Table 1: Comparing with state-of-the-art tuners on 300 budget/30 runs. $\texttt{X}_p$ and $\texttt{X}_r$ denotes tuning with and without target performance requirement, respectively. ✗ denotes failed to complete in a reasonable time. The format follows Table **??**.

d%	System	$p_{t,2}$										
		CoTune	HEBO$_p$	HEBO$_r$	Flash$_p$	Flash$_r$	SMAC$_p$	SMAC$_r$	TurBO$_p$	TurBO$_r$	Bounce$_p$	Bounce$_r$
0.10%	7z	.35±.39 (1)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.01 (1)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)
	Kanzi	.01±.05 (1)	.00±.00 (2)	.00±.00 (2)	✗	✗	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)
	ExaStencils	.69±.46 (1)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)
	Apache	.00±.00 (1)	.00±.00 (1)	.00±.00 (1)	.00±.00 (1)	.00±.00 (1)	.00±.00 (1)	.00±.00 (1)	.00±.00 (1)	.00±.00 (1)	.00±.00 (1)	.00±.00 (1)
	SQLite	.03±.18 (1)	.00±.00 (2)	.00±.00 (2)	✗	✗	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)
	DConvert	.00±.00 (1)	.00±.00 (1)	.00±.00 (1)	.00±.00 (1)	.00±.00 (1)	.00±.00 (1)	.00±.00 (1)	.00±.00 (1)	.00±.00 (1)	.00±.00 (1)	.00±.00 (1)
	DeepArch	.73±.40 (1)	.10±.23 (2)	.00±.00 (3)	.00±.00 (3)	.00±.00 (3)	.12±.23 (2)	.00±.00 (3)	.00±.00 (3)	.00±.00 (3)	.00±.00 (3)	.00±.00 (3)
	Jump3r	.00±.00 (1)	.00±.00 (2)	.00±.00 (2)	✗	✗	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)
	HSMGP	.75±.40 (1)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.01±.03 (1)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)	.00±.00 (2)
1%	7z	.16±.18 (1)	.00±.01 (3)	.00±.01 (3)	.00±.01 (3)	.00±.01 (3)	.00±.01 (3)	.00±.01 (3)	.02±.06 (2)	.00±.00 (3)	.01±.05 (2)	.00±.02 (3)
	Kanzi	.05±.18 (1)	.04±.16 (1)	.04±.16 (1)	✗	✗	.04±.16 (1)	.04±.16 (1)	.04±.16 (1)	.04±.16 (1)	.00±.00 (2)	.00±.00 (2)
	ExaStencils	.80±.26 (1)	.07±.13 (3)	.29±.32 (2)	.02±.09 (4)	.02±.09 (4)	.09±.15 (3)	.02±.08 (4)	.02±.05 (4)	.02±.09 (4)	.01±.03 (5)	.00±.00 (6)
	Apache	.01±.06 (5)	.28±.35 (2)	.47±.41 (1)	.02±.10 (5)	.02±.10 (5)	.16±.25 (3)	.05±.18 (4)	.28±.33 (2)	.02±.10 (5)	.28±.33 (2)	.22±.31 (2)
	SQLite	.19±.30 (1)	.03±.10 (3)	.05±.16 (2)	✗	✗	.03±.13 (3)	.05±.16 (2)	.07±.19 (2)	.05±.16 (2)	.00±.00 (4)	.00±.00 (4)
	DConvert	.25±.14 (1)	.02±.05 (2)	.02±.05 (2)	.02±.05 (2)	.02±.05 (2)	.02±.05 (2)	.02±.05 (2)	.02±.05 (2)	.02±.05 (2)	.01±.04 (2)	.01±.04 (2)
	DeepArch	.93±.13 (1)	.51±.28 (3)	.30±.03 (4)	.00±.00 (7)	.00±.00 (7)	.60±.37 (2)	.00±.00 (7)	.00±.00 (7)	.00±.00 (7)	.09±.24 (5)	.00±.02 (6)
	Jump3r	.08±.21 (1)	.02±.13 (2)	.02±.13 (2)	✗	✗	.02±.13 (2)	.02±.13 (2)	.02±.13 (2)	.02±.13 (2)	.00±.00 (3)	.00±.00 (3)
	HSMGP	1.00±.01 (1)	.07±.21 (2)	.07±.21 (2)	.07±.21 (2)	.07±.21 (2)	.07±.21 (2)	.07±.21 (2)	.07±.21 (2)	.07±.21 (2)	.03±.17 (2)	.00±.00 (3)
5%	7z	.62±.41 (1)	.19±.32 (4)	.19±.32 (4)	.19±.32 (4)	.19±.32 (4)	.35±.38 (2)	.18±.32 (4)	.26±.38 (3)	.19±.32 (4)	.03±.16 (5)	.02±.04 (5)
	Kanzi	.14±.25 (2)	.22±.31 (1)	.25±.32 (1)	✗	✗	.23±.32 (1)	.23±.32 (1)	.25±.32 (1)	.23±.32 (1)	.10±.19 (2)	.10±.19 (2)
	ExaStencils	.95±.07 (1)	.29±.23 (3)	.38±.39 (2)	.08±.19 (6)	.08±.19 (6)	.26±.27 (3)	.07±.18 (6)	.18±.19 (4)	.13±.21 (5)	.02±.08 (7)	.00±.02 (8)
	Apache	.34±.16 (3)	.53±.23 (1)	.30±.29 (3)	.08±.17 (4)	.08±.17 (4)	.30±.25 (3)	.11±.20 (4)	.50±.19 (2)	.09±.18 (4)	.50±.20 (2)	.48±.19 (2)
	SQLite	.42±.39 (1)	.18±.29 (2)	.19±.30 (2)	✗	✗	.21±.30 (2)	.21±.30 (2)	.21±.30 (2)	.21±.30 (2)	.00±.00 (3)	.00±.00 (3)
	DConvert	.77±.16 (1)	.23±.32 (2)	.21±.30 (2)	.22±.30 (2)	.22±.30 (2)	.22±.30 (2)	.22±.30 (2)	.23±.30 (2)	.20±.29 (2)	.09±.21 (3)	.09±.21 (3)
	DeepArch	.99±.01 (1)	.82±.06 (2)	.80±.08 (3)	.12±.26 (6)	.12±.26 (6)	.65±.27 (4)	.12±.26 (6)	.12±.26 (6)	.12±.27 (6)	.23±.34 (5)	.04±.15 (7)
	Jump3r	.18±.34 (1)	.06±.22 (2)	.06±.22 (2)	✗	✗	.06±.22 (2)	.06±.22 (2)	.06±.22 (2)	.06±.22 (2)	.03±.15 (2)	.03±.15 (2)
	HSMGP	1.00±.00 (1)	.30±.34 (2)	.24±.34 (3)	.22±.34 (3)	.19±.31 (4)	.31±.35 (2)	.19±.31 (4)	.22±.34 (3)	.22±.34 (3)	.19±.32 (4)	.14±.29 (4)
20%	7z	.70±.15 (1)	.27±.25 (4)	.34±.24 (3)	.35±.24 (3)	.34±.24 (3)	.45±.18 (2)	.34±.24 (3)	.32±.27 (3)	.36±.23 (3)	.20±.24 (5)	.19±.18 (5)
	Kanzi	.64±.23 (1)	.52±.26 (2)	.51±.26 (2)	✗	✗	.52±.27 (2)	.52±.26 (2)	.52±.26 (2)	.52±.26 (2)	.28±.29 (3)	.28±.29 (3)
	ExaStencils	.99±.04 (1)	.58±.15 (3)	.65±.19 (2)	.23±.21 (6)	.22±.21 (6)	.26±.20 (5)	.21±.21 (6)	.32±.23 (4)	.26±.22 (5)	.06±.13 (7)	.02±.07 (8)
	Apache	.14±.02 (3)	.23±.22 (2)	.12±.07 (4)	.08±.08 (5)	.07±.08 (5)	.08±.09 (5)	.09±.13 (5)	.29±.21 (1)	.08±.09 (5)	.27±.20 (1)	.25±.19 (1)
	SQLite	.64±.19 (1)	.52±.20 (2)	.52±.20 (2)	✗	✗	.51±.22 (2)	.50±.22 (2)	.50±.22 (2)	.52±.21 (2)	.12±.20 (3)	.12±.20 (3)
	DConvert	.95±.02 (1)	.61±.29 (2)	.41±.24 (3)	.42±.24 (3)	.39±.25 (3)	.41±.24 (3)	.39±.25 (3)	.43±.23 (3)	.39±.25 (3)	.27±.27 (4)	.19±.25 (5)
	DeepArch	1.00±.00 (1)	1.00±.00 (3)	1.00±.00 (2)	.63±.29 (5)	.63±.29 (5)	.78±.14 (4)	.61±.30 (5)	.65±.29 (5)	.64±.30 (5)	.66±.27 (5)	.39±.33 (6)
	Jump3r	.15±.32 (1)	.08±.24 (2)	.08±.24 (2)	✗	✗	.08±.24 (2)	.08±.24 (2)	.08±.24 (2)	.08±.24 (2)	.04±.17 (3)	.04±.17 (3)
	HSMGP	.98±.13 (1)	.83±.30 (2)	.74±.38 (3)	.65±.42 (4)	.62±.43 (4)	.74±.36 (3)	.63±.42 (4)	.62±.43 (4)	.71±.37 (3)	.61±.40 (4)	.58±.41 (4)
50%	7z	.64±.28 (1)	.29±.19 (3)	.30±.20 (3)	.31±.20 (3)	.30±.20 (3)	.30±.20 (3)	.30±.20 (3)	.30±.23 (3)	.33±.22 (2)	.15±.04 (5)	.18±.07 (4)
	Kanzi	.64±.22 (1)	.59±.19 (2)	.60±.19 (2)	✗	✗	.59±.19 (2)	.60±.18 (2)	.59±.19 (2)	.59±.19 (2)	.41±.21 (3)	.41±.21 (3)
	ExaStencils	.88±.15 (1)	.12±.07 (2)	.11±.08 (2)	.06±.04 (4)	.06±.04 (4)	.06±.04 (4)	.06±.04 (4)	.07±.02 (3)	.07±.04 (3)	.02±.02 (5)	.02±.02 (6)
	Apache	.34±.17 (3)	.39±.30 (2)	.42±.21 (2)	.20±.16 (4)	.19±.16 (4)	.20±.16 (4)	.22±.21 (4)	.56±.30 (1)	.20±.16 (4)	.60±.30 (1)	.56±.30 (1)
	SQLite	.68±.19 (1)	.53±.11 (2)	.53±.11 (2)	✗	✗	.53±.11 (2)	.53±.11 (2)	.54±.11 (2)	.53±.11 (2)	.36±.14 (3)	.37±.14 (3)
	DConvert	.94±.02 (1)	.49±.28 (2)	.38±.26 (3)	.42±.24 (3)	.38±.26 (3)	.42±.24 (3)	.38±.26 (3)	.45±.23 (2)	.40±.25 (3)	.29±.22 (4)	.24±.22 (5)
	DeepArch	1.00±.00 (1)	1.00±.00 (3)	1.00±.00 (2)	.92±.07 (4)	.91±.10 (4)	.92±.07 (4)	.91±.10 (4)	.91±.10 (4)	.91±.10 (4)	.91±.02 (4)	.86±.16 (5)
	Jump3r	.42±.25 (1)	.32±.19 (2)	.33±.18 (2)	✗	✗	.33±.18 (2)	.33±.18 (2)	.33±.18 (2)	.32±.19 (2)	.21±.17 (3)	.21±.17 (3)
	HSMGP	1.00±.00 (1)	.92±.14 (2)	.87±.20 (3)	.79±.24 (4)	.79±.24 (4)	.89±.15 (3)	.80±.23 (4)	.83±.22 (4)	.79±.24 (4)	.76±.23 (5)	.76±.23 (5)
90%	7z	.81±.26 (1)	.42±.28 (2)	.42±.28 (2)	.42±.28 (2)	.42±.28 (2)	.42±.28 (2)	.42±.28 (2)	.39±.32 (2)	.43±.28 (2)	.21±.09 (4)	.25±.13 (3)
	Kanzi	.30±.22 (1)	.33±.24 (1)	.33±.24 (1)	✗	✗	.33±.23 (1)	.32±.23 (1)	.32±.24 (1)	.32±.24 (1)	.15±.15 (2)	.15±.15 (2)
	ExaStencils	.91±.14 (1)	.28±.19 (3)	.32±.15 (2)	.13±.10 (4)	.13±.10 (4)	.12±.10 (4)	.12±.10 (4)	.13±.07 (4)	.14±.10 (4)	.07±.02 (5)	.07±.02 (5)
	Apache	.80±.00 (4)	.81±.04 (3)	.87±.10 (1)	.80±.02 (4)	.80±.02 (4)	.80±.02 (4)	.80±.04 (3)	.80±.02 (4)	.80±.02 (4)	.85±.08 (2)	.84±.08 (2)
	SQLite	.68±.17 (1)	.53±.11 (2)	.53±.11 (2)	✗	✗	.53±.11 (2)	.53±.11 (2)	.54±.11 (2)	.53±.11 (2)	.41±.06 (3)	.41±.06 (3)
	DConvert	.94±.03 (1)	.51±.31 (2)	.51±.32 (2)	.51±.32 (2)	.51±.32 (2)	.51±.32 (2)	.51±.32 (2)	.51±.32 (2)	.51±.32 (2)	.33±.28 (3)	.33±.28 (3)
	DeepArch	1.00±.00 (1)	1.00±.00 (2)	1.00±.00 (2)	.91±.10 (3)	.91±.09 (3)	.91±.10 (3)	.91±.09 (3)	.92±.07 (3)	.91±.10 (3)	.89±.13 (4)	.86±.16 (4)
	Jump3r	.27±.38 (1)	.10±.23 (2)	.11±.23 (2)	✗	✗	.11±.23 (2)	.11±.23 (2)	.11±.23 (2)	.11±.23 (2)	.06±.17 (3)	.06±.17 (3)
	HSMGP	1.00±.00 (1)	.82±.31 (2)	.82±.29 (2)	.70±.38 (4)	.67±.39 (4)	.70±.38 (4)	.68±.38 (4)	.76±.34 (3)	.76±.34 (3)	.61±.39 (5)	.61±.38 (5)
Average p_t score/rank		.57/1.19	.34/2.00	.33/2.09	.27/3.11	.26/3.11	.30/2.35	.25/2.65	.28/2.54	.26/2.83	.21/3.26	.19/3.46