

# Assignment – 3

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## Execution Times:

Matrix Size	Reference C Implementation (Single Thread) (s)	OpenCL on CPU			OpenCL on GPU		
		Normal Kernel (Tile Size = 16) (s)	Tiled Kernel (Tile Size = 8) (s)	Tiled Kernel (Tile Size = 16) (s)	Normal Kernel (s)	Tiled Kernel (Tile Size = 8) (s)	Tiled Kernel (Tile Size = 16) (s)
512 X 512	0.211567	0.00152681	0.0187209	0.00169767	0.00036857	0.00037097	0.000243648
1024 X1024	3.55312	0.0392472	0.0836204	0.00787649	0.00282326	0.0028753	0.0018247
2048 X 2048	51.62	0.292979	0.697396	0.079308	0.0229774	0.0229578	0.014518

## Device Type and Models:

Device Type	Model Name
CPU	Intel® Core™ i9-9820X CPU @ 3.30GHz
GPU	Quadro RTX 5000

## Screenshots of the Result:

```
2. /home/mobaxterm 3. vvvenka1@en6169324-217: ~/Downloads
Last login: Sun Apr 26 21:08:29 2020 from 172.31.26.212
vvvenka1@en6169324-217:~$ cd Downloads
vvvenka1@en6169324-217:~/Downloads$ make all
g++ -O3 -std=c++11 main.cpp -o matrix_mul -lOpenCL
vvvenka1@en6169324-217:~/Downloads$ g++ -O3 -std=c++11 main.cpp -o matrix_mul -lOpenCL
vvvenka1@en6169324-217:~/Downloads$ ./matrix_mul

-----Simulation for Matrix Size = 512x512-----

Reference C matrix multiplication: 0.211567 sec

DEVICE TYPE: CPU
KERNEL TYPE: NORMAL
OpenCL matrix multiplication: 0.00152681 sec
KERNEL TYPE: TILED_8
OpenCL matrix multiplication: 0.0187209 sec
KERNEL TYPE: TILED_16
OpenCL matrix multiplication: 0.00169767 sec

DEVICE TYPE: GPU
KERNEL TYPE: NORMAL
OpenCL matrix multiplication: 0.000368576 sec
KERNEL TYPE: TILED_8
OpenCL matrix multiplication: 0.000370976 sec
KERNEL TYPE: TILED_16
OpenCL matrix multiplication: 0.000243648 sec
```

```
2. /home/mobaxterm 3. vvvenka1@en6169324-217: ~/Downloads
-----Simulation for Matrix Size = 1024x1024-----

Reference C matrix multiplication: 3.55312 sec

DEVICE TYPE: CPU
KERNEL TYPE: NORMAL
OpenCL matrix multiplication: 0.0392472 sec
KERNEL TYPE: TILED_8
OpenCL matrix multiplication: 0.0836204 sec
KERNEL TYPE: TILED_16
OpenCL matrix multiplication: 0.00787649 sec

DEVICE TYPE: GPU
KERNEL TYPE: NORMAL
OpenCL matrix multiplication: 0.00282326 sec
KERNEL TYPE: TILED_8
OpenCL matrix multiplication: 0.0028753 sec
KERNEL TYPE: TILED_16
OpenCL matrix multiplication: 0.0018247 sec
```

-----Simulation for Matrix Size = 2048x2048-----

Reference C matrix multiplication: 51.62 sec

DEVICE TYPE: CPU

KERNEL TYPE: NORMAL

OpenCL matrix multiplication: 0.292979 sec

KERNEL TYPE: TILED\_8

OpenCL matrix multiplication: 0.697396 sec

KERNEL TYPE: TILED\_16

OpenCL matrix multiplication: 0.079308 sec

DEVICE TYPE: GPU

KERNEL TYPE: NORMAL

OpenCL matrix multiplication: 0.0229774 sec

KERNEL TYPE: TILED\_8

OpenCL matrix multiplication: 0.0229578 sec

KERNEL TYPE: TILED\_16

OpenCL matrix multiplication: 0.014518 sec

Press Enter to finish...

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