Test #2

Due Jun 12 at 11:59pm **Points** 100 **Questions** 40

Available Jun 8 at 12:01am - Jun 12 at 11:59pm 5 days Time Limit 60 Minutes

Instructions

This is called a "quiz" on Canvas, but it is really 100-point Test #2.

There is a time limit of 60 minutes on this test. Once you start, you must finish. Canvas will not let you pause and come back later.

This test is Open Notes, Closed Friends, and Closed Internet.

This is your last graded-anything in this class, so do a good job!

Thanks for a great quarter!

Attempt History

	Attempt	Time	Score
EST	Attempt 1	41 minutes	100 out of 100

(!) Correct answers will be available on Jun 13 at 12:01am.

Score for this quiz: 100 out of 100

Submitted Jun 9 at 12:57am This attempt took 41 minutes.

Question 1 2.5 / 2.5 pts

What does the OpenCL call "gid = get_global_id(0)" return?

It tells you how big the global dataset is
It tells you how big the local dataset is
It tells you where you are in the global dataset
It tells you where you are in the local dataset

Question 2	2.5 / 2.5 pts
The OpenGL-created Vertex Buffer Object lo	oks, to OpenCL, like:
A table of XYZ coordinates	
A linked list of XYZ coordinates	
○ A collection of separate X[], Y[], and Z[] arra	ys
A hash table of XYZ arrays	

•

Question 3 2.5 / 2.5 pts In the OpenCL call "gid = get_global_id(0)", what does the argument of 0 indicate? Since the time at which the program started Relative to the first element of the dataset That you want only one value returned

In the X dimension

What is special about using OpenCL/OpenGL interoperability?

It saves electrical power

The data never leaves GPU memory

It allows GPU graphics to be driven by CPU multicore computing

The Khronos Group gives you a certificate for doing it

In running your GPU program on the DGX server, you needed to type, for example: output outpu

Question 6 2.5 / 2.5 pts

When is it OK to use the less-precise "fast_normalize()" call instead of the full-precision "normalize()" call? When using OpenCL for computer graphics When using OpenCL for scientific computing Never Always

Question 8

2.5 / 2.5 pts

Projects #1 and #5 ran roughly the same code on a CPU and a GPU, respectively. What can you say about their relative performance in Trials/Second?

The GPU version was way faster

O The CPU version was way faster
 Within 10%, the two versions had about the same performance

Comparing CPUs and GPUs, it is correct to say: CPUs are better with linked-list data structures, GPUs are better with data parallel arrays GPUs are better with integers, CPUs are better with floating-point CPUs are better with integers, GPUs are better with floating-point GPUs are better with linked-list data structures, CPUs are better with data parallel arrays

•

In your CUDA program, how do you show that a function is the GPU Kernel function? By labeling it with __device__ By labeling it with __global__ By labeling it with __local__ By labeling it with __kernel__

The primary purpose of MPI is to: To allow multicore Allow parallel computing among separate computers To get computing access to a GPU To get SIMD performance

Question 12	2.5 / 2.5 pts
In Project #3, the Functional Decomposition project individual quantity's function needed to have three second barrier was there to:	•
Indicate when the Watcher thread could print values	
O Indicate when it was time to increment the month	
Indicate when that quantity's function was done computing quantity's next value	g that
Indicate when that quantity's next value was done being of global state	copied to the



Many functions: a broadcast sender and one unique broadcast receiver function per CPU

O Two functions: a broadcast sender and a broadcast receiver

A single function regardless of if you are sending or receiving

MPI Reductions: Must be implemented by your application Are unnecessary because of the number of CPUs Are unnecessary because of the SIMD units on the CPUs Are a built-in feature of the MPI API

Question 15 2.5 / 2.5 pts GPU Reductions:

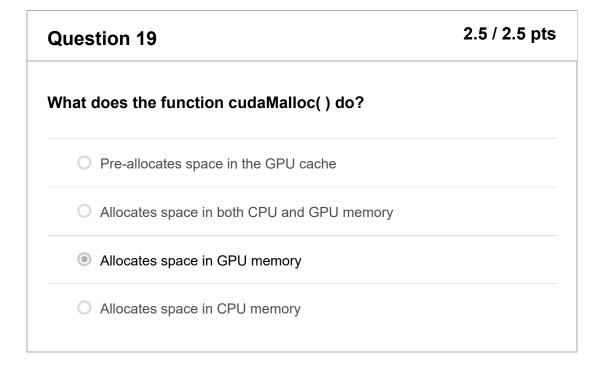
Question 16 The OpenCL function clCreateFromGLBuffer(): OpeneCL buffer and replaces it with an OpenGL-compatible vertex buffer object Allocates an OpenCL device memory buffer Creates an OpenCL device memory pointer from an OpenGL graphics vertex buffer object Creates an OpenGL graphics vertex buffer object

Question 17	2.5 / 2.5 pts
A Sphere can be represented as four floats. Wh	at are they?
The four hyperbolic radii	
The STP of the texture coordinates and the radius	



XYZ of the center position and the radius
O XYZ of the surface normal and the radius

Question 18	2.5 / 2.5 pts
What is the advantage of a Fused-Multiply-Add?	
You only have to write one line of code instead of to	WO
It can perform a multiply plus an add in about the same have done the multiply alone	e time as it could
O It implies that a SIMD operation should be performed	ed
O It reduces the possibility of False Sharing	





Question 20 2.5 / 2.5 pts

There were several cases when OpenCL, in querying what sort of system it was running on, called the same function twice:

status = clGetDevicelDs(platform, CL_DEVICE_TYPE_ALL, 0, NULL, &numDevices);
...
status = clGetDevicelDs(platform, CL_DEVICE_TYPE_ALL, numDevices, devices, NULL);

Why?

O So you could get the information from two separate platforms

Once to get the information from a CPU, and once to get it from a GPU

Once to get the information from a CPU/GPU, and once to get it from an FPGA (Field-Programmable Gate Array)

Once to get the number of something, and once to retrieve that much information

•

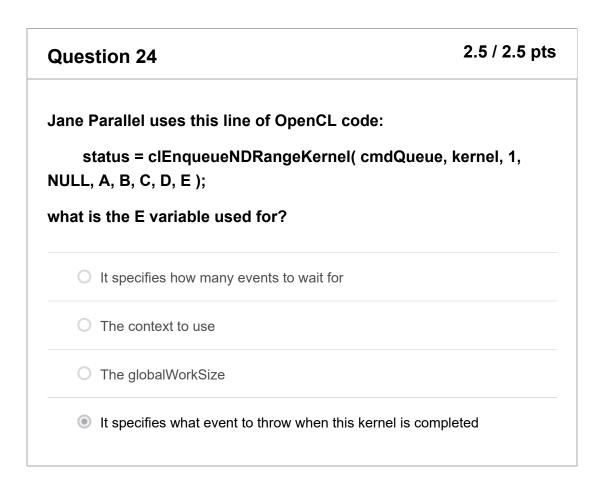
Question 21 2.5 / 2.5 pts

Question 22 In this class, the letters "MPI" stand for: MegaCalculation Per Instruction Many-Processor Interfaces Message Passing Interface Millions of Processor Instructions

Question 23	2.5 / 2.5 pts
In Project #3, the Functional De	• • • •
individual quantity's function no first barrier was there to:	eeded to have three barriers. The
O	

•

Indicate when that quantity's next value was done being copied to the global state
 O Indicate when it was time to increment the month
Indicate when that quantity's function was done computing that quantity's next value
O Indicate when the Watcher thread could print values



Question 25	2.5 / 2.5 pts
When OpenCL and OpenGL work together:	
It is just OpenCL that is able to access the vertex buffer	



O It is just OpenGL that is able to access the vertex buffer
They take turns accessing the vertex buffer

Question 26	2.5 / 2.5 pts
Joe Parallel wants to use OpenCL execution structure shown here.	•
O He con't it is not possible in the our	rent version of OpenCl. but might
He can't it is not possible in the cur be in the future	rent version of OpenCL, but might
•	
He has A, B, and C each throw even (respectively) wait for those events.	ts, and has C, C, and D
O He turns C and D into special Op	enCL reduction functions
O He sets up barriers at C and D	

Question 27

2.5 / 2.5 pts

The advantage of using SSE SIMD is:



As of the writing of our class notes, the 2022 SC conference (International Conference for High Performance Computing, Networking, Storage, and Analysis) will be held: In Los Angeles, CA In Washington, DC In Dallas, TX Totally online

Question 29	2.5 / 2.5 pts
Let's beat the Yellow Robot metaphor to death grippers represent:	The yellow robot's
O Compute Units	

Processing Elements	
O Separate CPU cores	
O SIMD banks	

In the CUDA call: cudaMemcpy(A, B, NUM_ELEMENTS*sizeof(float), cudaMemcpyHostToDevice); The CPU array A gets copied to the GPU array B The GPU array B gets copied to the CPU array A The CPU array B gets copied to the CPU array A

Question 31 2.5 / 2.5 pts

In Project #1, you performed a multicore Monte Carlo simulation by using the NUMTRIALS for-loop. In Project #5, you re-created that same simulation using CUDA without any for-loop. Where did that NUMTRIALS for-loop go?

You don't need to include it— CUDA is smart enough to figure out what you are trying to do and adds it for you

Jane Parallel uses this line of OpenCL code: status = clEnqueueNDRangeKernel(cmdQueue, kernel, 1, NULL, A, B, C, D, E); what are the C and D variables used for? They specify what event to throw when this kernel is completed The globalWorkSize and the localWorkSize They specify how many events to wait for and which ones they are The context to use

Question 33 2.5 / 2.5 pts

What is the relationship between Global Data Set Size, Work Group Size, and the Number of Work Groups?

Why did Jane Parallel use those typedefs (point, vector, color, sphere) in her OpenCL code? The compiler requires it Those were indeed the real OpenCL names for those types of variables It makes it more obvious what her code is doing The OpenCL standard requires it

Question 35 In MPI, the phrase "scatter/gather" means:

To break a problem up into pieces, give each piece to a separate computers, and then gather up the results	
0	
To gather input data from the disk and then scatter it out to CPUs for computation	o different
To setup Barriers across all CPUs	
0	
To use the MPI_Bcast() function to get information to all o	other CPUs

Question 36	2.5 / 2.5 pts
In your C/C++ CUDA program, how do you making a call to the GPU Kernel function?	•
With the cudaExecuteKernel() function	
With the cudaEnqueueNDRangeKernel() f	function
O With the >>> <<< (chevron) syntax	

•

Question 37	2.5 / 2.5 pts
In MPI, a "derived type" is:	
Linking multiple MPI calls together to send both MPI_FI MPI_INTs	LOATs and

O Being able to pack multiple MPI_INTs into a single MPI_LONG
Being able to pack multiple MPI_CHARs into a single MPI_LONG
You creating a struct that can act just like MPI_FLOAT, MPI_INT, etc.

Question 38	2.5 / 2.5 pts
What is one reason that OpenCL uses a Comm	and Queue?
To be compatible with CPU-SIMD	
 So OpenCL can gobble up commands as fast as 	it can
So that you don't need to know what each comm	and does
This paradigm is forced by how the hardware wo	rks



Question 39	2.5 / 2.5 pts
In MPI, a computer's "rank" is:	
Its integer identifier	
Its processing power	
The number of cores it has	
O Its priority	

Question 40	2.5 / 2.5 pts
Let's beat the Yellow Robot metaphor to death. represents:	The yellow robot
A separate CPU core	
A Processing Element	
A Compute Unit	
O A SIMD bank	

Quiz Score: 100 out of 100

