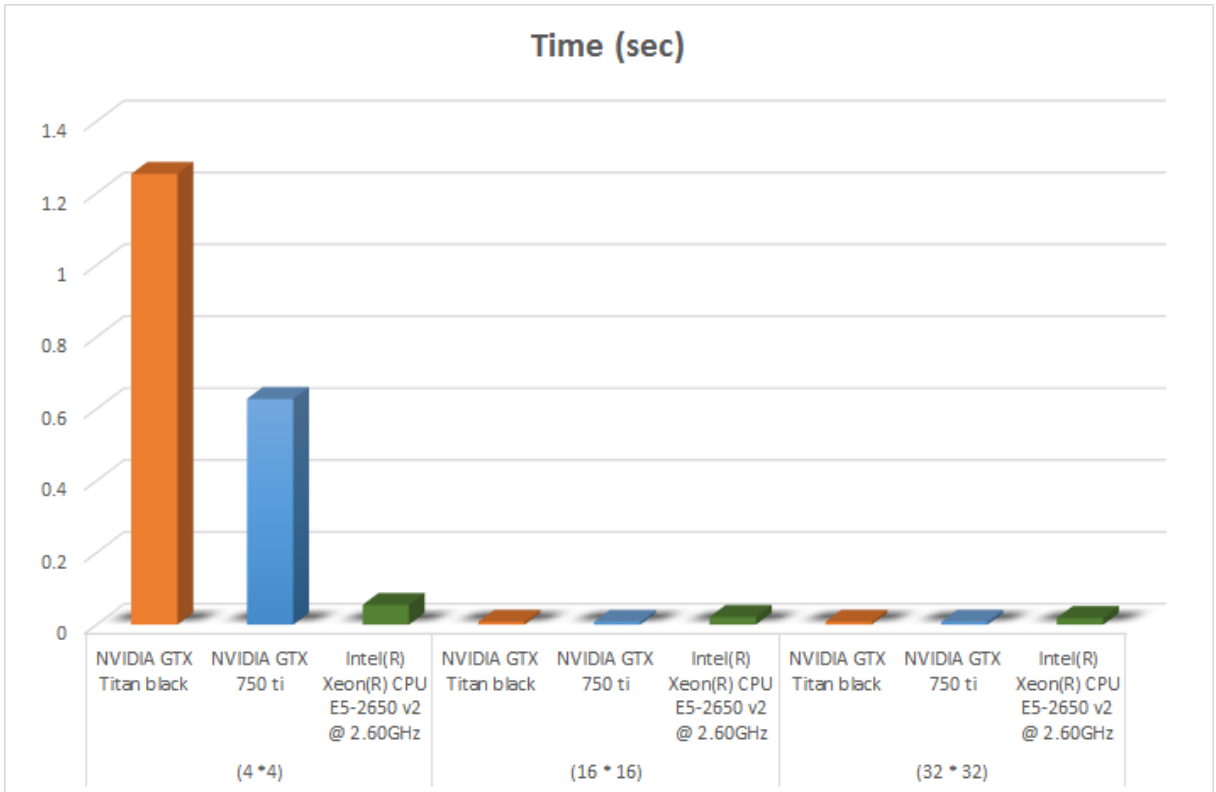
HPC, Assignment 4

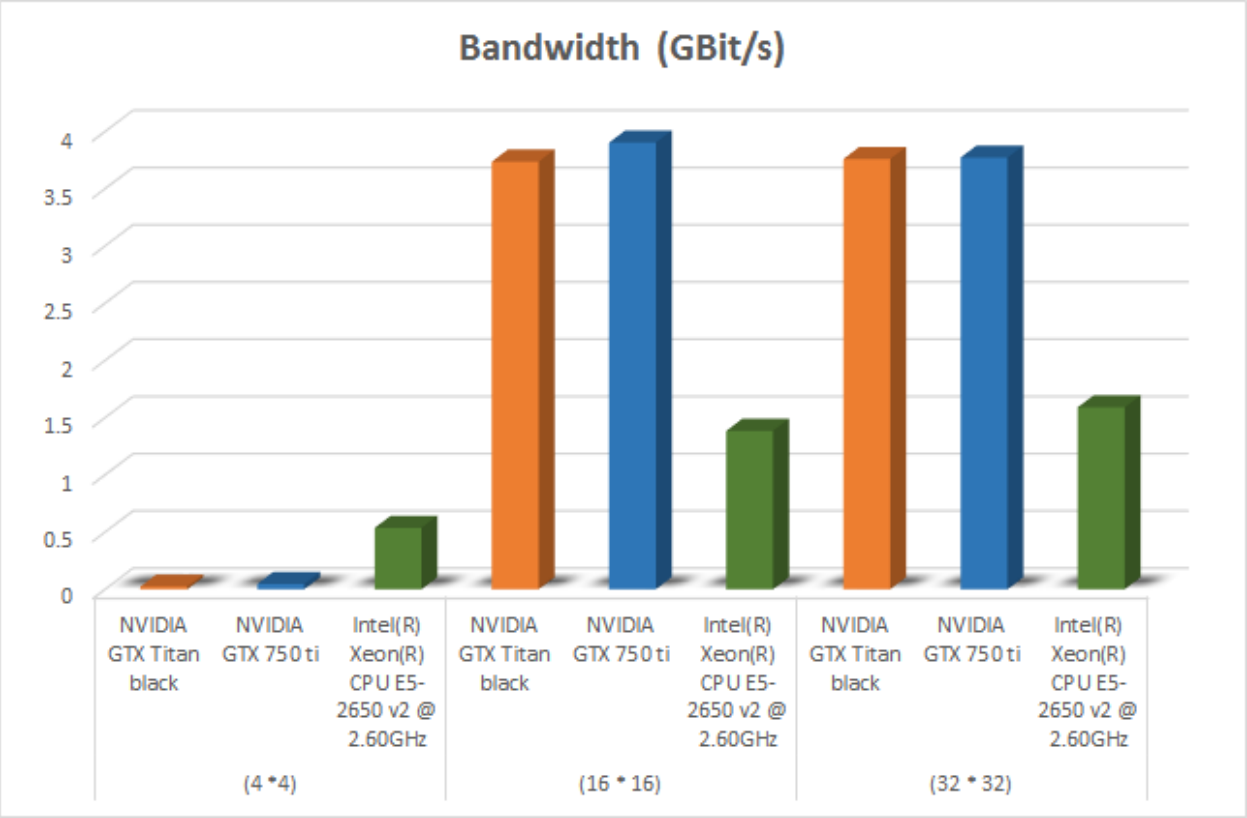
Q1)

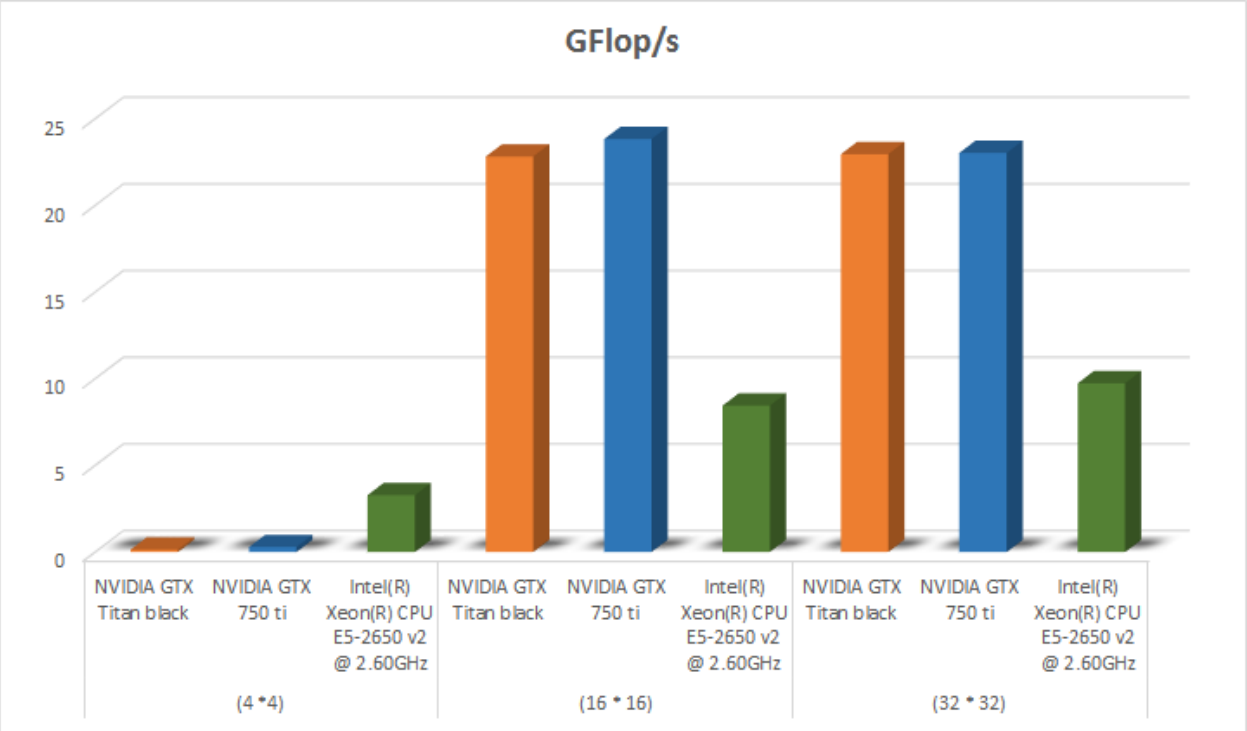
a. **Comparison of performance on 3 different devices:**

Local workgroup size	Device	Time (sec)	Processed pixels (Mpixels/s)	Bandwidth (GBit/s)	GFlop/s
(4 *4)	NVIDIA GTX Titan black	1.254	2.939	0.023	0.144
	NVIDIA GTX 750 ti	0.628	5.864	0.0469	0.286
	Intel(R) Xeon(R) CPU E5-2650 v2 @ 2.60GHz	0.0548	67.157	0.537	3.28
(16 * 16)	NVIDIA GTX Titan black	0.0079	467.192	3.737	22.818
	NVIDIA GTX 750 ti	0.0075	487.876	3.903	23.828
	Intel(R) Xeon(R) CPU E5-2650 v2 @ 2.60GHz	0.0213	173.05	1.384	8.45
(32 * 32)	NVIDIA GTX Titan black	0.00784	469.999	3.76	22.955
	NVIDIA GTX 750 ti	0.0078	471.503	3.772	23.028
	Intel(R) Xeon(R) CPU E5-2650 v2 @ 2.60GHz	0.0184	199.47	1.59	9.74


Processed pixels (Mpixels/s)
500
450
400
350
300
250
200
150
100
50
0
NVIDIA GTX Titan black
NVIDIA GTX 750 ti
Intel(R) Xeon(R) CPU E5-2650 v2 @ 2.60GHz
(4 * 4)
NVIDIA GTX Titan black
NVIDIA GTX 750 ti
Intel(R) Xeon(R) CPU E5-2650 v2 @ 2.60GHz
(16 * 16)
NVIDIA GTX Titan black
NVIDIA GTX 750 ti
Intel(R) Xeon(R) CPU E5-2650 v2 @ 2.60GHz
(32 * 32)


Time (sec)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
NVIDIA GTX Titan black
NVIDIA GTX 750 ti
Intel(R) Xeon(R) CPU E5-2650 v2 @ 2.60GHz
(4 * 4)
NVIDIA GTX Titan black
NVIDIA GTX 750 ti
Intel(R) Xeon(R) CPU E5-2650 v2 @ 2.60GHz
(16 * 16)
NVIDIA GTX Titan black
NVIDIA GTX 750 ti
Intel(R) Xeon(R) CPU E5-2650 v2 @ 2.60GHz
(32 * 32)





The work group sizes 32*32 and 16*16 gave the optimal performance. Any larger errors out, and 4*4 and smaller are extremely slow. (CPU is better for 4*4)

b. With iterative application of blurring, the image did kept getting blurrier but even after 50 iterations, it is still not washed out. Adding modified convolution.c and image outputs at various stages to the repo.