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## Supplemental Material for "Fine-Grained Memory Profiling of GPGPU Kernels"

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This supplemental material is organized as follows. In section A, we provide a complete comparison with actual cache hit rates on the set benchmark applications and section B describes the mistake of PPT-GPU-Mem in approximating the stack distance cache model (SDCM).

## A. Cache Hit Rates

Table 1 shows bare cache hit rates estimated using our approach, PPT and the official NVIDIA profiler Nsight Compute on the Poly-Bench [GXS\*12], Rodinia [CBM\*09], Pannotia [CBRS13] and Tango [KKS\*19] benchmark as well as our ray tracer.

## **B. SDCM Approximation**

In fig. 1, we visualize a plot of SDCM [AHH89] and compare it with the supposed approximation of PPT-GPU-Mem [ABE\*21] on exemplary cache configurations. The original SDCM formulation is defined in eq. (1). Equation (2) is the approximation as defined and implemented in the work of ARAFA, BADAWY, ELWAZIR, et al. [ABE\*21] using the *Q*-function. Note, that the function follows the opposite direction after reaching the discontinuity of the derivative. Equation (3) is a corrected version of eq. (2), where we removed the absolute value function.

$$p_{\rm sdcm} = \sum_{a=0}^{A-1} {D \choose a} \left(\frac{A}{B}\right)^a \left(1 - \frac{A}{B}\right)^{D-a} \tag{1}$$

$$p_{\text{ppt}} = 1 - Q\left(\frac{|A - 1 - D \cdot (A/B)|}{\sqrt{D \cdot (A/B) \cdot (1 - A/B)}}\right)$$
(2)

$$p_{\text{pptcorr}} = 1 - Q\left(\frac{A - 1 - D \cdot (A/B)}{\sqrt{D \cdot (A/B) \cdot (1 - A/B)}}\right)$$
(3)



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**Figure 1:** Plot of SDCM and its supposed approximations for an 8way set associative cache with a capacity of 512 entries. "SDCM" denotes the direct implementation of the SDCM formula, "PPT" denotes the approximation used in the PPT-GPU-Mem implementation and "corrected PPT" is our correction to it.

## References

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Table 1: Raw results from cache hit rate estimation of our model and PPT compared to measured values from NVIDIA Nsight Compute.

VerthervourPPTmeas.meas.KernelourPPTmeas.ourPPTmeas.vouPPTmeas.PPT <th></th> <th></th> <th>L1</th> <th></th> <th>I</th> <th>L2</th> <th> </th> <th>1</th> <th></th> <th>L1</th> <th></th> <th> </th> <th>L2</th> <th></th>			L1		I	L2		1		L1			L2	
	Kernel	our	PPT	meas.	our	PPT	meas.	Kernel	our	PPT	meas.	our	PPT	meas.
cor3cor3cor4cor6cor4cor4cor4cor4cor6cor4c	cor1	50	50	50	75	50	50.25	sssp1	0	×	0	50	×	99.67
cord77.5677.5783.9579.5668.04ssep368.7×68.23×50.83cord505050755050.25DrD85.9295.0281.9174.4497.9576.27cord31.963.363.1976.1466.333.44RrD71.40292.2321.11274.4890.8461.22cord78.4599.9178.2599.9299.7297.75InD71.3393.0470.289.8797.7775.662mm192.7694.1393.5499.8799.4299.88SrD88.2894.6383.2666.575.7789.7997.823mm293.2896.3193.6499.7499.8899.66InB84.3195.6481.1299.7897.823mm393.2996.3193.6499.7499.8899.66InB84.3195.6481.1299.7897.78atax197.2293.3594.6593.4692.8495.24MrIB89.5296.7485.2997.6598.9797.11atax290.9093.3594.0599.7492.8899.66InB84.3195.6681.0499.8999.7692.08olicigal90.7492.8899.7692.0897.7697.1473.8973.6687.0499.9797.12atax197.2397.3587.6687.0497.8998.96<	cor2	66.62	66.62	66.62	74.98	66.62	26.93	sssp2	0	×	0	50	×	51.46
cord   78.4   99.9   80.05   99.98   97.51   85.94   0   ×   0   50   50   22.93     cov2   63.19   63.33   63.19   76.14   66.3   33.44   RtnD   74.02   92.27   71.12   98.14   97.51   RD.71     2mm1   92.76   94.13   93.53   99.87   99.42   99.97   IntD   85.84   95.64   82.33   87.57   98.27   78.77     3mm1   93.29   96.31   93.64   99.74   99.85   90.65   IntB   84.31   95.64   81.01   96.15   90.66   90.79   91.33     3mm3   93.28   96.44   85.15   98.25   90.64   RHB   84.31   95.64   81.01   96.11   90.66   90.79   91.33     atax2   90.90   93.35   94.64   98.16   74.14   RHB   83.23   91.64   91.75   92.79   92.79   92.18   91.11     doingen1 </td <td>cor3</td> <td>77.56</td> <td>76</td> <td>77.54</td> <td>83.95</td> <td>79.56</td> <td>68.04</td> <td>sssp3</td> <td>68.77</td> <td>×</td> <td>68.35</td> <td>66.23</td> <td>×</td> <td>50.83</td>	cor3	77.56	76	77.54	83.95	79.56	68.04	sssp3	68.77	×	68.35	66.23	×	50.83
cov2   50   50   50   50   50   50   50   76.27   76.27     cvv3   78.45   99.91   79.82   99.98   99.42   99.75   InD   71.33   93.04   70.27   71.12   74.48   89.87   97.37   75.66     2mm1   92.76   94.13   93.53   99.87   99.42   99.97   MrD   85.84   95.64   82.23   87.57   98.27   78.77     3mm2   93.29   96.31   93.64   99.74   99.58   99.66   RrB   84.31   95.6   81.01   86.1   87.07   97.19   98.03     3mm3   93.29   96.31   93.64   98.74   98.25   96.61   RrB   84.31   95.6   81.01   90.61   97.07   97.17   97.1   atax   99.29   97.65   97.08   97.09   97.08   99.06   97.14   84.31   95.6   81.01   99.07   97.08   99.06   97.04   87.04   87.17 <td>cor4</td> <td>78.4</td> <td>99.9</td> <td>80.05</td> <td>99.98</td> <td>98.3</td> <td>97.51</td> <td>sssp4</td> <td>0</td> <td>×</td> <td>0</td> <td>50</td> <td>×</td> <td>2.93</td>	cor4	78.4	99.9	80.05	99.98	98.3	97.51	sssp4	0	×	0	50	×	2.93
cov2   63.19   63.33   63.19   70.42   90.23   71.12   74.48   96.48   67.27     2mm1   92.74   94.13   93.33   99.87   99.42   99.97   MrlD   85.84   95.64   83.28   87.57   97.20   89.43   97.56   69.75   96.63   87.02   97.85   97.10   88.28   95.64   83.26   97.65   87.10   88.25   97.14   98.05   99.05   R1B   84.31   95.74   96.61   87.02   97.78   97.19   98.03   99.71   97.1   98.03   99.71   98.03   99.71   99.13   90.61   118   84.31   95.61   91.05   99.79   97.39   96.31   99.60   118   84.31   95.16   99.79   99.79   99.75   97.10   97.19   93.19   93.65   97.0   117   79.83   97.60   79.77   97.1   97.13   97.37   97.33   97.61   97.79   97.10   97.10   97.10   97.03	cov1	50	50	50	75	50	50.25	DrtD	85.92	95.02	81.91	84.75	97.95	76.27
cov3   78,45   99,91   79,32   99,98   98,32   97,75   InD   71,33   93,04   70.2   88,78   97,37   75,66     3mm1   92,76   94,13   93,34   99,87   99,42   99,87   SrbD   88,38   94,63   83,75   98,27   97,87   98,27   97,87   98,35   97,49   95,88   99,65   RnB   84,31   95,64   82,32   96,13   90,74   99,58   99,65   RnB   84,31   95,67   88,03   99,74   99,58   99,66   InB   84,31   95,67   88,03   99,74   99,58   99,65   R1B   84,31   95,67   89,79   91,33   99,65   92,08   90,61	cov2	63.19	63.33	63.19	76.14	66.3	53.44	RrtD	74.02	92.32	71.12	74.48	96.84	61.22
2mm1   92.74   94.13   93.54   99.87   99.42   99.78   MrD   85.84   95.64   83.63   85.75   95.27   78.77     3mm1   93.29   96.31   93.64   97.4   99.58   99.75   DrlB   90.57   96.63   87.02   97.08   99.75   97.82     3mm3   93.28   96.31   93.64   97.4   99.58   99.66   IrB   84.31   95.74   81.02   97.77   98.30     atax1   97.32   98.36   98.61   98.55   90.62   MrB   84.53   95.74   91.19   91.39   96.5   79.29     bicg1   55.27   55.37   55.38   75.06   55.44   50.10   DrH   75.49   96.10   92.179   99.29   99.81   87.1     doitgen1   92.73   92.73   92.79   95.89   94.50   91.14   75.29   96.60   72.17   79.79   95.89   97.01   93.04   99.17   73.71   89.14 <td>cov3</td> <td>78.45</td> <td>99.91</td> <td>79.82</td> <td>99.98</td> <td>98.32</td> <td>97.75</td> <td>IrtD</td> <td>71.33</td> <td>93.04</td> <td>70.2</td> <td>89.87</td> <td>97.37</td> <td>75.66</td>	cov3	78.45	99.91	79.82	99.98	98.32	97.75	IrtD	71.33	93.04	70.2	89.87	97.37	75.66
2mm1   92.76   94.13   93.63   99.74   99.58   SrtD   88.28   94.63   65.6   87.90   97.82     3mm2   93.28   96.31   93.64   99.74   99.58   99.66   IrtB   84.33   95.74   81.07   98.08   99.74   99.58   99.66   IrtB   84.31   95.6   81.01   96.12   99.77   93.35     3mm3   97.29   98.35   94.35   94.65   55.4   50.62   10.64   90.74   90.29   99.83   90.61   96.61   96.61   96.61   96.61   96.61   97.65   99.75   97.1     atax2   90.9   90.41   85.79   98.78   0.5   97.65   97.65   99.78   90.58   99.48   99.1   IrtH   70.52   96.66   97.74   97.89   99.48   99.1   174   70.36   88.43   99.41   99.1   74.83     gemer   38.33   89.14   86.51   98.25   99.45   97.11	2mm1	92.74	94.13	93.53	99.87	99.42	99.97	MrtD	85.84	95.64	82.33	87.57	98.27	78.7
mm1   93.29   96.31   93.64   99.74   99.58   99.75   RfR   84.31   95.6   RfR   84.33   95.74   81.01   96.13   99.75   97.83     atmx1   97.32   98.36   98.61   88.51   98.25   90.62   InB   84.31   95.6   81.01   96.12   99.75   99.78   98.03     atmx2   99.99   93.53   94.06   92.65   57.45   St.41   St.44   St.44   96.74   95.74   95.71   97.15   98.92   99.76   79.21     bicg1   55.27   55.37   55.34   St.14   76.42   RtH   76.32   96.61   92.1   98.79   95.79   95.80   99.76   92.81   98.79   95.75   95.31   95.10   91.14   87.42   89.74   99.76   90.14   90.5   77.47   81.92   98.79   95.75   97.83   95.06   92.14   91.7   78.43   97.65   92.81   98.10   98.36   99.	2mm2	92.76	94.13	93.54	99.87	99.42	99.85	SrtD	88.28	94.63	83.6	68.55	97.91	60.57
	3mm1	93.29	96.31	93.63	99.74	99.58	99.79	DrtB	90.57	96.63	87.02	97.08	99.75	97.82
3mm   93.29   96.31   93.26   96.74   99.88   90.66   InB   84.31   95.6   81.01   96.12   99.76   99.77   97.1     utax2   90.99   93.35   94.35   94.06   92.86   55.48   SrtB   96.61   96.06   91.99   91.93   99.65   79.29     bicg1   55.27   55.37   55.38   75.06   55.45   50.1   DrtH   70.8   96.61   90.60   72.17   79.29   95.1   87.11     doitgen2   0   0   0   0   0   0   0   0   0   90.50   97.4   97.85   87.44   87.44   87.45   84.14   87.66   92.19   98.7   90.5   99.17   66.03   97.4   90.15   73.4   78.05   54.69   bytree1   70.3   68.06   92.21   99.17   78.68   99.17   68.03   92.47   85.05   92.12   98.7   78.69   50.21   0.01   0.03	3mm2	93.28	96.31	93.64	99.74	99.58	99.65	RrtB	84.53	95.74	81.47	98.03	99.7	98.35
atax2   97.32   98.36   98.51   98.25   90.74   85.29   97.65   97.77   97.1     atax2   90.99   93.35   94.35   94.06   92.66   55.48   SrR   96.61   96.06   91.91   99.65   72.92     bicg1   55.27   55.37   55.38   75.06   55.44   SrR   96.61   96.06   91.91   99.65   72.92     doitgen1   27.3   92.73   92.73   92.73   92.73   92.73   92.73   92.74   97.89   98.96   99   IHH   70.38   97.26   68.8   89.90   99.77   90.55     germ   93.3   96.31   93.66   97.4   95.8   99.45   SrtH   91.14   97.9   81.06   92.4   SrtH   91.14   97.9   81.04   60.7   81.92   81.7   66.7   82.9   75.1   60.04   0.25   0.04   49.98   0.32   76.7   75.4   75.35   75.05   75.5 <t< td=""><td>3mm3</td><td>93.29</td><td>96.31</td><td>93.62</td><td>99.74</td><td>99.58</td><td>99.66</td><td>IrtB</td><td>84.31</td><td>95.6</td><td>81.01</td><td>96.12</td><td>99.78</td><td>98.03</td></t<>	3mm3	93.29	96.31	93.62	99.74	99.58	99.66	IrtB	84.31	95.6	81.01	96.12	99.78	98.03
atax2   90.99   93.35   94.06   92.86   55.48   SrtB   96.61   96.06   91.99   99.59   79.29     bicg2   88.32   89.14   86.48   65.01   89.18   76.42   RrtH   75.62   96.69   72.17   97.92   99.51   87.11     doitgen1   92.73   92.73   98.99   99.95   99   IrtH   70.38   97.26   68.8   98.96   99.71   99.58   99.45   SrtH   91.14   79.79   86.06   92.24   99.17   74.83     gemver1   73.12   71.39   72.68   77.34   75.75   54.69   bptrec2   66.63   59.37   69.05   81.74   78.64   66.74     gemver3   88.33   89.14   86.74   68.18   78.37   bfs1   0.04   0.02   0.03   0.01   40.99   0.03   20.02     gesumm/   97.34   97.59   94.35   94.18   89.17   56.14   56.4   68.2   5	atax 1	97.32	98.36	98.61	88.51	98.25	90.82	MrtB	89.52	96.74	85.29	97.65	99.77	97.1
bicg1   55.27   55.38   75.06   55.54   50.1   DrtH   90.54   98.11   85.97   98.92   99.83   90.63     bicg2   88.32   89.14   86.48   65.01   89.18   76.42   RrHH   75.62   96.69   72.17   97.92   99.51   87.11     gemm   93.3   96.31   93.64   93.74   95.78   97.14   88.52   98.45   84.3   99.17   98.81   99.87   99.87   99.16   87.11     gemver1   73.12   71.39   72.68   77.34   75.79   54.69   bptree1   70.37   68.03   72.47   81.92   81.74   66.74     gemver2   55.28   50.20   0.04   0.25   0.04   49.98   0.03   20.02     gs1   0   0   0   0   0   0   0.25   60.04   0.25   60.04   49.88   39.85   78.13     gs2   1.35   0.17   1.51   58.11	atax2	90.99	93.35	94.35	94.06	92.86	55.48	SrtB	96.61	96.06	91.99	91.93	99.65	79.29
bicg288.3289.1486.4865.0189.1876.42RrtH75.6296.6972.1797.9299.5187.11doitgen1000050058.2MrtH88.5298.4584.399.2199.8790.5gemwer173.1273.1375.7975.4757.9754.69bptree170.3768.0397.2481.9281.766.74gemver255.2855.3755.3875.0655.5450.08bptree170.3768.0370.4481.7478.6466.75gesumwr388.3389.1486.7464.7489.1878.37bfs10.040.250.0449.980.3710.02gs10000029.72bfs355.3755.3755.3753.8578.13gs21.341.351.350.171.5511bf4339.839.4369.5169.5539.8578.13gs361.3981.1662.4975.4881.7450.61cfd16.1628.462085.267.6774.86mv1297.1398.3998.6188.498.2589.94dwc2d100000080.05syrk97.798.6198.1898.91dwc2d10.220.620.6851.448.5250.58syrk97.798.6198.1898.91dwc2d10.2	bicg1	55.27	55.37	55.38	75.06	55.54	50.1	DrtH	90.54	98.11	85.97	98.92	99.83	90.63
	bicg2	88.32	89.14	86.48	65.01	89.18	76.42	RrtH	75.62	96.69	72.17	97.92	99.51	87.11
	doitgen1	92.73	92.73	92.73	98.99	98.96	99	IrtH	70.38	97.26	68.8	98.96	99.76	92.08
gernwer1   93.3   96.31   93.66   99.74   99.45   SrtH   91.14   97.9   86.06   92.24   99.1   74.83     gernwer1   73.12   71.12   71.30   72.68   77.34   75.79   54.69   bptrec1   70.37   68.03   72.47   81.92   81.74   76.67.4     gernwer3   88.33   89.14   86.74   64.74   89.18   78.37   bft1   0.04   0.25   0.04   49.98   0.37   18.98     gesummv   56.23   90.22   23.1   53.3   90.24   95.28   bft2   0   0.03   0.01   49.99   0.03   20.02     gs3   61.39   81.16   62.46   77.48   74.88   1.14   50.61   Cfd   16.16   28.46   20   85.2   67.67   74.86     mv1   97.34   98.45   98.47   98.51   dwr2d1   0   0   0   0   0   80.55   57.58   57.55   56.48 </td <td>doitgen2</td> <td>0</td> <td>0</td> <td>0</td> <td>50</td> <td>0</td> <td>58.2</td> <td>MrtH</td> <td>88.52</td> <td>98.45</td> <td>84.3</td> <td>99.21</td> <td>99.87</td> <td>90.5</td>	doitgen2	0	0	0	50	0	58.2	MrtH	88.52	98.45	84.3	99.21	99.87	90.5
gemver173.1271.3972.6877.3475.9954.69bptree170.3768.0372.4781.9281.766.75gemver388.3389.1486.7464.7489.1878.37bfs10.040.250.0449.990.0320.02gs100000.29.72bfs356.3758.2657.5267.3563.4276.87gs21.341.351.350.171.5158.11bfs439.839.4369.5169.5539.8578.13gs361.3981.1662.4975.4881.7450.61cfd16.1628.462085.267.6774.86mvt197.3498.3898.6188.498.2589.94dwr2d1000	gemm	93.3	96.31	93.66	99.74	99.58	99.45	SrtH	91.14	97.9	86.06	92.24	99.1	74.83
genner2   55.38   55.38   75.06   55.54   50.08   bptree2   66.63   59.37   69.05   81.74   78.64   66.75     gesummv   56.23   90.22   23.1   53.3   90.24   95.28   bfs1   0.04   0.25   0.04   49.99   0.03   20.02     gs1   0   0   0   0   29.72   bfs3   56.37   58.26   57.52   67.35   63.42   76.87     gs3   61.39   81.16   62.49   75.48   81.74   50.61   cfd   16.16   128.46   20   0.85.2   67.67   74.86     mv12   91.05   93.25   94.05   92.81   55.27   dwt2d1   0   0   0   0   83.84   85.2   50.88     syrzk   86.47   98.43   96.29   94.63   99.87   94.86   dwt2d4   6.77   12.63   11.75   59.98   25.14   63.05     adi1   50.18   85.19   <	gemver1	73.12	71.39	72.68	77.34	75.79	54.69	bptree1	70.37	68.03	72.47	81.92	81.7	66.74
genuer3   88.33   89.14   86.74   66.74   89.18   78.37   bfs1   0.0   0.0   0.07   18.98     gesummv   56.23   90.22   23.1   53.3   90.24   95.28   bfs2   0   0.03   0.01   49.99   0.03   20.02     gs2   1.34   1.35   1.15   0.17   1.51   58.11   bfs4   39.8   39.43   69.51   69.55   39.82   78.13     gs3   61.39   81.16   62.49   75.48   81.74   50.61   cfd   16.16   28.46   20   85.2   67.67   74.86     mv12   91.05   93.25   94.63   99.87   94.86   dwt2d1   0   0   0   55.69   13.88   56.79     syrk   86.47   98.43   97.62   94.83   33.33   33.33   33.33   33.33   33.33   33.33   33.33   33.33   33.33   33.33   33.33   33.33   33.33   33.33	gemver2	55.28	55.37	55.38	75.06	55.54	50.08	bptree2	66.63	59.37	69.05	81.74	78.64	66.75
	gemver3	88.33	89.14	86.74	64.74	89.18	78.37	bfs1	0.04	0.25	0.04	49.98	0.37	18.98
gs1   0   0   0   0   29.72   bfs3   56.37   58.26   57.52   67.35   63.42   76.38     gs2   1.34   1.35   1.35   0.17   1.51   58.11   bfs4   39.83   39.43   69.51   69.55   39.85   78.13     gs3   61.39   81.16   62.49   75.48   81.74   50.61   cfd   16.16   28.46   20   85.2   67.67   74.86     mvt1   97.34   98.38   98.61   88.4   98.25   89.94   dwt2d1   0   0   0   0   0   0   85.07   58.26   0.58   93.85   71.85   93.15   45.16   65.14   84.27   65.77     syrk   97.7   98.61   98.18   99.87   98.91   dwt2d4   6.77   12.63   11.75   59.88   25.14   63.05     adii   50.27   84.30   48.33   63.05   64.45   46.51   44.25	gesummv	56.23	90.22	23.1	53.3	90.24	95.28	bfs2	0	0.03	0.01	49.99	0.03	20.02
gs21.341.351.350.171.5158.11bfs439.839.4369.5169.5539.8578.13gs361.3981.1662.4975.4881.7450.61cfd16.1628.462085.267.6774.86mvt197.3498.3898.6188.499.2589.94dwt2d1000050080.05mvt291.0593.2594.3594.0592.8155.27dwt2d10.720.620.6851.848.5250.58syr2k86.4798.6198.1899.9794.86dwt2d10.7712.6311.7559.9825.1463.05adi150.1895.0236.6773.3295.4597.19heartwall31.5931.5545.1665.148.2177.71adi233.3333.3333.3333.3333.3333.3350.2550.4859.559.7576.19adi444.4444.4464.2844.4451.24huf7156.3351.6356.4154.6563.6233.78conv2D75.1574.8675.164.9581.7871huf7256.3251.6356.4154.6563.6233.78conv2D75.1574.8675.164.9581.7871huf7256.3251.6356.4154.6563.6233.78conv2D75.1574.8675.164.9581.	gs1	0	0	0	0	0	29.72	bfs3	56.37	58.26	57.52	67.35	63.42	76.87
gs3 61.39 81.16 62.49 75.48 81.74 50.61 cfd 16.16 28.46 20 85.2 67.67 74.86   mvt1 97.34 98.38 98.61 88.4 98.25 89.94 dwt2d1 0 0 0 50 0 80.05   mvt2 91.05 93.25 94.35 94.63 99.87 94.86 dwt2d2 0.72 0.62 0.68 51.84 8.52 50.58   syrk 97.7 98.61 98.18 99.91 99.87 98.91 dwt2d4 6.77 12.63 11.75 59.98 25.14 63.05   adi1 50.18 95.02 36.67 73.32 95.45 97.19 heartwall 31.59 31.55 45.16 65.1 48.21 77.11 63.02 33.76 33.33 33.33 44.83 hotspot1 1.7 0.92 1.25 77.06 50.23 76.75 74.62   adi3 41.89 90.52 44.44 51.74 71.47 16.05 51.63 56.41 54.65 6	gs2	1.34	1.35	1.35	0.17	1.51	58.11	bfs4	39.8	39.43	69.51	69.55	39.85	78.13
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	gs3	61.39	81.16	62.49	75.48	81.74	50.61	cfd	16.16	28.46	20	85.2	67.67	74.86
mvt2   91.05   93.25   94.35   94.05   92.81   55.27   dwt2d2   0.72   0.62   0.68   51.84   8.52   50.58     syr2k   86.47   98.43   97.62   94.63   99.87   94.86   dwt2d4   6.77   12.63   11.75   55.99   13.88   56.79     adi1   50.18   95.02   36.67   73.32   95.45   97.19   heatwall   31.59   31.55   45.16   65.1   48.21   77.71     adi2   33.33   33.33   33.33   33.33   33.33   33.33   33.33   50.38   50.25   50.48   59.5   59.75   46.2     adi4   44.44   44.44   64.28   44.44   10.14   48.38   48.39   74.19   48.39   92.87     fdtdDD   46.91   46.47   45.53   67.97   79.22   55.97   lud1   48.38   48.39   74.19   48.39   92.87     fdtdDD   46.91   46.47   45.21<	mvt1	97.34	98.38	98.61	88.4	98.25	89.94	dwt2d1	0	0	0	50	0	80.05
syr2k 86.47 98.647 98.64 94.86 dwt2d3 2.53 3.81 1.66 55.69 13.88 56.79   syrk 97.7 98.61 98.18 99.91 99.87 98.91 dwt2d4 6.77 12.63 11.75 59.98 25.14 63.05   adi1 33.33 33.33 33.26 33.33 33.33 44.83 hotspot1 1.7 0.92 1.25 77.06 50.23 76.19   adi3 41.89 90.52 48.36 65.01 92.49 94.43 hotspot1 1.7 0.92 1.25 77.06 50.23 76.19   adi4 44.44 44.44 44.44 51.24 huff1 56.32 51.63 56.41 54.65 63.62 33.76   conv2D 75.15 74.86 75.1 64.95 70.74 52.4 lud1 48.39 48.39 74.19 48.39 92.87 fdtd2D 46.91 46.47 45.53 67.97 49.22 35.97 lud2 39.24 39.24 39.24 79.07 58.14 <t< td=""><td>mvt2</td><td>91.05</td><td>93.25</td><td>94.35</td><td>94.05</td><td>92.81</td><td>55.27</td><td>dwt2d2</td><td>0.72</td><td>0.62</td><td>0.68</td><td>51.84</td><td>8.52</td><td>50.58</td></t<>	mvt2	91.05	93.25	94.35	94.05	92.81	55.27	dwt2d2	0.72	0.62	0.68	51.84	8.52	50.58
syrk 97.7 98.61 98.18 99.91 99.87 98.91 dwt2d4 6.77 12.63 11.75 59.98 25.14 63.05   adi1 50.18 95.02 36.67 73.32 95.45 97.19 heartwall 31.59 31.55 45.16 65.1 48.21 77.71   adi3 41.89 90.52 48.38 65.01 92.49 94.43 hotspot 1.7 0.92 1.25 77.06 50.23 76.19   adi4 44.44 44.44 64.28 44.44 51.24 huff1 56.33 51.63 56.41 54.65 63.62 33.78   conv2D 75.15 74.86 75.1 64.95 70.74 52.4 lud1 48.39 48.39 48.39 48.39 48.39 74.19 48.30 92.47 39.24 79.07 58.14 69.75   jacobi1D 54.21 54.21 51.42 55.52 68.79 lud3 30.44 25 30.44 85.01 71.67 71.74   jacobi1D 54.21 54.21	syr2k	86.47	98.43	97.62	94.63	99.87	94.86	dwt2d3	2.53	3.81	1.66	55.69	13.88	56.79
adi1 50.18 95.02 36.67 73.32 95.45 97.19 heartwall 31.59 31.55 45.16 65.1 48.21 77.71   adi2 33.33 33.33 33.33 34.48 hotspot 1.7 0.92 1.25 77.06 50.23 76.19   adi3 41.89 90.52 48.38 65.01 92.49 94.43 hotspot3D 50.38 50.25 50.48 59.5 59.75 46.2   adi4 44.44 44.44 44.44 64.28 44.44 51.24 huff1 56.33 51.63 56.41 54.65 63.62 33.76   conv2D 75.15 74.86 75.1 64.95 70.74 52.4 lud1 48.38 48.39 74.19 48.39 92.4 39.24 79.07 58.14 69.75   jacobi1D 54.21 54.21 51.42 55.52 68.79 nw1 13.39 13.39 41.07 41.44 13.39 55.04   bc1 0 0 0 50.25 0.52 99.36 pathfind	syrk	97.7	98.61	98.18	99.91	99.87	98.91	dwt2d4	6.77	12.63	11.75	59.98	25.14	63.05
adi2 33.33 33.33 33.33 34.83 hotspot 1.7 0.92 1.25 77.06 50.23 76.19   adi3 41.89 90.52 48.38 65.01 92.49 94.43 hotspot3D 50.38 50.25 50.48 59.5 59.75 46.2   adi4 44.44 44.44 64.28 44.44 51.24 huff1 56.33 51.63 56.41 54.65 63.62 33.78   conv2D 75.15 74.86 60.29 64.95 70.74 52.4 lud1 48.38 48.39 74.19 48.39 92.87   fdtd2D 46.91 46.47 45.53 67.97 49.22 35.97 lud2 39.24 39.24 39.24 79.07 58.14 69.75   jacobi1D 54.21 54.21 51.42 55.52 68.79 lud3 30.44 25 30.44 85.01 71.67 71.74   jacobi1D 54.21 54.21 51.42 55.52 68.79 nw1 13.39 13.22 21.62 41.89 13.66	adil	50.18	95.02	36.67	73.32	95.45	97.19	heartwall	31.59	31.55	45.16	65.1	48.21	77.71
adi3 44.89 90.52 48.38 65.01 92.49 94.43 huff1 50.38 50.25 50.48 59.55 59.75 46.2   adi4 44.44 44.44 64.28 44.44 51.24 huff1 56.33 51.63 56.41 54.65 63.62 33.76   conv2D 75.15 74.86 75.1 64.95 70.74 52.4 lud1 48.38 48.39 74.19 48.39 92.87   fdtd2D 46.91 46.47 45.53 67.97 49.22 35.97 lud2 39.24 39.24 39.24 79.07 58.14 69.75   jacobi1D 54.21 54.21 51.42 55.52 68.79 lud3 30.44 25 30.44 85.01 71.67 71.74   jacobi2D 58.2 57.79 58.21 63.06 68.8 65.94 nw1 13.39 13.22 21.62 41.89 13.66 65.44   bc1 0 0 50 0 99.23 nw2 13.39 13.22 21.62 41.89	adi2	33.33	33.33	33.26	33.33	33.33	44.83	hotspot	1.7	0.92	1.25	77.06	50.23	76.19
adi4 44.44 44.44 44.44 51.24 huff1 56.33 51.63 56.41 54.65 63.62 33.76   conv2D 75.15 74.86 75.1 64.95 81.78 71 huff2 56.32 51.63 56.41 54.65 63.62 33.76   conv3D 58.24 58.26 60.29 64.95 70.74 52.4 lud1 48.38 48.39 74.19 48.39 92.87   fdtd2D 46.91 46.47 45.53 67.97 49.22 35.97 lud2 39.24 39.24 39.24 79.07 58.14 69.75   jacobi1D 54.21 54.21 51.42 55.52 68.79 lud2 39.24 39.24 39.24 79.07 58.14 69.76 71.74   jacobi2D 58.2 57.79 58.21 63.06 68.8 65.94 nw1 13.39 13.22 21.62 41.89 13.66 65.44   bc2 0.51 0.49 0.52 50.25 0.52 99.36 pathinder 18.99 22.09	adi3	41.89	90.52	48.38	65.01	92.49	94.43	hotspot3D	50.38	50.25	50.48	39.5	59.75	46.2
conv2D 75.15 74.86 75.1 64.95 81.78 71 InffI2 56.32 51.63 56.41 54.65 63.62 33.76   conv3D 58.24 58.26 60.29 64.95 70.74 52.4 Iud1 48.38 48.39 74.19 48.39 92.87   fdtd2D 46.91 46.47 45.53 67.97 49.22 35.97 Iud2 39.24 39.24 39.24 39.24 39.24 79.07 58.14 69.75   jacobiD 54.21 54.21 54.21 54.21 54.21 55.26 68.79 Iud3 30.44 25 30.44 85.01 71.67 71.74   jacobiD 58.2 57.79 58.21 63.06 68.8 65.94 nw1 13.39 13.22 21.62 41.89 13.66 65.44   bc1 0 0 0 50.25 0.52 99.36 pathfinder 18.99 22.09 23.96 55.74 30.9 18.66   bc3 69.76 10.37 59.38 83.14 80	adi4	44.44	44.44	44.44	64.28	44.44	51.24	huffl	56.33	51.63	56.41	54.65	63.62	33.78
conv3D58.2458.2660.2964.9570.7452.4Iud148.3848.3948.3974.1948.3992.87fdtd2D46.9146.4745.5367.9749.2235.97lud239.2439.2439.2479.0758.1469.75jacobi1D54.2154.2154.2154.2154.2155.5268.79lud330.442530.4485.0171.6771.74jacobi2D58.257.7958.2163.0668.865.94nw113.3913.3941.0741.4413.3955.04bc100000.520.5299.36pathfinder18.9922.0923.9655.7430.918.66bc369.7610.3759.3883.148034.63sc24.2223.952451.0624.823.99bc492.394.5466.7874.4496.1687.08backprop159.261.9962.7277.8964.1459.86bc592.6295.7792.9254.3196.0156.68backprop272.4772.4474.4177.2273.8760.44bc692.0692.3486.5456.0693.0276.05AlexNet175.0291.1176.999.8499.9399.7bc788.5888.4488.3861.2991.7451.59AlexNet287.1695.2579.999.6499.9298.54	conv2D	/5.15	/4.80	/5.1	64.95	81.78	/1 52.4		56.32	51.63	30.41	54.65	63.62	33.76
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	conv3D	58.24	58.20	60.29	64.95	/0./4	52.4		48.38	48.39	48.39	74.19	48.39	92.87
jacobili34.2134.2134.2151.4235.3268.79Indis50.442.550.4485.0171.0771.74jacobili58.257.7958.2163.0668.865.94nw113.3913.3941.0741.4413.3955.04bc100050099.23nw213.3913.2221.6241.8913.6665.44bc20.510.490.5250.250.5299.64pathfinder18.9922.0923.9655.7430.918.66bc369.7610.3759.3883.148034.63sc24.2223.952451.0624.823.99bc492.394.5466.7874.4496.1687.08backprop159.261.9962.7277.8964.1459.86bc592.6295.7792.9254.3196.0156.68backprop272.4772.4474.4177.2273.8760.44bc692.0692.3486.5456.0693.0276.05AlexNet175.0291.1176.999.8499.9399.7bc788.5888.4488.3861.2991.7451.59AlexNet287.1695.2579.999.6499.9298.54color173.6469.7973.7570.482.0950.42AlexNet390.7195.0882.4599.5499.9298.54color2 <t< td=""><td>lata2D</td><td>40.91</td><td>40.47</td><td>45.55</td><td>51 42</td><td>49.22</td><td>55.97 68 70</td><td>lud2</td><td>39.24</td><td>39.24 25</td><td>39.24</td><td>/9.0/</td><td>38.14 71.67</td><td>09.75</td></t<>	lata2D	40.91	40.47	45.55	51 42	49.22	55.97 68 70	lud2	39.24	39.24 25	39.24	/9.0/	38.14 71.67	09.75
Jacobi2D38.237.7938.2105.0608.805.94INV115.3915.3941.0741.4415.3953.04bc100050099.23nw213.3913.2221.6241.8913.6665.44bc20.510.490.5250.250.5299.36pathfinder18.9922.0923.9655.7430.918.66bc369.7610.3759.3883.148034.63sc24.2223.952451.0624.823.99bc492.394.5466.7874.4496.1687.08backprop159.261.9962.7277.8964.1459.86bc592.6295.7792.9254.3196.0156.68backprop272.4772.4474.4177.2273.8760.44bc692.0692.3486.5456.0693.0276.05AlexNet175.0291.1176.999.8499.9399.7bc788.5888.4488.3861.2991.7451.59AlexNet287.1695.2579.999.6499.9299.78bc844.757.7744.7566.5163.581.61AlexNet390.7195.0882.4599.5499.9298.54color173.6469.7973.7570.482.0950.42AlexNet494.197.3286.0499.1899.9199.68color2	jacobiiD	59.21	57.70	59 21	62.06	200	08.79 65.04		12 20	12 20	50.44 41.07	65.01	/1.0/	/1./4
bc110000099.231W213.3913.2221.0241.8913.0005.44bc20.510.490.5250.250.5299.36pathfinder18.9922.0923.9655.7430.918.66bc369.7610.3759.3883.148034.63sc24.2223.952451.0624.823.99bc492.394.5466.7874.4496.1687.08backprop159.261.9962.7277.8964.1459.86bc592.6295.7792.9254.3196.0156.68backprop272.4772.4474.4177.2273.8760.44bc692.0692.3486.5456.0693.0276.05AlexNet175.0291.1176.999.8499.9399.7bc788.5888.4488.3861.2991.7451.59AlexNet287.1695.2579.999.6499.9299.78bc844.757.7744.7566.5163.581.61AlexNet390.7195.0882.4599.5499.9298.54color173.6469.7973.7570.482.0950.42AlexNet494.197.3286.0499.1899.9199.68color223.123.1421.861.5523.1523.42LSTM1.413.561.7251.033.5616.69mis158.64 <td>Jacobi2D</td> <td>38.2</td> <td>57.79</td> <td>38.21</td> <td>05.00</td> <td>08.8</td> <td>00.22</td> <td></td> <td>13.39</td> <td>12.39</td> <td>41.07</td> <td>41.44</td> <td>13.39</td> <td>55.04 65.44</td>	Jacobi2D	38.2	57.79	38.21	05.00	08.8	00.22		13.39	12.39	41.07	41.44	13.39	55.04 65.44
bc2 0.31 0.49 0.32 50.25 0.32 97.36 parminder 18.99 22.09 23.90 50.74 50.9 18.00   bc3 69.76 10.37 59.38 83.14 80 34.63 sc 24.22 23.95 24 51.06 24.82 3.99   bc4 92.3 94.54 66.78 74.44 96.16 87.08 backprop1 59.2 61.99 62.72 77.89 64.14 59.86   bc5 92.62 95.77 92.92 54.31 96.01 56.68 backprop2 72.47 72.44 74.41 77.22 73.87 60.44   bc6 92.06 92.34 86.54 56.06 93.02 76.05 AlexNet1 75.02 91.11 76.9 99.84 99.93 99.7   bc7 88.58 88.44 88.38 61.29 91.74 51.59 AlexNet2 87.16 95.25 79.9 99.64 99.92 98.54   color1 73.64 69.79 73.75 70.4 82.09 50.42 Alex	bc1	0.51	0.40	0.52	50.25	0.52	99.23	nothfinder	13.39	22.00	21.02	41.09 55.74	30.0	18.66
bc3 65.76 10.37 59.38 63.14 60 54.03 8c 24.22 23.93 24 51.06 24.82 3.99   bc4 92.3 94.54 66.78 74.44 96.16 87.08 backprop1 59.2 61.99 62.72 77.89 64.14 59.86   bc5 92.62 95.77 92.92 54.31 96.01 56.68 backprop2 72.47 72.44 74.41 77.22 73.87 60.44   bc6 92.06 92.34 86.54 56.06 93.02 76.05 AlexNet1 75.02 91.11 76.9 99.84 99.93 99.7   bc7 88.58 88.44 88.38 61.29 91.74 51.59 AlexNet2 87.16 95.25 79.9 99.64 99.92 99.78   bc8 44.75 7.77 44.75 66.51 63.5 81.61 AlexNet3 90.71 95.08 82.45 99.54 99.92 98.54   color1 73.64 69.79 73.75 70.4 82.09 50.42 Al	bc2	60.76	10.49	50.32	83 14	0.52 80	99.50 34.63	paulinuer	10.99	22.09	23.90	51.06	24.82	3 00
bc4 52.3 54.34 60.78 74.44 50.16 87.08 backprop1 55.2 61.59 62.12 77.39 64.14 55.86   bc5 92.62 95.77 92.92 54.31 96.01 56.68 backprop2 72.47 72.44 74.41 77.22 73.87 60.44   bc6 92.06 92.34 86.54 56.06 93.02 76.05 AlexNet1 75.02 91.11 76.9 99.84 99.93 99.7   bc7 88.58 88.44 88.38 61.29 91.74 51.59 AlexNet2 87.16 95.25 79.9 99.64 99.92 99.78   bc8 44.75 7.77 44.75 66.51 63.5 81.61 AlexNet3 90.71 95.08 82.45 99.54 99.92 98.54   color1 73.64 69.79 73.75 70.4 82.09 50.42 AlexNet4 94.1 97.32 86.04 99.18 99.91 99.68   color2 23.1 23.14 21.8 61.55 23.15 23.42	bc3	09.70	04 54	59.50 66.78	74 44	06 16	97.09	backprop1	50.2	61.00	62 72	77.80	24.02 64.14	50.86
bc392.0295.1792.9294.9190.0190.0190.0390.0390.0272.4474.4171.2213.3760.44bc692.0692.3486.5456.0693.0276.05AlexNet175.0291.1176.999.8499.9399.7bc788.5888.4488.3861.2991.7451.59AlexNet287.1695.2579.999.6499.9299.78bc844.757.7744.7566.5163.581.61AlexNet390.7195.0882.4599.5499.9298.54color173.6469.7973.7570.482.0950.42AlexNet494.197.3286.0499.1899.9199.68color223.123.1421.861.5523.1523.42LSTM1.413.561.7251.033.5616.69mis158.6457.8859.3168.4973.2548.13ResNet129.8397.4851.7999.9399.7899mis242.6442.944.566.5660.2259.65ResNet293.9193.9693.3894.4493.9694.39pagerank100050099.98ResNet393.9193.9671.1394.4493.9696.13pagerank285.783.5450.6754.286.8888.59ResNet490.2893.7589.0684.9893.7584.97 <td>bc5</td> <td>92.5</td> <td>94.94</td> <td>00.78</td> <td>5/ 31</td> <td>90.10</td> <td>56.68</td> <td>backprop2</td> <td>72 47</td> <td>72 44</td> <td>74 41</td> <td>77.09</td> <td>73.87</td> <td>60 <i>11</i></td>	bc5	92.5	94.94	00.78	5/ 31	90.10	56.68	backprop2	72 47	72 44	74 41	77.09	73.87	60 <i>11</i>
bc092.5092.5480.3450.0093.0210.03AlexNet115.0291.1110.395.6495.9395.74bc788.5888.4488.3861.2991.7451.59AlexNet287.1695.2579.999.6499.9299.78bc844.757.7744.7566.5163.581.61AlexNet390.7195.0882.4599.5499.9298.54color173.6469.7973.7570.482.0950.42AlexNet494.197.3286.0499.1899.9199.68color223.123.1421.861.5523.1523.42LSTM1.413.561.7251.033.5616.69mis158.6457.8859.3168.4973.2548.13ResNet129.8397.4851.7999.9399.7899mis242.6442.944.566.5660.2259.65ResNet293.9193.9693.3894.4493.9694.39pagerank100050099.98ResNet393.9193.9671.1394.4493.9696.13pagerank285.783.5450.6754.286.8888.59ResNet490.2893.7589.0684.9893.7584.97pagerank333.3333.3333.3266.6633.3367.22ResNet593.3193.6694.3879.6193.6483.23 <td>bcb</td> <td>92.02</td> <td>93.77</td> <td>92.92 86.54</td> <td>56.06</td> <td>90.01</td> <td>76.05</td> <td>AlexNet1</td> <td>75.02</td> <td>01 11</td> <td>76.0</td> <td>00.84</td> <td>00.03</td> <td>00.44</td>	bcb	92.02	93.77	92.92 86.54	56.06	90.01	76.05	AlexNet1	75.02	01 11	76.0	00.84	00.03	00.44
bc844.757.7744.7566.5163.581.61AlexNet390.7195.0882.4599.5499.9298.54color173.6469.7973.7570.482.0950.42AlexNet494.197.3286.0499.1899.9199.68color223.123.1421.861.5523.1523.42LSTM1.413.561.7251.033.5616.69mis158.6457.8859.3168.4973.2548.13ResNet129.8397.4851.7999.9399.7899mis242.6442.944.566.5660.2259.65ResNet293.9193.9693.3894.4493.9694.39pagerank100050099.98ResNet393.9193.9671.1394.4493.9696.13pagerank285.783.5450.6754.286.8888.59ResNet490.2893.7589.0684.9893.7584.97pagerank333.3333.3266.6633.3367.22ResNet593.3193.6694.3879.6193.6483.23	bc0	92.00 88.58	92.J <del>4</del> 88.44	88 38	61.20	95.02 01.74	51 59	AlexNet?	87.16	05 25	70.9	00 64	00 02	00 78
color 73.64 69.79 73.75 70.4 82.09 50.42 AlexNet4 94.1 97.32 86.04 99.18 99.91 99.68   color2 23.1 23.14 21.8 61.55 23.15 23.42 LSTM 1.41 3.56 1.72 51.03 3.56 16.69   mis1 58.64 57.88 59.31 68.49 73.25 48.13 ResNet1 29.83 97.48 51.79 99.93 99.78 99   mis2 42.64 42.9 44.5 66.56 60.22 59.65 ResNet2 93.91 93.96 93.38 94.44 93.96 94.39   pagerank1 0 0 0 50 0 99.98 ResNet3 93.91 93.96 71.13 94.44 93.96 96.13   pagerank2 85.7 83.54 50.67 54.2 86.88 88.59 ResNet4 90.28 93.75 89.06 84.98 93.75 84.97   pagerank3 33.33 33.33 33.33 66.66 33.33 67.22 Res	bc8	14 75	00.77 7 77	14 75	66 51	63.5	81.61	AlexNet3	00.71	95.08	82 45	00 5/	00 02	08 5/
color1 75.64 65.79 75.75 76.4 62.65 50.42 140.44 97.52 86.04 97.16 97.51 97.66   color2 23.1 23.14 21.8 61.55 23.15 23.42 LSTM 1.41 3.56 1.72 51.03 3.56 16.69   mis1 58.64 57.88 59.31 68.49 73.25 48.13 ResNet1 29.83 97.48 51.79 99.93 99.78 99   mis2 42.64 42.9 44.5 66.56 60.22 59.65 ResNet2 93.91 93.96 93.38 94.44 93.96 94.39   pagerank1 0 0 0 99.98 ResNet3 93.91 93.96 71.13 94.44 93.96 96.13   pagerank2 85.7 83.54 50.67 54.2 86.88 88.59 ResNet4 90.28 93.75 89.06 84.98 93.75 84.97   pagerank3 33.33 33.33 33.33 67.62 ResNet5 93.31 93.66 94.38 79.61	color1	73.64	69 79	73 75	70.4	82.09	50.42	AlexNet4	90.71	95.08	86.04	99.54	99.92	90.54
mis1 58.64 57.88 59.31 68.49 73.25 48.13 ResNet1 29.83 97.48 51.79 99.93 99.78 99   mis2 42.64 42.9 44.5 66.56 60.22 59.65 ResNet2 93.91 93.96 93.38 94.44 93.96 94.39   pagerank1 0 0 50 0 99.98 ResNet3 93.91 93.96 71.13 94.44 93.96 96.13   pagerank2 85.7 83.54 50.67 54.2 86.88 88.59 ResNet4 90.28 93.75 89.06 84.98 93.75 84.97   pagerank3 33.33 33.33 33.32 66.66 33.33 67.22 ResNet5 93.31 93.66 94.38 79.61 93.64 83.23	color?	23.1	23 14	21.8	61 55	23.15	23.42	LSTM	1 41	3 56	1 72	51.03	3 56	16 69
mis2 42.64 42.9 44.5 66.56 60.22 59.65 ResNet2 93.91 93.96 93.38 94.44 93.96 94.39   pagerank1 0 0 0 50 0 99.98 ResNet3 93.91 93.96 93.38 94.44 93.96 94.39   pagerank2 85.7 83.54 50.67 54.2 86.88 88.59 ResNet4 90.28 93.75 89.06 84.98 93.75 84.97   pagerank3 33.33 33.33 33.33 66.66 33.33 67.22 ResNet5 93.31 93.66 94.38 79.61 93.64 83.23	mis1	58 64	57 88	59 31	68 49	73 25	48 13	ResNet1	29.83	97 48	51 79	99.93	99 78	90
pagerank1 0 0 0 50 0 99.98 ResNet3 93.91 93.96 71.13 94.44 93.96 96.13   pagerank2 85.7 83.54 50.67 54.2 86.88 88.59 ResNet4 90.28 93.75 89.06 84.98 93.75 84.97   pagerank3 33.33 33.33 33.32 66.66 33.33 67.22 ResNet5 93.31 93.66 94.38 79.61 93.64 83.23	mis?	42.64	42.9	44 5	66 56	60.22	59.65	ResNet2	93.91	93.96	93 38	94 44	93.96	94 39
pagerank2 85.7 83.54 50.67 54.2 86.88 88.59 ResNet4 90.28 93.75 89.06 84.98 93.75 84.97   pagerank3 33.33 33.33 33.32 66.66 33.33 67.22 ResNet5 93.31 93.66 94.38 79.61 93.64 83.23	pagerank1	0	.2.9	0	50	00.22	99.98	ResNet3	93.91	93.96	71.13	94.44	93.96	96.13
pagerank3 33.33 33.33 33.32 66.66 33.33 67.22 ResNet5 93.31 93.66 94.38 79.61 93.64 83.23	pagerank?	85 7	83.54	50.67	54.2	86.88	88.59	ResNet4	90.28	93.75	89.06	84.98	93.75	84.97
	pagerank3	33.33	33.33	33.32	66.66	33.33	67.22	ResNet5	93.31	93.66	94.38	79.61	93.64	83.23

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