179.art, Ref110

Datasets profile vs. Reference Dataset

The following are the profiles for the 179.art, ref110 benchmark. For more details about our profile development and dataset reduction methodology, refer to the paper by AJ KleinOsowski and David J. Lilja, "MinneSPEC: A New SPEC Benchmark Workload for Simulation−Based Computer Architecture Research", Computer Architecture Letters, Volume 1, June 2002. This paper is available in electronic form at http://www.arctic.umn.edu/~lilja/minnespec/index.html

http:// www.arctic.umn.edu

Function level execution profile at optimization level O0

The following table contains function execution profiles and goodness–of–fit chi–squared statistic values for the train, test, and large (LgRed) reduced datasets as compared to the full SPEC reference datasets. Note: Medium (MdRed) and small (SmRed) reduced input sets are not available for this benchmark. This data was gathered with the gprof profiling utility. *90% Conf = Critical value of the chi–squared statistic at the 90 percent confidence level. Numbers in the Ref, Train, Test, and LgRed columns are the percent of overall execution time spent in the stated function (in the Function column). Numbers in the Train Chi, Test Chi, and LgRed Chi are the terms of the chi–squared statistic for the stated function (in the function column).

Function	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi
match	78.48	48.22	11.67	4.61	69.53	14.48	52.19
train_match	15.81	39.74	36.22	86.31	314.37	68.65	176.60
reset_nodes2	2.10	1.85	0.03	0.08	1.94	0.63	1.03
simtest2	1.71	1.51	0.02	0.08	1.55	0.41	0.99
weightadj	0.52	2.67	8.89	2.72	9.31	5.33	44.49
reset_nodes	0.43	1.97	5.52	1.42	2.28	3.20	17.84
simtest	0.39	1.69	4.33	2.21	8.49	3.42	23.54
internal_mcount	0.21	0.64	0.88	0.94	2.54	1.85	12.81
g	0.19	0.87	2.43	1.16	4.95	1.63	10.91
scan_recognize	0.12	0.55	1.54	0.03	0.07	0.09	0.01
init_bu	0.01	0.01	0.00	0.11	1.00	0.03	0.04
sim_other_objects	0.01		0.01		0.01		0.01
Sum	99.98	99.72	71.54	99.67	416.05	99.72	340.47
	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi

90% Confidence level (12 entries) = 17.275

179.art, Ref110

Function level execution profile at optimization level O1

The following table contains function execution profiles and goodness–of–fit chi–squared statistic values for the train, test, and large (LgRed) reduced datasets as compared to the full SPEC reference datasets. Note: Medium (MdRed) and small (SmRed) reduced input sets are not available for this benchmark. This data was gathered with the gprof profiling utility. *90% Conf = Critical value of the chi–squared statistic at the 90 percent confidence level. Numbers in the Ref, Train, Test, and LgRed columns are the percent of overall execution time spent in the stated function (in the Function column). Numbers in the Train Chi, Test Chi, and LgRed Chi are the terms of the chi–squared statistic for the stated function (in the function column).

Function	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi
match	79.30	46.38	13.67	4.50	70.56	13.42	54.73
train_match	15.86	40.04	36.86	83.23	286.17	65.43	154.93
simtest2	1.58	1.27	0.06	0.04	1.50	0.45	0.81
weightadj	0.82	4.12	13.28	4.50	16.52	7.13	48.56
reset_nodes2	0.76	0.75	0.00	0.00	0.76	0.08	0.61
g	0.46	1.39	1.88	2.33	7.60	3.64	21.98
simtest	0.43	1.76	4.11	2.04	6.03	3.71	25.02
internal_mcount	0.36	1.95	7.02	2.25	9.92	3.94	35.60
reset_nodes	0.18	1.09	4.60	0.45	0.41	1.29	6.85
scan_recognize	0.16	0.71	1.89	0.00	0.16	0.23	0.03
.umul	0.02	0.11	0.41	0.12	0.50	0.08	0.18
init_bu	0.02	0.07	0.13	0.16	0.98	0.08	0.18
_mcount	0.02	0.11	0.41		0.02	0.15	0.85
_brk_unlocked	0.01	0.07	0.36	0.04	0.09	0.15	1.96
Sum	99.98	99.82	84.67	99.66	401.21	99.78	352.28
	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi

90% Confidence level (14 entries) = 19.812

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Function level execution profile at optimization level O2

The following table contains function execution profiles and goodness–of–fit chi–squared statistic values for the train, test, and large (LgRed) reduced datasets as compared to the full SPEC reference datasets. Note: Medium (MdRed) and small (SmRed) reduced input sets are not available for this benchmark. This data was gathered with the gprof profiling utility. *90% Conf = Critical value of the chi–squared statistic at the 90 percent confidence level. Numbers in the Ref, Train, Test, and LgRed columns are the percent of overall execution time spent in the stated function (in the Function column). Numbers in the Train Chi, Test Chi, and LgRed Chi are the terms of the chi–squared statistic for the stated function (in the function column).

Function	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi
match	79.77	47.63	12.95	4.58	70.87	13.30	55.39
train_match	16.50	42.00	39.41	85.87	291.65	68.12	161.49
simtest2	1.10	0.96	0.02	0.12	0.87	0.23	0.69
weightadj	0.63	2.96	8.62	3.41	12.27	5.91	44.25
reset_nodes2	0.63	0.56	0.01	0.00	0.63	0.08	0.48
internal_mcount	0.44	1.89	4.78	2.07	6.04	3.97	28.32
simtest	0.34	1.37	3.12	1.64	4.97	3.50	29.37
g	0.25	1.15	3.24	1.41	5.38	3.11	32.72
scan_recognize	0.15	0.52	0.91	0.00	0.15	0.54	1.01
reset_nodes	0.13	0.56	1.42	0.31	0.25	0.78	3.25
_brk_unlocked	0.01		0.01	0.12	1.21		0.01
init_bu	0.01	0.07	0.36	0.16	2.25	0.00	0.01
init_td	0.01	0.00	0.01	0.00	0.01	0.08	0.49
sim_other_objects	0.01		0.01		0.01		0.01
Sum	99.98	99.67	74.87	99.69	396.56	99.62	357.49
	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi

90% Confidence level (14 entries) = 19.812

179.art, Ref110

Function level execution profile at optimization level O3

The following table contains function execution profiles and goodness–of–fit chi–squared statistic values for the train, test, and large (LgRed) reduced datasets as compared to the full SPEC reference datasets. Note: Medium (MdRed) and small (SmRed) reduced input sets are not available for this benchmark. This data was gathered with the gprof profiling utility. *90% Conf = Critical value of the chi–squared statistic at the 90 percent confidence level. Numbers in the Ref, Train, Test, and LgRed columns are the percent of overall execution time spent in the stated function (in the Function column). Numbers in the Train Chi, Test Chi, and LgRed Chi are the terms of the chi–squared statistic for the stated function (in the function column).

Function	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi
match	80.26	48.39	12.66	4.55	71.42	14.29	54.22
train_match	16.71	43.08	41.61	88.18	305.68	73.11	190.36
simtest2	0.97	1.08	0.01	0.04	0.89	0.08	0.82
weightadj	0.80	3.31	7.88	4.39	16.11	7.39	54.29
reset_nodes2	0.67	0.42	0.09	0.00	0.67	0.42	0.09
simtest	0.26	1.73	8.31	1.56	6.50	2.61	21.24
reset_nodes	0.14	0.58	1.38	0.37	0.38	0.59	1.45
scan_recognize	0.10	0.77	4.49	0.04	0.04	0.42	1.02
main	0.02	0.08	0.18	0.21	1.81	0.00	0.02
internal_mcount	0.02	0.23	2.21	0.16	0.98	0.25	2.65
.umul	0.02	0.12	0.50	0.16	0.98	0.42	8.00
sim_other_objects	0.01		0.01		0.01		0.01
_brk_unlocked	0.01	0.04	0.09	0.16	2.25	0.08	0.49
Sum	99.99	99.83	79.42	99.82	407.71	99.66	334.66
	Ref	Train	Train Chi	Test	Test Chi	LgRed	LgRed Chi

90% Confidence level (13 entries) = 18.549

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Instruction Mix profile at optimization level o0

The following table contains instruction mix breakdown and goodness–of–fit chi–squared statistic values for the train, test, and large reduced (LgRed) datasets , as compared to the full SPEC dataset. Note: Medium (MdRed) and small (SmRed) reduced input sets are not available for this benchmark. *90% Conf = Critical value of the chi–squared statistic at the 90 percent confidence level. Numbers in the Ref, Train, Test, and LgRed columns are the percent of overall instructions of the stated instruction type (in the Inst Type column). Numbers in the Train Chi, Test Chi, and LgRed Chi columns are the terms of the chi–squared statistic for the stated instruction type (in the Inst Type column).

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O0 program

Inst type	Ref	Train	Train Chi	Test	Test Chi	Lgred	LgRed Chi
load	36.79	36.21	0.01	36.09	0.01	36.12	0.01
store	6.36	6.63	0.01	5.95	0.03	6.82	0.03
uncond branch	3.42	3.10	0.03	3.32	0.00	3.09	0.03
cond branch	5.18	4.33	0.14	4.86	0.02	4.09	0.23
int computation	43.74	44.43	0.01	44.72	0.02	44.14	0.00
fp computation	4.51	5.30	0.14	5.05	0.06	5.75	0.34
trap	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sum	100.00	100.00	0.34	99.99	0.15	100.01	0.65
	Ref	Train	Train Chi	Test	Test Chi	Lgred	LgRed Chi

90% Confidence level (7 entries) = 10.645

179.art, Ref110

Instruction Mix profile at optimization level o1

The following table contains instruction mix breakdown and goodness–of–fit chi–squared statistic values for the train, test, and large reduced (LgRed) datasets , as compared to the full SPEC dataset. Note: Medium (MdRed) and small (SmRed) reduced input sets are not available for this benchmark. *90% Conf = Critical value of the chi–squared statistic at the 90 percent confidence level. Numbers in the Ref, Train, Test, and LgRed columns are the percent of overall instructions of the stated instruction type (in the Inst Type column). Numbers in the Train Chi, Test Chi, and LgRed Chi columns are the terms of the chi–squared statistic for the stated instruction type (in the Inst Type column).

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O1 program

Inst type	Ref	Train	Train Chi	Test	Test Chi	Lgred	LgRed Chi
load	17.84	18.46	0.02	19.96	0.25	18.59	0.03
store	5.87	6.63	0.10	5.81	0.00	6.54	0.08
uncond branch	0.44	0.83	0.35	0.61	0.07	1.22	1.38
cond branch	15.81	13.03	0.49	14.04	0.20	12.21	0.82
int computation	46.36	45.36	0.02	45.93	0.00	44.48	0.08
fp computation	13.68	15.69	0.30	13.64	0.00	16.96	0.79
trap	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sum	100.00	100.00	1.27	99.99	0.52	100.00	3.17
	Ref	Train	Train Chi	Test	Test Chi	Lgred	LgRed Chi

90% Confidence level (7 entries) = 10.645

179.art, Ref110

Instruction Mix profile at optimization level o2

The following table contains instruction mix breakdown and goodness–of–fit chi–squared statistic values for the train, test, and large reduced (LgRed) datasets , as compared to the full SPEC dataset. Note: Medium (MdRed) and small (SmRed) reduced input sets are not available for this benchmark. *90% Conf = Critical value of the chi–squared statistic at the 90 percent confidence level. Numbers in the Ref, Train, Test, and LgRed columns are the percent of overall instructions of the stated instruction type (in the Inst Type column). Numbers in the Train Chi, Test Chi, and LgRed Chi columns are the terms of the chi–squared statistic for the stated instruction type (in the Inst Type column).

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O2 program

Inst type	Ref	Train	Train Chi	Test	Test Chi	Lgred	LgRed Chi
load	18.93	20.10	0.07	21.43	0.33	20.34	0.11
store	6.37	7.39	0.16	6.30	0.00	7.33	0.14
uncond branch	0.04	0.21	0.72	0.23	0.90	0.45	4.20
cond branch	17.13	14.53	0.39	15.24	0.21	13.68	0.69
int computation	42.27	39.58	0.17	41.55	0.01	38.24	0.38
fp computation	15.26	18.18	0.56	15.24	0.00	19.95	1.44
trap	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sum	100.00	99.99	2.08	99.99	1.45	99.99	6.97
	Ref	Train	Train Chi	Test	Test Chi	Lgred	LgRed Chi

90% Confidence level (7 entries) = 10.645

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Instruction Mix profile at optimization level o3

The following table contains instruction mix breakdown and goodness–of–fit chi–squared statistic values for the train, test, and large reduced (LgRed) datasets , as compared to the full SPEC dataset. Note: Medium (MdRed) and small (SmRed) reduced input sets are not available for this benchmark. *90% Conf = Critical value of the chi–squared statistic at the 90 percent confidence level. Numbers in the Ref, Train, Test, and LgRed columns are the percent of overall instructions of the stated instruction type (in the Inst Type column). Numbers in the Train Chi, Test Chi, and LgRed Chi columns are the terms of the chi–squared statistic for the stated instruction type (in the Inst Type column).

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O3 program

Inst type	Ref	Train	Train Chi	Test	Test Chi	Lgred	LgRed Chi
load	18.85	19.73	0.04	21.04	0.25	19.51	0.02
store	6.39	7.52	0.20	6.43	0.00	7.62	0.24
uncond branch	0.00	0.01	0.00	0.00	0.00	0.01	0.00
cond branch	17.19	14.78	0.34	15.54	0.16	14.23	0.51
int computation	42.26	39.45	0.19	41.44	0.02	37.89	0.45
fp computation	15.31	18.50	0.66	15.54	0.00	20.74	1.93
trap	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sum	100.00	99.99	1.43	99.99	0.43	100.00	3.15
	Ref	Train	Train Chi	Test	Test Chi	Lgred	LgRed Chi

90% Confidence level (7 entries) = 10.645

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Cache profile

The following chart shows level 1 data cache miss rates for the ref, train, test, and LgRed datasets. Note: Medium (MdRed) and small (SmRed) reduced input sets are not available for this benchmark. This data was gathered with the sim–cache simulator from the SimpleScalar suite. Miss rate is stated as the ratio of level 1 misses to total level 1 accesses.

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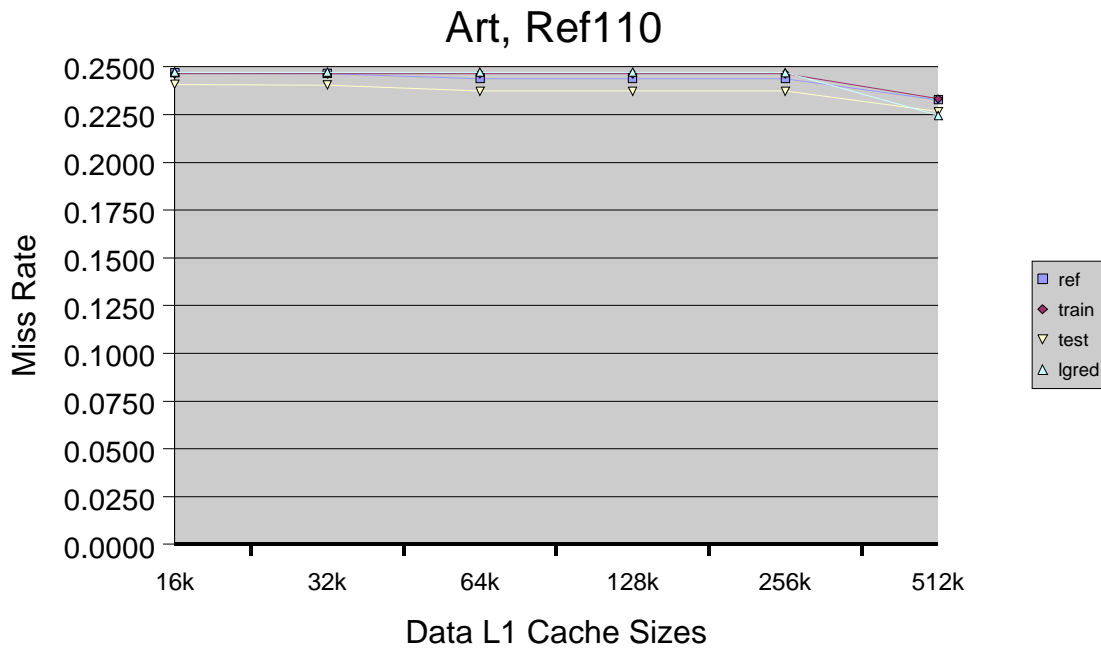
Instruction Counts for all Datasets

The following table shows the instruction counts and estimated simulation time for the reference (Ref), train, test, and large (LgRed) reduced datasets. Note: Medium (MdRed) and small (SmRed) reduced input sets are not available for this benchmark. Instruction counts are from the simulated benchmark, compiled at optimization level O0 and run with each input dataset. Estimated simulation times are calculated using a 45,000 instructions per second factor. This factor was determined by observing the simulation rate of a simulator similar to sim–outorder, run on a machine similar to the SPEC 2000 reference machine (a 333 Mhz Sparc).

	Ref	Train	Test	LgRed
Instruction Count (in millions)	181647	17434	15763	7741
Simulation Time (in hours)	1121.3	107.6	97.3	47.8

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