

# 256 Block Results

## 2k Nodes

```
==1757== NVPROF is profiling process 1757, command: ./zdo3
RUN 1: Number of Vertices = 2000 | Number of Edges = 8953 | ERROR COUNT (BELLMAN FORD): 0

==1757== Profiling application: ./zdo3
==1757== Profiling result:
      Type  Time(%)    Time     Calls      Avg      Min      Max   Name
GPU activities: 100.00% 187.55us           1 187.55us 187.55us 187.55us is_zero_indegree_parallel(node*, int, bool*)
      API calls:  99.42% 402.17ms           2 201.08ms 25.259us 402.14ms cudaMallocManaged
      0.37% 1.5145ms           1 1.5145ms 1.5145ms 1.5145ms cuDeviceGetPCIBusId
      0.07% 279.64us           3 93.213us 32.311us 188.26us cudaMemPrefetchAsync
      0.05% 194.54us           1 194.54us 194.54us 194.54us cudaDeviceSynchronize
      0.04% 165.78us           3 55.260us 2.5470us 102.81us cudaFree
      0.03% 122.79us          101 1.2150us 133ns 46.495us cuDeviceGetAttribute
      0.01% 30.857us           1 30.857us 30.857us 30.857us cudaLaunchKernel
      0.01% 23.322us           1 23.322us 23.322us 23.322us cuDeviceGetName
      0.00% 13.654us           2 6.8270us 1.4030us 12.251us cudaMemAdvise
      0.00% 3.2260us           1 3.2260us 3.2260us 3.2260us cudaGetDevice
      0.00% 1.7650us           3 588ns 169ns 1.3410us cuDeviceGetCount
      0.00% 820ns              2 410ns 165ns 655ns cuDeviceGet
      0.00% 606ns              1 606ns 606ns 606ns cuModuleGetLoadingMode
      0.00% 477ns              1 477ns 477ns 477ns cuDeviceTotalMem
      0.00% 234ns              1 234ns 234ns 234ns cuDeviceGetUuid

==1757== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time   Name
      5  22.399KB 4.0000KB 36.000KB 112.0000KB 22.49500us Host To Device
      1  4.0000KB 4.0000KB 4.0000KB 4.000000KB 1.824000us Device To Host
      1  -       -       -       -       - 177.2120us Gpu page fault groups

==8621== NVPROF is profiling process 8621, command: ./zdo3
RUN 1: Number of Vertices = 2000 | Number of Edges = 8953 | ERROR COUNT (BELLMAN FORD): 0

==8621== Profiling application: ./zdo3
==8621== Profiling result:
      Type  Time(%)    Time     Calls      Avg      Min      Max   Name
GPU activities: 100.00% 172.09us           1 172.09us 172.09us 172.09us is_zero_indegree_parallel(node*, int, bool*)
      API calls:  99.63% 248.85ms           2 124.42ms 13.166us 248.83ms cudaMallocManaged
      0.11% 271.91us           3 90.637us 30.925us 174.70us cudaMemPrefetchAsync
      0.08% 189.78us           3 63.259us 2.9520us 120.75us cudaFree
      0.07% 176.63us           1 176.63us 176.63us 176.63us cudaDeviceSynchronize
      0.07% 172.19us          101 1.7040us 134ns 84.040us cuDeviceGetAttribute
      0.01% 30.153us           1 30.153us 30.153us 30.153us cudaLaunchKernel
      0.01% 28.116us           1 28.116us 28.116us 28.116us cuDeviceGetName
      0.01% 25.188us           2 12.594us 1.4570us 23.731us cudaMemAdvise
      0.01% 16.704us           1 16.704us 16.704us 16.704us cudaGetDevice
      0.00% 6.0650us           1 6.0650us 6.0650us 6.0650us cuDeviceGetPCIBusId
      0.00% 1.4720us           3 490ns 182ns 941ns cuDeviceGetCount
      0.00% 1.0720us           2 536ns 265ns 807ns cuDeviceGet
      0.00% 806ns              1 806ns 806ns 806ns cuDeviceTotalMem
      0.00% 519ns              1 519ns 519ns 519ns cuModuleGetLoadingMode
      0.00% 264ns              1 264ns 264ns 264ns cuDeviceGetUuid

==8621== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time   Name
      5  22.399KB 4.0000KB 36.000KB 112.0000KB 22.40000us Host To Device
      1  4.0000KB 4.0000KB 4.0000KB 4.000000KB 1.824000us Device To Host
      1  -       -       -       -       - 161.7880us Gpu page fault groups
```

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==8742== NVPROF is profiling process 8742, command: ./zdo3
RUN 1: Number of Vertices = 2000 | Number of Edges = 8953 | ERROR COUNT (BELLMAN FORD): 0
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==8742== Profiling application: ./zdo3
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==8742== Profiling result:
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Type	Time(%)	Time	Calls	Avg	Min	Max	Name
GPU activities:	100.00%	153.95us	1	153.95us	153.95us	153.95us	is_zero_indegree_parallel(node*, int, bool*)
API calls:	99.67%	239.32ms	2	119.66ms	12.835us	239.30ms	cudaMallocManaged
	0.11%	260.13us	3	86.710us	30.605us	170.96us	cudaMemPrefetchAsync
	0.08%	189.43us	3	63.141us	2.9550us	123.04us	cudaFree
	0.07%	159.03us	1	159.03us	159.03us	159.03us	cudaDeviceSynchronize
	0.05%	113.73us	101	1.1260us	130ns	47.988us	cuDeviceGetAttribute
	0.01%	26.437us	1	26.437us	26.437us	26.437us	cudaLaunchKernel
	0.01%	23.782us	1	23.782us	23.782us	23.782us	cuDeviceGetName
	0.01%	12.388us	2	6.1940us	1.6470us	10.741us	cudaMemAdvise
	0.00%	5.4420us	1	5.4420us	5.4420us	5.4420us	cuDeviceGetPCIBusId
	0.00%	2.6420us	1	2.6420us	2.6420us	2.6420us	cudaGetDevice
	0.00%	1.8750us	3	625ns	211ns	1.4340us	cuDeviceGetCount
	0.00%	920ns	2	460ns	170ns	750ns	cuDeviceGet
	0.00%	555ns	1	555ns	555ns	555ns	cuModuleGetLoadingMode
	0.00%	545ns	1	545ns	545ns	545ns	cuDeviceTotalMem
	0.00%	250ns	1	250ns	250ns	250ns	cuDeviceGetUuid

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==8742== Unified Memory profiling result:
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Device "Tesla T4 (0)"
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Count	Avg	Size	Min Size	Max Size	Total Size	Total Time	Name
5	22.399KB	4.0000KB	36.000KB	112.0000KB	22.46400us	Host To Device	
1	4.0000KB	4.0000KB	4.0000KB	4.000000KB	1.824000us	Device To Host	
1	-	-	-	-	-	143.6450us	Gpu page fault groups

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==8827== NVPROF is profiling process 8827, command: ./zdo3
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```
RUN 1: Number of Vertices = 2000 | Number of Edges = 8953 | ERROR COUNT (BELLMAN FORD): 0
```

```
==8827== Profiling application: ./zdo3
```

```
==8827== Profiling result:
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Type	Time(%)	Time	Calls	Avg	Min	Max	Name
GPU activities:	100.00%	143.39us	1	143.39us	143.39us	143.39us	is_zero_indegree_parallel(node*, int, bool*)
API calls:	99.58%	239.55ms	2	119.78ms	17.562us	239.54ms	cudaMallocManaged
	0.19%	458.27us	3	152.76us	33.499us	358.04us	cudaMemPrefetchAsync
	0.09%	205.00us	3	68.334us	2.6700us	138.21us	cudaFree
	0.06%	146.63us	1	146.63us	146.63us	146.63us	cudaDeviceSynchronize
	0.05%	114.79us	101	1.1360us	137ns	49.200us	cuDeviceGetAttribute
	0.01%	33.988us	1	33.988us	33.988us	33.988us	cudaLaunchKernel
	0.01%	22.814us	1	22.814us	22.814us	22.814us	cuDeviceGetName
	0.01%	17.020us	2	8.5100us	5.1070us	11.913us	cudaMemAdvise
	0.00%	6.4590us	1	6.4590us	6.4590us	6.4590us	cudaGetDevice
	0.00%	5.3000us	1	5.3000us	5.3000us	5.3000us	cuDeviceGetPCIBusId
	0.00%	1.8550us	3	618ns	221ns	1.4120us	cuDeviceGetCount
	0.00%	785ns	2	392ns	180ns	605ns	cuDeviceGet
	0.00%	503ns	1	503ns	503ns	503ns	cuModuleGetLoadingMode
	0.00%	474ns	1	474ns	474ns	474ns	cuDeviceTotalMem
	0.00%	216ns	1	216ns	216ns	216ns	cuDeviceGetUuid

```
==8827== Unified Memory profiling result:
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```
Device "Tesla T4 (0)"
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Count	Avg	Size	Min Size	Max Size	Total Size	Total Time	Name
5	22.399KB	4.0000KB	36.000KB	112.0000KB	21.72700us	Host To Device	
1	4.0000KB	4.0000KB	4.0000KB	4.000000KB	1.824000us	Device To Host	
1	-	-	-	-	-	133.1490us	Gpu page fault groups

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==8916== NVPROF is profiling process 8916, command: ./zdo3
RUN 1: Number of Vertices = 2000 | Number of Edges = 8953 | ERROR COUNT (BELLMAN FORD): 0

==8916== Profiling application: ./zdo3
==8916== Profiling result:
      Type  Time(%)    Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 250.30us           1  250.30us  250.30us  250.30us  is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.63% 237.81ms           2  118.90ms  12.965us  237.79ms  cudaMallocManaged
          0.11% 263.83us           3  87.943us  31.611us  172.21us  cudaMemPrefetchAsync
          0.11% 255.90us           1  255.90us  255.90us  255.90us  cudaDeviceSynchronize
          0.07% 168.28us           3  56.092us  2.4230us  101.59us  cudaFree
          0.05% 113.22us          101  1.1200us  132ns   47.970us  cuDeviceGetAttribute
          0.01% 27.377us          1  27.377us  27.377us  27.377us  cudaLaunchKernel
          0.01% 27.014us          1  27.014us  27.014us  27.014us  cuDeviceGetName
          0.01% 14.497us          2  7.2480us  1.2260us  13.271us  cudaMemAdvise
          0.00% 6.7320us          1  6.7320us  6.7320us  6.7320us  cudaGetDevice
          0.00% 5.5650us          1  5.5650us  5.5650us  5.5650us  cuDeviceGetPCIBusId
          0.00% 1.5730us          3  524ns    262ns   998ns   cuDeviceGetCount
          0.00% 1.0570us          2  528ns    296ns   761ns   cuDeviceGet
          0.00% 488ns             1  488ns    488ns   488ns   cuModuleGetLoadingMode
          0.00% 387ns             1  387ns    387ns   387ns   cuDeviceTotalMem
          0.00% 234ns             1  234ns    234ns   234ns   cuDeviceGetUuid

==8916== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
      5     22.399KB  4.0000KB  36.000KB  112.0000KB  22.27200us  Host To Device
      1     4.0000KB  4.0000KB  4.0000KB  4.000000KB  1.824000us  Device To Host
      1                 -        -        -        -        -  240.0270us  Gpu page fault groups

```

## 4k Nodes

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==2417== NVPROF is profiling process 2417, command: ./zdo3
RUN 1: Number of Vertices = 4000 | Number of Edges = 18135 | ERROR COUNT (BELLMAN FORD): 0

==2417== Profiling application: ./zdo3
==2417== Profiling result:
      Type  Time(%)    Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 217.31us           1  217.31us  217.31us  217.31us  is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.61% 251.33ms           2  125.66ms  16.290us  251.31ms  cudaMallocManaged
          0.14% 342.79us           3  114.26us  32.060us  210.04us  cudaMemPrefetchAsync
          0.09% 222.49us           1  222.49us  222.49us  222.49us  cudaDeviceSynchronize
          0.08% 191.16us           3  63.721us  2.8580us  123.35us  cudaFree
          0.04% 112.04us          101  1.1090us  130ns   47.188us  cuDeviceGetAttribute
          0.01% 34.663us          1  34.663us  34.663us  34.663us  cuDeviceGetName
          0.01% 32.103us          1  32.103us  32.103us  32.103us  cudaLaunchKernel
          0.01% 19.802us          1  19.802us  19.802us  19.802us  cudaGetDevice
          0.01% 15.097us          2  7.5480us  1.8060us  13.291us  cudaMemAdvise
          0.00% 5.8890us          1  5.8890us  5.8890us  5.8890us  cuDeviceGetPCIBusId
          0.00% 1.7800us          3  593ns    227ns   1.2470us  cuDeviceGetCount
          0.00% 1.1990us          2  599ns    277ns   922ns   cuDeviceGet
          0.00% 507ns             1  507ns    507ns   507ns   cuModuleGetLoadingMode
          0.00% 384ns             1  384ns    384ns   384ns   cuDeviceTotalMem
          0.00% 232ns             1  232ns    232ns   232ns   cuDeviceGetUuid

==2417== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
      11    20.000KB  4.0000KB  36.000KB  220.0000KB  46.46200us  Host To Device
      1    8.0000KB  8.0000KB  8.0000KB  8.000000KB  2.048000us  Device To Host
      1                 -        -        -        -        -  205.4990us  Gpu page fault groups

```

```
==7846== NVPROF is profiling process 7846, command: ./zdo3
RUN 1: Number of Vertices = 4000 | Number of Edges = 18135 | ERROR COUNT (BELLMAN FORD): 0
```

```
==7846== Profiling application: ./zdo3
```

```
==7846== Profiling result:
```

Type	Time(%)	Time	Calls	Avg	Min	Max	Name
GPU activities:	100.00%	241.11us	1	241.11us	241.11us	241.11us	is_zero_indegree_parallel(node*, int, bool*)
API calls:	99.57%	293.00ms	2	146.50ms	17.466us	292.98ms	cudaMallocManaged
	0.17%	493.26us	3	164.42us	36.012us	332.44us	cudaMemPrefetchAsync
	0.08%	245.00us	1	245.00us	245.00us	245.00us	cudaDeviceSynchronize
	0.07%	218.01us	3	72.668us	2.7460us	134.10us	cudaFree
	0.06%	165.92us	101	1.6420us	197ns	66.420us	cuDeviceGetAttribute
	0.03%	74.372us	1	74.372us	74.372us	74.372us	cudaLaunchKernel
	0.01%	27.151us	1	27.151us	27.151us	27.151us	cuDeviceGetName
	0.01%	22.668us	1	22.668us	22.668us	22.668us	cudaGetDevice
	0.00%	14.473us	2	7.2360us	2.1050us	12.368us	cudaMemAdvise
	0.00%	7.9640us	1	7.9640us	7.9640us	7.9640us	cuDeviceGetPCIBusId
	0.00%	2.1610us	3	720ns	321ns	1.4560us	cuDeviceGetCount
	0.00%	1.0120us	2	506ns	306ns	706ns	cuDeviceGet
	0.00%	665ns	1	665ns	665ns	665ns	cuDeviceTotalMem
	0.00%	525ns	1	525ns	525ns	525ns	cuModuleGetLoadingMode
	0.00%	413ns	1	413ns	413ns	413ns	cuDeviceGetUuid

```
==7846== Unified Memory profiling result:
```

```
Device "Tesla T4 (0)"
```

Count	Avg	Size	Min	Size	Max	Size	Total	Size	Total	Time	Name
11	20.000KB	4.0000KB	36.000KB	220.0000KB	46.04600us	Host To Device					
1	8.0000KB	8.0000KB	8.0000KB	8.000000KB	2.048000us	Device To Host					
1	-	-	-	-	-	Gpu page fault groups	229.2430us				

```
==8005== NVPROF is profiling process 8005, command: ./zdo3
```

```
RUN 1: Number of Vertices = 4000 | Number of Edges = 18135 | ERROR COUNT (BELLMAN FORD): 0
```

```
==8005== Profiling application: ./zdo3
```

```
==8005== Profiling result:
```

Type	Time(%)	Time	Calls	Avg	Min	Max	Name
GPU activities:	100.00%	202.91us	1	202.91us	202.91us	202.91us	is_zero_indegree_parallel(node*, int, bool*)
API calls:	99.61%	297.08ms	2	148.54ms	18.517us	297.07ms	cudaMallocManaged
	0.15%	461.02us	3	153.67us	35.988us	326.93us	cudaMemPrefetchAsync
	0.07%	223.60us	1	223.60us	223.60us	223.60us	cudaDeviceSynchronize
	0.07%	220.20us	3	73.400us	3.6790us	150.10us	cudaFree
	0.06%	168.94us	101	1.6720us	191ns	72.726us	cuDeviceGetAttribute
	0.01%	37.546us	1	37.546us	37.546us	37.546us	cudaLaunchKernel
	0.01%	28.177us	1	28.177us	28.177us	28.177us	cuDeviceGetName
	0.00%	14.207us	2	7.1030us	3.6450us	10.562us	cudaMemAdvise
	0.00%	8.0260us	1	8.0260us	8.0260us	8.0260us	cuDeviceGetPCIBusId
	0.00%	7.6350us	1	7.6350us	7.6350us	7.6350us	cudaGetDevice
	0.00%	2.3320us	3	777ns	376ns	1.5760us	cuDeviceGetCount
	0.00%	1.5530us	2	776ns	269ns	1.2840us	cuDeviceGet
	0.00%	621ns	1	621ns	621ns	621ns	cuDeviceTotalMem
	0.00%	516ns	1	516ns	516ns	516ns	cuModuleGetLoadingMode
	0.00%	377ns	1	377ns	377ns	377ns	cuDeviceGetUuid

```
==8005== Unified Memory profiling result:
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```
Device "Tesla T4 (0)"
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Count	Avg	Size	Min	Size	Max	Size	Total	Size	Total	Time	Name
11	20.000KB	4.0000KB	36.000KB	220.0000KB	46.81500us	Host To Device					
1	8.0000KB	8.0000KB	8.0000KB	8.000000KB	2.048000us	Device To Host					
1	-	-	-	-	-	Gpu page fault groups	191.0990us				

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==8146== NVPROF is profiling process 8146, command: ./zdo3
RUN 1: Number of Vertices = 4000 | Number of Edges = 18135 | ERROR COUNT (BELLMAN FORD): 0

==8146== Profiling application: ./zdo3
==8146== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 220.48us           1 220.48us 220.48us 220.48us  is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.62% 243.91ms           2 121.95ms 13.812us 243.89ms  cudaMallocManaged
               0.12% 303.30us            3 101.10us 31.505us 188.68us  cudaMemcpyPrefetchAsync
               0.09% 225.50us            1 225.50us 225.50us 225.50us  cudaDeviceSynchronize
               0.08% 187.35us            3 62.449us 2.5310us 123.71us  cudaFree
               0.05% 112.52us          101 1.1140us 131ns 47.167us  cuDeviceGetAttribute
               0.01% 28.243us           1 28.243us 28.243us 28.243us  cuLaunchKernel
               0.01% 24.054us           1 24.054us 24.054us 24.054us  cuDeviceGetName
               0.01% 16.797us           1 16.797us 16.797us 16.797us  cuDeviceGetPCIBusId
               0.01% 15.658us           2 7.8290us 2.0280us 13.630us  cudaMemcpyAdvise
               0.00% 7.3630us           1 7.3630us 7.3630us 7.3630us  cuDeviceGetDevice
               0.00% 2.1960us           3 732ns   223ns 1.6330us  cuDeviceGetCount
               0.00% 1.1380us           2 569ns   283ns 855ns   cuDeviceGet
               0.00% 604ns              1 604ns   604ns 604ns   cuDeviceTotalMem
               0.00% 389ns              1 389ns   389ns 389ns   cuModuleGetLoadingMode
               0.00% 254ns              1 254ns   254ns 254ns   cuDeviceGetUuid

==8146== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
           11  20.000KB  4.0000KB  36.000KB  220.000KB  46.27100us  Host To Device
           1  8.0000KB  8.0000KB  8.0000KB  8.000000KB  2.048000us  Device To Host
           1      -       -       -       -           -  208.6350us  Gpu page fault groups

==8273== NVPROF is profiling process 8273, command: ./zdo3
RUN 1: Number of Vertices = 4000 | Number of Edges = 18135 | ERROR COUNT (BELLMAN FORD): 0

==8273== Profiling application: ./zdo3
==8273== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 212.60us           1 212.60us 212.60us 212.60us  is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.63% 299.24ms           2 149.62ms 17.621us 299.22ms  cudaMallocManaged
               0.14% 430.61us            3 143.54us 31.250us 286.16us  cudaMemcpyPrefetchAsync
               0.07% 216.06us            1 216.06us 216.06us 216.06us  cudaDeviceSynchronize
               0.06% 194.08us            3 64.694us 3.2840us 126.70us  cudaFree
               0.06% 169.56us          101 1.6780us 299ns 68.073us  cuDeviceGetAttribute
               0.01% 35.362us           1 35.362us 35.362us 35.362us  cuLaunchKernel
               0.01% 29.940us           1 29.940us 29.940us 29.940us  cuDeviceGetName
               0.00% 13.672us           2 6.8360us 2.2240us 11.448us  cudaMemcpyAdvise
               0.00% 9.3870us           1 9.3870us 9.3870us 9.3870us  cuDeviceGetDevice
               0.00% 7.4220us           1 7.4220us 7.4220us 7.4220us  cuDeviceGetPCIBusId
               0.00% 2.1000us           3 700ns   326ns 1.4080us  cuDeviceGetCount
               0.00% 1.0650us           2 532ns   272ns 793ns   cuDeviceGet
               0.00% 651ns              1 651ns   651ns 651ns   cuDeviceTotalMem
               0.00% 425ns              1 425ns   425ns 425ns   cuDeviceGetUuid
               0.00% 419ns              1 419ns   419ns 419ns   cuModuleGetLoadingMode

==8273== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
           11  20.000KB  4.0000KB  36.000KB  220.000KB  46.75200us  Host To Device
           1  8.0000KB  8.0000KB  8.0000KB  8.000000KB  2.049000us  Device To Host
           1      -       -       -       -           -  200.7630us  Gpu page fault groups

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## 6k Nodes

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==2667== NVPROF is profiling process 2667, command: ./zdo3
RUN 1: Number of Vertices = 6000 | Number of Edges = 26718 | ERROR COUNT (BELLMAN FORD): 0

==2667== Profiling application: ./zdo3
==2667== Profiling result:
      Type  Time(%)    Time     Calls      Avg      Min      Max   Name
GPU activities: 100.00% 272.19us      1 272.19us 272.19us 272.19us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.52% 239.58ms      2 119.79ms 15.767us 239.56ms cudaMallocManaged
      0.16% 378.59us      3 126.20us 30.457us 222.60us cudaMemPrefetchAsync
      0.13% 308.84us      1 308.84us 308.84us 308.84us cudaDeviceSynchronize
      0.09% 213.93us      3 71.309us 3.5800us 145.14us cudaFree
      0.05% 124.47us     101 1.2320us 152ns 51.246us cuDeviceGetAttribute
      0.02% 42.292us      1 42.292us 42.292us 42.292us cudaLaunchKernel
      0.02% 41.644us      1 41.644us 41.644us 41.644us cudaGetDevice
      0.01% 25.724us      1 25.724us 25.724us 25.724us cuDeviceGetName
      0.00% 11.650us      2 5.8250us 2.5350us 9.1150us cudaMemAdvise
      0.00% 5.6300us      1 5.6300us 5.6300us 5.6300us cuDeviceGetPCIBusId
      0.00% 2.3080us      3 769ns 271ns 1.7640us cuDeviceGetCount
      0.00% 1.0400us      2 520ns 340ns 700ns cuDeviceGet
      0.00% 610ns         1 610ns 610ns 610ns cuModuleGetLoadingMode
      0.00% 535ns         1 535ns 535ns 535ns cuDeviceTotalMem
      0.00% 248ns         1 248ns 248ns 248ns cuDeviceGetUuid

==2667== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time   Name
          13 25.538KB 4.0000KB 48.000KB 332.0000KB 61.34300us Host To Device
          1 8.0000KB 8.0000KB 8.0000KB 8.000000KB 2.048000us Device To Host
          1           -       -       -           - 259.8650us Gpu page fault groups

==6908== NVPROF is profiling process 6908, command: ./zdo3
RUN 1: Number of Vertices = 6000 | Number of Edges = 26718 | ERROR COUNT (BELLMAN FORD): 0

==6908== Profiling application: ./zdo3
==6908== Profiling result:
      Type  Time(%)    Time     Calls      Avg      Min      Max   Name
GPU activities: 100.00% 254.36us      1 254.36us 254.36us 254.36us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.59% 243.28ms      2 121.64ms 13.809us 243.27ms cudaMallocManaged
      0.14% 330.95us      3 110.32us 30.372us 181.83us cudaMemPrefetchAsync
      0.11% 260.16us      1 260.16us 260.16us 260.16us cudaDeviceSynchronize
      0.08% 204.66us      3 68.219us 2.7140us 137.88us cudaFree
      0.05% 113.03us     101 1.1190us 133ns 47.012us cuDeviceGetAttribute
      0.01% 31.101us      1 31.101us 31.101us 31.101us cudaLaunchKernel
      0.01% 25.107us      1 25.107us 25.107us 25.107us cuDeviceGetName
      0.01% 23.594us      1 23.594us 23.594us 23.594us cuDeviceGetPCIBusId
      0.01% 15.325us      2 7.6620us 1.4860us 13.839us cudaMemAdvise
      0.00% 2.8250us      1 2.8250us 2.8250us 2.8250us cudaGetDevice
      0.00% 2.1620us      3 720ns 270ns 1.5720us cuDeviceGetCount
      0.00% 941ns         2 470ns 271ns 670ns cuDeviceGet
      0.00% 437ns         1 437ns 437ns 437ns cuDeviceTotalMem
      0.00% 414ns         1 414ns 414ns 414ns cuModuleGetLoadingMode
      0.00% 238ns         1 238ns 238ns 238ns cuDeviceGetUuid

==6908== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time   Name
          13 25.538KB 4.0000KB 48.000KB 332.0000KB 62.04600us Host To Device
          1 8.0000KB 8.0000KB 8.0000KB 8.000000KB 2.208000us Device To Host
          1           -       -       -           - 243.1310us Gpu page fault groups
```

```

==7109== NVPROF is profiling process 7109, command: ./zdo3
RUN 1: Number of Vertices = 6000 | Number of Edges = 26718 | ERROR COUNT (BELLMAN FORD): 0

==7109== Profiling application: ./zdo3
==7109== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 226.17us           1 226.17us 226.17us 226.17us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.50% 234.34ms           2 117.17ms 17.592us 234.32ms cudaMemcpyManaged
                  0.20% 481.50us            3 160.50us 53.185us 271.15us cudaMemcpyPrefetchAsync
                  0.12% 273.41us            1 273.41us 273.41us 273.41us cudaMemcpyDeviceSynchronize
                  0.09% 216.16us            3 72.052us 3.7920us 147.12us cudaMemcpyFree
                  0.05% 119.81us          101 1.1860us 145ns 49.247us cuDeviceGetAttribute
                  0.02% 35.701us          1 35.701us 35.701us 35.701us cudaLaunchKernel
                  0.01% 24.413us          1 24.413us 24.413us 24.413us cuDeviceGetName
                  0.01% 14.696us          2 7.3480us 3.6160us 11.080us cudaMemcpyMemAdvise
                  0.00% 6.1470us          1 6.1470us 6.1470us 6.1470us cuDeviceGetDevice
                  0.00% 5.4690us          1 5.4690us 5.4690us 5.4690us cuDeviceGetPCIBusId
                  0.00% 1.6270us          3 542ns   229ns 1.1300us cuDeviceGetCount
                  0.00% 988ns             2 494ns   213ns 775ns cuDeviceGet
                  0.00% 539ns             1 539ns   539ns 539ns cuModuleGetLoadingMode
                  0.00% 397ns             1 397ns   397ns 397ns cuDeviceTotalMem
                  0.00% 279ns             1 279ns   279ns 279ns cuDeviceGetUuid

==7109== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count Avg Size  Min Size  Max Size  Total Size  Total Time  Name
              13 25.538KB 4.0000KB 48.0000KB 332.0000KB 61.40700us Host To Device
              1 8.0000KB 8.0000KB 8.0000KB 8.000000KB 2.048000us Device To Host
              1 -       -       -       -       - 213.7230us Gpu page fault groups

==10688== NVPROF is profiling process 10688, command: ./zdo3
RUN 1: Number of Vertices = 6000 | Number of Edges = 26718 | ERROR COUNT (BELLMAN FORD): 0

==10688== Profiling application: ./zdo3
==10688== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 241.40us           1 241.40us 241.40us 241.40us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.61% 292.52ms           2 146.26ms 18.199us 292.50ms cudaMemcpyManaged
                  0.16% 478.04us            3 159.35us 29.459us 300.22us cudaMemcpyPrefetchAsync
                  0.08% 244.71us            1 244.71us 244.71us 244.71us cudaMemcpyDeviceSynchronize
                  0.07% 194.85us            3 64.951us 2.5730us 127.95us cudaMemcpyFree
                  0.04% 117.44us          101 1.1620us 138ns 48.962us cuDeviceGetAttribute
                  0.02% 46.255us          1 46.255us 46.255us 46.255us cudaLaunchKernel
                  0.01% 23.234us          1 23.234us 23.234us 23.234us cuDeviceGetName
                  0.01% 18.235us          1 18.235us 18.235us 18.235us cuDeviceGetDevice
                  0.00% 13.456us          2 6.7280us 2.1110us 11.345us cudaMemcpyMemAdvise
                  0.00% 6.2310us          1 6.2310us 6.2310us 6.2310us cuDeviceGetPCIBusId
                  0.00% 1.6040us          3 534ns   240ns 1.1230us cuDeviceGetCount
                  0.00% 988ns             2 494ns   190ns 798ns cuDeviceGet
                  0.00% 563ns             1 563ns   563ns 563ns cuDeviceTotalMem
                  0.00% 493ns             1 493ns   493ns 493ns cuModuleGetLoadingMode
                  0.00% 246ns             1 246ns   246ns 246ns cuDeviceGetUuid

==10688== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count Avg Size  Min Size  Max Size  Total Size  Total Time  Name
              13 25.538KB 4.0000KB 48.0000KB 332.0000KB 61.05500us Host To Device
              1 8.0000KB 8.0000KB 8.0000KB 8.000000KB 2.048000us Device To Host
              1 -       -       -       -       - 229.0500us Gpu page fault groups

```

```

==7524== NVPROF is profiling process 7524, command: ./zdo3
RUN 1: Number of Vertices = 6000 | Number of Edges = 26718 | ERROR COUNT (BELLMAN FORD): 0

==7524== Profiling application: ./zdo3
==7524== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 249.66us           1 249.66us 249.66us 249.66us is_zero_indegree_parallel(node*, int, bool*)
    API calls: 99.58% 249.63ms           2 124.81ms 14.406us 249.61ms cudaMallocManaged
               0.16% 395.48us           3 131.83us 30.714us 239.59us cudaMemPrefetchAsync
               0.11% 274.92us           1 274.92us 274.92us 274.92us cudaDeviceSynchronize
               0.07% 186.51us           3 62.170us 2.7540us 118.36us cudaFree
               0.05% 122.78us          101 1.2150us 149ns 51.832us cuDeviceGetAttribute
               0.01% 29.681us           1 29.681us 29.681us 29.681us cudaLaunchKernel
               0.01% 24.912us           1 24.912us 24.912us 24.912us cuDeviceGetName
               0.01% 13.621us           2 6.8100us 2.4060us 11.215us cudaMemAdvise
               0.00% 5.0350us           1 5.0350us 5.0350us 5.0350us cuDeviceGetPCIBusId
               0.00% 3.2890us           1 3.2890us 3.2890us 3.2890us cudaGetDevice
               0.00% 1.6970us           3 565ns 243ns 1.2030us cuDeviceGetCount
               0.00% 1.0910us           2 545ns 165ns 926ns cuDeviceGet
               0.00% 510ns             1 510ns 510ns 510ns cuModuleGetLoadingMode
               0.00% 458ns              1 458ns 458ns 458ns cuDeviceTotalMem
               0.00% 248ns              1 248ns 248ns 248ns cuDeviceGetUuid

==7524== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
           13  25.538KB 4.0000KB 48.0000KB 332.0000KB 62.07800us Host To Device
            1  8.0000KB 8.0000KB 8.0000KB 8.000000KB 2.048000us Device To Host
            1          -   -   -   -   - 237.3070us Gpu page fault groups

```

## 8k Nodes

```

==2991== NVPROF is profiling process 2991, command: ./zdo3
RUN 1: Number of Vertices = 8000 | Number of Edges = 35925 | ERROR COUNT (BELLMAN FORD): 0

==2991== Profiling application: ./zdo3
==2991== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 274.94us           1 274.94us 274.94us 274.94us is_zero_indegree_parallel(node*, int, bool*)
    API calls: 99.54% 297.18ms           2 148.59ms 12.804us 297.17ms cudaMallocManaged
               0.16% 466.90us           3 155.63us 36.168us 284.04us cudaMemPrefetchAsync
               0.10% 295.17us           1 295.17us 295.17us 295.17us cudaDeviceSynchronize
               0.10% 292.87us           3 97.623us 3.3560us 190.57us cudaFree
               0.07% 206.68us          101 2.0460us 235ns 88.994us cuDeviceGetAttribute
               0.01% 37.446us           1 37.446us 37.446us 37.446us cudaLaunchKernel
               0.01% 30.124us           1 30.124us 30.124us 30.124us cuDeviceGetName
               0.00% 14.903us           2 7.4510us 3.2980us 11.605us cudaMemAdvise
               0.00% 7.7140us           1 7.7140us 7.7140us 7.7140us cuDeviceGetPCIBusId
               0.00% 3.1880us           1 3.1880us 3.1880us 3.1880us cudaGetDevice
               0.00% 2.5140us           3 838ns 369ns 1.7320us cuDeviceGetCount
               0.00% 1.1260us           2 563ns 390ns 736ns cuDeviceGet
               0.00% 750ns             1 750ns 750ns 750ns cuDeviceTotalMem
               0.00% 529ns              1 529ns 529ns 529ns cuModuleGetLoadingMode
               0.00% 435ns              1 435ns 435ns 435ns cuDeviceGetUuid

==2991== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
       23 19.130KB 4.0000KB 48.0000KB 440.0000KB 93.91800us Host To Device
        1 12.000KB 12.000KB 12.000KB 12.00000KB 2.368000us Device To Host
        1          -   -   -   -   - 261.5940us Gpu page fault groups

```

```

==5575== NVPROF is profiling process 5575, command: ./zdo3
RUN 1: Number of Vertices = 8000 | Number of Edges = 35925 | ERROR COUNT (BELLMAN FORD): 0

==5575== Profiling application: ./zdo3
==5575== Profiling result:
      Type  Time(%)    Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 280.09us      1 280.09us 280.09us 280.09us is_zero_indegree_parallel(node*, int, bool*)
    API calls: 99.51% 238.93ms      2 119.47ms 11.610us 238.92ms cudaMallocManaged
      0.15% 363.36us      3 121.12us 28.652us 186.30us cudaMemPrefetchAsync
      0.13% 302.64us      1 302.64us 302.64us 302.64us cudaDeviceSynchronize
      0.11% 257.58us      3 85.859us 3.0540us 158.52us cudaFree
      0.07% 171.98us     101 1.7020us 132ns 82.881us cuDeviceGetAttribute
      0.01% 29.652us      1 29.652us 29.652us 29.652us cudaLaunchKernel
      0.01% 26.639us      1 26.639us 26.639us 26.639us cuDeviceGetName
      0.01% 13.071us      2 6.5350us 2.1940us 10.877us cudaMemAdvise
      0.00% 6.2840us      1 6.2840us 6.2840us 6.2840us cudaGetDevice
      0.00% 5.7230us      1 5.7230us 5.7230us 5.7230us cuDeviceGetPCIBusId
      0.00% 1.6110us      3 537ns 168ns 1.0650us cuDeviceGetCount
      0.00% 899ns         2 449ns 326ns 573ns cuDeviceGet
      0.00% 531ns         1 531ns 531ns 531ns cuModuleGetLoadingMode
      0.00% 370ns         1 370ns 370ns 370ns cuDeviceTotalMem
      0.00% 227ns         1 227ns 227ns 227ns cuDeviceGetUuid

==5575== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
        23 19.130KB 4.0000KB 48.000KB 440.0000KB 93.75700us Host To Device
        1 12.000KB 12.000KB 12.000KB 12.0000KB 2.496000us Device To Host
        1      -      -      -      -      - 266.7130us Gpu page fault groups

==5854== NVPROF is profiling process 5854, command: ./zdo3
RUN 1: Number of Vertices = 8000 | Number of Edges = 35925 | ERROR COUNT (BELLMAN FORD): 0

==5854== Profiling application: ./zdo3
==5854== Profiling result:
      Type  Time(%)    Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 259.35us      1 259.35us 259.35us 259.35us is_zero_indegree_parallel(node*, int, bool*)
    API calls: 99.54% 236.55ms      2 118.27ms 12.362us 236.54ms cudaMallocManaged
      0.17% 397.09us      3 132.36us 35.678us 196.52us cudaMemPrefetchAsync
      0.11% 267.30us      1 267.30us 267.30us 267.30us cudaDeviceSynchronize
      0.09% 215.27us      3 71.758us 2.7150us 148.60us cudaFree
      0.05% 112.90us     101 1.1170us 134ns 48.036us cuDeviceGetAttribute
      0.02% 50.614us      1 50.614us 50.614us 50.614us cudaLaunchKernel
      0.01% 24.384us      1 24.384us 24.384us 24.384us cuDeviceGetName
      0.01% 12.414us      2 6.2070us 1.6430us 10.771us cudaMemAdvise
      0.00% 6.4570us      1 6.4570us 6.4570us 6.4570us cudaGetDevice
      0.00% 6.0520us      1 6.0520us 6.0520us 6.0520us cuDeviceGetPCIBusId
      0.00% 1.5170us      3 505ns 181ns 1.0050us cuDeviceGetCount
      0.00% 916ns         2 458ns 297ns 619ns cuDeviceGet
      0.00% 705ns         1 705ns 705ns 705ns cuDeviceTotalMem
      0.00% 400ns         1 400ns 400ns 400ns cuModuleGetLoadingMode
      0.00% 241ns         1 241ns 241ns 241ns cuDeviceGetUuid

==5854== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
        23 19.130KB 4.0000KB 48.000KB 440.0000KB 94.33400us Host To Device
        1 12.000KB 12.000KB 12.000KB 12.0000KB 2.368000us Device To Host
        1      -      -      -      -      - 246.0410us Gpu page fault groups

```

```
==6123== NVPROF is profiling process 6123, command: ./zdo3
RUN 1: Number of Vertices = 8000 | Number of Edges = 35925 | ERROR COUNT (BELLMAN FORD): 0
```

```
==6123== Profiling application: ./zdo3
==6123== Profiling result:
      Type  Time(%)    Time     Calls      Avg      Min      Max  Name
GPU activities: 100.00% 263.03us           1 263.03us 263.03us 263.03us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.45% 248.19ms           2 124.10ms 13.666us 248.18ms cudaMallocManaged
                  0.22% 557.62us            3 185.87us 37.148us 333.76us cudaMemPrefetchAsync
                  0.12% 295.10us            3 98.365us 5.0480us 192.63us cudaFree
                  0.11% 280.91us            1 280.91us 280.91us 280.91us cudaDeviceSynchronize
                  0.05% 112.57us          101 1.1140us 134ns 47.258us cuDeviceGetAttribute
                  0.03% 63.117us           1 63.117us 63.117us 63.117us cudaLaunchKernel
                  0.01% 27.696us            2 13.848us 3.7050us 23.991us cudaMemAdvise
                  0.01% 27.514us            1 27.514us 27.514us 27.514us cuDeviceGetName
                  0.00% 6.3990us            1 6.3990us 6.3990us 6.3990us cuDeviceGetPCIBusId
                  0.00% 2.7810us            1 2.7810us 2.7810us 2.7810us cudaGetDevice
                  0.00% 1.4550us            3 485ns   169ns 955ns cuDeviceGetCount
                  0.00% 959ns              2 479ns   295ns 664ns cuDeviceGet
                  0.00% 423ns              1 423ns   423ns 423ns cuDeviceTotalMem
                  0.00% 370ns              1 370ns   370ns 370ns cuModuleGetLoadingMode
                  0.00% 252ns              1 252ns   252ns 252ns cuDeviceGetUuid

==6123== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
        23 19.130KB 4.0000KB 48.000KB 440.0000KB 94.94300us Host To Device
        1 12.000KB 12.000KB 12.000KB 12.00000KB 2.400000us Device To Host
        1      -       -       -       -       - 249.5940us Gpu page fault groups
```

```
==6386== NVPROF is profiling process 6386, command: ./zdo3
RUN 1: Number of Vertices = 8000 | Number of Edges = 35925 | ERROR COUNT (BELLMAN FORD): 0
```

```
==6386== Profiling application: ./zdo3
==6386== Profiling result:
      Type  Time(%)    Time     Calls      Avg      Min      Max  Name
GPU activities: 100.00% 295.00us           1 295.00us 295.00us 295.00us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.54% 245.56ms           2 122.78ms 13.914us 245.55ms cudaMallocManaged
                  0.16% 383.90us            3 127.97us 33.972us 184.29us cudaMemPrefetchAsync
                  0.12% 300.21us            1 300.21us 300.21us 300.21us cudaDeviceSynchronize
                  0.10% 244.49us            3 81.495us 2.4620us 161.52us cudaFree
                  0.05% 113.85us          101 1.1270us 128ns 47.738us cuDeviceGetAttribute
                  0.01% 29.052us           1 29.052us 29.052us 29.052us cudaLaunchKernel
                  0.01% 26.418us            1 26.418us 26.418us 26.418us cuDeviceGetName
                  0.00% 12.162us            2 6.0810us 2.0370us 10.125us cudaMemAdvise
                  0.00% 5.6560us            1 5.6560us 5.6560us 5.6560us cuDeviceGetPCIBusId
                  0.00% 2.7860us            1 2.7860us 2.7860us 2.7860us cudaGetDevice
                  0.00% 1.4570us            3 485ns   169ns 970ns cuDeviceGetCount
                  0.00% 942ns              2 471ns   263ns 679ns cuDeviceGet
                  0.00% 675ns              1 675ns   675ns 675ns cuModuleGetLoadingMode
                  0.00% 493ns              1 493ns   493ns 493ns cuDeviceTotalMem
                  0.00% 431ns              1 431ns   431ns 431ns cuDeviceGetUuid

==6386== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
        23 19.130KB 4.0000KB 48.000KB 440.0000KB 93.02200us Host To Device
        1 12.000KB 12.000KB 12.000KB 12.00000KB 2.400000us Device To Host
        1      -       -       -       -       - 281.4970us Gpu page fault groups
```

## 10k Nodes

```
==3501== NVPROF is profiling process 3501, command: ./zdo3
RUN 1: Number of Vertices = 10000 | Number of Edges = 44969 | ERROR COUNT (BELLMAN FORD): 0

==3501== Profiling application: ./zdo3
==3501== Profiling result:
      Type  Time(%)    Time     Calls      Avg      Min      Max    Name
GPU activities: 100.00% 367.03us      1 367.03us 367.03us 367.03us is_zero_indegree_parallel(node*, int, bool*)
API calls:   99.47% 250.33ms      2 125.17ms 14.028us 250.32ms cudaMallocManaged
          0.18% 448.29us      3 149.43us 35.375us 232.59us cudaMemcpyPrefetchAsync
          0.15% 373.22us      1 373.22us 373.22us 373.22us cudaDeviceSynchronize
          0.10% 246.88us      3 82.294us 3.0100us 148.38us cudaFree
          0.07% 166.97us     101 1.6530us 245ns 63.386us cuDeviceGetAttribute
          0.01% 32.333us      1 32.333us 32.333us 32.333us cudaLaunchKernel
          0.01% 26.962us      1 26.962us 26.962us 26.962us cuDeviceGetName
          0.01% 15.041us      2 7.5200us 1.8830us 13.158us cudaMemAdvise
          0.00% 9.3340us      1 9.3340us 9.3340us 9.3340us cudaGetDevice
          0.00% 7.1100us      1 7.1100us 7.1100us 7.1100us cuDeviceGetPCIBusId
          0.00% 1.7470us      3 582ns 299ns 1.1470us cuDeviceGetCount
          0.00% 1.0850us      2 542ns 281ns 804ns cuDeviceGet
          0.00% 666ns         1 666ns 666ns 666ns cuDeviceTotalMem
          0.00% 520ns          1 520ns 520ns 520ns cuModuleGetLoadingMode
          0.00% 447ns          1 447ns 447ns 447ns cuDeviceGetUuid

==3501== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
        27 20.296KB 4.0000KB 44.000KB 548.0000KB 111.9970us Host To Device
        1 16.000KB 16.000KB 16.000KB 16.00000KB 2.624000us Device To Host
        1      -       -       -       -       - 353.6880us Gpu page fault groups

==3117== NVPROF is profiling process 3117, command: ./zdo3
RUN 1: Number of Vertices = 10000 | Number of Edges = 44969 | ERROR COUNT (BELLMAN FORD): 0

==3117== Profiling application: ./zdo3
==3117== Profiling result:
      Type  Time(%)    Time     Calls      Avg      Min      Max    Name
GPU activities: 100.00% 366.59us      1 366.59us 366.59us 366.59us is_zero_indegree_parallel(node*, int, bool*)
API calls:   99.42% 411.82ms      2 205.91ms 24.181us 411.79ms cudaMallocManaged
          0.25% 1.0396ms      1 1.0396ms 1.0396ms 1.0396ms cuDeviceGetPCIBusId
          0.12% 489.22us      3 163.07us 50.288us 223.55us cudaMemcpyPrefetchAsync
          0.09% 378.03us      1 378.03us 378.03us 378.03us cudaDeviceSynchronize
          0.06% 243.15us      3 81.051us 2.5200us 145.18us cudaFree
          0.03% 140.68us     101 1.3920us 142ns 63.632us cuDeviceGetAttribute
          0.01% 38.159us      2 19.079us 1.6820us 36.477us cudaMemAdvise
          0.01% 32.796us      1 32.796us 32.796us 32.796us cudaLaunchKernel
          0.01% 27.067us      1 27.067us 27.067us 27.067us cuDeviceGetName
          0.00% 4.4240us      1 4.4240us 4.4240us 4.4240us cudaGetDevice
          0.00% 2.2590us      3 753ns 263ns 1.6900us cuDeviceGetCount
          0.00% 932ns         2 466ns 194ns 738ns cuDeviceGet
          0.00% 436ns          1 436ns 436ns 436ns cuModuleGetLoadingMode
          0.00% 383ns          1 383ns 383ns 383ns cuDeviceTotalMem
          0.00% 234ns          1 234ns 234ns 234ns cuDeviceGetUuid

==3117== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
        27 20.296KB 4.0000KB 44.000KB 548.0000KB 116.9590us Host To Device
        1 16.000KB 16.000KB 16.000KB 16.00000KB 2.624000us Device To Host
        1      -       -       -       -       - 353.4030us Gpu page fault groups
```

```

==4341== NVPROF is profiling process 4341, command: ./zdo3
RUN 1: Number of Vertices = 10000 | Number of Edges = 44969 | ERROR COUNT (BELLMAN FORD): 0

==4341== Profiling application: ./zdo3
==4341== Profiling result:
      Type  Time(%)    Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 339.70us      1 339.70us 339.70us 339.70us is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.50% 251.42ms      2 125.71ms 15.493us 251.41ms cudaMallocManaged
               0.17% 432.56us      3 144.19us 32.481us 204.42us cudaMemPrefetchAsync
               0.15% 368.22us      1 368.22us 368.22us 368.22us cudaDeviceSynchronize
               0.10% 247.39us      3 82.464us 3.1290us 156.50us cudaFree
               0.05% 116.13us     101 1.1490us 142ns 48.320us cuDeviceGetAttribute
               0.02% 51.665us      1 51.665us 51.665us 51.665us cudaLaunchKernel
               0.01% 26.346us      1 26.346us 26.346us 26.346us cuDeviceGetName
               0.01% 16.922us      2 8.4610us 2.2500us 14.672us cudaMemAdvise
               0.00% 6.5310us      1 6.5310us 6.5310us 6.5310us cuDeviceGetPCIBusId
               0.00% 2.8550us      1 2.8550us 2.8550us 2.8550us cudaGetDevice
               0.00% 1.7640us      3 588ns   227ns 1.1340us cuDeviceGetCount
               0.00% 1.2820us      2 641ns   346ns 936ns  cuDeviceGet
               0.00% 566ns        1 566ns   566ns 566ns  cuModuleGetLoadingMode
               0.00% 543ns        1 543ns   543ns 543ns  cuDeviceTotalMem
               0.00% 235ns        1 235ns   235ns 235ns  cuDeviceGetUuid

==4341== Unified Memory profiling result:
Device "Tesla T4 (0)"

      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
      27  20.296KB 4.0000KB 44.000KB 548.0000KB 111.9340us Host To Device
      1  16.000KB 16.000KB 16.000KB 16.00000KB 2.624000us Device To Host
      1          -       -       -           - 326.3290us Gpu page fault groups

==4678== NVPROF is profiling process 4678, command: ./zdo3
RUN 1: Number of Vertices = 10000 | Number of Edges = 44969 | ERROR COUNT (BELLMAN FORD): 0

==4678== Profiling application: ./zdo3
==4678== Profiling result:
      Type  Time(%)    Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 323.13us      1 323.13us 323.13us 323.13us is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.53% 245.90ms      2 122.95ms 13.601us 245.89ms cudaMallocManaged
               0.16% 404.37us      3 134.79us 30.193us 192.85us cudaMemPrefetchAsync
               0.14% 347.67us      1 347.67us 347.67us 347.67us cudaDeviceSynchronize
               0.09% 217.14us      3 72.379us 3.4620us 151.49us cudaFree
               0.05% 112.24us     101 1.1110us 134ns 47.026us cuDeviceGetAttribute
               0.01% 29.660us      1 29.660us 29.660us 29.660us cudaLaunchKernel
               0.01% 22.755us      1 22.755us 22.755us 22.755us cuDeviceGetName
               0.01% 13.787us      2 6.8930us 1.7120us 12.075us cudaMemAdvise
               0.00% 5.3490us      1 5.3490us 5.3490us 5.3490us cuDeviceGetPCIBusId
               0.00% 4.0100us      1 4.0100us 4.0100us 4.0100us cudaGetDevice
               0.00% 1.6920us      3 564ns   241ns 1.1990us cuDeviceGetCount
               0.00% 1.0790us      2 539ns   167ns 912ns  cuDeviceGet
               0.00% 634ns        1 634ns   634ns 634ns  cuDeviceTotalMem
               0.00% 510ns        1 510ns   510ns 510ns  cuModuleGetLoadingMode
               0.00% 243ns        1 243ns   243ns 243ns  cuDeviceGetUuid

==4678== Unified Memory profiling result:
Device "Tesla T4 (0)"

      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
      27  20.296KB 4.0000KB 44.000KB 548.0000KB 113.0550us Host To Device
      1  16.000KB 16.000KB 16.000KB 16.00000KB 2.624000us Device To Host
      1          -       -       -           - 309.7200us Gpu page fault groups

```

```

==5015== NVPROF is profiling process 5015, command: ./zdo3
RUN 1: Number of Vertices = 10000 | Number of Edges = 44969 | ERROR COUNT (BELLMAN FORD): 0

==5015== Profiling application: ./zdo3
==5015== Profiling result:
      Type  Time(%)    Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 321.34us           1 321.34us 321.34us 321.34us is_zero_indegree_parallel(node*, int, bool*)
    API calls: 99.51% 251.76ms           2 125.88ms 13.007us 251.75ms cudaMallocManaged
               0.16% 402.53us           3 134.18us 31.911us 208.28us cudaMemPrefetchAsync
               0.13% 330.07us           3 110.02us 3.7420us 218.64us cudaFree
               0.13% 326.97us           1 326.97us 326.97us 326.97us cudaDeviceSynchronize
               0.04% 112.53us          101 1.1140us 132ns 47.367us cuDeviceGetAttribute
               0.01% 25.562us           1 25.562us 25.562us 25.562us cudaLaunchKernel
               0.01% 23.448us           1 23.448us 23.448us 23.448us cuDeviceGetName
               0.00% 11.759us           2 5.8790us 1.7690us 9.9900us cudaMemAdvise
               0.00% 7.0720us           1 7.0720us 7.0720us 7.0720us cuDeviceGetPCIBusId
               0.00% 2.4510us           1 2.4510us 2.4510us 2.4510us cudaGetDevice
               0.00% 1.6830us           3 561ns   217ns 1.2450us cuDeviceGetCount
               0.00% 851ns             2 425ns   185ns 666ns  cuDeviceGet
               0.00% 483ns             1 483ns   483ns 483ns  cuModuleGetLoadingMode
               0.00% 466ns             1 466ns   466ns 466ns  cuDeviceTotalMem
               0.00% 223ns             1 223ns   223ns 223ns  cuDeviceGetUuid

==5015== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min Size  Max Size  Total Size  Total Time  Name
      27  20.296KB  4.0000KB  48.000KB  548.0000KB  112.5420us  Host To Device
      1  16.000KB  16.000KB  16.000KB  16.00000KB  2.624000us  Device To Host
      1      -       -       -       -      - 308.1200us  Gpu page fault groups

```

# 512 Block Results

## 2k Nodes

```
--1579== NVPROF is profiling process 1579, command: ./zdo3
RUN 1: Number of Vertices = 2000 | Number of Edges = 8953 | ERROR COUNT (BELLMAN FORD): 0

--1579== Profiling application: ./zdo3
--1579== Profiling result:
      Type  Time(%)    Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 155.84us   1  155.84us  155.84us  155.84us  is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.43% 151.01ms   2  75.503ms  13.450us  150.99ms  cudaMallocManaged
          0.17% 262.69us   3  87.564us  30.058us  172.79us  cudaMemPrefetchAsync
          0.13% 203.00us   3  67.667us  2.9110us  137.38us  cudaFree
          0.11% 160.01us   1  160.01us  160.01us  160.01us  cudaDeviceSynchronize
          0.10% 149.11us  101  1.4760us  132ns   71.157us  cuDeviceGetAttribute
          0.02% 30.170us   1  30.170us  30.170us  30.170us  cudaLaunchKernel
          0.02% 23.186us   1  23.186us  23.186us  23.186us  cuDeviceGetName
          0.01% 17.223us   2  8.610us   1.6960us  15.527us  cudaMemAdvise
          0.01% 10.015us   1  10.015us  10.015us  10.015us  cudaGetDevice
          0.00% 6.2740us   1  6.2740us  6.2740us  6.2740us  cuDeviceGetPCIBusId
          0.00% 2.3830us   3  794ns    267ns   1.8240us  cuDeviceGetCount
          0.00% 849ns     2  424ns    245ns   604ns   cuDeviceGet
          0.00% 458ns     1  458ns    458ns   458ns   cuModuleGetLoadingMode
          0.00% 372ns     1  372ns    372ns   372ns   cuDeviceTotalMem
          0.00% 345ns     1  345ns    345ns   345ns   cuDeviceGetUuid

--1579== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg Size  Min Size  Max Size  Total Size  Total Time  Name
      5  22.399KB  4.0000KB  36.000KB  112.0000KB  21.24800us  Host To Device
      1  4.0000KB  4.0000KB  4.0000KB  4.000000KB  1.824000us  Device To Host
      1  -          -          -          -          -          145.6290us  Gpu page fault groups

--1672== NVPROF is profiling process 1672, command: ./zdo3
RUN 1: Number of Vertices = 2000 | Number of Edges = 8953 | ERROR COUNT (BELLMAN FORD): 0

--1672== Profiling application: ./zdo3
--1672== Profiling result:
      Type  Time(%)    Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 165.08us   1  165.08us  165.08us  165.08us  is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.39% 143.01ms   2  71.505ms  14.049us  143.00ms  cudaMallocManaged
          0.19% 267.29us   3  89.096us  30.846us  169.11us  cudaMemPrefetchAsync
          0.14% 207.91us   3  69.302us  3.2100us  141.86us  cudaFree
          0.12% 169.63us   1  169.63us  169.63us  169.63us  cudaDeviceSynchronize
          0.10% 138.90us  101  1.3750us  137ns   66.538us  cuDeviceGetAttribute
          0.02% 29.882us   1  29.882us  29.882us  29.882us  cuDeviceGetName
          0.02% 28.309us   1  28.309us  28.309us  28.309us  cudaLaunchKernel
          0.01% 15.174us   2  7.5870us  1.9350us  13.239us  cudaMemAdvise
          0.00% 7.1620us   1  7.1620us  7.1620us  7.1620us  cudaGetDevice
          0.00% 6.3700us   1  6.3700us  6.3700us  6.3700us  cuDeviceGetPCIBusId
          0.00% 1.7270us   3  575ns   168ns   1.2710us  cuDeviceGetCount
          0.00% 1.1370us   2  568ns   275ns   862ns   cuDeviceGet
          0.00% 527ns     1  527ns   527ns   527ns   cuModuleGetLoadingMode
          0.00% 428ns     1  428ns   428ns   428ns   cuDeviceTotalMem
          0.00% 285ns     1  285ns   285ns   285ns   cuDeviceGetUuid

--1672== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg Size  Min Size  Max Size  Total Size  Total Time  Name
      5  22.399KB  4.0000KB  36.000KB  112.0000KB  21.66400us  Host To Device
      1  4.0000KB  4.0000KB  4.0000KB  4.000000KB  1.824000us  Device To Host
      1  -          -          -          -          -          154.8130us  Gpu page fault groups
```

```

==2294== NVPROF is profiling process 2294, command: ./zdo3
RUN 1: Number of Vertices = 2000 | Number of Edges = 8953 | ERROR COUNT (BELLMAN FORD): 0

==2294== Profiling application: ./zdo3
==2294== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 183.32us           1 183.32us 183.32us 183.32us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.39% 152.17ms           2 76.086ms 20.543us 152.15ms cudaMallocManaged
                  0.20% 306.20us            3 102.07us 30.259us 202.76us cudaMemPrefetchAsync
                  0.13% 195.51us            3 65.169us 3.1960us 124.37us cudaFree
                  0.12% 189.11us            1 189.11us 189.11us 189.11us cudaDeviceSynchronize
                  0.09% 141.71us          101 1.4030us 133ns 74.901us cuDeviceGetAttribute
                  0.02% 32.642us            1 32.642us 32.642us 32.642us cudaLaunchKernel
                  0.02% 24.988us            1 24.988us 24.988us 24.988us cuDeviceGetPCIBusId
                  0.02% 23.626us            1 23.626us 23.626us 23.626us cuDeviceGetName
                  0.01% 16.881us            2 8.4400us 2.0280us 14.853us cudaMemAdvise
                  0.00% 5.6090us            1 5.6090us 5.6090us 5.6090us cudaGetDevice
                  0.00% 2.3120us            3 770ns 226ns 1.8600us cuDeviceGetCount
                  0.00% 1.3040us            2 652ns 206ns 1.0980us cuDeviceGet
                  0.00% 512ns              1 512ns 512ns 512ns cuModuleGetLoadingMode
                  0.00% 362ns              1 362ns 362ns 362ns cuDeviceTotalMem
                  0.00% 234ns              1 234ns 234ns 234ns cuDeviceGetUuid

==2294== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count Avg Size Min Size Max Size Total Size Total Time  Name
      5 22.399KB 4.0000KB 36.000KB 112.0000KB 24.648000us Host To Device
      1 4.0000KB 4.0000KB 4.0000KB 4.000000KB 1.792000us Device To Host
      1 - - - - - 173.244000us Gpu page fault groups

==1818== NVPROF is profiling process 1818, command: ./zdo3
RUN 1: Number of Vertices = 2000 | Number of Edges = 8953 | ERROR COUNT (BELLMAN FORD): 0

==1818== Profiling application: ./zdo3
==1818== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 138.43us           1 138.43us 138.43us 138.43us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.47% 188.23ms           2 94.117ms 17.630us 188.22ms cudaMallocManaged
                  0.20% 386.73us            3 128.91us 28.086us 282.66us cudaMemPrefetchAsync
                  0.10% 191.24us            3 63.745us 3.5950us 126.61us cudaFree
                  0.09% 163.73us          101 1.6210us 223ns 64.122us cuDeviceGetAttribute
                  0.08% 144.39us            1 144.39us 144.39us 144.39us cudaDeviceSynchronize
                  0.02% 43.417us            1 43.417us 43.417us 43.417us cudaLaunchKernel
                  0.02% 39.919us            1 39.919us 39.919us 39.919us cuDeviceGetName
                  0.01% 16.247us            2 8.1230us 1.8000us 14.447us cudaMemAdvise
                  0.00% 7.9280us            1 7.9280us 7.9280us 7.9280us cudaGetDevice
                  0.00% 7.0550us            1 7.0550us 7.0550us 7.0550us cuDeviceGetPCIBusId
                  0.00% 2.2170us            3 739ns 336ns 1.5120us cuDeviceGetCount
                  0.00% 1.9790us            2 989ns 314ns 1.6650us cuDeviceGet
                  0.00% 659ns              1 659ns 659ns 659ns cuDeviceTotalMem
                  0.00% 646ns              1 646ns 646ns 646ns cuModuleGetLoadingMode
                  0.00% 321ns              1 321ns 321ns 321ns cuDeviceGetUuid

==1818== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count Avg Size Min Size Max Size Total Size Total Time  Name
      5 22.399KB 4.0000KB 36.000KB 112.0000KB 23.616000us Host To Device
      1 4.0000KB 4.0000KB 4.0000KB 4.000000KB 1.824000us Device To Host
      1 - - - - - 128.414000us Gpu page fault groups

```

```

==2099== NVPROF is profiling process 2099, command: ./zdo3
RUN 1: Number of Vertices = 2000 | Number of Edges = 8953 | ERROR COUNT (BELLMAN FORD): 0

==2099== Profiling application: ./zdo3
==2099== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 188.22us           1 188.22us 188.22us 188.22us is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.35% 144.81ms           2 72.406ms 15.685us 144.80ms cudaMallocManaged
               0.22% 324.74us           3 108.25us 34.009us 206.40us cudaMemPrefetchAsync
               0.15% 221.82us           3 73.940us 3.8470us 133.15us cudaFree
               0.13% 194.37us           1 194.37us 194.37us 194.37us cudaDeviceSynchronize
               0.08% 113.56us          101 1.1240us 126ns 47.670us cuDeviceGetAttribute
               0.02% 34.938us           1 34.938us 34.938us 34.938us cudaLaunchKernel
               0.02% 24.039us           1 24.039us 24.039us 24.039us cuDeviceGetName
               0.01% 16.910us           2 8.4550us 1.7840us 15.126us cudaMemAdvise
               0.01% 8.5430us           1 8.5430us 8.5430us 8.5430us cudaGetDevice
               0.00% 6.6700us           1 6.6700us 6.6700us 6.6700us cuDeviceGetPCIBusId
               0.00% 2.1170us           3 705ns   199ns 1.6880us cuDeviceGetCount
               0.00% 1.1010us           2 550ns   166ns 935ns cuDeviceGet
               0.00% 492ns             1 492ns   492ns 492ns cuModuleGetLoadingMode
               0.00% 367ns             1 367ns   367ns 367ns cuDeviceTotalMem
               0.00% 226ns             1 226ns   226ns 226ns cuDeviceGetUuid

==2099== Unified Memory profiling result:
Device "Tesla T4 (0)"

      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
        5  22.399KB 4.0000KB 36.000KB 112.0000KB 23.68000us Host To Device
        1  4.0000KB 4.0000KB 4.0000KB 4.000000KB 1.792000us Device To Host
        1      -      -      -      -      - 178.1080us Gpu page fault groups

```

## 4k Nodes

```

==2406== NVPROF is profiling process 2406, command: ./zdo3
RUN 1: Number of Vertices = 4000 | Number of Edges = 18135 | ERROR COUNT (BELLMAN FORD): 0

==2406== Profiling application: ./zdo3
==2406== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 228.74us           1 228.74us 228.74us 228.74us is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.54% 398.46ms           2 199.23ms 18.407us 398.44ms cudaMallocManaged
               0.22% 880.57us           1 880.57us 880.57us 880.57us cuDeviceGetPCIBusId
               0.08% 319.11us           3 106.37us 29.983us 185.31us cudaMemPrefetchAsync
               0.06% 234.51us           1 234.51us 234.51us 234.51us cudaDeviceSynchronize
               0.05% 199.19us           3 66.397us 2.5890us 129.17us cudaFree
               0.03% 117.23us          101 1.1600us 133ns 47.441us cuDeviceGetAttribute
               0.01% 31.417us           1 31.417us 31.417us 31.417us cudaLaunchKernel
               0.01% 23.192us           1 23.192us 23.192us 23.192us cuDeviceGetName
               0.00% 11.957us           2 5.9780us 1.6200us 10.337us cudaMemAdvise
               0.00% 6.4060us           1 6.4060us 6.4060us 6.4060us cudaGetDevice
               0.00% 1.7420us           3 580ns   224ns 1.2920us cuDeviceGetCount
               0.00% 908ns             2 454ns   155ns 753ns cuDeviceGet
               0.00% 551ns             1 551ns   551ns 551ns cuModuleGetLoadingMode
               0.00% 324ns             1 324ns   324ns 324ns cuDeviceTotalMem
               0.00% 203ns             1 203ns   203ns 203ns cuDeviceGetUuid

==2406== Unified Memory profiling result:
Device "Tesla T4 (0)"

      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
      11  20.000KB 4.0000KB 36.000KB 220.0000KB 47.90300us Host To Device
      1  8.0000KB 8.0000KB 8.0000KB 8.000000KB 2.016000us Device To Host
      1      -      -      -      -      - 216.9910us Gpu page fault groups

```

```

==5878== NVPROF is profiling process 5878, command: ./zdo3
RUN 1: Number of Vertices = 4000 | Number of Edges = 18135 | ERROR COUNT (BELLMAN FORD): 0

==5878== Profiling application: ./zdo3
==5878== Profiling result:
      Type  Time(%)    Time   Calls     Avg     Min     Max  Name
GPU activities: 100.00% 214.72us      1 214.72us 214.72us 214.72us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.57% 271.71ms      2 135.85ms 29.467us 271.68ms cudaMallocManaged
          0.14% 385.33us      3 128.44us 31.647us 212.15us cudaMemPrefetchAsync
          0.08% 226.26us      3 75.421us 2.9960us 142.11us cudaFree
          0.08% 219.15us      1 219.15us 219.15us 219.15us cudaDeviceSynchronize
          0.07% 196.39us     101 1.9440us 264ns 69.873us cuDeviceGetAttribute
          0.02% 47.848us      1 47.848us 47.848us 47.848us cuDeviceGetName
          0.02% 43.372us      1 43.372us 43.372us 43.372us cudaLaunchKernel
          0.01% 17.774us      2 8.8870us 2.1860us 15.588us cudaMemAdvise
          0.00% 10.047us       1 10.047us 10.047us 10.047us cudaGetDevice
          0.00% 7.9320us       1 7.9320us 7.9320us 7.9320us cuDeviceGetPCIBusId
          0.00% 3.8280us       3 1.2760us 385ns 3.0430us cuDeviceGetCount
          0.00% 1.1000us       2 550ns 298ns 802ns cuDeviceGet
          0.00% 685ns          1 685ns 685ns 685ns cuDeviceTotalMem
          0.00% 532ns          1 532ns 532ns 532ns cuModuleGetLoadingMode
          0.00% 430ns          1 430ns 430ns 430ns cuDeviceGetUuid

==5878== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
           11 20.000KB 4.0000KB 36.000KB 220.0000KB 46.59200us Host To Device
            1 8.0000KB 8.0000KB 8.0000KB 8.000000KB 2.048000us Device To Host
            1      -      -      -      -      - 203.0690us Gpu page fault groups

==7073== NVPROF is profiling process 7073, command: ./zdo3
RUN 1: Number of Vertices = 4000 | Number of Edges = 18135 | ERROR COUNT (BELLMAN FORD): 0

==7073== Profiling application: ./zdo3
==7073== Profiling result:
      Type  Time(%)    Time   Calls     Avg     Min     Max  Name
GPU activities: 100.00% 233.18us      1 233.18us 233.18us 233.18us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.60% 263.77ms      2 131.89ms 24.498us 263.75ms cudaMallocManaged
          0.13% 337.72us      3 112.57us 32.002us 198.28us cudaMemPrefetchAsync
          0.09% 239.36us      3 79.786us 3.3870us 153.56us cudaFree
          0.09% 238.47us      1 238.47us 238.47us 238.47us cudaDeviceSynchronize
          0.05% 131.55us     101 1.3020us 155ns 55.160us cuDeviceGetAttribute
          0.02% 40.622us      1 40.622us 40.622us 40.622us cudaLaunchKernel
          0.01% 34.010us      1 34.010us 34.010us 34.010us cuDeviceGetName
          0.01% 18.208us      2 9.1040us 2.2680us 15.940us cudaMemAdvise
          0.00% 8.0490us      1 8.0490us 8.0490us 8.0490us cudaGetDevice
          0.00% 6.4310us      1 6.4310us 6.4310us 6.4310us cuDeviceGetPCIBusId
          0.00% 2.3140us      3 771ns 220ns 1.7790us cuDeviceGetCount
          0.00% 1.6710us      2 835ns 474ns 1.1970us cuDeviceGet
          0.00% 575ns          1 575ns 575ns 575ns cuModuleGetLoadingMode
          0.00% 558ns          1 558ns 558ns 558ns cuDeviceTotalMem
          0.00% 286ns          1 286ns 286ns 286ns cuDeviceGetUuid

==7073== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
           11 20.000KB 4.0000KB 36.000KB 220.0000KB 45.56700us Host To Device
            1 8.0000KB 8.0000KB 8.0000KB 8.000000KB 1.983000us Device To Host
            1      -      -      -      -      - 221.5320us Gpu page fault groups

```

```

==7216== NVPROF is profiling process 7216, command: ./zdo3
RUN 1: Number of Vertices = 4000 | Number of Edges = 18135 | ERROR COUNT (BELLMAN FORD): 0

==7216== Profiling application: ./zdo3
==7216== Profiling result:
      Type Time(%)      Time    Calls      Avg      Min      Max Name
GPU activities: 100.00% 252.86us           1 252.86us 252.86us 252.86us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.55% 257.48ms           2 128.74ms 33.730us 257.44ms cudaMallocManaged
          0.14% 363.93us           3 121.31us 32.744us 195.89us cudaMemPrefetchAsync
          0.10% 263.60us           3 87.867us 4.5870us 180.34us cudaFree
          0.10% 259.67us           1 259.67us 259.67us 259.67us cudaDeviceSynchronize
          0.05% 139.89us          101 1.3850us 153ns 65.921us cuDeviceGetAttribute
          0.02% 39.355us           1 39.355us 39.355us 39.355us cuDeviceGetName
          0.02% 39.076us           1 39.076us 39.076us 39.076us cudaLaunchKernel
          0.01% 31.847us           1 31.847us 31.847us 31.847us cudaGetDevice
          0.01% 19.969us           2 9.9840us 1.9010us 18.068us cudaMemAdvise
          0.00% 7.4690us           1 7.4690us 7.4690us 7.4690us cuDeviceGetPCIBusId
          0.00% 3.7620us           3 1.2540us 273ns 3.1200us cuDeviceGetCount
          0.00% 1.3010us           2 650ns 351ns 950ns cuDeviceGet
          0.00% 510ns              1 510ns 510ns 510ns cuDeviceTotalMem
          0.00% 496ns              1 496ns 496ns 496ns cuModuleGetLoadingMode
          0.00% 273ns              1 273ns 273ns 273ns cuDeviceGetUuid

==7216== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count Avg Size Min Size Max Size Total Size Total Time Name
        11 20.000KB 4.0000KB 36.000KB 220.0000KB 46.84800us Host To Device
        1 8.0000KB 8.0000KB 8.0000KB 8.000000KB 2.016000us Device To Host
        1       -      -      -      -      - 241.2120us Gpu page fault groups

==7317== NVPROF is profiling process 7317, command: ./zdo3
RUN 1: Number of Vertices = 4000 | Number of Edges = 18135 | ERROR COUNT (BELLMAN FORD): 0

==7317== Profiling application: ./zdo3
==7317== Profiling result:
      Type Time(%)      Time    Calls      Avg      Min      Max Name
GPU activities: 100.00% 258.43us           1 258.43us 258.43us 258.43us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.56% 268.09ms           2 134.05ms 29.019us 268.06ms cudaMallocManaged
          0.14% 386.64us           3 128.88us 30.447us 245.28us cudaMemPrefetchAsync
          0.10% 278.76us           1 278.76us 278.76us 278.76us cudaDeviceSynchronize
          0.09% 243.32us           3 81.105us 4.0180us 154.32us cudaFree
          0.05% 133.40us          101 1.3200us 151ns 53.891us cuDeviceGetAttribute
          0.02% 50.279us           1 50.279us 50.279us 50.279us cuDeviceGetName
          0.02% 44.157us           1 44.157us 44.157us 44.157us cudaLaunchKernel
          0.01% 18.653us           2 9.3260us 2.2090us 16.444us cudaMemAdvise
          0.00% 7.8450us           1 7.8450us 7.8450us 7.8450us cuDeviceGetPCIBusId
          0.00% 3.4240us           1 3.4240us 3.4240us 3.4240us cudaGetDevice
          0.00% 2.5320us           3 844ns 181ns 2.0920us cuDeviceGetCount
          0.00% 1.1670us           2 583ns 217ns 950ns cuDeviceGet
          0.00% 725ns              1 725ns 725ns 725ns cuDeviceTotalMem
          0.00% 581ns              1 581ns 581ns 581ns cuModuleGetLoadingMode
          0.00% 278ns              1 278ns 278ns 278ns cuDeviceGetUuid

==7317== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count Avg Size Min Size Max Size Total Size Total Time Name
        11 20.000KB 4.0000KB 36.000KB 220.0000KB 46.17600us Host To Device
        1 8.0000KB 8.0000KB 8.0000KB 8.000000KB 1.983000us Device To Host
        1       -      -      -      -      - 246.9720us Gpu page fault groups

```

## 6k Nodes

```
==4121== NVPROF is profiling process 4121, command: ./zdo3
RUN 1: Number of Vertices = 6000 | Number of Edges = 26718 | ERROR COUNT (BELLMAN FORD): 0

==4121== Profiling application: ./zdo3
==4121== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max   Name
GPU activities: 100.00% 242.14us      1 242.14us 242.14us 242.14us is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.60% 241.92ms      2 120.96ms 13.477us 241.91ms cudaMallocManaged
               0.13% 318.90us      3 106.30us 27.526us 176.77us cudaMemPrefetchAsync
               0.11% 265.81us      1 265.81us 265.81us 265.81us cudaDeviceSynchronize
               0.07% 180.43us      3 60.144us 2.5670us 110.95us cudaFree
               0.05% 117.82us     101 1.1660us 145ns 48.726us cuDeviceGetAttribute
               0.01% 32.253us      1 32.253us 32.253us 32.253us cudaLaunchKernel
               0.01% 27.437us      1 27.437us 27.437us 27.437us cuDeviceGetName
               0.00% 10.973us      2 5.4860us 1.6290us 9.3440us cudaMemAdvise
               0.00% 6.4630us      1 6.4630us 6.4630us 6.4630us cudaGetDevice
               0.00% 5.9760us      1 5.9760us 5.9760us 5.9760us cuDeviceGetPCIBusId
               0.00% 1.7370us      3 579ns 242ns 1.1190us cuDeviceGetCount
               0.00% 1.1920us      2 596ns 302ns 890ns cuDeviceGet
               0.00% 426ns         1 426ns 426ns 426ns cuDeviceTotalMem
               0.00% 402ns         1 402ns 402ns 402ns cuModuleGetLoadingMode
               0.00% 258ns         1 258ns 258ns 258ns cuDeviceGetUuid

==4121== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count Avg Size Min Size Max Size Total Size Total Time   Name
        13 25.538KB 4.0000KB 48.000KB 332.0000KB 59.83900us Host To Device
        1 8.0000KB 8.0000KB 8.0000KB 8.000000KB 2.016000us Device To Host
        1      -       -       -          - 229.7910us Gpu page fault groups

==5528== NVPROF is profiling process 5528, command: ./zdo3
RUN 1: Number of Vertices = 6000 | Number of Edges = 26718 | ERROR COUNT (BELLMAN FORD): 0

==5528== Profiling application: ./zdo3
==5528== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max   Name
GPU activities: 100.00% 259.14us      1 259.14us 259.14us 259.14us is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.55% 246.26ms      2 123.13ms 14.197us 246.25ms cudaMallocManaged
               0.15% 379.78us      3 126.59us 32.277us 226.87us cudaMemPrefetchAsync
               0.11% 266.02us      1 266.02us 266.02us 266.02us cudaDeviceSynchronize
               0.11% 259.82us      3 86.608us 3.3290us 174.22us cudaFree
               0.05% 115.49us     101 1.1430us 137ns 47.630us cuDeviceGetAttribute
               0.01% 32.520us      1 32.520us 32.520us 32.520us cudaLaunchKernel
               0.01% 27.840us      1 27.840us 27.840us 27.840us cuDeviceGetName
               0.00% 12.305us      2 6.1520us 2.2900us 10.015us cudaMemAdvise
               0.00% 6.8800us      1 6.8800us 6.8800us 6.8800us cudaGetDevice
               0.00% 5.5120us      1 5.5120us 5.5120us 5.5120us cuDeviceGetPCIBusId
               0.00% 1.5360us      3 512ns 180ns 1.1090us cuDeviceGetCount
               0.00% 1.1140us      2 557ns 468ns 646ns cuDeviceGet
               0.00% 568ns         1 568ns 568ns 568ns cuDeviceTotalMem
               0.00% 478ns         1 478ns 478ns 478ns cuModuleGetLoadingMode
               0.00% 236ns         1 236ns 236ns 236ns cuDeviceGetUuid

==5528== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count Avg Size Min Size Max Size Total Size Total Time   Name
        13 25.538KB 4.0000KB 48.000KB 332.0000KB 60.86400us Host To Device
        1 8.0000KB 8.0000KB 8.0000KB 8.000000KB 2.017000us Device To Host
        1      -       -       -          - 247.1350us Gpu page fault groups
```

```

==6187== NVPROF is profiling process 6187, command: ./zdo3
RUN 1: Number of Vertices = 6000 | Number of Edges = 26718 | ERROR COUNT (BELLMAN FORD): 0

==6187== Profiling application: ./zdo3
==6187== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max   Name
GPU activities: 100.00% 233.21us           1 233.21us 233.21us 233.21us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.59% 240.75ms           2 120.38ms 12.599us 240.74ms cudaMallocManaged
                  0.14% 329.52us            3 109.84us 27.434us 176.82us cudaMemPrefetchAsync
                  0.11% 256.81us            1 256.81us 256.81us 256.81us cudaDeviceSynchronize
                  0.08% 203.36us            3 67.786us 2.5670us 132.98us cudaFree
                  0.05% 114.53us          101 1.1340us 134ns 47.764us cuDeviceGetAttribute
                  0.01% 30.760us           1 30.760us 30.760us 30.760us cudaLaunchKernel
                  0.01% 27.948us           1 27.948us 27.948us 27.948us cuDeviceGetName
                  0.01% 15.172us           2 7.5860us 1.8520us 13.320us cudaMemAdvise
                  0.00% 6.9250us           1 6.9250us 6.9250us 6.9250us cuDeviceGetPCIBusId
                  0.00% 3.6600us           1 3.6600us 3.6600us 3.6600us cudaGetDevice
                  0.00% 1.7400us           3 580ns 223ns 1.1780us cuDeviceGetCount
                  0.00% 1.0290us           2 514ns 296ns 733ns cuDeviceGet
                  0.00% 468ns              1 468ns 468ns 468ns cuDeviceTotalMem
                  0.00% 409ns              1 409ns 409ns 409ns cuModuleGetLoadingMode
                  0.00% 221ns              1 221ns 221ns 221ns cuDeviceGetUuid

==6187== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count Avg Size  Min Size  Max Size  Total Size  Total Time   Name
      13 25.538KB 4.0000KB 48.000KB 332.0000KB 60.63900us Host To Device
      1 8.0000KB 8.0000KB 8.0000KB 8.000000KB 2.016000us Device To Host
      1      -       -       -        -        - 222.1430us Gpu page fault groups

==6842== NVPROF is profiling process 6842, command: ./zdo3
RUN 1: Number of Vertices = 6000 | Number of Edges = 26718 | ERROR COUNT (BELLMAN FORD): 0

==6842== Profiling application: ./zdo3
==6842== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max   Name
GPU activities: 100.00% 232.90us           1 232.90us 232.90us 232.90us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.61% 247.61ms           2 123.80ms 13.444us 247.59ms cudaMallocManaged
                  0.13% 324.73us            3 108.24us 27.966us 178.36us cudaMemPrefetchAsync
                  0.10% 258.23us            1 258.23us 258.23us 258.23us cudaDeviceSynchronize
                  0.07% 183.69us            3 61.230us 2.5420us 116.08us cudaFree
                  0.05% 114.76us          101 1.1360us 132ns 47.946us cuDeviceGetAttribute
                  0.01% 30.443us           1 30.443us 30.443us 30.443us cudaLaunchKernel
                  0.01% 23.045us           1 23.045us 23.045us 23.045us cuDeviceGetName
                  0.01% 16.352us           2 8.1760us 1.8530us 14.499us cudaMemAdvise
                  0.00% 12.329us           1 12.329us 12.329us 12.329us cuDeviceGetPCIBusId
                  0.00% 6.6430us           1 6.6430us 6.6430us 6.6430us cudaGetDevice
                  0.00% 1.6180us           3 539ns 194ns 1.0990us cuDeviceGetCount
                  0.00% 1.0040us           2 502ns 304ns 700ns cuDeviceGet
                  0.00% 824ns              1 824ns 824ns 824ns cuDeviceTotalMem
                  0.00% 370ns              1 370ns 370ns 370ns cuModuleGetLoadingMode
                  0.00% 253ns              1 253ns 253ns 253ns cuDeviceGetUuid

==6842== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count Avg Size  Min Size  Max Size  Total Size  Total Time   Name
      13 25.538KB 4.0000KB 48.000KB 332.0000KB 60.95900us Host To Device
      1 8.0000KB 8.0000KB 8.0000KB 8.000000KB 2.016000us Device To Host
      1      -       -       -        -        - 220.8310us Gpu page fault groups

```

```

==7769== NVPROF is profiling process 7769, command: ./zdo3
RUN 1: Number of Vertices = 6000 | Number of Edges = 26718 | ERROR COUNT (BELLMAN FORD): 0

==7769== Profiling application: ./zdo3
==7769== Profiling result:
      Type  Time(%)    Time    Calls      Avg      Min      Max   Name
GPU activities: 100.00% 304.74us     1 304.74us 304.74us 304.74us is_zero_indegree_parallel(node*, int, bool*)
  API calls: 99.57% 253.61ms     2 126.80ms 15.514us 253.59ms cudaMallocManaged
              0.14% 343.98us     3 114.66us 29.369us 191.08us cudaMemPrefetchAsync
              0.13% 328.80us     1 328.80us 328.80us 328.80us cudaDeviceSynchronize
              0.09% 221.74us     3 73.914us 3.1070us 141.06us cudaFree
              0.05% 114.76us    101 1.1360us 133ns 47.625us cuDeviceGetAttribute
              0.01% 34.598us     1 34.598us 34.598us 34.598us cudalaunchKernel
              0.01% 23.732us     1 23.732us 23.732us 23.732us cuDeviceGetName
              0.01% 12.828us     2 6.4140us 1.7060us 11.122us cudaMemAdvise
              0.00% 6.6350us     1 6.6350us 6.6350us 6.6350us cuDeviceGetPCIBusId
              0.00% 4.1130us     1 4.1130us 4.1130us 4.1130us cudaGetDevice
              0.00% 1.4640us     3 488ns 262ns 916ns cuDeviceGetCount
              0.00% 1.0990us     2 549ns 393ns 706ns cuDeviceGet
              0.00% 616ns        1 616ns 616ns 616ns cuDeviceTotalMem
              0.00% 516ns        1 516ns 516ns 516ns cuModuleGetLoadingMode
              0.00% 232ns        1 232ns 232ns 232ns cuDeviceGetUuid

==7769== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg Size  Min Size  Max Size  Total Size  Total Time   Name
          13 25.538KB 4.0000KB 48.0000KB 332.0000KB 61.66300us Host To Device
          1 8.0000KB 8.0000KB 8.0000KB 8.000000KB 2.016000us Device To Host
          1           -       -       -           -       - 293.5980us Gpu page fault groups

```

## 8k Nodes

```

==787== NVPROF is profiling process 787, command: ./zdo3
RUN 1: Number of Vertices = 8000 | Number of Edges = 35925 | ERROR COUNT (BELLMAN FORD): 0

==787== Profiling application: ./zdo3
==787== Profiling result:
      Type  Time(%)    Time    Calls      Avg      Min      Max   Name
GPU activities: 100.00% 319.54us     1 319.54us 319.54us 319.54us is_zero_indegree_parallel(node*, int, bool*)
  API calls: 99.13% 314.15ms     2 157.07ms 18.330us 314.13ms cudaMallocManaged
              0.50% 1.5940ms     1 1.5940ms 1.5940ms 1.5940ms cuDeviceGetPCIBusId
              0.13% 406.91us     3 135.64us 30.545us 207.74us cudaMemPrefetchAsync
              0.10% 324.86us     1 324.86us 324.86us 324.86us cudaDeviceSynchronize
              0.07% 233.92us     3 77.972us 3.2800us 149.39us cudaFree
              0.04% 117.73us    101 1.1650us 130ns 48.093us cuDeviceGetAttribute
              0.01% 34.359us     1 34.359us 34.359us 34.359us cudalaunchKernel
              0.01% 22.290us     1 22.290us 22.290us 22.290us cuDeviceGetName
              0.01% 16.576us     2 8.2880us 1.8100us 14.766us cudaMemAdvise
              0.00% 6.6790us     1 6.6790us 6.6790us 6.6790us cudaGetDevice
              0.00% 1.7040us     3 568ns 213ns 1.2510us cuDeviceGetCount
              0.00% 809ns       2 404ns 155ns 654ns cuDeviceGet
              0.00% 545ns       1 545ns 545ns 545ns cuModuleGetLoadingMode
              0.00% 364ns       1 364ns 364ns 364ns cuDeviceTotalMem
              0.00% 232ns       1 232ns 232ns 232ns cuDeviceGetUuid

==787== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg Size  Min Size  Max Size  Total Size  Total Time   Name
          23 19.130KB 4.0000KB 48.0000KB 440.0000KB 93.59800us Host To Device
          1 12.000KB 12.000KB 12.000KB 12.00000KB 2.336000us Device To Host
          1           -       -       -           -       - 306.0730us Gpu page fault groups

```

```

==2866== NVPROF is profiling process 2866, command: ./zdo3
RUN 1: Number of Vertices = 8000 | Number of Edges = 35925 | ERROR COUNT (BELLMAN FORD): 0

==2866== Profiling application: ./zdo3
==2866== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max Name
GPU activities: 100.0% 325.02us      1 325.02us 325.02us 325.02us is_zero_indegree_parallel(node*, int, bool*)
    API calls: 99.51% 268.12ms      2 134.06ms 27.907us 268.10ms cudaMallocManaged
      0.16% 442.76us      3 147.59us 33.166us 228.18us cudaMemPrefetchAsync
      0.13% 353.34us      1 353.34us 353.34us 353.34us cudaDeviceSynchronize
      0.09% 248.75us      3 82.916us 3.1050us 163.97us cudaFree
      0.06% 151.04us     101 1.4950us 156ns 66.525us cuDeviceGetAttribute
      0.02% 44.708us      1 44.708us 44.708us 44.708us cudaLaunchKernel
      0.01% 39.526us      1 39.526us 39.526us 39.526us cuDeviceGetName
      0.01% 16.894us      2 8.4470us 2.3700us 14.524us cudaMemAdvise
      0.01% 16.197us      1 16.197us 16.197us 16.197us cudaGetDevice
      0.00% 8.2670us      1 8.2670us 8.2670us 8.2670us cuDeviceGetPCIBusId
      0.00% 3.4520us      3 1.1500us 284ns 2.7660us cuDeviceGetCount
      0.00% 1.2610us      2 630ns 323ns 938ns cuDeviceGet
      0.00% 670ns        1 670ns 670ns 670ns cuDeviceTotalMem
      0.00% 545ns         1 545ns 545ns 545ns cuModuleGetLoadingMode
      0.00% 252ns         1 252ns 252ns 252ns cuDeviceGetUuid

==2866== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg Size  Min Size  Max Size  Total Size  Total Time  Name
      23  19.130KB  4.0000KB  48.000KB  440.0000KB  94.78300us Host To Device
      1  12.000KB  12.000KB  12.000KB  12.00000KB  2.400000us Device To Host
      1          -       -       -           -  311.2910us Gpu page fault groups

==3554== NVPROF is profiling process 3554, command: ./zdo3
RUN 1: Number of Vertices = 8000 | Number of Edges = 35925 | ERROR COUNT (BELLMAN FORD): 0

==3554== Profiling application: ./zdo3
==3554== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max Name
GPU activities: 100.0% 318.14us      1 318.14us 318.14us 318.14us is_zero_indegree_parallel(node*, int, bool*)
    API calls: 99.42% 260.91ms      2 130.46ms 25.748us 260.89ms cudaMallocManaged
      0.20% 535.56us      3 178.52us 138.46us 227.50us cudaMemPrefetchAsync
      0.14% 373.02us      1 373.02us 373.02us 373.02us cudaDeviceSynchronize
      0.12% 318.94us      3 106.31us 3.6960us 210.40us cudaFree
      0.07% 172.65us     101 1.7000us 151ns 53.955us cuDeviceGetAttribute
      0.02% 49.482us      1 49.482us 49.482us 49.482us cudaLaunchKernel
      0.01% 32.114us      2 16.057us 14.946us 17.168us cudaMemAdvise
      0.01% 30.900us      1 30.900us 30.900us 30.900us cuDeviceGetName
      0.00% 7.2800us      1 7.2800us 7.2800us 7.2800us cuDeviceGetPCIBusId
      0.00% 3.7800us      1 3.7800us 3.7800us 3.7800us cudaGetDevice
      0.00% 2.5800us      3 860ns 234ns 2.0050us cuDeviceGetCount
      0.00% 1.1220us      2 561ns 365ns 757ns cuDeviceGet
      0.00% 538ns         1 538ns 538ns 538ns cuModuleGetLoadingMode
      0.00% 458ns         1 458ns 458ns 458ns cuDeviceTotalMem
      0.00% 264ns         1 264ns 264ns 264ns cuDeviceGetUuid

==3554== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg Size  Min Size  Max Size  Total Size  Total Time  Name
      23  19.130KB  4.0000KB  48.000KB  440.0000KB  97.02200us Host To Device
      1  12.000KB  12.000KB  12.000KB  12.00000KB  2.400000us Device To Host
      1          -       -       -           -  304.6670us Gpu page fault groups

```

```

==4109== NVPROF is profiling process 4109, command: ./zdo3
RUN 1: Number of Vertices = 8000 | Number of Edges = 35925 | ERROR COUNT (BELLMAN FORD): 0

==4109== Profiling application: ./zdo3
==4109== Profiling result:
      Type Time(%)    Time   Calls     Avg      Min      Max  Name
GPU activities: 100.00% 333.66us      1 333.66us 333.66us 333.66us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.51% 270.27ms      2 135.14ms 25.167us 270.25ms cudaMallocManaged
          0.16% 428.85us      3 142.95us 33.088us 221.75us cudaMemPrefetchAsync
          0.12% 338.98us      1 338.98us 338.98us 338.98us cudaDeviceSynchronize
          0.10% 281.75us      3 93.915us 3.6150us 188.55us cudaFree
          0.06% 157.95us     101 1.5630us 150ns 59.549us cuDeviceGetAttribute
          0.02% 42.194us      1 42.194us 42.194us 42.194us cudaLaunchKernel
          0.01% 39.696us      1 39.696us 39.696us 39.696us cuDeviceGetName
          0.01% 18.188us      2 9.0940us 3.1580us 15.030us cudaMemAdvise
          0.00% 7.2320us      1 7.2320us 7.2320us 7.2320us cuDeviceGetPCIBusId
          0.00% 3.9130us      1 3.9130us 3.9130us 3.9130us cudaGetDevice
          0.00% 2.3810us      3 793ns 249ns 1.8590us cuDeviceGetCount
          0.00% 1.4300us      2 715ns 317ns 1.1130us cuDeviceGet
          0.00% 583ns         1 583ns 583ns 583ns cuModuleGetLoadingMode
          0.00% 509ns         1 509ns 509ns 509ns cuDeviceTotalMem
          0.00% 279ns         1 279ns 279ns 279ns cuDeviceGetUuid

==4109== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg Size  Min Size  Max Size  Total Size  Total Time  Name
      23 19.130KB 4.0000KB 48.000KB 440.0000KB 99.58100us Host To Device
      1 12.000KB 12.000KB 12.000KB 12.00000KB 2.399000us Device To Host
      1      -       -       -           - 320.1870us Gpu page fault groups

==4964== NVPROF is profiling process 4964, command: ./zdo3
RUN 1: Number of Vertices = 8000 | Number of Edges = 35925 | ERROR COUNT (BELLMAN FORD): 0

==4964== Profiling application: ./zdo3
==4964== Profiling result:
      Type Time(%)    Time   Calls     Avg      Min      Max  Name
GPU activities: 100.00% 329.50us      1 329.50us 329.50us 329.50us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.50% 261.39ms      2 130.70ms 26.729us 261.37ms cudaMallocManaged
          0.17% 453.27us      3 151.09us 34.764us 239.49us cudaMemPrefetchAsync
          0.13% 334.14us      1 334.14us 334.14us 334.14us cudaDeviceSynchronize
          0.10% 264.70us      3 88.232us 3.4750us 176.18us cudaFree
          0.05% 124.63us     101 1.2330us 137ns 52.557us cuDeviceGetAttribute
          0.02% 48.787us      1 48.787us 48.787us 48.787us cudaLaunchKernel
          0.01% 35.896us      1 35.896us 35.896us 35.896us cuDeviceGetName
          0.01% 24.670us      2 12.335us 2.4890us 22.181us cudaMemAdvise
          0.00% 6.6590us      1 6.6590us 6.6590us 6.6590us cuDeviceGetPCIBusId
          0.00% 4.1270us      1 4.1270us 4.1270us 4.1270us cudaGetDevice
          0.00% 1.9380us      3 646ns 169ns 1.5160us cuDeviceGetCount
          0.00% 931ns         2 465ns 195ns 736ns cuDeviceGet
          0.00% 652ns         1 652ns 652ns 652ns cuDeviceTotalMem
          0.00% 531ns         1 531ns 531ns 531ns cuModuleGetLoadingMode
          0.00% 237ns         1 237ns 237ns 237ns cuDeviceGetUuid

==4964== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg Size  Min Size  Max Size  Total Size  Total Time  Name
      23 19.130KB 4.0000KB 48.000KB 440.0000KB 94.04600us Host To Device
      1 12.000KB 12.000KB 12.000KB 12.00000KB 2.400000us Device To Host
      1      -       -       -           - 315.9310us Gpu page fault groups

```

## 10k Nodes

```
==606== NVPROF is profiling process 606, command: ./zdo3
RUN 1: Number of Vertices = 10000 | Number of Edges = 44969 | ERROR COUNT (BELLMAN FORD): 0

==606== Profiling application: ./zdo3
==606== Profiling result:
      Type  Time(%)    Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 340.76us      1 340.76us 340.76us 340.76us is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.36% 416.85ms      2 208.43ms 25.438us 416.83ms cudaMallocManaged
               0.32% 1.3343ms      1 1.3343ms 1.3343ms 1.3343ms cuDeviceGetPCIBusId
               0.11% 462.44us       3 154.15us 32.507us 216.70us cudaMemPrefetchAsync
               0.08% 346.66us       1 346.66us 346.66us 346.66us cudaDeviceSynchronize
               0.07% 283.46us       3 94.487us 3.0950us 167.53us cudaFree
               0.03% 138.95us     101 1.3750us 163ns 54.952us cuDeviceGetAttribute
               0.01% 39.476us       1 39.476us 39.476us 39.476us cudaLaunchKernel
               0.01% 34.894us       1 34.894us 34.894us 34.894us cuDeviceGetName
               0.00% 20.062us       2 10.031us 2.9080us 17.154us cudaMemAdvise
               0.00% 3.8130us       1 3.8130us 3.8130us 3.8130us cudaGetDevice
               0.00% 2.2080us       3 736ns 251ns 1.6800us cuDeviceGetCount
               0.00% 869ns          2 434ns 199ns 670ns cuDeviceGet
               0.00% 621ns          1 621ns 621ns 621ns cuDeviceTotalMem
               0.00% 582ns          1 582ns 582ns 582ns cuModuleGetLoadingMode
               0.00% 320ns          1 320ns 320ns 320ns cuDeviceGetUuid

==606== Unified Memory profiling result:
Device "Tesla T4 (0)"
  Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
    27  20.296KB  4.0000KB  48.000KB  548.0000KB 112.9260us Host To Device
      1  16.000KB  16.000KB  16.000KB  16.00000KB  2.624000us Device To Host
      1      -        -        -        -           - 327.4190us Gpu page fault groups

==1053== NVPROF is profiling process 1053, command: ./zdo3
RUN 1: Number of Vertices = 10000 | Number of Edges = 44969 | ERROR COUNT (BELLMAN FORD): 0

==1053== Profiling application: ./zdo3
==1053== Profiling result:
      Type  Time(%)    Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 349.28us      1 349.28us 349.28us 349.28us is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.50% 267.13ms      2 133.57ms 28.239us 267.10ms cudaMallocManaged
               0.17% 449.03us       3 149.68us 33.351us 208.28us cudaMemPrefetchAsync
               0.13% 354.69us       1 354.69us 354.69us 354.69us cudaDeviceSynchronize
               0.11% 296.34us       3 98.779us 6.3230us 184.58us cudaFree
               0.05% 130.97us     101 1.2960us 137ns 58.678us cuDeviceGetAttribute
               0.01% 39.730us       1 39.730us 39.730us 39.730us cudaLaunchKernel
               0.01% 37.416us       1 37.416us 37.416us 37.416us cuDeviceGetName
               0.01% 21.771us       2 10.885us 2.0900us 19.681us cudaMemAdvise
               0.00% 8.2460us       1 8.2460us 8.2460us 8.2460us cudaGetDevice
               0.00% 6.4430us       1 6.4430us 6.4430us 6.4430us cuDeviceGetPCIBusId
               0.00% 2.5660us       3 855ns 194ns 2.0540us cuDeviceGetCount
               0.00% 1.1720us       2 586ns 313ns 859ns cuDeviceGet
               0.00% 524ns          1 524ns 524ns 524ns cuModuleGetLoadingMode
               0.00% 461ns          1 461ns 461ns 461ns cuDeviceTotalMem
               0.00% 327ns          1 327ns 327ns 327ns cuDeviceGetUuid

==1053== Unified Memory profiling result:
Device "Tesla T4 (0)"
  Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
    27  20.296KB  4.0000KB  44.000KB  548.0000KB 113.1510us Host To Device
      1  16.000KB  16.000KB  16.000KB  16.00000KB  2.624000us Device To Host
      1      -        -        -        -           - 336.0590us Gpu page fault groups
```

```

==1528== NVPROF is profiling process 1528, command: ./zdo3
RUN 1: Number of Vertices = 10000 | Number of Edges = 44969 | ERROR COUNT (BELLMAN FORD): 0

==1528== Profiling application: ./zdo3
==1528== Profiling result:
      Type  Time(%)    Time   Calls     Avg     Min     Max  Name
GPU activities: 100.00% 380.89us      1 380.89us 380.89us is_zero_indegree_parallel(node*, int, bool*)
    API calls: 99.44% 272.68ms      2 136.34ms 32.982us 272.65ms cudaMallocManaged
      0.21% 576.37us      3 192.12us 185.18us 241.57us cudaMemcpyPrefetchAsync
      0.14% 387.57us      1 387.57us 387.57us 387.57us cudaDeviceSynchronize
      0.10% 282.47us      3 94.157us 3.2770us 175.04us cudaFree
      0.06% 159.42us    101 1.5780us 164ns 73.897us cuDeviceGetAttribute
      0.02% 43.128us      1 43.128us 43.128us 43.128us cudaLaunchKernel
      0.01% 40.934us      1 40.934us 40.934us 40.934us cuDeviceGetName
      0.01% 19.566us      2 9.7830us 2.4240us 17.142us cudaMemAdvise
      0.00% 8.2420us      1 8.2420us 8.2420us 8.2420us cudaGetDevice
      0.00% 7.6320us      1 7.6320us 7.6320us 7.6320us cuDeviceGetPCIBusId
      0.00% 3.5060us      3 1.1680us 270ns 2.8970us cuDeviceGetCount
      0.00% 1.2210us      2 610ns 348ns 873ns cuDeviceGet
      0.00% 718ns        1 718ns 718ns 718ns cuDeviceGetUuid
      0.00% 664ns        1 664ns 664ns 664ns cuDeviceTotalMem
      0.00% 547ns        1 547ns 547ns 547ns cuModuleGetLoadingMode

==1528== Unified Memory profiling result:
Device "Tesla T4 (0)"
  Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
    27  20.296KB  4.0000KB  48.000KB  548.0000KB 114.9740us Host To Device
      1  16.000KB  16.000KB  16.000KB  16.00000KB  2.623000us Device To Host
      1      -       -       -       -      - 367.5140us Gpu page fault groups

==1931== NVPROF is profiling process 1931, command: ./zdo3
RUN 1: Number of Vertices = 10000 | Number of Edges = 44969 | ERROR COUNT (BELLMAN FORD): 0

==1931== Profiling application: ./zdo3
==1931== Profiling result:
      Type  Time(%)    Time   Calls     Avg     Min     Max  Name
GPU activities: 100.00% 347.42us      1 347.42us 347.42us 347.42us is_zero_indegree_parallel(node*, int, bool*)
    API calls: 99.48% 265.37ms      2 132.69ms 29.024us 265.34ms cudaMallocManaged
      0.18% 469.78us      3 156.59us 35.394us 225.87us cudaMemcpyPrefetchAsync
      0.14% 374.86us      1 374.86us 374.86us 374.86us cudaDeviceSynchronize
      0.11% 300.06us      3 100.02us 3.6060us 203.54us cudaFree
      0.05% 136.84us    101 1.3540us 151ns 54.854us cuDeviceGetAttribute
      0.01% 39.388us      1 39.388us 39.388us 39.388us cudaLaunchKernel
      0.01% 38.401us      1 38.401us 38.401us 38.401us cuDeviceGetName
      0.01% 17.789us      2 8.8940us 2.1850us 15.604us cudaMemAdvise
      0.00% 6.8100us      1 6.8100us 6.8100us 6.8100us cudaGetDevice
      0.00% 6.7280us      1 6.7280us 6.7280us 6.7280us cuDeviceGetPCIBusId
      0.00% 2.5110us      3 837ns 276ns 1.9350us cuDeviceGetCount
      0.00% 1.2250us      2 612ns 219ns 1.0060us cuDeviceGet
      0.00% 565ns        1 565ns 565ns 565ns cuDeviceTotalMem
      0.00% 527ns        1 527ns 527ns 527ns cuModuleGetLoadingMode
      0.00% 252ns        1 252ns 252ns 252ns cuDeviceGetUuid

==1931== Unified Memory profiling result:
Device "Tesla T4 (0)"
  Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
    27  20.296KB  4.0000KB  44.000KB  548.0000KB 113.0540us Host To Device
      1  16.000KB  16.000KB  16.000KB  16.00000KB  2.656000us Device To Host
      1      -       -       -       -      - 333.8510us Gpu page fault groups

```

```

==2326== NVPROF is profiling process 2326, command: ./zdo3
RUN 1: Number of Vertices = 10000 | Number of Edges = 44969 | ERROR COUNT (BELLMAN FORD): 0

==2326== Profiling application: ./zdo3
==2326== Profiling result:
      Type  Time(%)    Time   Calls     Avg      Min      Max  Name
GPU activities: 100.00% 372.44us           1 372.44us  372.44us  372.44us  is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.46% 263.39ms           2 131.70ms  28.827us  263.36ms  cudaMallocManaged
          0.18% 488.43us           3 162.81us  40.587us  237.96us  cudaMemPrefetchAsync
          0.14% 378.21us           1 378.21us  378.21us  378.21us  cudaDeviceSynchronize
          0.12% 315.27us           3 105.09us  4.2800us  187.86us  cudaFree
          0.05% 133.71us          101 1.3230us  160ns   56.377us  cuDeviceGetAttribute
          0.02% 43.625us           1 43.625us  43.625us  43.625us  cudaLaunchKernel
          0.02% 42.504us           1 42.504us  42.504us  42.504us  cuDeviceGetName
          0.01% 17.397us           2 8.6980us  2.4510us  14.946us  cudaMemAdvise
          0.00% 8.7530us           1 8.7530us  8.7530us  8.7530us  cuDeviceGetPCIBusId
          0.00% 4.1040us           1 4.1040us  4.1040us  4.1040us  cudaGetDevice
          0.00% 4.0570us           3 1.3520us  215ns   2.3080us  cuDeviceGetCount
          0.00% 1.2870us           2 643ns    405ns   882ns   cuDeviceGet
          0.00% 685ns              1 685ns    685ns   685ns   cuDeviceTotalMem
          0.00% 598ns              1 598ns    598ns   598ns   cuModuleGetLoadingMode
          0.00% 283ns              1 283ns    283ns   283ns   cuDeviceGetUuid

==2326== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg Size  Min Size  Max Size  Total Size  Total Time  Name
      27  20.296KB  4.0000KB  44.000KB  548.0000KB  112.9260us  Host To Device
      1  16.000KB  16.000KB  16.000KB  16.00000KB  2.656000us  Device To Host
      1      -        -        -        -        -  359.1300us  Gpu page fault groups

```

# 1024 Blocks Results

## 2k Nodes

```
--7656== NVPROF is profiling process 7656, command: ./zdo3
RUN 1: Number of Vertices = 4000 | Number of Edges = 18135 | ERROR COUNT (BELLMAN FORD): 0

--7656== Profiling application: ./zdo3
--7656== Profiling result:
      Type  Time(%)    Time   Calls     Avg      Min      Max  Name
GPU activities: 100.00% 231.51us      1 231.51us 231.51us 231.51us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.39% 205.59ms      2 102.79ms 24.572us 205.56ms cudaMallocManaged
          0.22% 463.73us      3 154.58us 33.129us 324.09us cudaMemPrefetchAsync
          0.11% 234.55us      1 234.55us 234.55us 234.55us cudaDeviceSynchronize
          0.11% 225.96us     101 2.2370us 207ns 83.982us cuDeviceGetAttribute
          0.10% 211.39us      3 70.462us 2.9770us 137.83us cudaFree
          0.02% 44.563us      1 44.563us 44.563us 44.563us cudaLaunchKernel
          0.02% 35.282us      1 35.282us 35.282us 35.282us cuDeviceGetName
          0.02% 35.211us      2 17.605us 3.0070us 32.204us cudaMemAdvise
          0.00% 8.3390us      1 8.3390us 8.3390us 8.3390us cuDeviceGetPCIBusId
          0.00% 3.8260us      1 3.8260us 3.8260us 3.8260us cudaGetDevice
          0.00% 2.5360us      3 845ns 323ns 1.8250us cuDeviceGetCount
          0.00% 1.0240us      2 512ns 323ns 701ns cuDeviceGet
          0.00% 737ns         1 737ns 737ns 737ns cuDeviceTotalMem
          0.00% 662ns         1 662ns 662ns 662ns cuModuleGetLoadingMode
          0.00% 442ns         1 442ns 442ns 442ns cuDeviceGetUuid

--7656== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
           11 20.000KB 4.0000KB 36.000KB 220.0000KB 47.96700us Host To Device
            1 8.0000KB 8.0000KB 8.0000KB 8.000000KB 2.016000us Device To Host
            1 -       -       -       -       - 219.8990us Gpu page fault groups
```

```
--9959== NVPROF is profiling process 9959, command: ./zdo3
RUN 1: Number of Vertices = 2000 | Number of Edges = 8953 | ERROR COUNT (BELLMAN FORD): 0

--9959== Profiling application: ./zdo3
--9959== Profiling result:
      Type  Time(%)    Time   Calls     Avg      Min      Max  Name
GPU activities: 100.00% 185.79us      1 185.79us 185.79us 185.79us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.41% 144.57ms      2 72.283ms 13.016us 144.55ms cudaMallocManaged
          0.18% 261.01us      3 87.002us 28.448us 174.02us cudaMemPrefetchAsync
          0.14% 208.70us      3 69.566us 3.3290us 138.30us cudaFree
          0.13% 190.57us      1 190.57us 190.57us 190.57us cudaDeviceSynchronize
          0.08% 121.58us     101 1.2030us 129ns 50.816us cuDeviceGetAttribute
          0.02% 27.107us      1 27.107us 27.107us 27.107us cudaLaunchKernel
          0.02% 26.371us      1 26.371us 26.371us 26.371us cuDeviceGetName
          0.01% 13.470us      2 6.7350us 1.6260us 11.844us cudaMemAdvise
          0.00% 5.7890us      1 5.7890us 5.7890us 5.7890us cuDeviceGetPCIBusId
          0.00% 5.7350us      1 5.7350us 5.7350us 5.7350us cudaGetDevice
          0.00% 1.9360us      3 645ns 208ns 1.4220us cuDeviceGetCount
          0.00% 939ns         2 469ns 311ns 628ns cuDeviceGet
          0.00% 455ns         1 455ns 455ns 455ns cuModuleGetLoadingMode
          0.00% 417ns         1 417ns 417ns 417ns cuDeviceTotalMem
          0.00% 228ns         1 228ns 228ns 228ns cuDeviceGetUuid

--9959== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
           5 22.399KB 4.0000KB 36.000KB 112.0000KB 22.91200us Host To Device
            1 4.0000KB 4.0000KB 4.0000KB 4.000000KB 1.824000us Device To Host
            1 -       -       -       -       - 175.7080us Gpu page fault groups
```

```

==10106== NVPROF is profiling process 10106, command: ./zdo3
RUN 1: Number of Vertices = 2000 | Number of Edges = 8953 | ERROR COUNT (BELLMAN FORD): 0

==10106== Profiling application: ./zdo3
==10106== Profiling result:
      Type  Time(%)    Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 191.71us           1  191.71us  191.71us  191.71us  is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.42% 159.17ms           2  79.587ms  18.236us  159.16ms  cudaMallocManaged
               0.19% 309.28us            3  103.09us  32.567us  208.70us  cudaMemPrefetchAsync
               0.12% 197.43us            1  197.43us  197.43us  197.43us  cudaDeviceSynchronize
               0.12% 197.04us            3  65.681us  2.9950us  126.72us  cudaFree
               0.08% 134.06us          101  1.3270us  155ns   57.321us  cuDeviceGetAttribute
               0.02% 33.855us           1  33.855us  33.855us  33.855us  cuDeviceGetName
               0.02% 32.583us           1  32.583us  32.583us  32.583us  cudaLaunchKernel
               0.01% 14.918us           2  7.4590us  1.5890us  13.329us  cudaMemAdvise
               0.00% 6.7130us           1  6.7130us  6.7130us  6.7130us  cuDeviceGetPCIBusId
               0.00% 3.6760us           1  3.6760us  3.6760us  3.6760us  cudaGetDevice
               0.00% 2.1450us           3   715ns   216ns   1.6080us  cuDeviceGetCount
               0.00% 1.1410us           2   570ns   359ns   782ns   cuDeviceGet
               0.00% 490ns              1   490ns   490ns   490ns   cuModuleGetLoadingMode
               0.00% 480ns              1   480ns   480ns   480ns   cuDeviceTotalMem
               0.00% 276ns              1   276ns   276ns   276ns   cuDeviceGetUuid

==10106== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
      5  22.399KB  4.0000KB  36.000KB  112.0000KB  23.00800us  Host To Device
      1  4.0000KB  4.0000KB  4.0000KB  4.000000KB  1.824000us  Device To Host
      1       -      -      -      -      -  181.6920us  Gpu page fault groups

```

```

==10241== NVPROF is profiling process 10241, command: ./zdo3
RUN 1: Number of Vertices = 2000 | Number of Edges = 8953 | ERROR COUNT (BELLMAN FORD): 0

==10241== Profiling application: ./zdo3
==10241== Profiling result:
      Type  Time(%)    Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 243.26us           1  243.26us  243.26us  243.26us  is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.33% 146.53ms           2  73.265ms  13.295us  146.52ms  cudaMallocManaged
               0.19% 284.80us            3  94.932us  31.302us  186.90us  cudaMemPrefetchAsync
               0.17% 247.92us            1  247.92us  247.92us  247.92us  cudaDeviceSynchronize
               0.17% 244.80us            3  81.599us  5.5120us  170.35us  cudaFree
               0.08% 120.77us          101  1.1950us  135ns   50.982us  cuDeviceGetAttribute
               0.02% 31.944us           1  31.944us  31.944us  31.944us  cudaLaunchKernel
               0.02% 24.440us           1  24.440us  24.440us  24.440us  cuDeviceGetName
               0.01% 15.408us           2  7.7040us  1.4220us  13.986us  cudaMemAdvise
               0.00% 6.4570us           1  6.4570us  6.4570us  6.4570us  cudaGetDevice
               0.00% 5.8140us           1  5.8140us  5.8140us  5.8140us  cuDeviceGetPCIBusId
               0.00% 1.9270us           3   642ns   233ns   1.3980us  cuDeviceGetCount
               0.00% 1.0700us           2   535ns   175ns   895ns   cuDeviceGet
               0.00% 390ns              1   390ns   390ns   390ns   cuModuleGetLoadingMode
               0.00% 353ns              1   353ns   353ns   353ns   cuDeviceTotalMem
               0.00% 196ns              1   196ns   196ns   196ns   cuDeviceGetUuid

==10241== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
      5  22.399KB  4.0000KB  36.000KB  112.0000KB  22.65500us  Host To Device
      1  4.0000KB  4.0000KB  4.0000KB  4.000000KB  1.824000us  Device To Host
      1       -      -      -      -      -  233.2430us  Gpu page fault groups

```

```

==10372== NVPROF is profiling process 10372, command: ./zdo3
RUN 1: Number of Vertices = 2000 | Number of Edges = 8953 | ERROR COUNT (BELLMAN FORD): 0

==10372== Profiling application: ./zdo3
==10372== Profiling result:
      Type  Time(%)    Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 220.09us           1 220.09us 220.09us 220.09us is_zero_indegree_parallel(node*, int, bool*)
      API calls:  99.40% 149.19ms           2 74.597ms 13.451us 149.18ms cudaMallocManaged
                  0.18% 277.12us            3 92.373us 31.195us 182.78us cudaMemPrefetchAsync
                  0.15% 225.78us            1 225.78us 225.78us 225.78us cudaDeviceSynchronize
                  0.13% 199.47us            3 66.490us 2.7270us 135.99us cudaFree
                  0.08% 120.29us          101 1.1900us 132ns 50.998us cuDeviceGetAttribute
                  0.02% 26.697us           1 26.697us 26.697us 26.697us cudaLaunchKernel
                  0.02% 23.237us           1 23.237us 23.237us 23.237us cuDeviceGetName
                  0.01% 17.424us            2 8.7120us 1.5260us 15.898us cudaMemAdvise
                  0.00% 7.1050us            1 7.1050us 7.1050us 7.1050us cudaGetDevice
                  0.00% 5.4480us            1 5.4480us 5.4480us 5.4480us cuDeviceGetPCIBusId
                  0.00% 2.0620us            3 687ns   232ns 1.5390us cuDeviceGetCount
                  0.00% 789ns              2 394ns   155ns 634ns cuDeviceGet
                  0.00% 653ns              1 653ns   653ns 653ns cuModuleGetLoadingMode
                  0.00% 415ns              1 415ns   415ns 415ns cuDeviceTotalMem
                  0.00% 223ns              1 223ns   223ns 223ns cuDeviceGetUuid

==10372== Unified Memory profiling result:
Device "Tesla T4 (0)"

      Count  Avg  Size  Min Size  Max Size  Total Size  Total Time  Name
      5     22.399KB 4.0000KB 36.000KB 112.0000KB 23.45600us Host To Device
      1     4.0000KB 4.0000KB 4.0000KB 4.000000KB 1.824000us Device To Host
      1     -        -       -       -          - 210.0120us Gpu page fault groups

```

## 4k Nodes

```

==10684== NVPROF is profiling process 10684, command: ./zdo3
RUN 1: Number of Vertices = 4000 | Number of Edges = 18135 | ERROR COUNT (BELLMAN FORD): 0

==10684== Profiling application: ./zdo3
==10684== Profiling result:
      Type  Time(%)    Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 248.54us           1 248.54us 248.54us 248.54us is_zero_indegree_parallel(node*, int, bool*)
      API calls:  99.33% 145.93ms           2 72.967ms 13.146us 145.92ms cudaMallocManaged
                  0.19% 278.85us            3 92.949us 30.593us 185.60us cudaMemPrefetchAsync
                  0.17% 254.08us            1 254.08us 254.08us 254.08us cudaDeviceSynchronize
                  0.15% 220.44us            3 73.479us 2.8630us 150.13us cudaFree
                  0.10% 148.90us          101 1.4740us 128ns 78.901us cuDeviceGetAttribute
                  0.02% 27.429us           1 27.429us 27.429us 27.429us cudaLaunchKernel
                  0.02% 24.140us           1 24.140us 24.140us 24.140us cuDeviceGetName
                  0.01% 9.8090us           2 4.9040us 1.3940us 8.4150us cudaMemAdvise
                  0.00% 6.0490us            1 6.0490us 6.0490us 6.0490us cuDeviceGetPCIBusId
                  0.00% 3.2840us            1 3.2840us 3.2840us 3.2840us cudaGetDevice
                  0.00% 2.0590us            3 686ns   227ns 1.5760us cuDeviceGetCount
                  0.00% 878ns              2 439ns   170ns 708ns cuDeviceGet
                  0.00% 550ns              1 550ns   550ns 550ns cuModuleGetLoadingMode
                  0.00% 461ns              1 461ns   461ns 461ns cuDeviceTotalMem
                  0.00% 238ns              1 238ns   238ns 238ns cuDeviceGetUuid

==10684== Unified Memory profiling result:
Device "Tesla T4 (0)"

      Count  Avg  Size  Min Size  Max Size  Total Size  Total Time  Name
      11    20.000KB 4.0000KB 36.000KB 220.0000KB 47.29600us Host To Device
      1     8.0000KB 8.0000KB 8.0000KB 8.000000KB 2.016000us Device To Host
      1     -        -       -       -          - 236.9860us Gpu page fault groups

```

```

==11044== NVPROF is profiling process 11044, command: ./zdo3
RUN 1: Number of Vertices = 4000 | Number of Edges = 18135 | ERROR COUNT (BELLMAN FORD): 0

==11044== Profiling application: ./zdo3
==11044== Profiling result:
      Type  Time(%)    Time   Calls     Avg      Min      Max  Name
GPU activities: 100.00% 214.36us       1  214.36us  214.36us  214.36us  is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.35% 149.93ms       2  74.966ms  15.601us  149.92ms  cudaMallocManaged
               0.21% 322.60us        3  107.53us  30.126us  192.17us  cudaMemPrefetchAsync
               0.15% 220.77us        1  220.77us  220.77us  220.77us  cudaDeviceSynchronize
               0.15% 219.08us        3  73.025us  2.9400us  146.16us  cudaFree
               0.08% 126.46us      101  1.2520us  140ns   53.248us  cuDeviceGetAttribute
               0.02% 29.051us        1  29.051us  29.051us  29.051us  cuDeviceGetName
               0.02% 27.439us        1  27.439us  27.439us  27.439us  cudaLaunchKernel
               0.01% 11.181us        2  5.5900us  1.5390us  9.6420us  cudaMemAdvise
               0.01% 9.6680us        1  9.6680us  9.6680us  9.6680us  cudaGetDevice
               0.00% 7.0460us        1  7.0460us  7.0460us  7.0460us  cuDeviceGetPCIBusId
               0.00% 2.6790us        2  1.3390us  281ns   2.3980us  cuDeviceGet
               0.00% 1.7220us        3  574ns   186ns   1.2330us  cuDeviceGetCount
               0.00% 434ns          1  434ns   434ns   434ns   cuDeviceTotalMem
               0.00% 412ns          1  412ns   412ns   412ns   cuModuleGetLoadingMode
               0.00% 228ns          1  228ns   228ns   228ns   cuDeviceGetUuid

==11044== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg Size  Min Size  Max Size  Total Size  Total Time  Name
           11  20.000KB  4.0000KB  36.000KB  220.0000KB  50.46200us  Host To Device
            1  8.0000KB  8.0000KB  8.0000KB  8.000000KB  2.016000us  Device To Host
            1      -      -      -      -      -  203.0030us  Gpu page fault groups

```

```

==11231== NVPROF is profiling process 11231, command: ./zdo3
RUN 1: Number of Vertices = 4000 | Number of Edges = 18135 | ERROR COUNT (BELLMAN FORD): 0

==11231== Profiling application: ./zdo3
==11231== Profiling result:
      Type  Time(%)    Time   Calls     Avg      Min      Max  Name
GPU activities: 100.00% 292.89us       1  292.89us  292.89us  292.89us  is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.28% 143.59ms       2  71.793ms  34.667us  143.55ms  cudaMallocManaged
               0.23% 335.27us        3  111.76us  27.961us  197.20us  cudaMemPrefetchAsync
               0.21% 304.28us        1  304.28us  304.28us  304.28us  cudaDeviceSynchronize
               0.14% 196.03us        3  65.344us  3.1290us  123.07us  cudaFree
               0.08% 119.25us      101  1.1800us  129ns   50.171us  cuDeviceGetAttribute
               0.02% 31.690us        1  31.690us  31.690us  31.690us  cudaLaunchKernel
               0.02% 22.964us        1  22.964us  22.964us  22.964us  cuDeviceGetName
               0.01% 14.489us        2  7.2440us  2.2510us  12.238us  cudaMemAdvise
               0.00% 6.1420us        1  6.1420us  6.1420us  6.1420us  cuDeviceGetPCIBusId
               0.00% 3.6080us        1  3.6080us  3.6080us  3.6080us  cudaGetDevice
               0.00% 2.5760us        2  1.2880us  182ns   2.3940us  cuDeviceGet
               0.00% 1.9510us        3  650ns   215ns   1.4620us  cuDeviceGetCount
               0.00% 620ns          1  620ns   620ns   620ns   cuModuleGetLoadingMode
               0.00% 395ns          1  395ns   395ns   395ns   cuDeviceTotalMem
               0.00% 243ns          1  243ns   243ns   243ns   cuDeviceGetUuid

==11231== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg Size  Min Size  Max Size  Total Size  Total Time  Name
           11  20.000KB  4.0000KB  36.000KB  220.0000KB  48.41500us  Host To Device
            1  8.0000KB  8.0000KB  8.0000KB  8.000000KB  2.016000us  Device To Host
            1      -      -      -      -      -  281.5610us  Gpu page fault groups

```

```

==11408== NVPROF is profiling process 11408, command: ./zdo3
RUN 1: Number of Vertices = 4000 | Number of Edges = 18135 | ERROR COUNT (BELLMAN FORD): 0

==11408== Profiling application: ./zdo3
==11408== Profiling result:
      Type  Time(%)    Time   Calls     Avg      Min      Max  Name
GPU activities: 100.00% 228.57us      1 228.57us 228.57us 228.57us is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.29% 146.77ms      2 73.385ms 13.547us 146.76ms cudaMallocManaged
               0.22% 332.49us      3 110.83us 47.751us 185.06us cudaMemPrefetchAsync
               0.16% 233.88us      1 233.88us 233.88us 233.88us cudaDeviceSynchronize
               0.15% 222.59us      3 74.196us 3.0660us 150.86us cudaFree
               0.11% 159.78us     101 1.5810us 135ns 84.186us cuDeviceGetAttribute
               0.02% 29.462us      1 29.462us 29.462us 29.462us cuDeviceGetName
               0.02% 28.897us      1 28.897us 28.897us 28.897us cudaLaunchKernel
               0.02% 22.371us      2 11.185us 1.7680us 20.603us cudaMemAdvise
               0.00% 7.2810us      1 7.2810us 7.2810us 7.2810us cudaGetDevice
               0.00% 5.7220us      1 5.7220us 5.7220us 5.7220us cuDeviceGetPCIBusId
               0.00% 2.6100us      2 1.3050us 274ns 2.3360us cuDeviceGet
               0.00% 2.0870us      3 695ns 239ns 1.4900us cuDeviceGetCount
               0.00% 551ns         1 551ns 551ns 551ns cuModuleGetLoadingMode
               0.00% 499ns         1 499ns 499ns 499ns cuDeviceTotalMem
               0.00% 248ns          1 248ns 248ns 248ns cuDeviceGetUuid

==11408== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg Size  Min Size  Max Size  Total Size  Total Time  Name
        11 20.000KB  4.0000KB 36.000KB 220.0000KB 47.71100us Host To Device
        1 8.0000KB  8.0000KB 8.0000KB 8.000000KB 2.015000us Device To Host
        1       -      -      -      -      - 216.9550us Gpu page fault groups

```

```

==12037== NVPROF is profiling process 12037, command: ./zdo3
RUN 1: Number of Vertices = 4000 | Number of Edges = 18135 | ERROR COUNT (BELLMAN FORD): 0

==12037== Profiling application: ./zdo3
==12037== Profiling result:
      Type  Time(%)    Time   Calls     Avg      Min      Max  Name
GPU activities: 100.00% 256.89us      1 256.89us 256.89us 256.89us is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.29% 149.06ms      2 74.531ms 14.956us 149.05ms cudaMallocManaged
               0.23% 343.31us      3 114.44us 33.389us 213.21us cudaMemPrefetchAsync
               0.17% 262.56us      1 262.56us 262.56us 262.56us cudaDeviceSynchronize
               0.14% 216.26us      3 72.086us 3.0500us 145.84us cudaFree
               0.10% 148.29us     101 1.4680us 129ns 64.516us cuDeviceGetAttribute
               0.02% 33.574us      1 33.574us 33.574us 33.574us cudaLaunchKernel
               0.02% 27.198us      1 27.198us 27.198us 27.198us cuDeviceGetName
               0.01% 14.120us      2 7.0600us 1.4400us 12.680us cudaMemAdvise
               0.01% 7.5980us      1 7.5980us 7.5980us 7.5980us cudaGetDevice
               0.00% 5.9310us      1 5.9310us 5.9310us 5.9310us cuDeviceGetPCIBusId
               0.00% 1.7020us      3 567ns 232ns 1.1500us cuDeviceGetCount
               0.00% 993ns         2 496ns 291ns 702ns cuDeviceGet
               0.00% 460ns         1 460ns 460ns 460ns cuDeviceTotalMem
               0.00% 390ns         1 390ns 390ns 390ns cuModuleGetLoadingMode
               0.00% 221ns          1 221ns 221ns 221ns cuDeviceGetUuid

==12037== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg Size  Min Size  Max Size  Total Size  Total Time  Name
        11 20.000KB  4.0000KB 36.000KB 220.0000KB 47.55100us Host To Device
        1 8.0000KB  8.0000KB 8.0000KB 8.000000KB 1.984000us Device To Host
        1       -      -      -      -      - 245.3070us Gpu page fault groups

```

## 6k Nodes

```
--2652== NVPROF is profiling process 2652, command: ./zdo3
RUN 1: Number of Vertices = 6000 | Number of Edges = 26718 | ERROR COUNT (BELLMAN FORD): 0

--2652== Profiling application: ./zdo3
--2652== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max   Name
GPU activities: 100.00% 290.07us      1 290.07us 290.07us 290.07us is_zero_indegree_parallel(node*, int, bool*)
API calls:    99.40% 381.81ms      2 190.91ms 17.412us 381.80ms cudaMallocManaged
              0.30% 1.1494ms      1 1.1494ms 1.1494ms 1.1494ms cuDeviceGetPCIBusId
              0.10% 389.30us      3 129.77us 29.056us 221.51us cudaMemPrefetchAsync
              0.08% 315.61us      1 315.61us 315.61us 315.61us cudaDeviceSynchronize
              0.07% 251.94us      3 83.981us 3.3870us 155.21us cudaFree
              0.03% 125.19us     101 1.2390us 132ns 51.225us cuDeviceGetAttribute
              0.01% 30.591us      1 30.591us 30.591us 30.591us cudaLaunchKernel
              0.01% 23.433us      1 23.433us 23.433us 23.433us cuDeviceGetName
              0.00% 17.322us      2 8.6610us 2.5610us 14.761us cudaMemAdvise
              0.00% 6.7940us      1 6.7940us 6.7940us 6.7940us cudaGetDevice
              0.00% 1.5840us      3 528ns 213ns 1.1510us cuDeviceGetCount
              0.00% 888ns         2 444ns 183ns 705ns cuDeviceGet
              0.00% 590ns          1 590ns 590ns 590ns cuModuleGetLoadingMode
              0.00% 510ns          1 510ns 510ns 510ns cuDeviceTotalMem
              0.00% 218ns          1 218ns 218ns 218ns cuDeviceGetUuid

--2652== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count Avg Size  Min Size  Max Size  Total Size  Total Time   Name
           13 25.538KB 4.0000KB 48.000KB 332.0000KB 66.20600us Host To Device
            1 8.0000KB 8.0000KB 8.0000KB 8.000000KB 2.047000us Device To Host
           1       -      -      -      -      - 277.7860us Gpu page fault groups
```

```
--2917== NVPROF is profiling process 2917, command: ./zdo3
RUN 1: Number of Vertices = 6000 | Number of Edges = 26718 | ERROR COUNT (BELLMAN FORD): 0

--2917== Profiling application: ./zdo3
--2917== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max   Name
GPU activities: 100.00% 337.14us      1 337.14us 337.14us 337.14us is_zero_indegree_parallel(node*, int, bool*)
API calls:    99.54% 248.56ms      2 124.28ms 17.342us 248.54ms cudaMallocManaged
              0.15% 383.79us      3 127.93us 31.315us 208.97us cudaMemPrefetchAsync
              0.14% 343.38us      1 343.38us 343.38us 343.38us cudaDeviceSynchronize
              0.09% 217.93us      3 72.644us 2.7540us 143.01us cudaFree
              0.05% 122.03us     101 1.2080us 132ns 51.235us cuDeviceGetAttribute
              0.01% 32.103us      1 32.103us 32.103us 32.103us cudaLaunchKernel
              0.01% 24.513us      1 24.513us 24.513us 24.513us cuDeviceGetName
              0.00% 11.949us      2 5.9740us 2.3050us 9.6440us cudaMemAdvise
              0.00% 5.6720us      1 5.6720us 5.6720us 5.6720us cuDeviceGetPCIBusId
              0.00% 3.4910us      1 3.4910us 3.4910us 3.4910us cudaGetDevice
              0.00% 1.7420us      3 580ns 214ns 1.2810us cuDeviceGetCount
              0.00% 629ns         2 314ns 179ns 450ns cuDeviceGet
              0.00% 570ns          1 570ns 570ns 570ns cuModuleGetLoadingMode
              0.00% 428ns          1 428ns 428ns 428ns cuDeviceTotalMem
              0.00% 222ns          1 222ns 222ns 222ns cuDeviceGetUuid

--2917== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count Avg Size  Min Size  Max Size  Total Size  Total Time   Name
           13 25.538KB 4.0000KB 48.000KB 332.0000KB 67.00700us Host To Device
            1 8.0000KB 8.0000KB 8.0000KB 8.000000KB 2.048000us Device To Host
           1       -      -      -      -      - 326.1690us Gpu page fault groups
```

```

==3256== NVPROF is profiling process 3256, command: ./zdo3
RUN 1: Number of Vertices = 6000 | Number of Edges = 26718 | ERROR COUNT (BELLMAN FORD): 0

==3256== Profiling application: ./zdo3
==3256== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 321.75us      1 321.75us 321.75us 321.75us  is_zero_indegree_parallel(node*, int, bool*)
    API calls: 99.52% 245.63ms      2 122.81ms 35.992us 245.59ms  cudaMallocManaged
      0.15% 366.55us      3 122.18us 34.455us 199.71us  cudaMemPrefetchAsync
      0.13% 329.75us      1 329.75us 329.75us 329.75us  cudaDeviceSynchronize
      0.10% 239.65us      3 79.883us 2.4210us 150.96us  cudaFree
      0.06% 150.03us    101 1.4850us 139ns 60.241us  cuDeviceGetAttribute
      0.01% 36.937us      1 36.937us 36.937us 36.937us  cudaLaunchKernel
      0.01% 36.329us      1 36.329us 36.329us 36.329us  cuDeviceGetName
      0.01% 13.201us      2 6.6000us 2.2980us 10.903us  cudaMemAdvise
      0.00% 6.6220us      1 6.6220us 6.6220us 6.6220us  cuDeviceGetPCIBusId
      0.00% 3.9600us      1 3.9600us 3.9600us 3.9600us  cudaGetDevice
      0.00% 1.6280us      3 542ns 182ns 1.1840us  cuDeviceGetCount
      0.00% 872ns        2 436ns 181ns 691ns  cuDeviceGet
      0.00% 647ns        1 647ns 647ns 647ns  cuDeviceTotalMem
      0.00% 530ns        1 530ns 530ns 530ns  cuModuleGetLoadingMode
      0.00% 236ns        1 236ns 236ns 236ns  cuDeviceGetUuid

==3256== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
          13 25.538KB 4.0000KB 48.0000KB 332.0000KB 66.36700us Host To Device
          1 8.0000KB 8.0000KB 8.0000KB 8.000000KB 2.048000us Device To Host
          1      -   -   -   -   - 309.4970us Gpu page fault groups

```

```

==3761== NVPROF is profiling process 3761, command: ./zdo3
RUN 1: Number of Vertices = 6000 | Number of Edges = 26718 | ERROR COUNT (BELLMAN FORD): 0

==3761== Profiling application: ./zdo3
==3761== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 310.27us      1 310.27us 310.27us 310.27us  is_zero_indegree_parallel(node*, int, bool*)
    API calls: 99.56% 259.98ms      2 129.99ms 16.074us 259.96ms  cudaMallocManaged
      0.13% 335.19us      1 335.19us 335.19us 335.19us  cudaDeviceSynchronize
      0.13% 329.92us      3 109.97us 27.522us 184.35us  cudaMemPrefetchAsync
      0.09% 225.05us      3 75.016us 2.9260us 141.35us  cudaFree
      0.06% 157.11us    101 1.5550us 141ns 77.436us  cuDeviceGetAttribute
      0.01% 31.878us      1 31.878us 31.878us 31.878us  cudaLaunchKernel
      0.01% 28.264us      1 28.264us 28.264us 28.264us  cuDeviceGetName
      0.01% 14.914us      2 7.4570us 1.5570us 13.357us  cudaMemAdvise
      0.00% 7.2800us      1 7.2800us 7.2800us 7.2800us  cudaGetDevice
      0.00% 5.4390us      1 5.4390us 5.4390us 5.4390us  cuDeviceGetPCIBusId
      0.00% 2.6600us      2 1.3300us 279ns 2.3810us  cuDeviceGet
      0.00% 1.6950us      3 565ns 214ns 1.1610us  cuDeviceGetCount
      0.00% 618ns        1 618ns 618ns 618ns  cuDeviceTotalMem
      0.00% 425ns        1 425ns 425ns 425ns  cuModuleGetLoadingMode
      0.00% 253ns        1 253ns 253ns 253ns  cuDeviceGetUuid

==3761== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
          13 25.538KB 4.0000KB 48.0000KB 332.0000KB 66.97400us Host To Device
          1 8.0000KB 8.0000KB 8.0000KB 8.000000KB 2.048000us Device To Host
          1      -   -   -   -   - 299.2570us Gpu page fault groups

```

```

==3976== NVPROF is profiling process 3976, command: ./zdo3
RUN 1: Number of Vertices = 6000 | Number of Edges = 26718 | ERROR COUNT (BELLMAN FORD): 0

==3976== Profiling application: ./zdo3
==3976== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 339.38us           1  339.38us  339.38us  339.38us  is_zero_indegree_parallel(node*, int, bool*)
      API calls:  99.52% 258.01ms           2  129.00ms  23.238us  257.99ms  cudaMallocManaged
                  0.15% 401.05us            3  133.68us  48.080us  221.48us  cudaMemPrefetchAsync
                  0.13% 345.05us            1  345.05us  345.05us  345.05us  cudaDeviceSynchronize
                  0.09% 236.25us            3  78.750us  3.6120us  156.78us  cudaFree
                  0.06% 155.95us          101  1.5440us  148ns   63.546us  cuDeviceGetAttribute
                  0.02% 39.948us           1  39.948us  39.948us  39.948us  cudaLaunchKernel
                  0.01% 24.409us           1  24.409us  24.409us  24.409us  cuDeviceGetName
                  0.01% 15.481us            2  7.7400us  2.0550us  13.426us  cudaMemAdvise
                  0.00% 6.3700us            1  6.3700us  6.3700us  6.3700us  cuDeviceGetPCIBusId
                  0.00% 3.2460us            1  3.2460us  3.2460us  3.2460us  cudaGetDevice
                  0.00% 2.2120us            3  737ns    200ns   1.7220us  cuDeviceGetCount
                  0.00% 1.0430us            2  521ns    192ns   851ns   cuDeviceGet
                  0.00% 559ns              1  559ns    559ns   559ns   cuModuleGetLoadingMode
                  0.00% 526ns              1  526ns    526ns   526ns   cuDeviceTotalMem
                  0.00% 275ns              1  275ns    275ns   275ns   cuDeviceGetUuid

==3976== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
        13  25.538KB  4.0000KB  48.000KB  332.0000KB  66.23700us  Host To Device
         1  8.0000KB  8.0000KB  8.0000KB  8.000000KB  2.048000us  Device To Host
         1      -       -       -       -       -  328.2160us  Gpu page fault groups

```

## 8k Nodes

```

==4370== NVPROF is profiling process 4370, command: ./zdo3
RUN 1: Number of Vertices = 8000 | Number of Edges = 35925 | ERROR COUNT (BELLMAN FORD): 0

==4370== Profiling application: ./zdo3
==4370== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 338.87us           1  338.87us  338.87us  338.87us  is_zero_indegree_parallel(node*, int, bool*)
      API calls:  99.51% 248.08ms           2  124.04ms  19.407us  248.06ms  cudaMallocManaged
                  0.15% 377.65us            3  125.88us  35.415us  188.48us  cudaMemPrefetchAsync
                  0.14% 343.65us            1  343.65us  343.65us  343.65us  cudaDeviceSynchronize
                  0.10% 240.28us            3  80.094us  2.4110us  138.77us  cudaFree
                  0.05% 127.11us          101  1.2580us  127ns   51.427us  cuDeviceGetAttribute
                  0.03% 72.117us           1  72.117us  72.117us  72.117us  cudaLaunchKernel
                  0.01% 24.397us           1  24.397us  24.397us  24.397us  cuDeviceGetName
                  0.01% 15.028us           2  7.5140us  1.7410us  13.287us  cudaMemAdvise
                  0.00% 5.6530us           1  5.6530us  5.6530us  5.6530us  cuDeviceGetPCIBusId
                  0.00% 2.7690us           1  2.7690us  2.7690us  2.7690us  cudaGetDevice
                  0.00% 2.0620us           3  687ns   225ns   1.5890us  cuDeviceGetCount
                  0.00% 1.2190us           2  609ns   189ns   1.0300us  cuDeviceGet
                  0.00% 536ns              1  536ns   536ns   536ns   cuModuleGetLoadingMode
                  0.00% 384ns              1  384ns   384ns   384ns   cuDeviceTotalMem
                  0.00% 209ns              1  209ns   209ns   209ns   cuDeviceGetUuid

==4370== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
        23  19.130KB  4.0000KB  48.000KB  440.0000KB  99.55000us  Host To Device
         1  12.000KB  12.000KB  12.000KB  12.00000KB  2.368000us  Device To Host
         1      -       -       -       -       -  325.5610us  Gpu page fault groups

```

```

==5091== NVPROF is profiling process 5091, command: ./zdo3
RUN 1: Number of Vertices = 8000 | Number of Edges = 35925 | ERROR COUNT (BELLMAN FORD): 0

==5091== Profiling application: ./zdo3
==5091== Profiling result:
      Type  Time(%)    Time   Calls     Avg      Min      Max  Name
GPU activities: 100.00% 375.48us      1  375.48us  375.48us  375.48us  is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.50% 242.59ms      2  121.30ms  17.826us  242.58ms  cudaMallocManaged
               0.16% 381.96us      1  381.96us  381.96us  381.96us  cudaDeviceSynchronize
               0.16% 380.75us      3  126.92us  31.460us  195.47us  cudaMemPrefetchAsync
               0.10% 237.95us      3  79.316us  3.1080us  149.25us  cudaFree
               0.05% 125.26us     101  1.2400us  132ns   52.738us  cuDeviceGetAttribute
               0.01% 35.243us      1  35.243us  35.243us  35.243us  cudaLaunchKernel
               0.01% 28.712us      1  28.712us  28.712us  28.712us  cuDeviceGetName
               0.01% 17.830us      2  8.9150us  2.2010us  15.629us  cudaMemAdvise
               0.00% 7.1210us      1  7.1210us  7.1210us  7.1210us  cuDeviceGetPCIBusId
               0.00% 4.4340us      1  4.4340us  4.4340us  4.4340us  cudaGetDevice
               0.00% 2.1000us      3  700ns   200ns   1.5550us  cuDeviceGetCount
               0.00% 940ns         2  470ns   267ns   673ns   cuDeviceGet
               0.00% 460ns         1  460ns   460ns   460ns   cuModuleGetLoadingMode
               0.00% 411ns         1  411ns   411ns   411ns   cuDeviceTotalMem
               0.00% 245ns         1  245ns   245ns   245ns   cuDeviceGetUuid

==5091== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
        23  19.130KB  4.0000KB  48.000KB  440.0000KB  98.87800us  Host To Device
         1  12.000KB  12.000KB  12.000KB  12.00000KB  2.368000us  Device To Host
         1      -       -       -       -          -  362.3590us  Gpu page fault groups

```

```

==5368== NVPROF is profiling process 5368, command: ./zdo3
RUN 1: Number of Vertices = 8000 | Number of Edges = 35925 | ERROR COUNT (BELLMAN FORD): 0

==5368== Profiling application: ./zdo3
==5368== Profiling result:
      Type  Time(%)    Time   Calls     Avg      Min      Max  Name
GPU activities: 100.00% 320.18us      1  320.18us  320.18us  320.18us  is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.54% 251.79ms      2  125.90ms  13.588us  251.78ms  cudaMallocManaged
               0.15% 368.77us      3  122.92us  30.546us  187.20us  cudaMemPrefetchAsync
               0.14% 346.08us      1  346.08us  346.08us  346.08us  cudaDeviceSynchronize
               0.09% 229.75us      3  76.583us  3.0050us  149.98us  cudaFree
               0.05% 123.31us     101  1.2200us  131ns   52.012us  cuDeviceGetAttribute
               0.02% 38.597us      1  38.597us  38.597us  38.597us  cudaLaunchKernel
               0.01% 25.758us      1  25.758us  25.758us  25.758us  cuDeviceGetName
               0.01% 15.979us      2  7.9890us  1.7260us  14.253us  cudaMemAdvise
               0.00% 9.2120us      1  9.2120us  9.2120us  9.2120us  cuDeviceGetPCIBusId
               0.00% 6.6180us      1  6.6180us  6.6180us  6.6180us  cudaGetDevice
               0.00% 2.6660us      3  888ns   206ns   2.1610us  cuDeviceGetCount
               0.00% 970ns         2  485ns   189ns   781ns   cuDeviceGet
               0.00% 633ns         1  633ns   633ns   633ns   cuModuleGetLoadingMode
               0.00% 511ns         1  511ns   511ns   511ns   cuDeviceTotalMem
               0.00% 233ns         1  233ns   233ns   233ns   cuDeviceGetUuid

==5368== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
        23  19.130KB  4.0000KB  48.000KB  440.0000KB  101.8860us  Host To Device
         1  12.000KB  12.000KB  12.000KB  12.00000KB  2.400000us  Device To Host
         1      -       -       -       -          -  306.9040us  Gpu page fault groups

```

```

==5725== NVPROF is profiling process 5725, command: ./zdo3
RUN 1: Number of Vertices = 8000 | Number of Edges = 35925 | ERROR COUNT (BELLMAN FORD): 0

==5725== Profiling application: ./zdo3
==5725== Profiling result:
      Type Time(%)      Time     Calls      Avg      Min      Max  Name
GPU activities: 100.00% 350.39us           1  350.39us  350.39us  350.39us  is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.49% 239.87ms           2 119.94ms  15.792us  239.86ms  cudaMallocManaged
               0.17% 405.05us           3 135.02us  47.270us  186.37us  cudaMemPrefetchAsync
               0.15% 361.35us           1 361.35us  361.35us  361.35us  cudaDeviceSynchronize
               0.10% 241.91us           3 80.636us  4.6790us  158.90us  cudaFree
               0.05% 129.72us          101 1.2840us  134ns   51.132us  cuDeviceGetAttribute
               0.01% 30.223us           1 30.223us  30.223us  30.223us  cudaLaunchKernel
               0.01% 26.267us           1 26.267us  26.267us  26.267us  cuDeviceGetName
               0.01% 16.761us           2 8.3800us  2.6840us  14.077us  cudaMemAdvise
               0.00% 7.4530us           1 7.4530us  7.4530us  7.4530us  cudaGetDevice
               0.00% 6.1360us           1 6.1360us  6.1360us  6.1360us  cuDeviceGetPCIBusId
               0.00% 2.6880us           2 1.3440us  275ns   2.4130us  cuDeviceGet
               0.00% 2.1810us           3 727ns   237ns   1.6300us  cuDeviceGetCount
               0.00% 485ns             1 485ns   485ns   485ns   cuDeviceTotalMem
               0.00% 444ns             1 444ns   444ns   444ns   cuModuleGetLoadingMode
               0.00% 229ns             1 229ns   229ns   229ns   cuDeviceGetUuid

==5725== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
            23 19.130KB 4.0000KB 48.000KB 440.0000KB 98.97300us Host To Device
            1 12.000KB 12.000KB 12.000KB 12.00000KB 2.432000us Device To Host
            1      -      -      -      -      - 336.8560us Gpu page fault groups

```

```

==7055== NVPROF is profiling process 7055, command: ./zdo3
RUN 1: Number of Vertices = 8000 | Number of Edges = 35925 | ERROR COUNT (BELLMAN FORD): 0

==7055== Profiling application: ./zdo3
==7055== Profiling result:
      Type Time(%)      Time     Calls      Avg      Min      Max  Name
GPU activities: 100.00% 374.30us           1  374.30us  374.30us  374.30us  is_zero_indegree_parallel(node*, int, bool*)
    API calls:  99.52% 249.24ms           2 124.62ms  14.394us  249.23ms  cudaMallocManaged
               0.15% 380.70us           1 380.70us  380.70us  380.70us  cudaDeviceSynchronize
               0.15% 379.08us           3 126.36us  31.533us  200.08us  cudaMemPrefetchAsync
               0.09% 217.97us           3 72.655us  3.0010us  137.97us  cudaFree
               0.05% 124.75us          101 1.2350us  135ns   52.686us  cuDeviceGetAttribute
               0.01% 29.226us           1 29.226us  29.226us  29.226us  cudaLaunchKernel
               0.01% 28.105us           1 28.105us  28.105us  28.105us  cuDeviceGetName
               0.01% 13.664us           2 6.8320us  1.8650us  11.799us  cudaMemAdvise
               0.00% 7.0410us           1 7.0410us  7.0410us  7.0410us  cudaGetDevice
               0.00% 5.2590us           1 5.2590us  5.2590us  5.2590us  cuDeviceGetPCIBusId
               0.00% 1.8060us           3 602ns   156ns   1.4330us  cuDeviceGetCount
               0.00% 1.4330us           2 716ns   265ns   1.1680us  cuDeviceGet
               0.00% 554ns             1 554ns   554ns   554ns   cuDeviceTotalMem
               0.00% 512ns             1 512ns   512ns   512ns   cuModuleGetLoadingMode
               0.00% 220ns             1 220ns   220ns   220ns   cuDeviceGetUuid

==7055== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg  Size  Min  Size  Max  Size  Total  Size  Total  Time  Name
            23 19.130KB 4.0000KB 48.000KB 440.0000KB 97.75800us Host To Device
            1 12.000KB 12.000KB 12.000KB 12.00000KB 2.432000us Device To Host
            1      -      -      -      -      - 360.9200us Gpu page fault groups

```

## 10k Nodes

```
--4501== NVPROF is profiling process 4501, command: ./zdo3
RUN 1: Number of Vertices = 10000 | Number of Edges = 44969 | ERROR COUNT (BELLMAN FORD): 0

--4501== Profiling application: ./zdo3
--4501== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max Name
GPU activities: 100.00% 383.39us      1 383.39us 383.39us 383.39us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.13% 150.83ms      2 75.415ms 15.176us 150.81ms cudaMallocManaged
          0.27% 409.88us      1 409.88us 409.88us 409.88us cudaDeviceSynchronize
          0.27% 405.29us      3 135.10us 31.695us 196.75us cudaMemPrefetchAsync
          0.18% 279.14us      3 93.045us 3.6230us 188.54us cudaFree
          0.08% 118.43us     101 1.1720us 132ns 49.485us cuDeviceGetAttribute
          0.02% 36.604us      1 36.604us 36.604us 36.604us cuDeviceGetName
          0.02% 32.318us      1 32.318us 32.318us 32.318us cuLaunchKernel
          0.01% 19.138us      2 9.5690us 1.9320us 17.206us cudaMemAdvise
          0.00% 7.5730us      1 7.5730us 7.5730us 7.5730us cudaGetDevice
          0.00% 6.2140us      1 6.2140us 6.2140us 6.2140us cuDeviceGetPCIBusId
          0.00% 2.0800us      3 693ns   221ns 1.5310us cuDeviceGetCount
          0.00% 1.0850us      2 542ns   311ns 774ns cuDeviceGet
          0.00% 483ns        1 483ns   483ns 483ns cuDeviceTotalMem
          0.00% 460ns        1 460ns   460ns 460ns cuModuleGetLoadingMode
          0.00% 219ns        1 219ns   219ns 219ns cuDeviceGetUuid

--4501== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count Avg Size Min Size Max Size Total Size Total Time Name
      27 20.296KB 4.0000KB 48.000KB 548.0000KB 116.0310us Host To Device
      1 16.000KB 16.000KB 16.000KB 16.00000KB 2.592000us Device To Host
      1      -      -      -      -      - 370.3020us Gpu page fault groups
```

```
--7633== NVPROF is profiling process 7633, command: ./zdo3
RUN 1: Number of Vertices = 10000 | Number of Edges = 44969 | ERROR COUNT (BELLMAN FORD): 0

--7633== Profiling application: ./zdo3
--7633== Profiling result:
      Type Time(%)     Time    Calls      Avg      Min      Max Name
GPU activities: 100.00% 352.79us      1 352.79us 352.79us 352.79us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.46% 256.58ms      2 128.29ms 19.357us 256.56ms cudaMallocManaged
          0.17% 437.29us      3 145.76us 31.370us 219.79us cudaMemPrefetchAsync
          0.15% 379.93us      1 379.93us 379.93us 379.93us cudaDeviceSynchronize
          0.11% 293.17us      3 97.724us 2.9490us 186.48us cudaFree
          0.07% 174.60us     101 1.7280us 188ns 70.691us cuDeviceGetAttribute
          0.01% 37.260us      1 37.260us 37.260us 37.260us cuLaunchKernel
          0.01% 29.011us      1 29.011us 29.011us 29.011us cuDeviceGetName
          0.01% 17.355us      2 8.6770us 1.9670us 15.388us cudaMemAdvise
          0.01% 14.384us      1 14.384us 14.384us 14.384us cudaGetDevice
          0.00% 9.4720us      1 9.4720us 9.4720us 9.4720us cuDeviceGetPCIBusId
          0.00% 2.6320us      2 1.3160us 311ns 2.3210us cuDeviceGet
          0.00% 1.8620us      3 620ns   241ns 1.3250us cuDeviceGetCount
          0.00% 691ns        1 691ns   691ns 691ns cuDeviceTotalMem
          0.00% 399ns        1 399ns   399ns 399ns cuModuleGetLoadingMode
          0.00% 331ns        1 331ns   331ns 331ns cuDeviceGetUuid

--7633== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count Avg Size Min Size Max Size Total Size Total Time Name
      27 20.296KB 4.0000KB 48.000KB 548.0000KB 121.4370us Host To Device
      1 16.000KB 16.000KB 16.000KB 16.00000KB 2.688000us Device To Host
      1      -      -      -      -      - 339.5120us Gpu page fault groups
```

```

==1799== NVPROF is profiling process 1799, command: ./zdo3
RUN 1: Number of Vertices = 10000 | Number of Edges = 44969 | ERROR COUNT (BELLMAN FORD): 0

==1799== Profiling application: ./zdo3
==1799== Profiling result:
      Type  Time(%)    Time   Calls     Avg      Min      Max  Name
GPU activities: 100.00% 350.11us           1 350.11us 350.11us 350.11us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.15% 147.41ms           2 73.705ms 16.289us 147.39ms cudaMallocManaged
      0.27% 408.31us           3 136.10us 34.335us 193.30us cudaMemPrefetchAsync
      0.24% 355.57us           1 355.57us 355.57us 355.57us cudaDeviceSynchronize
      0.19% 281.10us           3 93.700us 3.2170us 185.46us cudaFree
      0.09% 134.43us          101 1.3310us 129ns 51.908us cuDeviceGetAttribute
      0.02% 29.992us           1 29.992us 29.992us 29.992us cudaLaunchKernel
      0.02% 25.645us           1 25.645us 25.645us 25.645us cuDeviceGetName
      0.01% 13.659us           2 6.8290us 1.9890us 11.670us cudaMemAdvise
      0.01% 7.9070us           1 7.9070us 7.9070us 7.9070us cudaGetDevice
      0.00% 6.6490us           1 6.6490us 6.6490us 6.6490us cuDeviceGetPCIBusId
      0.00% 2.5030us           3 834ns 253ns 1.9280us cuDeviceGetCount
      0.00% 1.0090us           2 504ns 295ns 714ns cuDeviceGet
      0.00% 551ns              1 551ns 551ns 551ns cuDeviceTotalMem
      0.00% 491ns              1 491ns 491ns 491ns cuModuleGetLoadingMode
      0.00% 236ns              1 236ns 236ns 236ns cuDeviceGetUuid

==1799== Unified Memory profiling result:
Device "Tesla T4 (0)"

      Count  Avg Size  Min Size  Max Size  Total Size  Total Time  Name
      27 20.296KB 4.0000KB 44.000KB 548.0000KB 116.5750us Host To Device
      1 16.000KB 16.000KB 16.000KB 16.00000KB 2.688000us Device To Host
      1      -       -       -        -        - 336.7340us Gpu page fault groups

```

```

==8056== NVPROF is profiling process 8056, command: ./zdo3
RUN 1: Number of Vertices = 10000 | Number of Edges = 44969 | ERROR COUNT (BELLMAN FORD): 0

==8056== Profiling application: ./zdo3
==8056== Profiling result:
      Type  Time(%)    Time   Calls     Avg      Min      Max  Name
GPU activities: 100.00% 392.50us           1 392.50us 392.50us 392.50us is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.40% 249.60ms           2 124.80ms 35.615us 249.57ms cudaMallocManaged
      0.22% 559.98us           3 186.66us 34.585us 309.25us cudaMemPrefetchAsync
      0.17% 425.70us           1 425.70us 425.70us 425.70us cudaDeviceSynchronize
      0.11% 282.49us           3 94.161us 3.2220us 193.83us cudaFree
      0.05% 132.86us          101 1.3150us 144ns 56.111us cuDeviceGetAttribute
      0.02% 44.035us           1 44.035us 44.035us 44.035us cudaLaunchKernel
      0.01% 29.968us           1 29.968us 29.968us 29.968us cuDeviceGetName
      0.01% 15.300us           2 7.6500us 2.5350us 12.765us cudaMemAdvise
      0.00% 10.225us           1 10.225us 10.225us 10.225us cuDeviceGetPCIBusId
      0.00% 7.4950us           1 7.4950us 7.4950us 7.4950us cudaGetDevice
      0.00% 1.9240us           3 641ns 198ns 1.4980us cuDeviceGetCount
      0.00% 786ns              2 393ns 237ns 549ns cuDeviceGet
      0.00% 530ns              1 530ns 530ns 530ns cuModuleGetLoadingMode
      0.00% 470ns              1 470ns 470ns 470ns cuDeviceTotalMem
      0.00% 262ns              1 262ns 262ns 262ns cuDeviceGetUuid

==8056== Unified Memory profiling result:
Device "Tesla T4 (0)"

      Count  Avg Size  Min Size  Max Size  Total Size  Total Time  Name
      27 20.296KB 4.0000KB 44.000KB 548.0000KB 122.1090us Host To Device
      1 16.000KB 16.000KB 16.000KB 16.00000KB 2.656000us Device To Host
      1      -       -       -        -        - 379.1270us Gpu page fault groups

```

```

==2436== NVPROF is profiling process 2436, command: ./zdo3
RUN 1: Number of Vertices = 10000 | Number of Edges = 44969 | ERROR COUNT (BELLMAN FORD): 0

==2436== Profiling application: ./zdo3
==2436== Profiling result:
      Type  Time(%)    Time    Calls      Avg      Min      Max  Name
GPU activities: 100.00% 360.73us       1  360.73us  360.73us  360.73us  is_zero_indegree_parallel(node*, int, bool*)
      API calls: 99.17% 156.98ms       2  78.492ms  21.623us  156.96ms  cudaMallocManaged
                  0.27% 420.45us       3   140.15us  32.394us  211.92us  cudaMemPrefetchAsync
                  0.23% 369.53us       1   369.53us  369.53us  369.53us  cudaDeviceSynchronize
                  0.17% 264.19us       3   88.063us  3.3330us  160.66us  cudaFree
                  0.11% 168.88us      101  1.6720us  150ns   80.829us  cuDeviceGetAttribute
                  0.02% 32.803us       1   32.803us  32.803us  32.803us  cudaLaunchKernel
                  0.02% 28.336us       1   28.336us  28.336us  28.336us  cuDeviceGetName
                  0.01% 12.891us       2   6.4450us  1.8820us  11.009us  cudaMemAdvise
                  0.00% 7.7420us       1   7.7420us  7.7420us  7.7420us  cuDeviceTotalMem
                  0.00% 7.1250us       1   7.1250us  7.1250us  7.1250us  cuDeviceGetPCIBusId
                  0.00% 3.9800us       1   3.9800us  3.9800us  3.9800us  cudaGetDevice
                  0.00% 2.0200us       3     673ns   238ns   1.4690us  cuDeviceGetCount
                  0.00% 1.0390us       2     519ns   287ns   752ns   cuDeviceGet
                  0.00% 416ns          1     416ns   416ns   416ns   cuModuleGetLoadingMode
                  0.00% 276ns          1     276ns   276ns   276ns   cuDeviceGetUuid

==2436== Unified Memory profiling result:
Device "Tesla T4 (0)"
      Count  Avg Size  Min Size  Max Size  Total Size  Total Time  Name
          27  20.296KB  4.0000KB  48.0000KB  548.0000KB  117.4720us  Host To Device
           1  16.000KB  16.000KB  16.000KB  16.00000KB  2.656000us  Device To Host
           1      -        -        -        -        -  347.5180us  Gpu page fault groups

```