The recorded runtime for the global convolution kernel is 6165us, compared to 6233us for the reference executable. There is no significant speedup for this kernel.

For the tiled kernel, the runtime was 2688us, compared to 1735us for the reference executable. The reason for this difference is unknown, however, speculation may suggest that the reference executable may implement some form of memory coalescing in order to further reduce global memory transactions.

I had significant issues in this lab as the output image was blue; it's as if the kernel is only preforming convolution on the blue channel. This was fixed by zeroing SUM every iteration of the main loop, however, I do not know why it solves the problem.

I also had issues with the grades.html as the plot of the test runtime is not showing. Also, the grades.html did not show whether or not the generated image was correct. I had to examine the image myself, comparing it to the expected output image to determine if my kernel was working correctly.

Attached below are the NSIGHT analysis for the kernels.

This was by far the hardest lab in this course so far.

◀ ▶   CUDA Summary ▾

	Device ID	Device Name	Contexts	Device %	Host to Device (Bytes)	Device to Host (Bytes)
1	[0]	GPU 0 - GeForce GTX 750 Ti	1	0.90 %	12,583,012	0

CUDA Contexts

	Total	No Context	1	
CUDA Device ID		-	0	
◢ Runtime API Calls Summary	All				
# Calls	18	0	18	
# Errors	0	0	0	
% Time	51.89	0.00	51.89	
◢ Driver API Calls Summary	All				
# Calls	87	87	0	
# Errors	0	0	0	
% Time	0.23	0.23	0.00	
◢ Launches Summary	All				
# Launches	1	0	1	
% Device Time	0.90	0.00	0.90	
◢ Memory Copies All				
H to D # Copies	2	0	2	
H to D # Bytes	12,583,012	0	12,583,012	
H to D % Time	0.8	0.0	0.8	
D to H # Copies	0	0	0	
D to H # Bytes	0	0	0	
D to H % Time	0.0	0.0	0.0	
D to D # Copies	0	0	0	
D to D # Bytes	0	0	0	
D to D % Time	0.0	0.0	0.0	

Top Device Functions By Total Time Summary | All

	Name	Launches	Device %	Total (µs)	Min (µs)	Avg (µs)	Max (µs)
1	convolution	1	0.90	2,688.139	2,688.139	2,688.139	2,688.139

CUDA Summary ⌄

	Device ID	Device Name	Contexts	Device %	Host to Device (Bytes)	Device to Host (Bytes)
1	[0]	GPU 0 - GeForce GTX 750 Ti	1	2.09 %	12,583,012	0

CUDA Contexts

	Total	No Context	1	
CUDA Device ID		-	0	
◢ Runtime API Calls Summary | All				
# Calls	18	0	18	
# Errors	0	0	0	
% Time	58.12	0.00	58.12	
◢ Driver API Calls Summary | All				
# Calls	87	87	0	
# Errors	0	0	0	
% Time	0.26	0.26	0.00	
◢ Launches Summary | All				
# Launches	1	0	1	
% Device Time	2.09	0.00	2.09	
◢ Memory Copies All				
H to D # Copies	2	0	2	
H to D # Bytes	12,583,012	0	12,583,012	
H to D % Time	0.7	0.0	0.7	
D to H # Copies	0	0	0	
D to H # Bytes	0	0	0	
D to H % Time	0.0	0.0	0.0	
D to D # Copies	0	0	0	
D to D # Bytes	0	0	0	
D to D % Time	0.0	0.0	0.0	

Top Device Functions By Total Time Summary \| All

	Name	Launches	Device %	Total (μs)	Min (μs)	Avg (μs)	Max (μs)	
1	convolution	1	2.09	6,156.205	6,156.205	6,156.205	6,156.205	