CME 213 Homework 3.

```
Host -> Device transfer bandwidth 6.48168

Host (reference) solution bandwidth GB/sec: 3.543
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Device Bandwidth GB/sec

Problem Size MB	char	uint	uint2
1.23515	23.0783	67.1277	72.4173
2.4703	36.8922	82.6077	96.0758
4.9406	40.8774	100.223	114.028
9.8812	41.4703	110.855	126.164
19.7624	44.5726	115.575	129.688
39.5248	44.7575	117.847	132.031
79.0496	45.2291	119.7	132.534
158.099	45.5405	120.176	133.971
316.198	45.6324	120.991	134.535

Device Bandwidth GB/sec

	Number of nodes					
Avg. no. edges	32768	65536	131072	262144	524288	1048576
2	1.89	2.15	2.33	1.68	1.22	1.09
3	1.52	1.69	1.90	1.38	0.98	0.87
4	1.26	1.53	1.64	1.17	0.84	0.75
5	1.12	1.29	1.48	1.07	0.77	0.68
6	1.00	1.15	1.34	0.99	0.71	0.63
7	1.00	1.12	1.27	0.92	0.66	0.59
8	1.00	1.09	1.20	0.86	0.62	0.56
9	0.94	1.07	1.15	0.82	0.59	0.53
10	0.91	1.00	1.09	0.79	0.56	0.51
11	0.88	0.96	1.04	0.75	0.54	0.49
12	0.92	1.00	1.09	0.81	0.59	0.54
13	0.96	1.10	1.19	0.84	0.62	0.57
14	0.85	0.97	1.08	0.78	0.56	0.51
15	0.88	1.06	1.14	0.77	0.59	0.55
16	0.88	1.17	1.20	0.73	0.61	0.57
17	0.87	1.10	1.18	0.70	0.60	0.56
18	0.98	1.20	1.25	0.69	0.60	0.56
19	1.03	1.20	1.20	0.68	0.59	0.55

Problem 1.

Note that the bottleneck gradually becomes the memory transferring once we go from char to uint2. Initially the instructions for increasing char is low is the bottleneck is memoery transferring. However, as we get to uint2, the bottleneck becomes memory transferring as the size of data per thread increases.

Problem 2.2

The total number of bytes read and written is equal to number of nodes times size of (float) times 2 + number of nodes times number of edges times sizeof(uint)+ (number of nodes+1)times size of (uint)

Problem 2.4

The memory access is better in the middle of the table. This is because the kernel here is computationally more expensive, and thus the takes much more bandwith as number of nodes and average number of egdes increases.