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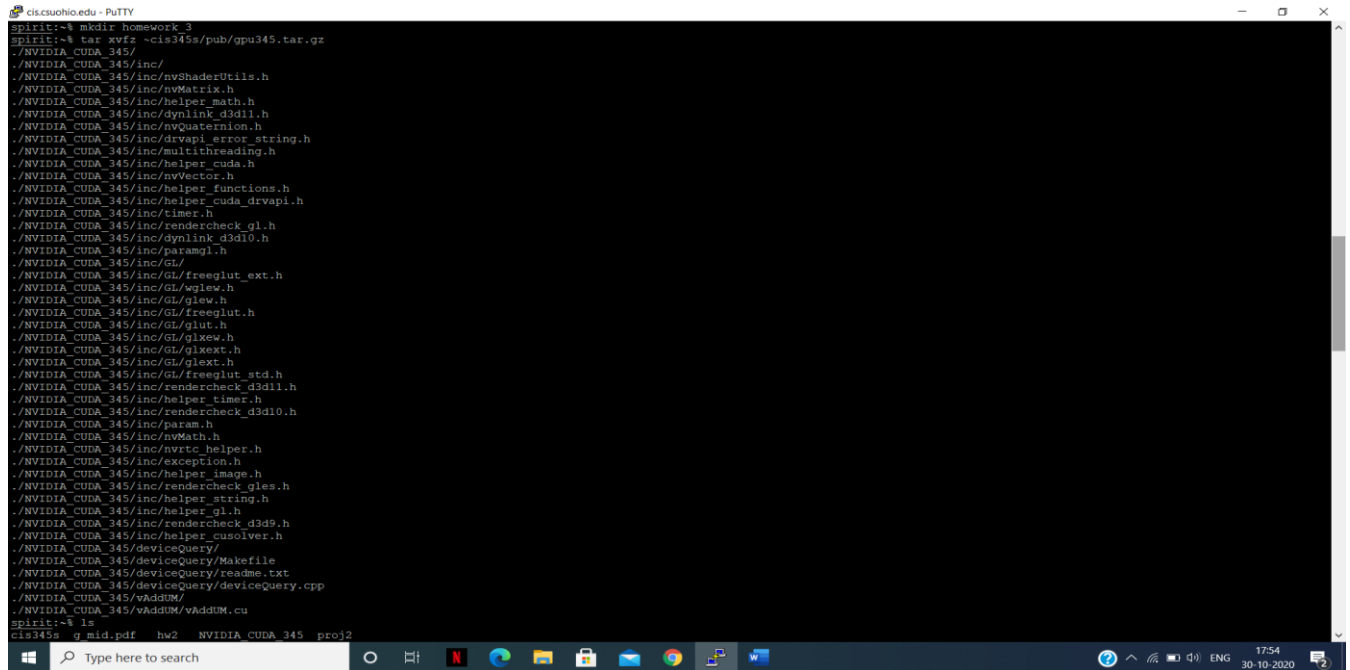
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Task:1

Step-1: I make a directory called hw3 and under this directory I have extracted the NVIDIA_CUDA_345 using tar xvfz ~cis345s/pub/gpu345.tar.gz



```
ciscuho.edu - PuTTY
SP1111:~$ mkdir homework 3
SP1111:~$ tar xvfz ~cis345s/pub/gpu345.tar.gz
./NVIDIA_CUDA_345/
./NVIDIA_CUDA_345/inc/
./NVIDIA_CUDA_345/inc/nvShaderUtils.h
./NVIDIA_CUDA_345/inc/nvMatrix.h
./NVIDIA_CUDA_345/inc/helper_math.h
./NVIDIA_CUDA_345/inc/dynlink_d3d11.h
./NVIDIA_CUDA_345/inc/nvQuaternion.h
./NVIDIA_CUDA_345/inc/drvapi_error_string.h
./NVIDIA_CUDA_345/inc/multithreading.h
./NVIDIA_CUDA_345/inc/helper_cuda.h
./NVIDIA_CUDA_345/inc/nvVector.h
./NVIDIA_CUDA_345/inc/helper_functions.h
./NVIDIA_CUDA_345/inc/helper_cuda_drvapi.h
./NVIDIA_CUDA_345/inc/timer.h
./NVIDIA_CUDA_345/inc/rendercheck_gl.h
./NVIDIA_CUDA_345/inc/dynlink_d3d10.h
./NVIDIA_CUDA_345/inc/paramgl.h
./NVIDIA_CUDA_345/inc/GL/
./NVIDIA_CUDA_345/inc/GL/freeglut_ext.h
./NVIDIA_CUDA_345/inc/GL/wglew.h
./NVIDIA_CUDA_345/inc/GL/glew.h
./NVIDIA_CUDA_345/inc/GL/freeglut.h
./NVIDIA_CUDA_345/inc/GL/glut.h
./NVIDIA_CUDA_345/inc/GL/glkw.h
./NVIDIA_CUDA_345/inc/GL/glxt.h
./NVIDIA_CUDA_345/inc/GL/freeglut_std.h
./NVIDIA_CUDA_345/inc/rendercheck_d3d11.h
./NVIDIA_CUDA_345/inc/helper_timer.h
./NVIDIA_CUDA_345/inc/rendercheck_d3d10.h
./NVIDIA_CUDA_345/inc/param.h
./NVIDIA_CUDA_345/inc/nvMath.h
./NVIDIA_CUDA_345/inc/nvrtc_helper.h
./NVIDIA_CUDA_345/inc/exception.h
./NVIDIA_CUDA_345/inc/helper_image.h
./NVIDIA_CUDA_345/inc/rendercheck_gles.h
./NVIDIA_CUDA_345/inc/helper_string.h
./NVIDIA_CUDA_345/inc/helper_gl.h
./NVIDIA_CUDA_345/inc/rendercheck_d3d9.h
./NVIDIA_CUDA_345/inc/helper_cusolver.h
./NVIDIA_CUDA_345/deviceQuery/
./NVIDIA_CUDA_345/deviceQuery/Makefile
./NVIDIA_CUDA_345/deviceQuery/readme.txt
./NVIDIA_CUDA_345/deviceQuery/deviceQuery.cpp
./NVIDIA_CUDA_345/vaddum/
./NVIDIA_CUDA_345/vaddum/vAddum.cu
SP1111:~$ ls
cis345s  g eid.pdf  hw2  NVIDIA_CUDA_345  proj2
```

-For the first part we navigate to ~/hw3/NVIDIA_CUDA_345/deviceQuery% and execute the make command to compile and build the kernel

```
ciscsuohio.edu - PuTTY
./NVIDIA_CUDA_345/inc/helper_gl.h
./NVIDIA_CUDA_345/inc/rendercheck_d3d9.h
./NVIDIA_CUDA_345/inc/helper_cusolver.h
./NVIDIA_CUDA_345/deviceQuery/
./NVIDIA_CUDA_345/deviceQuery/Makefile
./NVIDIA_CUDA_345/deviceQuery/readme.txt
./NVIDIA_CUDA_345/deviceQuery/deviceQuery.cpp
./NVIDIA_CUDA_345/vaddum/
./NVIDIA_CUDA_345/vaddum/vAddUM.cu
spirit:~/homework_3% ls
NVIDIA_CUDA_345
spirit:~/homework_3% cd NVIDIA_CUDA_345
spirit:~/homework_3/NVIDIA_CUDA_345% ls
deviceQuery inc vaddum
spirit:~/homework_3/NVIDIA_CUDA_345% cd deviceQuery
spirit:~/homework_3/NVIDIA_CUDA_345/deviceQuery% ls
deviceQuery.cpp Makefile readme.txt
spirit:~/homework_3/NVIDIA_CUDA_345/deviceQuery% make
"/usr/local/cuda/bin/nvcc -ccbin g++ -I../inc -m64 -gencode arch=compute_30
,code=sm_30 -gencode arch=compute_35,code=sm_35 -gencode arch=compute_37,code=sm
_37 -gencode arch=compute_50,code=sm_50 -gencode arch=compute_52,code=sm_52 -gen
code arch=compute_60,code=sm_60 -gencode arch=compute_61,code=sm_61 -gencode arc
h=compute_70,code=sm_70 -gencode arch=compute_75,code=sm_75 -gencode arch=comput
e_75,code=compute_75 -o deviceQuery.o -c deviceQuery.cpp
"/usr/local/cuda/bin/nvcc -ccbin g++ -m64 -gencode arch=compute_30,code=
sm_30 -gencode arch=compute_35,code=sm_35 -gencode arch=compute_37,code=sm_37 -g
encode arch=compute_50,code=sm_50 -gencode arch=compute_52,code=sm_52 -gencode a
rch=compute_60,code=sm_60 -gencode arch=compute_61,code=sm_61 -gencode arch=comp
ute_70,code=sm_70 -gencode arch=compute_75,code=sm_75 -gencode arch=compute_75,c
ode=compute_75 -o deviceQuery deviceQuery.o
spirit:~/homework_3/NVIDIA_CUDA_345/deviceQuery% ./deviceQuery
./deviceQuery Starting...

CUDA Device Query (Runtime API) version (CUDA static linking)

Detected 1 CUDA Capable device(s)

Device 0: "Quadro P620"
  CUDA Driver Version / Runtime Version      10.0 / 10.0
  CUDA Capability Major/Minor version number: 6.1
  Total amount of global memory:              1992 MBytes (2089091072 bytes)
  ( 4) Multiprocessors, (128) CUDA Cores/MP: 512 CUDA Cores
  GPU Max Clock rate:                        1354 MHz (1.35 GHz)
  Memory Clock rate:                         2505 Mhz
  Memory Bus Width:                           128-bit
  L2 Cache Size:                             524288 bytes
  Maximum Texture Dimension Size (x,y,z)      1D=(131072), 2D=(131072, 65536)
, 3D=(16384, 16384, 16384)
  Maximum Layered 1D Texture Size, (num) layers 1D=(32768), 2048 layers
  Maximum Layered 2D Texture Size, (num) layers 2D=(32768, 32768), 2048 layers
```

-After compiling we are running it using

`./deviceQuery`

```
ciscsuohio.edu - PuTTY
ode=compute_75 -o deviceQuery deviceQuery.o
spirit:~/homework_3/NVIDIA_CUDA_345/deviceQuery% ./deviceQuery
./deviceQuery Starting...

CUDA Device Query (Runtime API) version (CUDA static linking)

Detected 1 CUDA Capable device(s)

Device 0: "Quadro P620"
  CUDA Driver Version / Runtime Version      10.0 / 10.0
  CUDA Capability Major/Minor version number: 6.1
  Total amount of global memory:              1992 MBytes (2089091072 bytes)
  ( 4) Multiprocessors, (128) CUDA Cores/MP: 512 CUDA Cores
  GPU Max Clock rate:                        1354 MHz (1.35 GHz)
  Memory Clock rate:                         2505 Mhz
  Memory Bus Width:                           128-bit
  L2 Cache Size:                             524288 bytes
  Maximum Texture Dimension Size (x,y,z)      1D=(131072), 2D=(131072, 65536)
, 3D=(16384, 16384, 16384)
  Maximum Layered 1D Texture Size, (num) layers 1D=(32768), 2048 layers
  Maximum Layered 2D Texture Size, (num) layers 2D=(32768, 32768), 2048 layers
  Total amount of constant memory:            65536 bytes
  Total amount of shared memory per block:    49152 bytes
  Total number of registers available per block: 65536
  Warp size:                                 32
  Maximum number of threads per multiprocessor: 2048
  Maximum number of threads per block:        1024
  Max dimension size of a thread block (x,y,z): (1024, 1024, 64)
  Max dimension size of a grid size (x,y,z):  (2147483647, 65535, 65535)
  Maximum memory pitch:                       2147483647 bytes
  Texture alignment:                           512 bytes
  Concurrent copy and kernel execution:       Yes with 2 copy engine(s)
  Run time limit on kernels:                   No
  Integrated GPU sharing Host Memory:          No
  Support host page-locked memory mapping:     Yes
  Alignment requirement for Surfaces:          Yes
  Device has ECC support:                      Disabled
  Device supports Unified Addressing (UVA):    Yes
  Device supports Compute Preemption:          Yes
  Supports Cooperative Kernel Launch:          Yes
  Supports MultiDevice Co-op Kernel Launch:   Yes
  Device PCI Domain ID / Bus ID / location ID: 0 / 1 / 0
  Compute Mode:
    < Default (multiple host threads can use ::cudaSetDevice() with device simu
ltaneously) >

deviceQuery, CUDA Driver = CUDART, CUDA Driver Version = 10.0, CUDA Runtime Vers
ion = 10.0, NumDevs = 1
Result = PASS
```

Streaming Multiprocessor (SM):4

CUDA core [(4) Multiprocessors, (128) CUDA Cores/MP]: 512 CUDA Cores

(Off chip) Global memory: 1992 MBytes (2089091072 bytes)

GPU clock rate: 1354 MHz (1.35 GHz)

TASK-2(page default):

In this task i reach the program vAddUM.cu by using following command

~/hw3/NVIDIA_CUDA_345/vAddUM

Next compile by using nvcc vAddUM.cu -o vAddUM

Next I run by using nvcc vAddUM.cu -o vAddUM then again I run by using nvprof ./vAddUM and taken screenshot. Because,it is in c++ that's why double cc

```
cis.csuohio.edu - PuTTY
% ./vAddUM
Kernel time: 2.554688 ms
Max error: 0
% nvprof ./vAddUM
==17329== NVPROF is profiling process 17329, command: ./vAddUM
Kernel time: 4.395200 ms
Max error: 0
==17329== Profiling application: ./vAddUM
==17329== Profiling result:
Type Time(%) Time Calls Avg Min Max Nam
e
GPU activities: 100.00% 4.2662ms 1 4.2662ms 4.2662ms 4.2662ms vec
Add(int, float*, float*, float*)
API calls: 95.97% 157.37ms 3 52.458ms 33.125us 157.25ms cud
aMallocManaged 2.60% 4.2600ms 1 4.2600ms 4.2600ms 4.2600ms cud
aEventSynchronize 0.65% 1.0741ms 3 358.02us 314.56us 398.22us cud
aFree 0.54% 890.10us 96 9.2710us 1.2200us 365.12us cuD
eviceGetAttribute 0.08% 127.57us 1 127.57us 127.57us 127.57us cud
aLaunchKernel 0.06% 91.451us 1 91.451us 91.451us 91.451us cuD
eviceTotalMem 0.04% 69.563us 1 69.563us 69.563us 69.563us cuD
eviceGetName 0.02% 35.755us 2 17.877us 5.0770us 30.678us cud
aEventCreate 0.02% 32.055us 2 16.027us 11.322us 20.733us cud
aEventRecord 0.00% 7.2750us 1 7.2750us 7.2750us 7.2750us cud
aEventElapsedTime 0.00% 6.6390us 3 2.2130us 1.1960us 2.7830us cuD
eviceGetCount 0.00% 5.5400us 1 5.5400us 5.5400us 5.5400us cuD
eviceGetPCIBusId 0.00% 3.4570us 2 1.7280us 1.4380us 2.0190us cuD
eviceGet 0.00% 1.4190us 1 1.4190us 1.4190us 1.4190us cuD
eviceGetUuid

==17329== Unified Memory profiling result:
Device "Quadro P620 (0)"
Count Avg Size Min Size Max Size Total Size Total Time Name
60 136.53KB 4.0000KB 0.9922MB 8.000000MB 1.169728ms Host To Device
24 170.67KB 4.0000KB 0.9961MB 4.000000MB 343.6800us Device To Host
25 - - - - - 4.097280ms Gpu page fault g
roups
Total CPU Page faults: 36
```

Count	Avg Size	Min Size	Max Size	Total Size	Total Time	Name
60	136.53KB	4.0000KB	0.9922MB	8.000000MB	1.169728ms	Host To
						To

Block 1

stride

0,1,2,-----255

256,257,



Index

Block 11

Page migration is caused that's why page fault occurs

Task-3(vAddUM_Init.cu):

In this task we copy the vAddUM and named That file in the name of vAddUM_Init.cu and changes are done based on handout. Removing the initialization of x and y we initialized values so that we reduce the page faults

Next step we run the program `nvcc vAddUM_Init.cu -o vAddUM_Init.cu` and execute the output `nvprof ./vAddUM_Init` and taken screen shot from bach.

I move initialization from the CPU to the GPU by `__global__`, the addkernel launch by `init<<<num Blocks, blockSize >>>` won't page fault. Here's a simple CUDA C++ kernel to initialize the data. We can just replace the host code(that's why not getting answers for host to device) that initializes **x** and **y** with a launch of this kernel. So we can reduce the page fault.

```

cscs.uhio.edu - default - SSH Secure Shell
File Edit View Window Help
Quick Connect Profiles

% nvcc vAddUM_Init.cu -o vAddUM_Init
% nvprof ./vAddUM_Init
==19899== NVPROF is profiling process 19899, command: ./vAddUM_Init
Kernel time: 1.374080 ms
Max error: 0
==19899== Profiling application: ./vAddUM_Init
==19899== Profiling result:
Type      Time(%)      Time      Calls      Avg      Min      Max      Name
GPU activities: 61.19%  2.1613ms    1  2.1613ms  2.1613ms  2.1613ms  init(int, float*, float*)
                30.81%  1.3710ms    1  1.3710ms  1.3710ms  1.3710ms  vecAdd(int, float*, float*, float*)
API calls:      97.99%  274.53ms    3  91.509ms  40.825us  274.38ms  cudaMallocManaged
                1.23%  3.4574ms    1  3.4574ms  3.4574ms  3.4574ms  cudaEventSynchronize
                0.34%  944.62us    3  314.87us  179.27us  537.72us  cudaFree
                0.25%  696.08us    96  7.2500us  74ns     302.75us  cuDeviceGetAttribute
                0.12%  332.07us    2  166.03us  41.030us  291.04us  cudaLaunchKernel
                0.02%  64.799us    1  64.799us  64.799us  64.799us  cuDeviceTotalMem
                0.02%  55.361us    1  55.361us  55.361us  55.361us  cuDeviceGetName
                0.01%  32.398us    2  16.199us  11.070us  21.328us  cudaEventRecord
                0.01%  17.390us    2  8.6950us  6.3420us  11.048us  cudaEventCreate
                0.00%  5.5230us    1  5.5230us  5.5230us  5.5230us  cudaEventElapsedTime
                0.00%  4.8560us    3  1.6180us  741ns    2.4280us  cuDeviceGetCount
                0.00%  2.6440us    1  2.6440us  2.6440us  2.6440us  cuDeviceGetPCIBusId
                0.00%  2.0750us    2  1.0370us  57ns     1.2180us  cuDeviceGet
                0.00%  849ns      1  849ns     849ns    849ns    cuDeviceGetUuid

==19899== Unified Memory profiling result:
Device "Quadro P620 (0)"
Count Avg Size Min Size Max Size Total Size Total Time Name
24 170.67KB 4.0000KB 0.9961MB 4.000000MB 344.4160us Device To Host
34 - - - - 3.287744Ms Gpu page fault groups
Total CPU Page faults: 12

```

Count	Avg Size	Min Size	Max Size	Total Size	Total Time	Name
24	170.67KB	4.0000KB	0.9961MB	4.000000MB	344.4160us	Device To Host
34	-	-	-	-	3.287744Ms	Gpu page fault groups

Total CPU Page faults: 12

Task-4 (vAddUM_Pfetch.cu):

Copy vAddUM.cu to another file vAddUM_Pfetch.cu and change the code add the code before the kernel launch or before the z variable use the Pfetch so that page migration is reduced.

Next compile for the command using `nvcc vAddUM_Pfetch.cu -o vAddUM_Pfetch` and then run by using `nvprof vAddUM_Pfetch` after that taken the screenshot of the result

```
cis.csuohio.edu - default - SSH Secure Shell
File Edit View Window Help
Quick Connect Profiles

% nvcc vAddUM_Pfetch.cu -o VAddUM_Pfetch
% nvprof ./vAddUM_Pfetch
==17899== NVPROF is profiling process 17899, command: ./vAddUM_Pfetch
Kernel time: 4.147488 ms
Max error: 0
==17899== Profiling application: ./vAddUM_Pfetch
==17899== Profiling result:
Type Time(%) Time Calls Avg Min Max Nam
e
GPU activities: 100.00% 1.4592ms 1 1.4592ms 1.4592ms 1.4592ms vec
Add(int, float*, float*, float*)
API calls: 96.15% 163.20ms 3 54.400ms 32.361us 163.10ms cud
aMallocManaged
aMemPrefetchAsync 1.44% 2.4369ms 3 812.29us 244.06us 1.3803ms cud
aEventSynchronize 1.39% 2.3638ms 1 2.3638ms 2.3638ms 2.3638ms cud
eviceGetAttribute 0.43% 721.88us 96 7.5190us 696ns 325.81us cuD
aFree 0.40% 677.45us 3 225.82us 186.77us 260.43us cud
aLaunchKernel 0.08% 133.74us 1 133.74us 133.74us 133.74us cud
eviceGetName 0.04% 63.065us 1 63.065us 63.065us 63.065us cuD
eviceTotalMem 0.04% 61.606us 1 61.606us 61.606us 61.606us cuD
aEventRecord 0.02% 34.442us 2 17.221us 13.326us 21.116us cud
aEventCreate 0.01% 21.526us 2 10.763us 5.1440us 16.382us cud
aEventElapsedTime 0.00% 5.1730us 1 5.1730us 5.1730us 5.1730us cud
aGetDevice 0.00% 4.7180us 1 4.7180us 4.7180us 4.7180us cud
eviceGetCount 0.00% 3.4500us 3 1.1500us 696ns 1.9500us cuD
eviceGetPCIBusId 0.00% 2.5440us 1 2.5440us 2.5440us 2.5440us cuD
eviceGet 0.00% 1.8390us 2 919ns 700ns 1.1390us cuD
eviceGetUuid 0.00% 822ns 1 822ns 822ns 822ns cuD

==17899== Unified Memory profiling result:
Device "Quadro P620 (0)"

Connected to cis.csuohio.edu
SSH2 - aes128-cbc - hmac-md5 - ni | 215x46
Type here to search
21:55
30-10-2020
```

```
cis.csuohio.edu - default - SSH Secure Shell
File Edit View Window Help
Quick Connect Profiles

Type Time(%) Time Calls Avg Min Max Nam
e
GPU activities: 100.00% 1.4592ms 1 1.4592ms 1.4592ms 1.4592ms vec
Add(int, float*, float*, float*)
API calls: 96.15% 163.20ms 3 54.400ms 32.361us 163.10ms cud
aMallocManaged
aMemPrefetchAsync 1.44% 2.4369ms 3 812.29us 244.06us 1.3803ms cud
aEventSynchronize 1.39% 2.3638ms 1 2.3638ms 2.3638ms 2.3638ms cud
eviceGetAttribute 0.43% 721.88us 96 7.5190us 696ns 325.81us cuD
aFree 0.40% 677.45us 3 225.82us 186.77us 260.43us cud
aLaunchKernel 0.08% 133.74us 1 133.74us 133.74us 133.74us cud
eviceGetName 0.04% 63.065us 1 63.065us 63.065us 63.065us cuD
eviceTotalMem 0.04% 61.606us 1 61.606us 61.606us 61.606us cuD
aEventRecord 0.02% 34.442us 2 17.221us 13.326us 21.116us cud
aEventCreate 0.01% 21.526us 2 10.763us 5.1440us 16.382us cud
aEventElapsedTime 0.00% 5.1730us 1 5.1730us 5.1730us 5.1730us cud
aGetDevice 0.00% 4.7180us 1 4.7180us 4.7180us 4.7180us cud
eviceGetCount 0.00% 3.4500us 3 1.1500us 696ns 1.9500us cuD
eviceGetPCIBusId 0.00% 2.5440us 1 2.5440us 2.5440us 2.5440us cuD
eviceGet 0.00% 1.8390us 2 919ns 700ns 1.1390us cuD
eviceGetUuid 0.00% 822ns 1 822ns 822ns 822ns cuD

==17899== Unified Memory profiling result:
Device "Quadro P620 (0)"
Count Avg Size Min Size Max Size Total Size Total Time Name
4 2.0000MB 2.0000MB 2.0000MB 8.000000MB 967.5200us Host To Device
2 2.0000MB 2.0000MB 2.0000MB 4.000000MB 330.3360us Device To Host
12 - - - - 1.252768ms Gpu page fault groups
Total CPU Page faults: 24

Connected to cis.csuohio.edu
SSH2 - aes128-cbc - hmac-md5 - ni | 215x46
Type here to search
21:55
30-10-2020
```


Count	Avg Size	Min Size	Max Size	Total Size	Total Time	Name
4	2.0000M B	2.0000M B	2.0000M B	8.000000M B	967.5200us	Host To Device
2	2.0000M B	2.0000M B	2.0000M B	4.000000M B	338.3360us	Device To Host
12	-	-	-	-	1.252768ms	Gpu page fault groups

Total CPU Page faults: 24

Task-5(vAddUM_Over.cu)

Copy the code from the vAddUM to vAddUM_Over.cu and modify the number from 2^{20} to 2^{28} and calculate the value $2^{28} \times 4 = 2^{30}$ bytes

Then compile `nvcc vAddUM_Over.cu -o vAddUM_Over` and run by using the command `nvprof vAddUM_Over.cu` and taken the screen shot of the results.

```

ciscuohio.edu - default - SSH Secure Shell
File Edit View Window Help
Quick Connect Profiles

% nvcc vAddUM_Over.cu -o vAddUM_Over
% nvprof ./vAddUM_Over
===== Error: application not found.
% nvprof ./vAddUM_Over
==18160== nvprof is profiling process 18160, command: ./vAddUM_Over
Nermal time: 605.787842 ms
Max error: 0
==18160== Profiling application: ./vAddUM_Over
==18160== Profiling result:
Type Time(%) Time Calls Avg Min Max Mem
e
GPU activities: 100.00% 605.73ms 1 605.73ms 605.73ms 605.73ms vec
Add(int, float*, float*, float*)
API calls: 67.90% 605.74ms 1 605.74ms 605.74ms 605.74ms cud
aEventSynchronize
17.54% 156.48ms 3 52.160ms 43.874us 156.35ms cud
aMallocManaged
14.49% 129.28ms 3 43.096ms 37.233ms 54.419ms cud
aFree
0.04% 389.62us 96 4.0580us 472ms 156.29us cud
eviceGetAttribute
0.01% 51.522us 1 51.522us 51.522us 51.522us cuD
eviceGetName
0.01% 48.430us 1 48.430us 48.430us 48.430us cuD
eviceTotalMem
0.01% 45.066us 1 45.066us 45.066us 45.066us cud
aLaunchKernel
0.00% 16.594us 2 8.2970us 4.1510us 12.443us cud
aEventRecord
0.00% 13.698us 2 6.8490us 1.7890us 11.909us cud
aEventCreate
0.00% 7.4150us 3 2.4710us 862ms 4.7590us cud
eviceGetCount
0.00% 6.3110us 1 6.3110us 6.3110us 6.3110us cuD
eviceGetPCIBusId
0.00% 4.3660us 1 4.3660us 4.3660us 4.3660us cud
aEventElapsedTime
0.00% 3.6130us 2 1.8060us 528ms 3.0850us cud
eviceGet
0.00% 552ns 1 552ns 552ns 552ns cuD
eviceGetLuid

==18160== Unified Memory profiling result:
Device "Quadro P620 (0)"
Count Avg Size Min Size Max Size Total Size Total Time Name
17616 119.05KB 4.0000KB 0.9961MB 2.000000GB 178.4112ms Host To Device

Connected to ciscuohio.edu
Type here to search

```

```

cscsuohio.edu - default - SSH Secure Shell
File Edit View Window Help
Quick Connect Profiles

Kernel time: 605.787842 ms
Max error: 0
==18160== Profiling application: ./VAddUM_Over
==18160== Profiling result:
Type Time(%) Time Calls Avg Min Max Nam
e
GPU activities: 100.00% 605.73ms 1 605.73ms 605.73ms 605.73ms vec
Add(int, float*, float*, float*) 1 605.74ms 605.74ms 605.74ms cud
API calls: 67.90% 605.74ms 1 605.74ms 605.74ms 605.74ms cud
aEventSynchronize 17.54% 156.48ms 3 52.160ms 43.874us 156.35ms cud
aMallocManaged 14.49% 129.29ms 3 43.096ms 37.233ms 54.419ms cud
aFree 0.04% 389.62us 96 4.0580us 472ns 156.29us cuD
eviceGetAttribute 0.01% 51.522us 1 51.522us 51.522us 51.522us cuD
eviceGetName 0.01% 48.430us 1 48.430us 48.430us 48.430us cuD
eviceTotalMem 0.01% 45.066us 1 45.066us 45.066us 45.066us cud
aLaunchKernel 0.00% 16.594us 2 8.2970us 4.1510us 12.443us cud
aEventRecord 0.00% 13.698us 2 6.8490us 1.7890us 11.909us cud
aEventCreate 0.00% 7.4150us 3 2.4710us 862ns 4.7590us cuD
eviceGetCount 0.00% 6.3110us 1 6.3110us 6.3110us 6.3110us cuD
eviceGetPCIBusId 0.00% 4.3660us 1 4.3660us 4.3660us 4.3660us cud
aEventElapsedTime 0.00% 3.6130us 2 1.8060us 528ns 3.0850us cuD
eviceGet 0.00% 552ns 1 552ns 552ns 552ns cuD
eviceGetUuid

==18160== Unified Memory profiling result:
Device "Quadro P620 (0)"
Count Avg Size Min Size Max Size Total Size Total Time Name
17616 119.05KB 4.0000KB 0.9961MB 2.000000GB 178.4112ms Host To Device
4336 432.18KB 4.0000KB 2.0000MB 1.787109GB 156.1746ms Device To Host
6185 - - - - 556.7007ms Gpu page fault groups
Total CPU Page faults: 8211
%

Connected to cscsuohio.edu
SSH2 - aes128-cbc - hmac-md5 - nv 215x46
Type here to search
22:09
30-10-2020

```

Count	Avg Size	Min Size	Max Size	Total Size	Total Time	Name
17616	119.05KB	4.0000KB	0.9961MB	2.000000GB	178.4112ms	Host To Device
4336	432.18KB	4.0000KB	2.0000MB	1.787109GB	156.1746ms	Device To Host
6185	-	-	-	-	556.7007ms	Gpu page fault groups

Total CPU Page faults: 8211

Here cpu has more space so its not problem of exceeding memory we increase from 2^{20} to 2^{28} .