tide GPT-char

Lucy Score = Throughput x Availability x Acc / 10,000. LPD condenses live-fit vs Acc-champ RAM.
[T]=Tween [S]=Split [FP]=FastProxy [L]=Linear [HP]=HeadProxy
done - epoch 1 - lr 1000 - 2026-08-21 16:08:52 - 0.0.0.0:8155
This epoch 986 / 986 cells. Recorded 986 results. Learning rate 1000.
Score 0 usually means the cell finished before a Lucy pulse (Acc never sampled). Score is live-fit: Throughput x Availability x Acc.
SGD that blocks serve dies on Availability. SoftAcc is serve-confidence only.
live_gpt v1.0.0 - cameralx3 - tinyshakespeare - 4096 windows - seq 32 - causal MHA - A->B->A2 - SIMD

Lucy champions (this tide)

Axis	Cell	Score	Soft	Acc	Thru	Avail
hard acc	fp4|none|[T]Alt|tricameral|simd	2.45	8.2	10.2	198.7	12.1
throughput	float32|none|[T][S][L]|tricameral|simd	9.72	0.0	2.5	1125.6	34.1
availability	int|none|[T][S][L]Cache|tricameral|simd	4.41	1.6	2.5	487.6	35.7
lucy score	int4|none|[T][S][L]Cache|tricameral|simd	31.65	4.8	9.0	1033.2	34.2
mobile score (trap)	binary|none|[T][S][L]Cache|tricameral|simd	29.59	4.7	8.4	1023.2	34.4
t->50%	int2|none|[T][S][HP]Async|tricameral|simd	12.49	5.0	10.2	552.0	22.3
acc/sec	int8|none|[T][S][L]Cache|tricameral|simd	30.82	4.7	8.9	1026.1	33.9

Lucy axis champions (this tide)

Axis	Mode	DType	Arch	Value
hard_acc	Step[T][S]	bfloat16	tricameralx3	11.20
throughput	[T][S][L]	float32	tricameralx3	1125.55
availability	[T][S][L]Cache	int	tricameralx3	35.75
score	[T][S][L]Cache	int4	tricameralx3	31.65
soft_acc	[T]Alt	fp4	tricameralx3	8.18
acc_thru	[T][S][L]Cache	int2	tricameralx3	92.63
realtime	[T][S][L]	float32	tricameralx3	383.61
adapt	[T]Alt	fp4	tricameralx3	8.61
keep_learn	[T][S][L]Cache	int2	tricameralx3	10.55
acc_per_sec	[T][S][L]Cache	int8	tricameralx3	1.44
time_to_50	[T][S][HP]Async	int2	tricameralx3	12.04
consistency	[T]Alt	fp4	tricameralx3	18.18
stability	sgd	fp4	tricameralx3	100.00
mobile_score	[T][S][L]Cache	binary	tricameralx3	2815.66
lpd	[T][S][L]Cache	int2	tricameralx3	7.31
mspeed	[T][S][L]Cache	int4	tricameralx3	1.00
mavail	[T][S][L]Cache	uint16	tricameralx3	1.00
mix	[T][S][L]Cache	int4	tricameralx3	0.92
gold_std	[T][S][L]Cache	int2	tricameralx3	21.52

Best settings per train mode

Mode	DType	Format	Score	Soft	Acc	Avail	n
[T][S][L]Cache	int4	none	31.7	4.8	9.0	34.2	34
[T][S][L]	int8	none	22.1	4.5	7.5	31.6	34
Mesh[T][S]Sparse	int4	none	21.3	4.4	6.8	32.8	34
[T][S]Sparse	int2	none	20.8	4.3	6.6	32.9	34
Step[T][S][L]Cache	float32	none	19.3	2.9	8.9	28.0	34
Step[T][S][L]	float32	none	18.5	2.6	8.6	27.8	34
[T][S][HP]Async	int2	none	12.5	5.0	10.2	22.3	34
Step[T][S][HP]Async	float32	none	12.3	3.4	11.0	21.2	34
Step[T][S][FP]	float32	none	11.5	3.3	10.1	21.3	34

[T][S][FP]	int2	none	11.0	4.8	8.9	22.2	34
Step[T][S]Sparse	float32	none	10.5	3.1	9.2	21.3	34
[T][S][HP]	int8	none	10.4	4.2	6.5	24.8	34
Step[T][S]	float32	none	10.1	3.0	9.1	21.0	34
step_tween	float32	none	9.8	2.5	9.3	20.6	34
step_sgd	int8	none	9.7	3.9	6.7	23.5	34
[T][S]	int8	none	9.5	4.3	6.2	24.2	34
Mesh[T][S][FP]	int8	none	9.5	3.6	6.1	24.4	34
Step[T][S][HP]	float32	none	9.4	3.1	9.0	20.5	34
Mesh[T][S]	int8	none	9.0	4.0	5.6	24.7	34
step_tween_chain	int8	none	8.6	2.7	5.8	23.6	34
tween	float32	none	7.3	2.3	8.9	18.2	34
tween_chain	int8	none	7.0	4.3	6.9	20.2	34
Mesh[T]	float32	none	6.6	2.3	8.4	17.9	34
Mesh[T]Chain	uint8	none	6.6	4.4	6.9	20.8	34
sgd	uint8	none	6.4	4.0	6.6	20.6	34
MeshBP	uint8	none	6.3	4.4	7.1	20.2	34
Step[T]Alt	float32	none	4.3	3.3	8.8	14.5	34
Mesh[T]Alt	uint8	none	3.2	6.7	8.2	13.9	34
[T]Alt	int8	none	3.0	6.2	8.4	12.5	34

Best dtype per mode

Mode	Winner dtype	Score	Soft	Acc
[T][S][L]Cache	int4	31.7	4.8	9.0
[T][S][L]	int8	22.1	4.5	7.5
Mesh[T][S]Sparse	int4	21.3	4.4	6.8
[T][S]Sparse	int2	20.8	4.3	6.6
Step[T][S][L]Cache	float32	19.3	2.9	8.9
Step[T][S][L]	float32	18.5	2.6	8.6
[T][S][HP]Async	int2	12.5	5.0	10.2
Step[T][S][HP]Async	float32	12.3	3.4	11.0
Step[T][S][FP]	float32	11.5	3.3	10.1
[T][S][FP]	int2	11.0	4.8	8.9
Step[T][S]Sparse	float32	10.5	3.1	9.2
[T][S][HP]	int8	10.4	4.2	6.5
Step[T][S]	float32	10.1	3.0	9.1
step_tween	float32	9.8	2.5	9.3
step_sgd	int8	9.7	3.9	6.7
[T][S]	int8	9.5	4.3	6.2
Mesh[T][S][FP]	int8	9.5	3.6	6.1
Step[T][S][HP]	float32	9.4	3.1	9.0
Mesh[T][S]	int8	9.0	4.0	5.6
step_tween_chain	int8	8.6	2.7	5.8
tween	float32	7.3	2.3	8.9
tween_chain	int8	7.0	4.3	6.9
Mesh[T]	float32	6.6	2.3	8.4
Mesh[T]Chain	uint8	6.6	4.4	6.9
sgd	uint8	6.4	4.0	6.6
MeshBP	uint8	6.3	4.4	7.1
Step[T]Alt	float32	4.3	3.3	8.8
Mesh[T]Alt	uint8	3.2	6.7	8.2
[T]Alt	int8	3.0	6.2	8.4

Best mode per dtype

DType	Winner mode	Score	Soft	Acc
int4	[T][S][L]Cache	31.7	4.8	9.0
int2	[T][S][L]Cache	31.4	4.8	9.1
int8	[T][S][L]Cache	30.8	4.7	8.9
ternary	[T][S][L]Cache	30.2	4.7	8.7
binary	[T][S][L]Cache	29.6	4.7	8.4
uint8	[T][S][L]Cache	26.9	4.6	8.4
float32	Step[T][S][L]Cache	19.3	2.9	8.9
uint16	[T][S][L]Cache	18.7	4.6	8.7
uint4	[T][S][L]Cache	17.1	4.7	8.4
int32	[T][S][L]Cache	17.0	4.9	8.7
int16	[T][S][L]Cache	16.8	4.9	8.8
uint32	[T][S][L]Cache	16.6	4.8	8.2
uint2	[T][S][L]Cache	15.6	4.6	7.6
uint64	[T][S][L]Cache	15.1	4.7	7.2
float64	Step[T][S][L]	15.0	3.0	9.4
uintptr	[T][S][L]Cache	14.8	4.7	8.3
bfloat16	Step[T][S][L]	14.3	2.8	9.7
uint	[T][S][L]Cache	13.6	4.5	7.5
nf4	[T][S][L]Cache	12.6	4.5	8.4
int64	Step[T][S][L]	11.6	3.6	10.6
uint3	[T][S][L]Cache	10.2	4.7	8.4
float16	Step[T][S][L]Cache	10.1	2.8	9.2
int3	[T][S][L]Cache	9.8	4.5	8.1
complex128	Step[T][S][L]	9.5	3.6	10.1
complex64	Step[T][S][L]Cache	9.3	3.2	9.8
fp8e5m2	Step[T][S][L]Cache	9.1	3.0	8.4
int	Step[T][S][L]Cache	8.6	3.4	10.1
int5	[T][S][L]Cache	8.6	4.7	8.5
uint5	[T][S][L]Cache	8.5	4.6	8.0
uint6	[T][S][L]Cache	8.3	4.9	8.7
fp4	Mesh[T][S]	7.8	4.4	7.0
fp6	[T][S][L]Cache	7.7	4.8	8.6
fp8e4m3	Step[T][S][L]Cache	7.6	2.5	8.3
int6	[T][S][L]Cache	7.6	4.7	8.4

Leaderboard (Lucy Score)

#	Cell	Score	Soft	Acc	Thru	Avail
1	int4|none|[T][S][L]Cache|tricameral|simd	31.7	4.8	9.0	1033.2	34.2
2	int2|none|[T][S][L]Cache|tricameral|simd	31.4	4.8	9.1	1018.9	33.9
3	int8|none|[T][S][L]Cache|tricameral|simd	30.8	4.7	8.9	1026.1	33.9
4	ternary|none|[T][S][L]Cache|tricameral|simd	30.2	4.7	8.7	1024.7	34.0
5	binary|none|[T][S][L]Cache|tricameral|simd	29.6	4.7	8.4	1023.2	34.4
6	uint8|none|[T][S][L]Cache|tricameral|simd	26.9	4.6	8.4	927.9	34.5
7	int8|none|[T][S][L]|tricameral|simd	22.1	4.5	7.5	928.6	31.6
8	int4|none|[T][S][L]|tricameral|simd	21.7	4.4	7.1	942.0	32.3
9	int4|none|Mesh[T][S]Sparse|tricameral|simd	21.3	4.4	6.8	956.8	32.8
10	int2|none|[T][S]Sparse|tricameral|simd	20.8	4.3	6.6	963.0	32.9
11	int2|none|Mesh[T][S]Sparse|tricameral|simd	20.8	4.3	6.6	962.3	32.9
12	int2|none|[T][S][L]|tricameral|simd	20.7	4.4	7.2	912.6	31.6
13	int8|none|Mesh[T][S]Sparse|tricameral|simd	20.5	3.6	6.3	984.9	33.1

14	int4|none|[T][S]Sparse|tricameral|simd	19.9	3.7	6.1	981.3	33.2
15	uint8|none|[T][S][L]|tricameral|simd	19.6	4.6	7.4	829.2	32.1
16	ternary|none|Mesh[T][S]Sparse|tricameral|simd	19.6	3.6	6.5	937.9	32.3
17	float32|none|Step[T][S][L]Cache|tricameral|simd	19.3	2.9	8.9	773.7	28.0
18	int8|none|[T][S]Sparse|tricameral|simd	18.8	3.2	5.7	999.8	33.2
19	binary|none|Mesh[T][S]Sparse|tricameral|simd	18.7	3.4	6.2	936.5	32.4
20	uint16|none|[T][S][L]Cache|tricameral|simd	18.7	4.6	8.7	604.4	35.6

Leaderboard (SoftAcc)

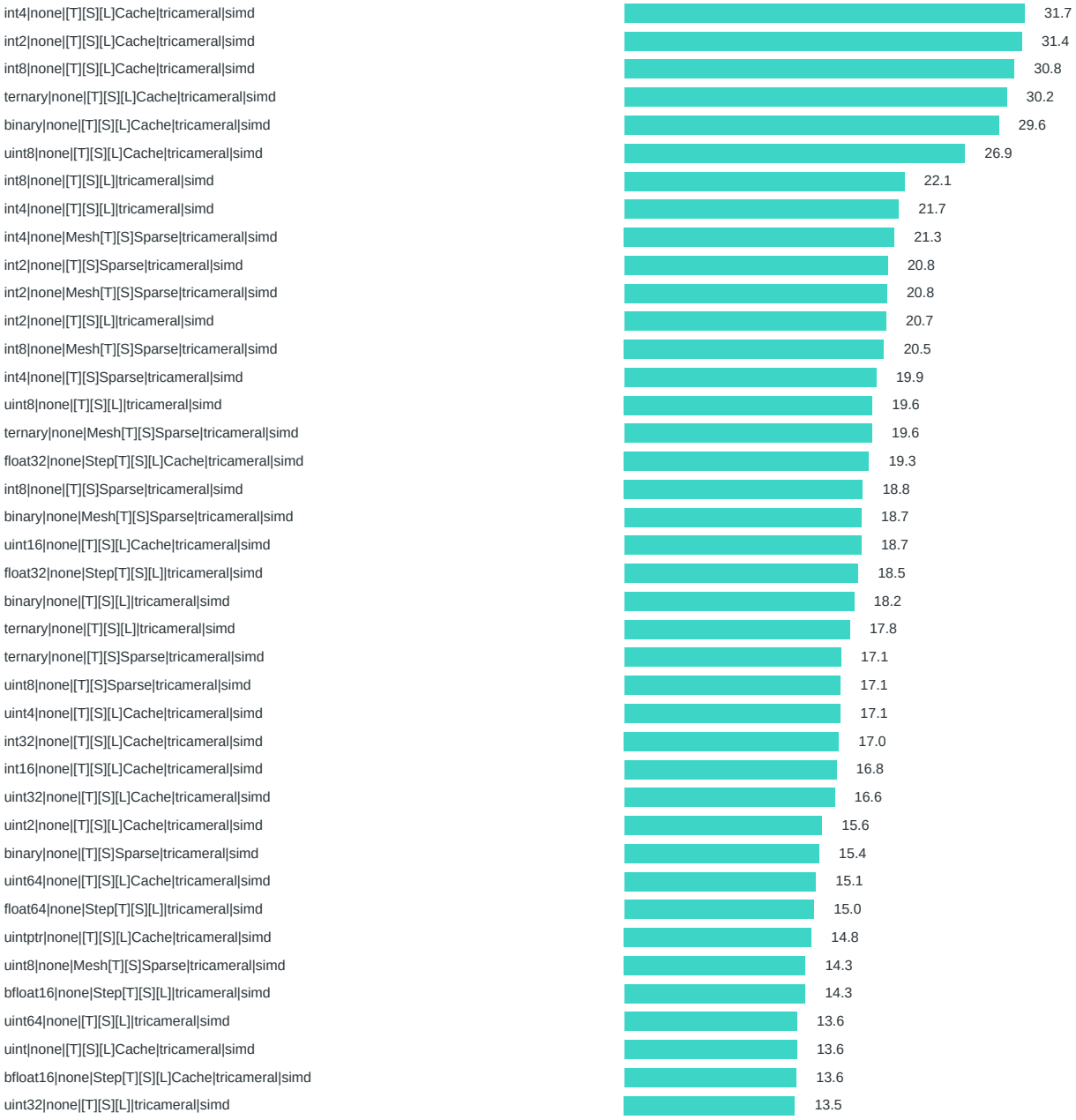
#	Cell	Score	Soft	Acc	Thru	Avail
1	int16|none|[T][S][L]Cache|tricameral|simd	16.8	4.9	8.8	544.7	35.0
2	int32|none|[T][S][L]Cache|tricameral|simd	17.0	4.9	8.7	553.7	35.1
3	int4|none|[T][S][L]Cache|tricameral|simd	31.7	4.8	9.0	1033.2	34.2
4	int2|none|[T][S][L]Cache|tricameral|simd	31.4	4.8	9.1	1018.9	33.9
5	uint32|none|[T][S][L]Cache|tricameral|simd	16.6	4.8	8.2	582.2	34.8
6	binary|none|[T][S][L]Cache|tricameral|simd	29.6	4.7	8.4	1023.2	34.4
7	uint4|none|[T][S][L]Cache|tricameral|simd	17.1	4.7	8.4	580.6	34.9
8	uintptr|none|[T][S][L]Cache|tricameral|simd	14.8	4.7	8.3	511.0	35.0
9	ternary|none|[T][S][L]Cache|tricameral|simd	30.2	4.7	8.7	1024.7	34.0
10	uint64|none|[T][S][L]|tricameral|simd	13.6	4.7	7.2	560.4	33.7
11	int8|none|[T][S][L]Cache|tricameral|simd	30.8	4.7	8.9	1026.1	33.9
12	uint64|none|[T][S][L]Cache|tricameral|simd	15.1	4.7	7.2	596.9	35.2
13	uint8|none|[T][S][L]Cache|tricameral|simd	26.9	4.6	8.4	927.9	34.5
14	uint16|none|[T][S][L]Cache|tricameral|simd	18.7	4.6	8.7	604.4	35.6
15	uint2|none|[T][S][L]Cache|tricameral|simd	15.6	4.6	7.6	578.2	35.6
16	uint8|none|[T][S][L]|tricameral|simd	19.6	4.6	7.4	829.2	32.1
17	ternary|none|[T][S][L]|tricameral|simd	17.8	4.6	6.6	879.2	30.8
18	uint|none|[T][S][L]Cache|tricameral|simd	13.6	4.5	7.5	514.9	35.3
19	uint32|none|[T][S][L]|tricameral|simd	13.5	4.5	7.2	554.0	33.6
20	int8|none|[T][S][L]|tricameral|simd	22.1	4.5	7.5	928.6	31.6

Leaderboard (hard Acc)

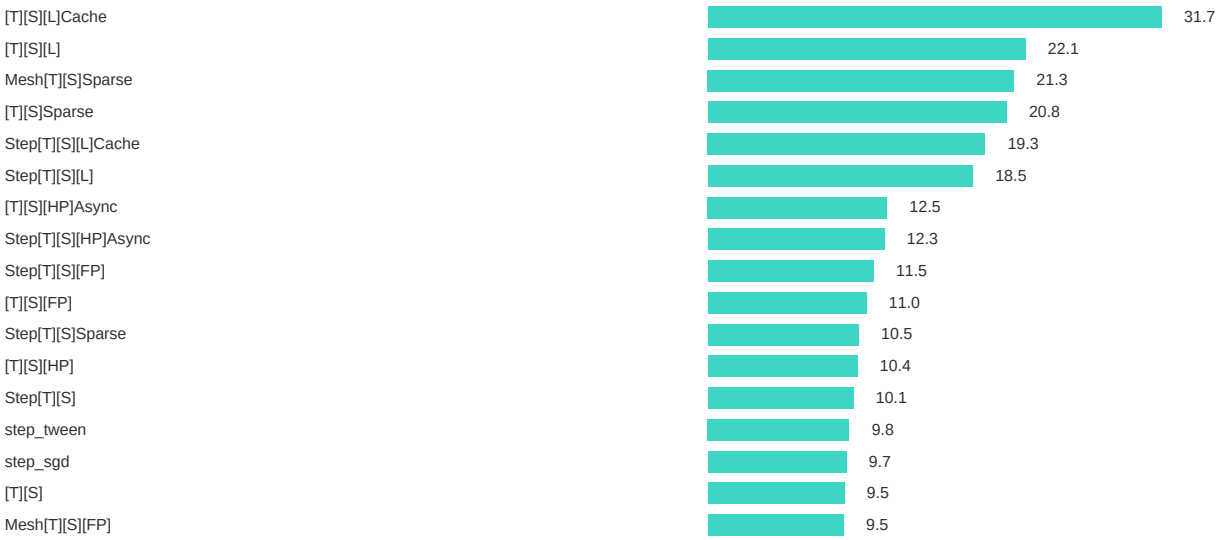
#	Cell	Score	Soft	Acc	Thru	Avail
1	bfloat16|none|Step[T][S][L]|tricameral|simd	14.3	2.8	9.7	532.9	27.6
2	float64|none|Step[T][S][L]|tricameral|simd	15.0	3.0	9.4	556.0	28.7
3	int2|none|[T][S][L]Cache|tricameral|simd	31.4	4.8	9.1	1018.9	33.9
4	int4|none|[T][S][L]Cache|tricameral|simd	31.7	4.8	9.0	1033.2	34.2
5	float32|none|Step[T][S][L]Cache|tricameral|simd	19.3	2.9	8.9	773.7	28.0
6	int8|none|[T][S][L]Cache|tricameral|simd	30.8	4.7	8.9	1026.1	33.9
7	int16|none|[T][S][L]Cache|tricameral|simd	16.8	4.9	8.8	544.7	35.0
8	int32|none|[T][S][L]Cache|tricameral|simd	17.0	4.9	8.7	553.7	35.1
9	uint16|none|[T][S][L]Cache|tricameral|simd	18.7	4.6	8.7	604.4	35.6
10	ternary|none|[T][S][L]Cache|tricameral|simd	30.2	4.7	8.7	1024.7	34.0
11	float32|none|Step[T][S][L]|tricameral|simd	18.5	2.6	8.6	769.4	27.8
12	bfloat16|none|Step[T][S][L]Cache|tricameral|simd	13.6	2.3	8.6	555.9	28.5
13	uint4|none|[T][S][L]Cache|tricameral|simd	17.1	4.7	8.4	580.6	34.9
14	uint8|none|[T][S][L]Cache|tricameral|simd	26.9	4.6	8.4	927.9	34.5
15	binary|none|[T][S][L]Cache|tricameral|simd	29.6	4.7	8.4	1023.2	34.4
16	uintptr|none|[T][S][L]Cache|tricameral|simd	14.8	4.7	8.3	511.0	35.0
17	uint32|none|[T][S][L]Cache|tricameral|simd	16.6	4.8	8.2	582.2	34.8
18	uint2|none|[T][S][L]Cache|tricameral|simd	15.6	4.6	7.6	578.2	35.6
19	int8|none|[T][S][L]|tricameral|simd	22.1	4.5	7.5	928.6	31.6

20	uint|none|[T][S][L]Cache|tricameral|simd	13.6	4.5	7.5	514.9	35.3

Top scores



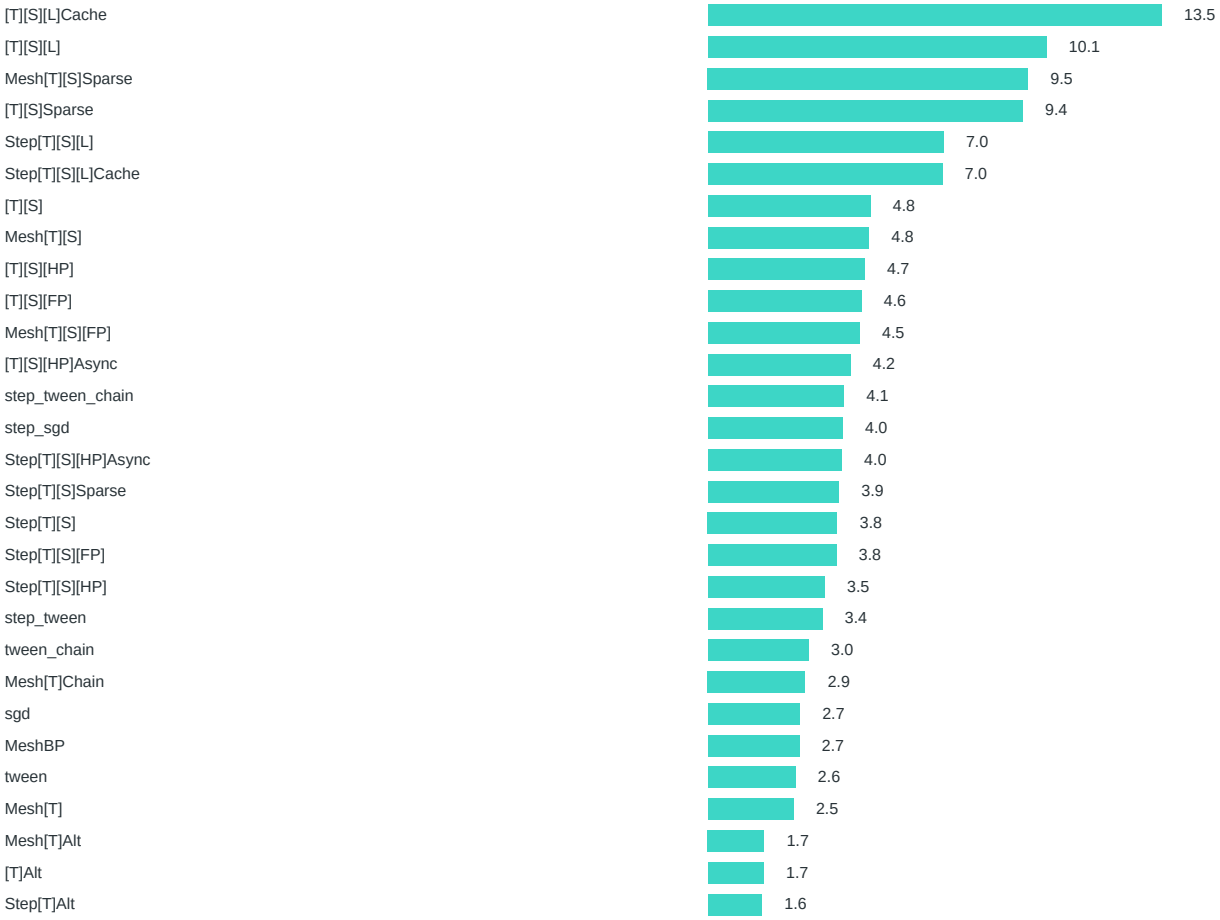
Best settings per mode



Best settings per mode



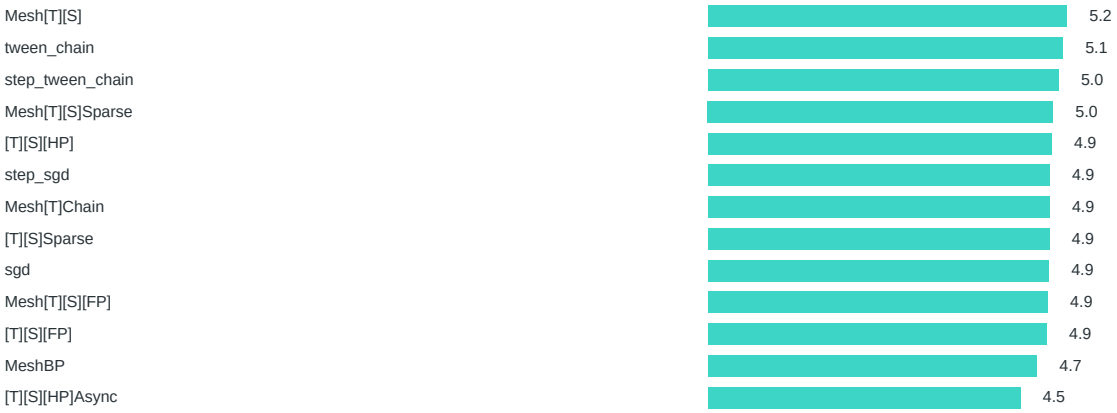
Mean Score by train mode



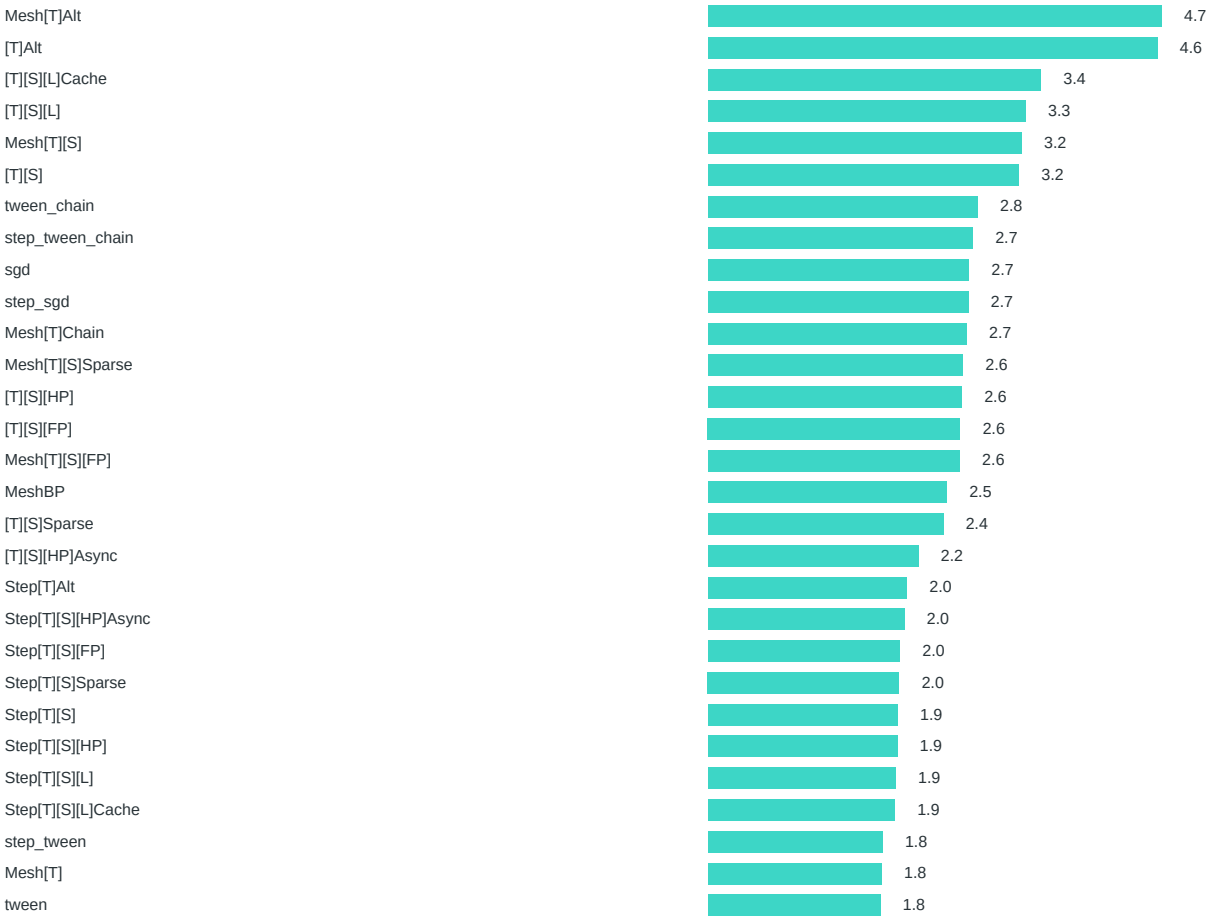
Mean hard Acc by train mode



Mean hard Acc by train mode



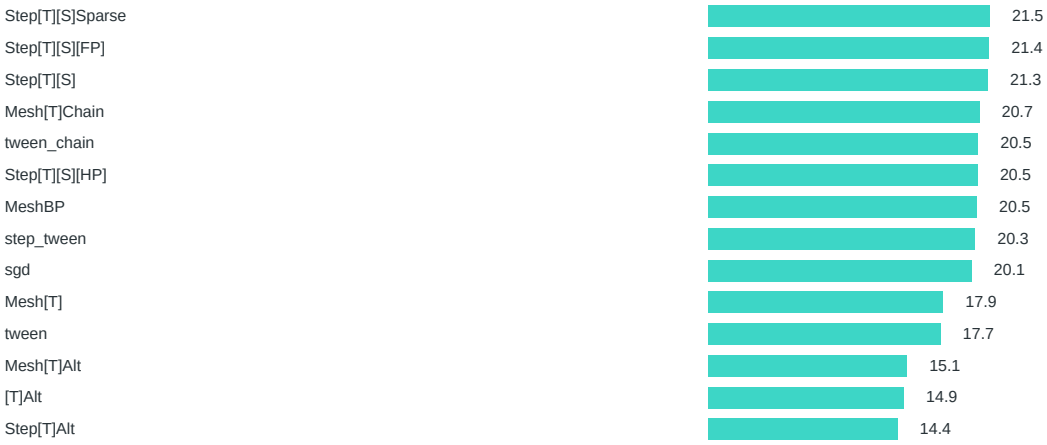
Mean SoftAcc by train mode



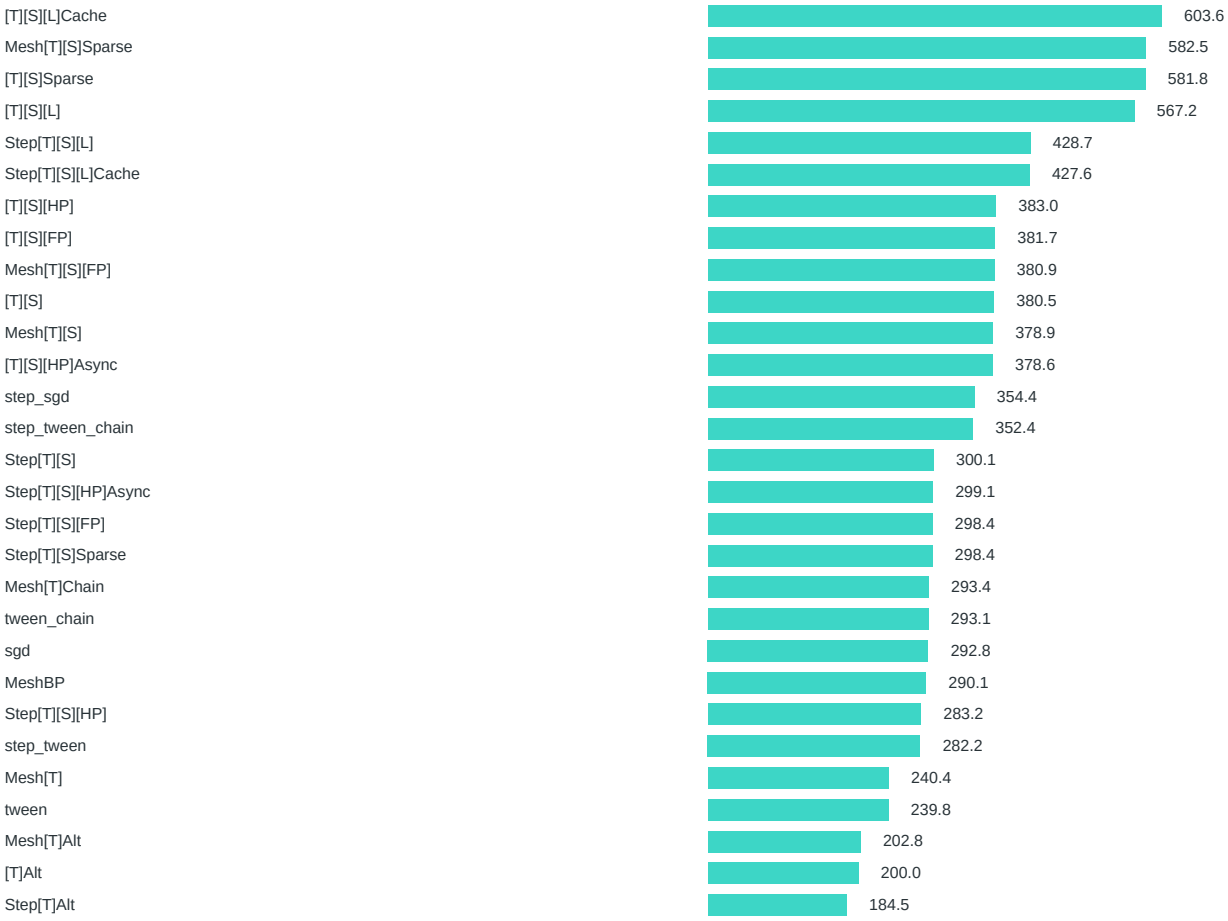
Mean Availability by train mode



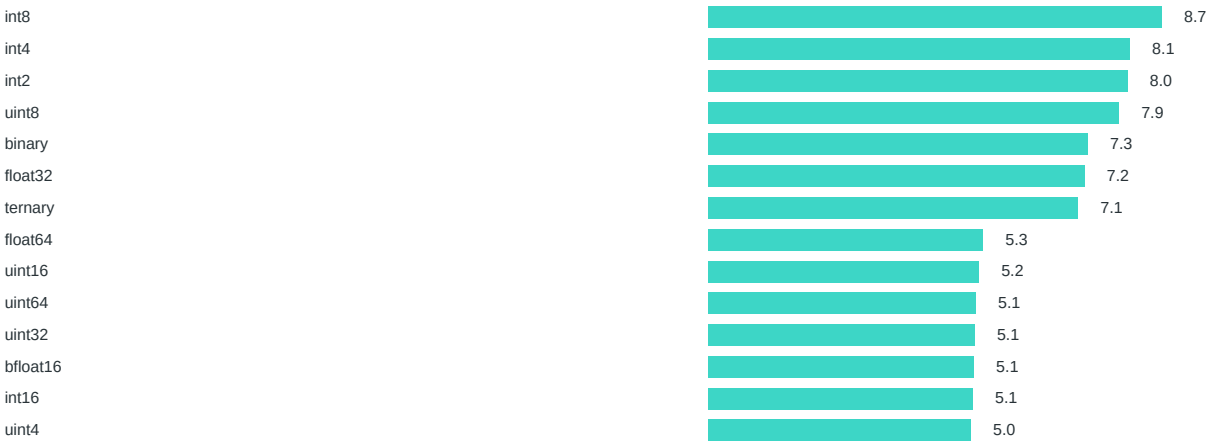
Mean Availability by train mode



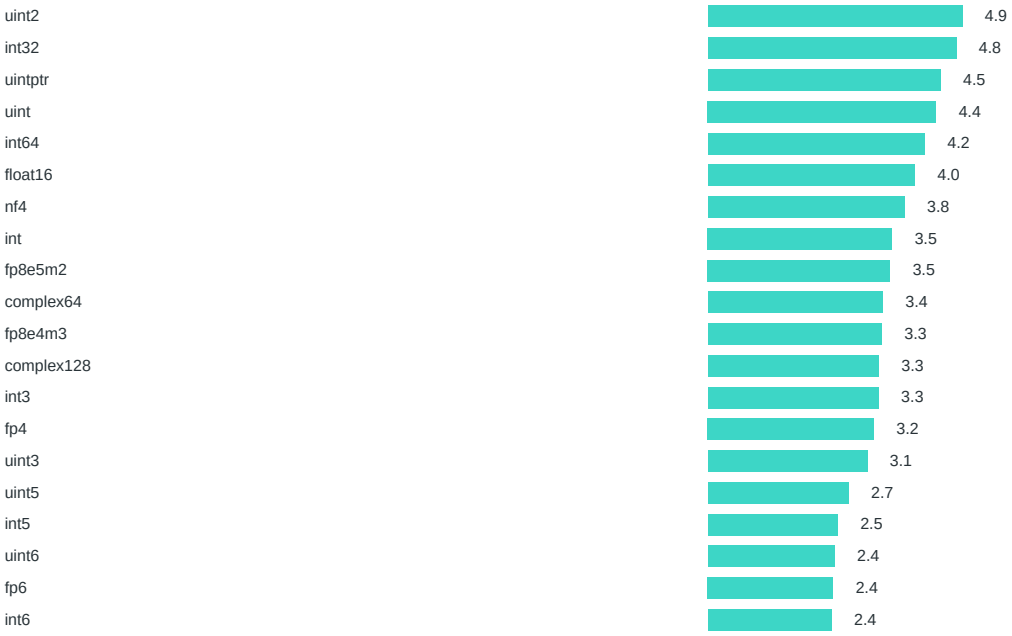
Mean Throughput by train mode



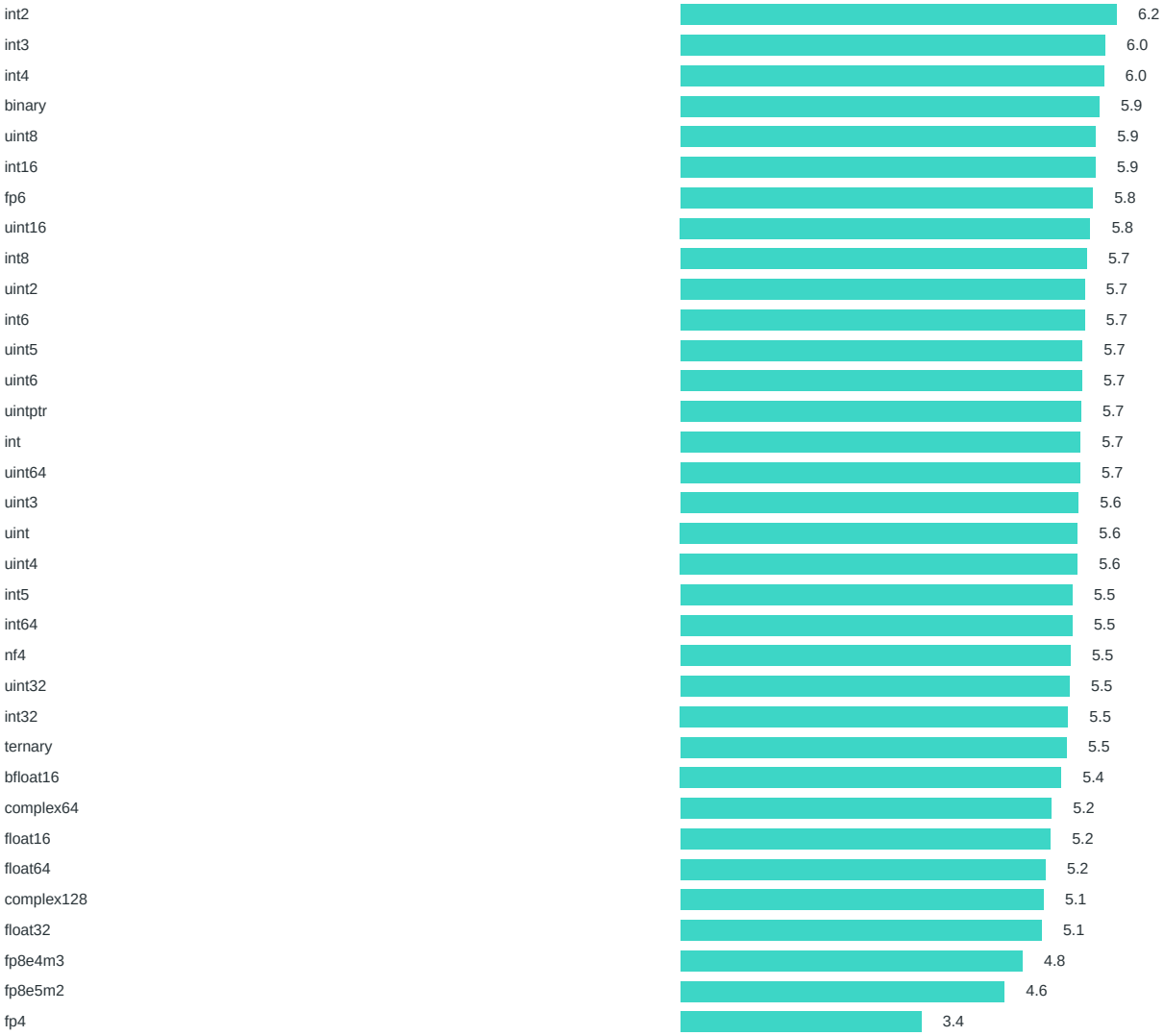
Mean Score by dtype



Mean Score by dtype



Mean hard Acc by dtype



Mean Score by arch



Honesty - mean Score, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	2	5	1	1	2	3	2	2	2	2	2	1
Mesh[T]	5	3	4	4	4	7	4	1	1	3	3	4
Mesh[T]Alt	2	2	1	2	2	3	2	3	1	1	2	1
Mesh[T]Chain	2	5	1	1	2	3	2	2	2	2	1	3
Mesh[T][S]	4	8	3	2	3	5	3	8	3	3	2	4
Mesh[T][S][FP]	3	7	2	2	2	4	3	3	3	2	3	2
Mesh[T][S]Sparse	7	19	4	4	5	9	7	7	5	5	5	5
Step[T]Alt	3	1	2	2	3	4	4	1	1	2	2	2
Step[T][S]	9	5	5	5	5	10	8	2	1	4	5	5
Step[T][S][FP]	6	5	6	5	6	12	7	2	1	4	5	6
Step[T][S][HP]	7	4	5	5	6	9	7	2	1	4	4	5
Step[T][S][HP]Async	9	4	5	5	6	12	8	2	1	4	5	6
Step[T][S][L]	14	9	9	9	9	18	15	3	2	7	8	7
Step[T][S][L]Cache	14	9	7	9	10	19	13	4	2	8	9	9
Step[T][S]Sparse	8	4	5	5	7	11	8	2	1	4	5	5
[T]Alt	2	2	1	1	2	3	2	2	1	1	1	1
[T][S]	3	8	2	2	3	5	3	7	3	3	2	4
[T][S][FP]	3	8	2	2	2	4	3	3	3	3	2	2
[T][S][HP]	3	7	2	2	2	5	4	3	3	3	3	3
[T][S][HP]Async	3	6	2	2	2	4	4	3	2	2	3	2
[T][S][L]	6	18	4	3	5	10	6	7	6	3	5	4
[T][S][L]Cache	6	30	4	4	5	10	7	7	8	5	5	4
[T][S]Sparse	7	15	4	5	6	10	8	7	6	7	5	5
sgd	2	4	1	1	2	3	2	2	2	1	2	1
step_sgd	2	6	2	2	2	4	3	3	2	2	2	2
step_tween	7	3	4	5	5	10	7	2	1	4	4	4
step_tween_chain	3	7	2	2	2	4	3	2	3	2	2	2
tween	6	3	3	3	4	7	6	1	1	3	3	3
tween_chain	2	6	1	1	2	3	2	2	2	2	2	1

Honesty - mean Score, every mode x dtype (cols 13-24)

Honesty - mean Score, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	4	6	3	2	5	2	1	2	4	1	5	3
Mesh[T]	2	3	1	2	3	1	1	3	4	2	2	2
Mesh[T]Alt	2	2	1	2	2	1	1	1	3	2	2	1
Mesh[T]Chain	3	6	3	2	5	2	1	1	6	3	5	2
Mesh[T][S]	6	6	3	6	8	3	3	5	9	4	7	5
Mesh[T][S][FP]	5	8	4	5	9	3	3	2	9	5	6	6
Mesh[T][S]Sparse	11	21	8	9	21	4	6	5	21	9	20	8
Step[T]Alt	1	1	1	1	2	1	1	3	2	1	1	1
Step[T][S]	3	4	2	3	4	1	1	7	5	2	4	3
Step[T][S][FP]	3	3	2	3	5	1	1	6	5	2	4	3
Step[T][S][HP]	3	3	1	3	4	1	1	5	5	2	3	3
Step[T][S][HP]Async	3	4	2	3	4	2	1	7	5	2	4	3
Step[T][S][L]	5	8	3	5	9	2	2	12	10	4	10	5
Step[T][S][L]Cache	6	9	3	5	10	3	2	9	9	4	9	5
Step[T][S]Sparse	3	4	2	3	4	2	2	6	5	2	4	3
[T]Alt	2	2	1	2	2	1	1	1	3	1	2	1
[T][S]	6	7	4	6	8	3	3	5	10	4	8	5
[T][S][FP]	6	11	4	5	8	3	3	3	9	4	6	5
[T][S][HP]	5	8	4	6	9	3	3	3	10	5	7	4
[T][S][HP]Async	5	12	4	5	8	3	3	2	9	3	6	4
[T][S][L]	12	21	8	13	22	6	5	5	22	9	18	12
[T][S][L]Cache	17	31	10	17	32	9	8	5	31	13	30	14
[T][S]Sparse	11	21	8	10	20	6	5	6	19	9	17	10
sgd	4	6	3	4	5	1	2	1	3	2	2	3
step_sgd	6	7	3	4	7	3	2	2	10	4	6	4
step_tween	3	4	1	3	3	1	1	6	6	2	3	2
step_tween_chain	5	7	3	5	7	2	3	2	9	3	7	5
tween	2	3	1	2	3	1	1	4	4	2	2	2
tween_chain	4	5	2	4	6	1	1	1	7	3	4	3

Honesty - mean Score, every mode x dtype (cols 25-34)

Honesty - mean Score, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	4	2	3	2	5	2	1	4	6	3
Mesh[T]	2	2	1	2	2	1	1	2	3	2
Mesh[T]Alt	2	2	1	2	2	1	1	2	3	2
Mesh[T]Chain	4	4	3	3	3	2	2	3	7	2
Mesh[T][S]	6	6	3	6	5	3	3	6	9	5
Mesh[T][S][FP]	6	5	3	5	4	3	3	5	8	6
Mesh[T][S]Sparse	11	12	7	13	10	6	6	12	14	9
Step[T]Alt	2	1	1	1	1	1	1	1	2	1
Step[T][S]	3	3	2	3	3	2	1	3	5	3
Step[T][S][FP]	4	3	2	3	3	2	1	3	4	3
Step[T][S][HP]	3	3	2	3	3	2	1	3	4	2
Step[T][S][HP]Async	3	3	2	3	3	2	2	3	4	3
Step[T][S][L]	5	6	3	6	6	3	3	6	9	5
Step[T][S][L]Cache	6	6	3	6	6	3	2	5	8	5
Step[T][S]Sparse	4	3	2	3	3	1	1	4	5	3
[T]Alt	2	2	1	2	2	1	1	2	3	2
[T][S]	6	5	3	6	6	3	3	6	8	5
[T][S][FP]	6	5	3	5	5	4	3	6	9	4
[T][S][HP]	5	6	3	5	7	3	2	6	10	6
[T][S][HP]Async	5	5	4	6	5	3	2	4	7	4
[T][S][L]	13	12	8	13	12	6	5	14	20	11
[T][S][L]Cache	19	16	10	17	17	8	8	15	27	15
[T][S]Sparse	10	10	7	10	10	6	5	11	17	9
sgd	3	4	2	3	4	2	2	4	6	3
step_sgd	5	5	2	6	6	3	2	6	7	4
step_tween	3	3	2	3	2	1	1	3	5	3
step_tween_chain	6	5	3	5	6	3	3	6	6	5
tween	2	2	1	2	2	1	1	2	4	2
tween_chain	4	4	3	3	4	1	2	4	6	3

Honesty - mean hard Acc, every mode x dtype (cols 1-12)

Honesty - mean hard Acc, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	3	6	3	3	3	2	3	2	6	3	3	3
Mesh[T]	10	5	10	10	9	8	8	3	4	10	7	10
Mesh[T]Alt	3	8	3	3	3	2	3	9	8	4	3	5
Mesh[T]Chain	3	7	3	3	3	3	3	3	7	3	3	5
Mesh[T][S]	3	6	3	3	3	3	2	7	6	3	2	5
Mesh[T][S][FP]	3	6	3	3	2	3	3	3	7	2	3	3
Mesh[T][S]Sparse	3	6	2	3	3	3	3	3	6	3	3	3
Step[T]Alt	10	5	9	9	11	9	10	3	5	7	7	9
Step[T][S]	11	5	9	9	9	9	9	3	5	8	8	10
Step[T][S][FP]	7	6	11	9	10	10	9	3	5	9	8	10
Step[T][S][HP]	9	6	9	9	11	9	8	3	4	8	7	10
Step[T][S][HP]Async	11	5	9	10	9	11	10	2	4	8	8	10
Step[T][S][L]	10	5	10	10	8	9	9	2	5	8	7	8
Step[T][S][L]Cache	9	5	8	10	9	9	9	3	5	8	8	10
Step[T][S]Sparse	10	5	9	9	11	9	10	2	5	8	8	10
[T]Alt	3	7	3	3	3	3	3	10	8	4	2	5
[T][S]	3	6	3	3	3	3	3	7	6	3	3	4
[T][S][FP]	3	6	2	3	2	3	2	3	6	3	3	3
[T][S][HP]	2	5	3	3	2	3	3	2	6	3	3	3
[T][S][HP]Async	2	5	3	2	3	3	3	3	4	2	3	3
[T][S][L]	3	6	3	2	3	3	2	3	7	2	3	3
[T][S][L]Cache	2	8	3	3	3	3	3	3	9	3	3	3
[T][S]Sparse	3	5	3	3	3	3	3	3	6	4	3	3
sgd	3	5	3	2	3	3	2	3	7	2	3	3
step_sgd	3	7	2	3	2	3	3	3	5	3	3	3
step_tween	11	5	8	10	8	9	10	3	5	8	7	9
step_tween_chain	3	7	3	2	3	2	3	2	7	3	3	3
tween	11	6	9	10	10	9	10	3	4	8	8	8
tween_chain	3	7	3	2	3	3	3	2	7	3	3	3

Honesty - mean hard Acc, every mode x dtype (cols 13-24)

Honesty - mean hard Acc, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	7	7	7	3	6	6	5	3	5	3	7	6
Mesh[T]	5	5	4	5	5	5	4	9	5	5	4	5
Mesh[T]Alt	7	7	7	8	7	8	8	5	7	8	7	7
Mesh[T]Chain	6	7	7	4	6	6	3	2	6	6	7	4
Mesh[T][S]	6	5	5	6	6	6	6	5	6	5	6	6
Mesh[T][S][FP]	5	7	7	5	7	6	7	2	6	7	5	6
Mesh[T][S]Sparse	6	7	7	5	7	5	7	3	6	6	6	5
Step[T]Alt	5	5	5	4	5	5	5	9	5	5	5	5
Step[T][S]	5	5	5	5	4	4	5	10	5	5	5	5
Step[T][S][FP]	5	4	5	5	5	4	4	9	5	4	4	5
Step[T][S][HP]	5	5	4	5	5	5	5	9	4	4	4	5
Step[T][S][HP]Async	5	5	5	5	5	5	4	11	5	5	5	5
Step[T][S][L]	5	4	4	5	5	4	4	11	5	5	5	5
Step[T][S][L]Cache	5	5	5	4	5	5	4	8	5	4	5	4
Step[T][S]Sparse	5	4	4	5	4	5	5	10	5	5	5	5
[T]Alt	8	7	8	8	8	8	7	5	8	8	7	8
[T][S]	6	6	6	6	7	6	6	5	6	5	6	6
[T][S][FP]	7	9	7	5	6	6	6	3	6	5	5	6
[T][S][HP]	6	7	7	7	7	7	7	3	6	7	5	5
[T][S][HP]Async	5	10	6	5	6	6	5	3	6	3	5	4
[T][S][L]	6	7	7	7	7	7	7	3	8	7	7	8
[T][S][L]Cache	9	9	8	9	9	8	8	2	9	8	9	7
[T][S]Sparse	6	7	7	5	6	6	6	3	6	6	6	6
sgd	6	7	7	7	7	3	7	2	3	6	3	7
step_sgd	7	6	7	5	6	7	6	3	7	6	6	5
step_tween	5	5	4	5	4	4	5	10	5	4	4	5
step_tween_chain	5	7	7	6	6	4	7	3	6	5	6	7
tween	5	5	5	5	4	6	5	9	5	5	4	5
tween_chain	7	7	7	7	7	4	5	3	7	7	5	5

Honesty - mean hard Acc, every mode x dtype (cols 25-34)

Honesty - mean hard Acc, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	7	3	7	3	8	6	5	6	7	5
Mesh[T]	5	5	5	4	5	5	5	5	5	4
Mesh[T]Alt	7	7	8	8	7	8	7	8	8	7
Mesh[T]Chain	7	7	7	5	5	6	7	5	7	4
Mesh[T][S]	6	6	5	6	5	6	6	6	7	6
Mesh[T][S][FP]	6	5	5	5	5	6	7	5	5	8
Mesh[T][S]Sparse	6	7	6	7	5	6	7	6	5	6
Step[T]Alt	5	5	5	5	5	5	5	4	5	4
Step[T][S]	5	5	5	4	5	5	5	4	4	5
Step[T][S][FP]	5	4	5	5	4	5	4	5	4	5
Step[T][S][HP]	5	5	4	5	5	5	5	5	5	5
Step[T][S][HP]Async	5	4	5	5	4	5	5	5	4	5
Step[T][S][L]	4	5	5	5	5	5	5	4	5	4
Step[T][S][L]Cache	5	5	4	5	5	5	4	4	5	5
Step[T][S]Sparse	5	5	4	5	5	4	5	5	5	5
[T]Alt	8	8	7	8	8	8	7	7	8	8
[T][S]	6	6	6	6	6	6	6	6	6	6
[T][S][FP]	6	5	5	5	5	7	5	6	7	5
[T][S][HP]	5	6	5	5	6	5	5	6	7	7
[T][S][HP]Async	5	5	6	6	6	6	5	4	5	5
[T][S][L]	7	7	7	7	7	7	7	7	7	7
[T][S][L]Cache	9	8	8	8	8	8	9	7	8	8
[T][S]Sparse	5	5	6	5	6	6	6	6	6	5
sgd	6	7	6	5	6	7	7	7	7	7
step_sgd	5	6	5	7	6	6	5	7	6	5
step_tween	4	5	4	4	4	5	5	5	5	5
step_tween_chain	7	7	5	6	7	6	7	6	5	7
tween	5	4	5	5	5	4	5	5	6	5
tween_chain	7	7	7	5	7	5	6	6	7	6

Honesty - mean SoftAcc, every mode x dtype (cols 1-12)

Honesty - mean SoftAcc, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	0	4	0	0	0	0	0	2	4	2	0	2
Mesh[T]	2	2	3	3	2	2	2	2	2	2	2	3
Mesh[T]Alt	0	6	0	0	0	0	0	8	6	4	0	5
Mesh[T]Chain	0	4	0	0	0	0	0	2	4	2	0	5
Mesh[T][S]	0	4	0	0	0	0	0	4	4	3	0	5
Mesh[T][S][FP]	0	3	0	0	0	0	0	2	4	2	0	2
Mesh[T][S]Sparse	0	3	0	0	0	0	0	2	4	2	0	2
Step[T]Alt	3	2	3	4	4	3	4	2	2	2	3	3
Step[T][S]	3	2	3	3	3	3	3	2	2	2	3	3
Step[T][S][FP]	2	2	4	3	3	3	3	2	2	2	3	3
Step[T][S][HP]	2	2	3	3	4	3	3	2	2	2	3	3
Step[T][S][HP]Async	3	2	3	3	3	3	3	2	2	2	3	3
Step[T][S][L]	3	2	4	3	2	3	3	2	2	2	3	3
Step[T][S][L]Cache	2	2	3	3	3	3	3	2	2	3	3	3
Step[T][S]Sparse	3	2	3	3	3	3	3	2	2	2	3	3
[T]Alt	0	5	0	0	0	0	0	8	6	3	0	5
[T][S]	0	4	0	0	0	0	0	4	4	2	0	4
[T][S][FP]	0	3	0	0	0	0	0	2	4	2	0	2
[T][S][HP]	0	3	0	0	0	0	0	2	4	2	0	2
[T][S][HP]Async	0	3	0	0	0	0	0	2	2	2	0	2
[T][S][L]	0	4	0	0	0	0	0	2	5	2	0	2
[T][S][L]Cache	0	5	0	0	0	0	0	2	5	3	0	2
[T][S]Sparse	0	3	0	0	0	0	0	2	4	4	0	2
sgd	0	4	0	0	0	0	0	2	4	2	0	2
step_sgd	0	4	0	0	0	0	0	2	3	2	0	2
step_tween	2	2	2	3	2	2	3	2	2	2	2	2
step_tween_chain	0	4	0	0	0	0	0	2	4	2	0	2
tween	2	2	2	2	2	2	3	2	2	2	2	2
tween_chain	0	5	0	0	0	0	0	2	5	2	0	2

Honesty - mean SoftAcc, every mode x dtype (cols 13-24)

Honesty - mean SoftAcc, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	4	5	4	1	3	4	3	2	3	1	4	4
Mesh[T]	2	2	2	2	2	2	2	2	2	2	2	2
Mesh[T]Alt	6	6	6	6	6	7	6	5	6	6	6	6
Mesh[T]Chain	4	5	5	2	4	3	2	2	4	4	4	2
Mesh[T][S]	4	3	4	4	4	4	4	5	4	4	4	4
Mesh[T][S][FP]	3	4	5	3	4	4	4	2	4	5	3	4
Mesh[T][S]Sparse	3	4	4	3	4	3	4	2	4	4	4	3
Step[T]Alt	2	2	2	2	2	2	2	3	2	2	2	2
Step[T][S]	2	2	2	2	2	2	2	3	2	2	2	2
Step[T][S][FP]	2	2	2	2	2	2	2	3	2	2	2	2
Step[T][S][HP]	2	2	2	2	2	2	2	3	2	2	2	2
Step[T][S][HP]Async	2	2	2	2	2	2	2	3	2	2	2	2
Step[T][S][L]	2	2	2	2	2	2	2	4	2	2	2	2
Step[T][S][L]Cache	2	2	2	2	2	2	2	3	2	2	2	2
Step[T][S]Sparse	2	2	2	2	2	2	2	3	2	2	2	2
[T]Alt	6	5	6	7	6	6	6	5	6	6	6	6
[T][S]	4	4	4	4	4	4	4	5	4	4	4	4
[T][S][FP]	4	5	5	3	4	4	4	2	4	3	3	3
[T][S][HP]	3	4	4	4	4	4	4	2	4	4	3	3
[T][S][HP]Async	3	5	3	3	4	3	3	2	3	1	3	3
[T][S][L]	4	4	5	5	4	4	5	2	4	5	5	5
[T][S][L]Cache	5	5	5	5	5	5	5	2	5	5	5	5
[T][S]Sparse	3	4	4	3	4	3	4	2	3	3	3	3
sgd	4	5	4	4	4	1	4	2	1	3	1	4
step_sgd	4	5	5	3	4	4	3	2	4	4	4	3
step_tween	2	2	2	2	2	2	2	3	2	2	2	2
step_tween_chain	3	4	4	4	4	2	4	2	3	3	4	4
tween	2	2	2	2	2	2	2	2	2	2	2	2
tween_chain	4	5	5	4	4	2	3	2	4	4	3	3

Honesty - mean SoftAcc, every mode x dtype (cols 25-34)

Honesty - mean SoftAcc, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	4	1	4	1	4	2	3	4	4	3
Mesh[T]	2	2	2	2	2	2	2	2	2	2
Mesh[T]Alt	6	6	6	6	6	6	6	7	7	6
Mesh[T]Chain	3	4	4	3	2	4	4	3	4	2
Mesh[T][S]	4	4	4	4	4	4	4	4	4	4
Mesh[T][S][FP]	3	3	2	3	3	3	4	3	3	5
Mesh[T][S]Sparse	3	4	3	3	3	4	4	4	3	3
Step[T]Alt	2	2	2	2	2	2	2	2	2	2
Step[T][S]	2	2	2	2	2	2	2	2	2	2
Step[T][S][FP]	2	2	2	2	2	2	2	2	2	2
Step[T][S][HP]	2	2	2	2	2	2	2	2	2	2
Step[T][S][HP]Async	2	2	2	2	2	2	2	2	2	2
Step[T][S][L]	2	2	2	2	2	2	2	2	2	2
Step[T][S][L]Cache	2	2	2	2	2	2	2	2	2	2
Step[T][S]Sparse	2	2	2	2	2	2	2	2	2	2
[T]Alt	6	6	6	6	6	6	6	6	6	6
[T][S]	4	4	4	4	4	4	4	4	4	4
[T][S][FP]	3	3	3	3	3	4	3	4	4	3
[T][S][HP]	3	3	3	3	4	3	3	4	4	4
[T][S][HP]Async	3	3	3	3	3	3	3	3	3	3
[T][S][L]	5	5	5	4	5	5	5	5	5	4
[T][S][L]Cache	5	5	5	5	5	5	5	5	5	5
[T][S]Sparse	3	3	3	3	3	3	3	3	3	3
sgd	4	4	4	3	3	4	4	4	4	4
step_sgd	4	4	3	4	4	4	3	4	3	2
step_tween	2	2	2	2	2	2	2	2	2	2
step_tween_chain	4	4	3	4	4	4	4	4	3	5
tween	2	2	2	2	2	2	2	2	2	2
tween_chain	4	4	4	3	4	2	4	4	4	4

Honesty - mean Avail, every mode x dtype (cols 1-12)

Honesty - mean Avail, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	20	18	21	21	20	20	21	20	22	21	20	21
Mesh[T]	18	15	19	19	18	18	18	17	19	18	18	18
Mesh[T]Alt	21	12	21	21	21	21	20	13	14	16	21	14
Mesh[T]Chain	20	18	22	21	20	20	21	20	22	21	20	21
Mesh[T][S]	25	23	26	26	26	25	25	24	27	26	25	27
Mesh[T][S][FP]	24	23	27	26	25	24	25	24	27	25	25	26
Mesh[T][S]Sparse	34	32	34	33	34	33	34	33	35	34	34	34
Step[T]Alt	14	12	15	15	14	15	15	14	15	15	15	15
Step[T][S]	21	19	21	22	21	21	22	21	22	23	22	22
Step[T][S][FP]	21	20	22	22	22	21	21	20	22	22	22	22
Step[T][S][HP]	20	17	21	21	21	20	21	20	21	21	21	22
Step[T][S][HP]Async	22	19	23	22	22	21	22	21	22	23	22	23
Step[T][S][L]	28	27	28	29	28	28	29	27	27	28	28	27
Step[T][S][L]Cache	28	27	27	28	28	28	28	27	27	28	27	27
Step[T][S]Sparse	21	19	23	22	22	21	21	21	22	22	21	22
[T]Alt	21	12	21	20	21	20	20	12	14	15	20	14
[T][S]	23	22	26	27	26	24	26	23	27	25	25	27
[T][S][FP]	24	22	26	26	26	24	25	25	27	26	25	27
[T][S][HP]	24	22	26	26	25	24	26	24	27	26	26	27
[T][S][HP]Async	24	22	26	27	25	24	25	24	27	26	26	27
[T][S][L]	33	32	33	33	33	34	34	34	33	34	34	35
[T][S][L]Cache	33	34	33	33	33	34	34	34	35	35	33	36
[T][S]Sparse	33	32	34	34	34	33	34	33	35	34	34	34
sgd	19	17	21	21	19	19	19	19	22	20	19	21
step_sgd	22	20	24	25	24	23	25	23	25	24	24	25
step_tween	20	17	21	22	20	21	20	19	21	21	20	21
step_tween_chain	22	20	25	24	24	23	25	22	25	23	24	25
tween	18	15	18	18	18	18	18	17	18	18	18	18
tween_chain	20	18	21	21	21	20	21	20	21	21	21	21

Honesty - mean Avail, every mode x dtype (cols 13-24)

Honesty - mean Avail, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	21	19	21	21	18	21	21	21	19	21	18	21
Mesh[T]	18	16	18	19	16	18	19	18	18	18	15	18
Mesh[T]Alt	14	11	14	15	12	14	14	15	13	14	12	14
Mesh[T]Chain	21	19	21	21	18	22	21	21	20	21	18	21
Mesh[T][S]	26	22	26	27	23	27	27	27	25	26	22	26
Mesh[T][S][FP]	27	22	27	27	23	27	27	26	24	26	22	26
Mesh[T][S]Sparse	34	33	34	34	33	35	34	34	33	34	32	33
Step[T]Alt	16	12	14	15	13	15	15	15	14	15	12	14
Step[T][S]	22	19	22	22	20	22	22	22	20	21	19	21
Step[T][S][FP]	22	19	22	22	20	22	22	22	20	22	19	22
Step[T][S][HP]	22	18	21	21	18	21	21	21	20	21	17	21
Step[T][S][HP]Async	22	19	22	22	19	22	22	22	21	22	19	22
Step[T][S][L]	28	27	27	28	27	27	27	28	28	27	27	28
Step[T][S][L]Cache	28	26	27	28	27	28	28	28	28	27	27	29
Step[T][S]Sparse	22	19	22	22	19	22	22	23	20	21	19	22
[T]Alt	14	11	14	15	11	14	14	14	13	14	12	13
[T][S]	26	23	27	27	23	27	27	26	24	26	22	26
[T][S][FP]	26	22	27	27	23	27	27	26	24	26	23	26
[T][S][HP]	26	22	27	26	22	27	27	26	25	26	23	26
[T][S][HP]Async	26	22	27	26	23	26	27	26	24	26	23	26
[T][S][L]	34	32	33	34	32	33	33	35	32	32	31	34
[T][S][L]Cache	35	34	35	35	34	35	35	35	34	34	34	35
[T][S]Sparse	34	33	34	34	33	35	34	34	33	34	32	34
sgd	21	18	21	21	18	21	21	20	19	20	17	20
step_sgd	24	20	25	25	21	25	24	24	23	25	21	25
step_tween	21	17	21	21	18	21	21	21	20	21	17	20
step_tween_chain	25	21	25	24	21	25	25	25	24	24	21	24
tween	19	15	18	18	16	18	18	18	18	18	15	18
tween_chain	21	18	21	21	19	22	21	21	20	21	19	21

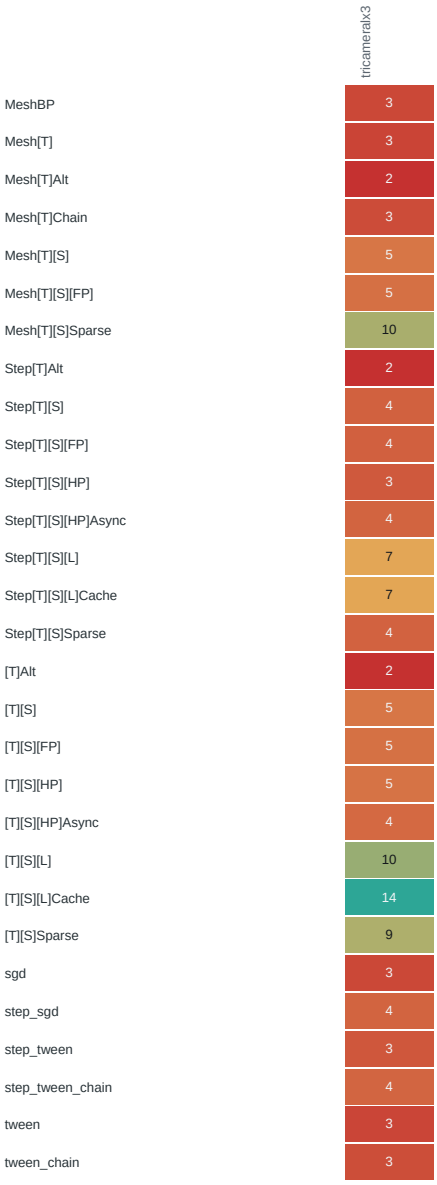
Honesty - mean Avail, every mode x dtype (cols 25-34)

Honesty - mean Avail, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	20	21	21	20	22	21	21	21	20	21
Mesh[T]	18	18	18	18	19	18	19	18	18	18
Mesh[T]Alt	14	14	14	14	14	14	14	14	14	14
Mesh[T]Chain	21	20	21	21	21	21	21	21	21	21
Mesh[T][S]	26	25	26	26	25	27	27	26	24	26
Mesh[T][S][FP]	26	26	27	26	26	27	27	26	25	26
Mesh[T][S]Sparse	34	34	34	34	34	35	35	34	34	33
Step[T]Alt	15	14	15	15	15	15	15	15	15	15
Step[T][S]	21	21	22	22	22	22	21	22	21	21
Step[T][S][FP]	22	21	22	22	22	22	22	22	21	22
Step[T][S][HP]	21	21	21	21	20	21	21	21	21	21
Step[T][S][HP]Async	21	21	22	23	22	22	22	22	21	22
Step[T][S][L]	28	27	27	28	28	28	27	29	27	28
Step[T][S][L]Cache	28	28	27	28	28	27	27	28	27	28
Step[T][S]Sparse	22	21	22	22	22	22	21	22	21	22
[T]Alt	14	14	14	14	13	14	14	14	13	14
[T][S]	25	26	26	26	26	27	27	26	25	27
[T][S][FP]	26	25	27	26	26	27	27	25	24	26
[T][S][HP]	25	26	27	26	26	27	26	26	25	26
[T][S][HP]Async	26	26	26	26	26	26	26	26	24	26
[T][S][L]	33	33	33	34	33	32	32	34	32	33
[T][S][L]Cache	36	36	35	35	35	35	35	35	34	35
[T][S]Sparse	34	34	34	34	34	35	34	33	33	34
sgd	20	21	21	20	21	21	21	20	21	21
step_sgd	25	24	24	24	25	25	24	24	24	24
step_tween	21	21	21	21	21	20	21	21	21	21
step_tween_chain	24	24	24	24	25	24	25	25	24	24
tween	17	18	18	18	18	18	18	18	18	18
tween_chain	21	21	21	21	21	21	22	21	20	21

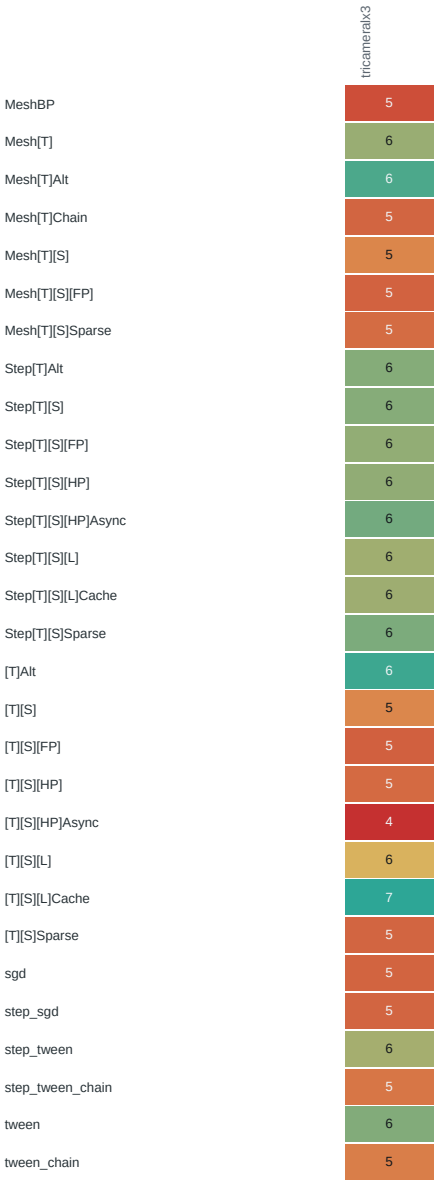
Mean Score, every mode x arch

Mean Score, every mode x arch



Mean hard Acc, every mode x arch

Mean hard Acc, every mode x arch

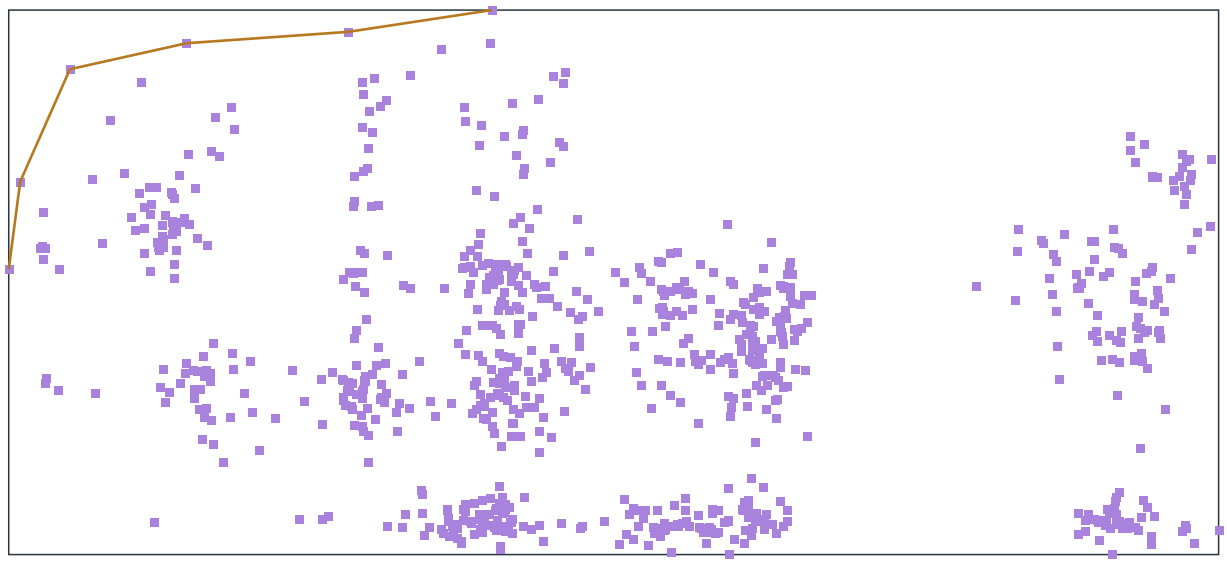


Mean Avail, every mode x arch

Mean Avail, every mode x arch

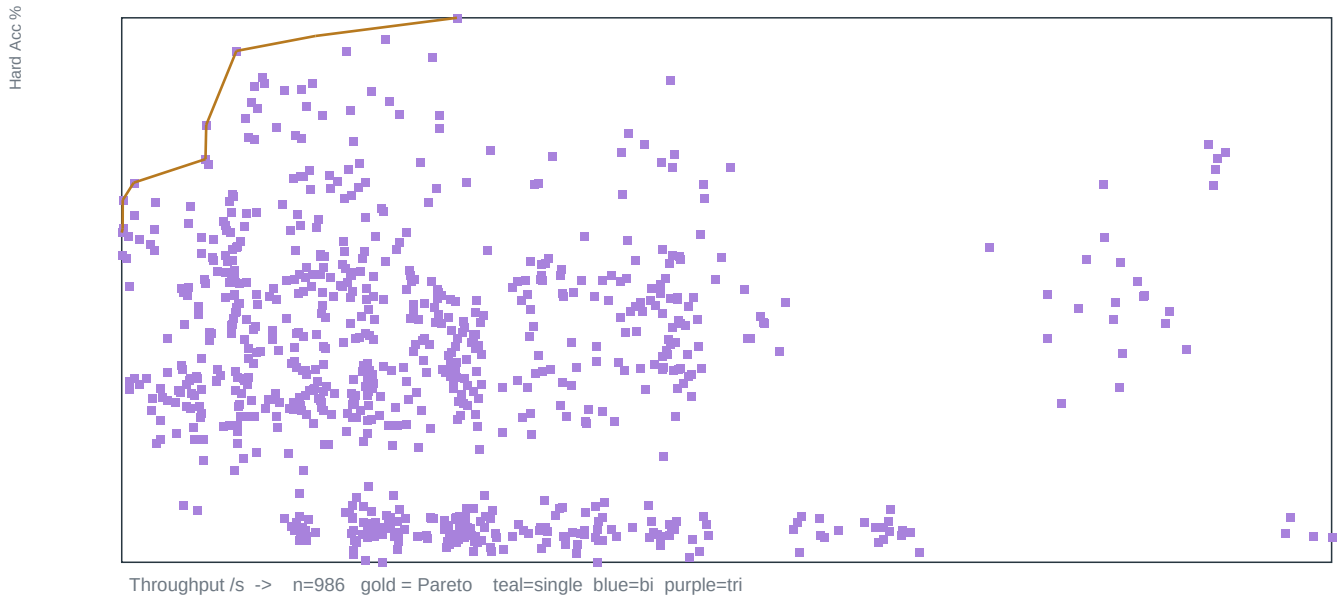
	tricamerarix3
MeshBP	20
Mesh[T]	18
Mesh[T]Alt	15
Mesh[T]Chain	21
Mesh[T][S]	25
Mesh[T][S][FP]	26
Mesh[T][S]Sparse	34
Step[T]Alt	14
Step[T][S]	21
Step[T][S][FP]	21
Step[T][S][HP]	21
Step[T][S][HP]Async	21
Step[T][S][L]	28
Step[T][S][L]Cache	28
Step[T][S]Sparse	21
[T]Alt	15
[T][S]	25
[T][S][FP]	25
[T][S][HP]	26
[T][S][HP]Async	25
[T][S][L]	33
[T][S][L]Cache	35
[T][S]Sparse	34
sgd	20
step_sgd	24
step_tween	20
step_tween_chain	24
tween	18
tween_chain	21

Pillars - Availability vs hard Acc

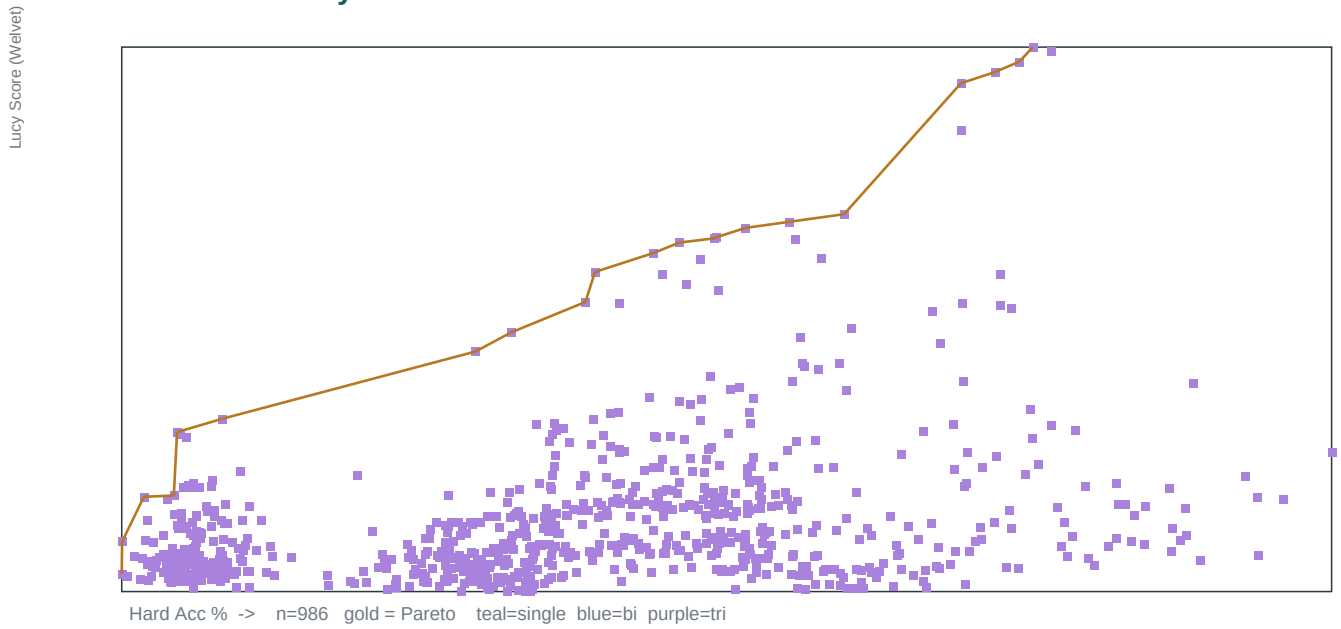



Availability % -> n=986 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

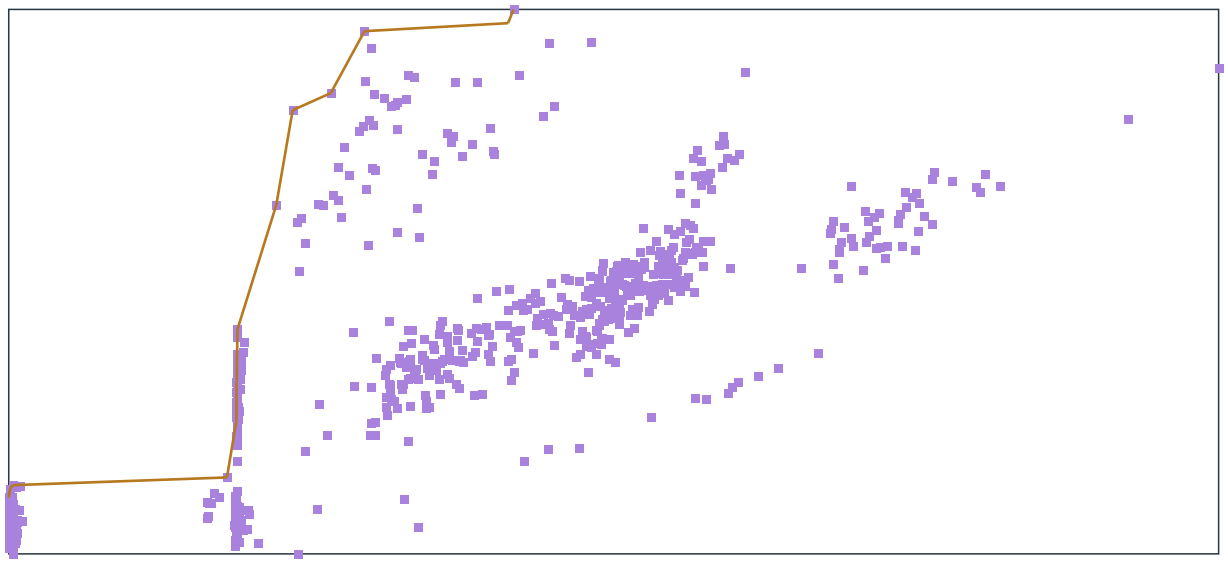
Pillars - Throughput vs hard Acc



Pareto - hard Acc vs Lucy Score

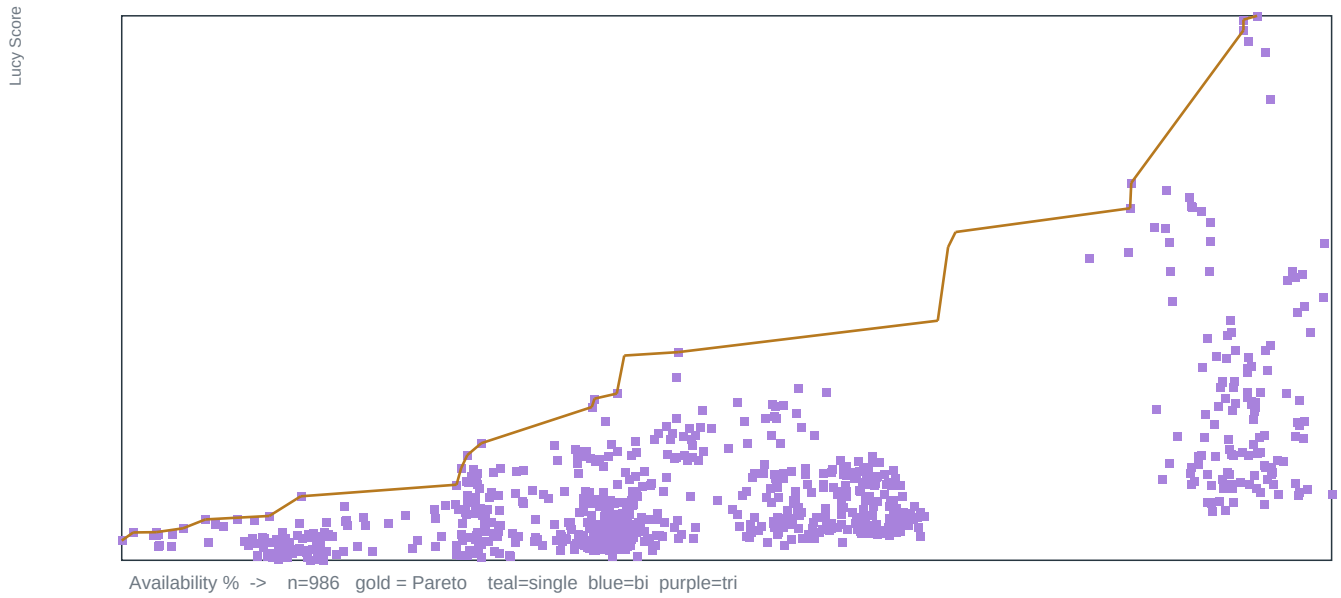


SoftAcc (serve-confidence) vs hard Acc

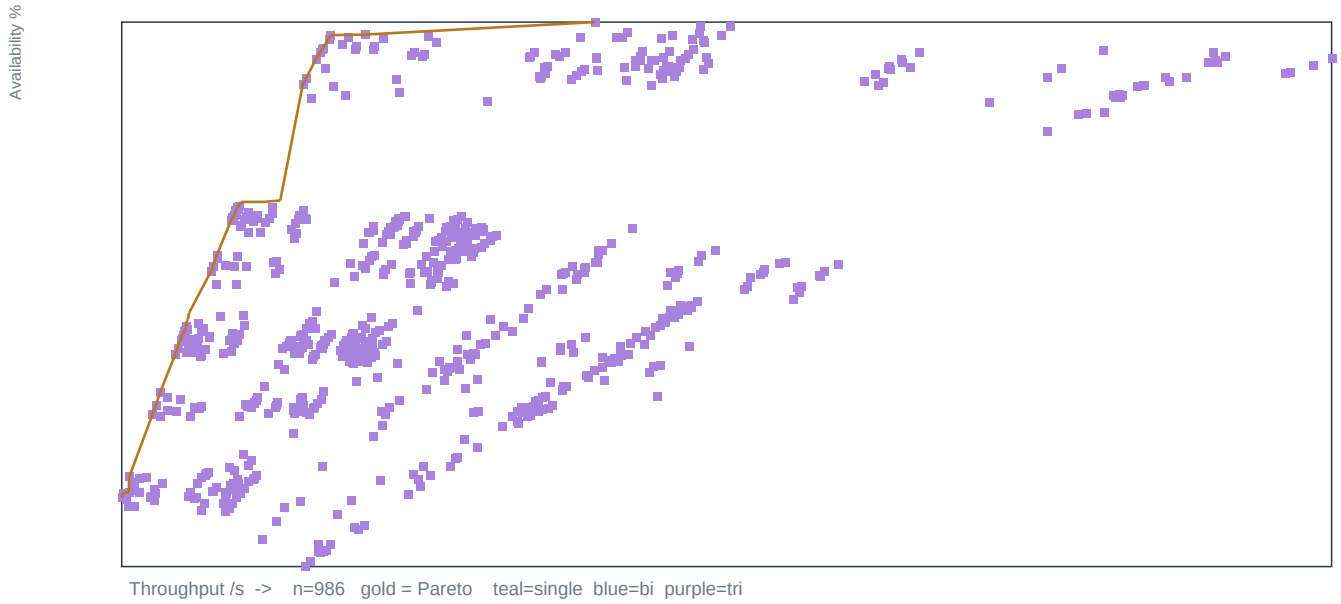



SoftAcc % -> n=986 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

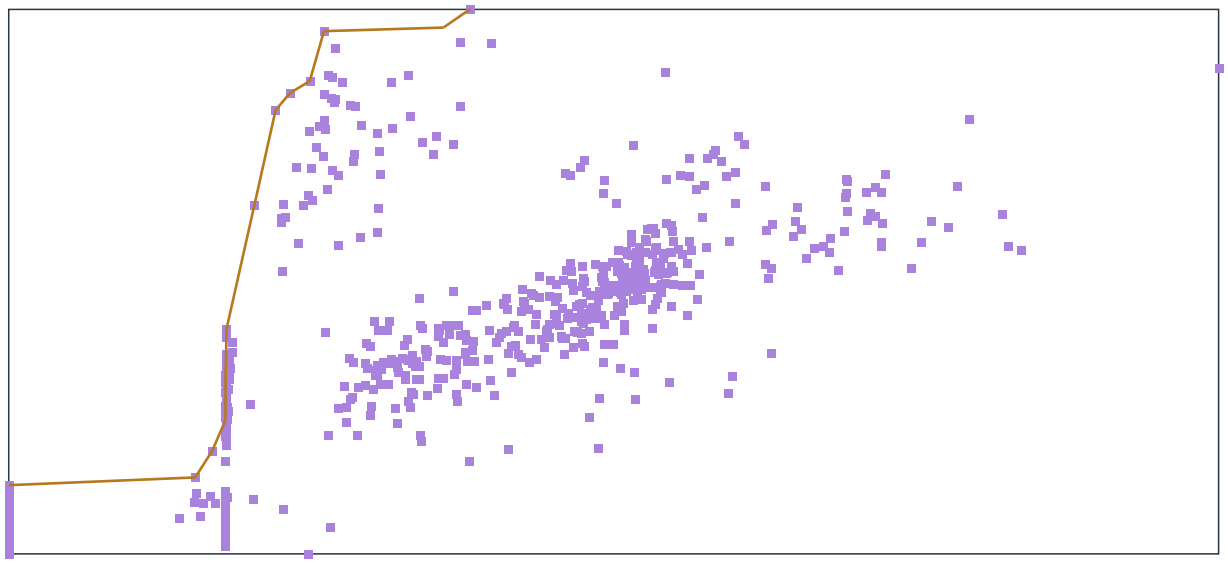
Avail vs Lucy Score (duty clock)



Pillars - Throughput vs Availability



AdaptPct vs hard Acc



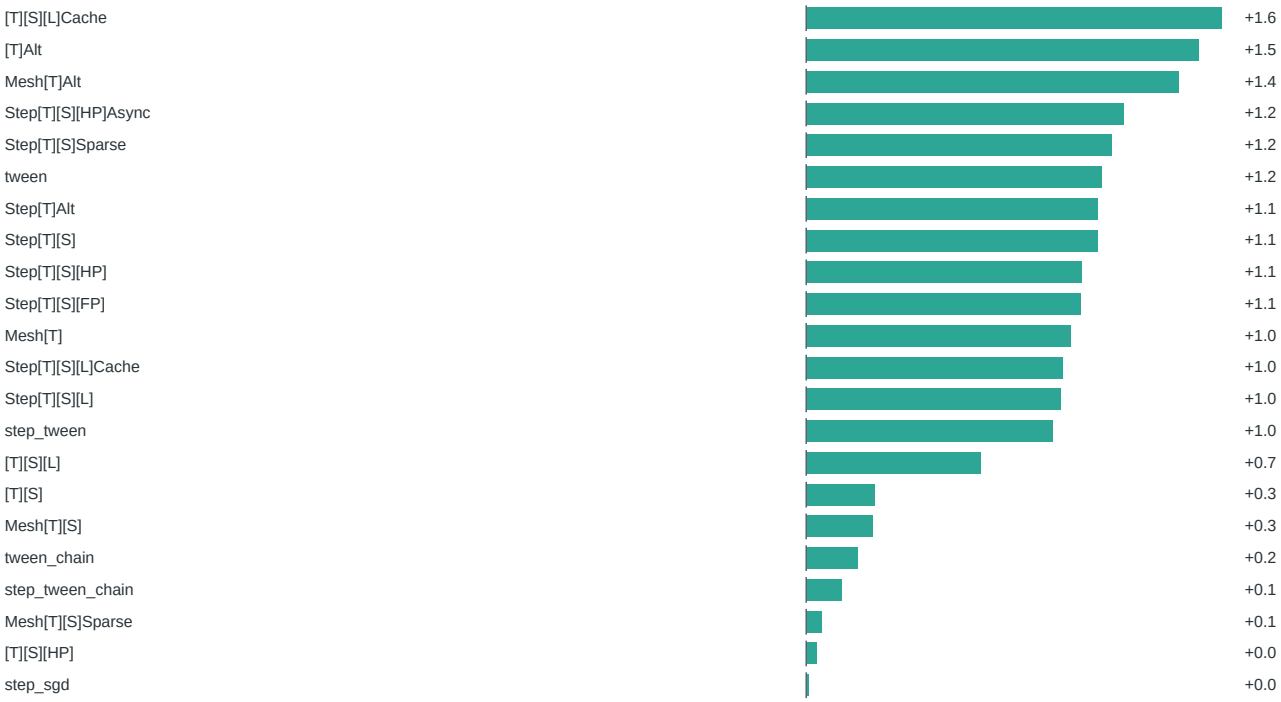

AdaptPct % -> n=986 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

vs sgd - matched dtype x format x arch

AccDelta is the honest column. ScoreDelta is usually Availability (duty clock), not a better chain rule. Acc win = AccDelta > 0.5. Score win = ScoreDelta > 1. Baseline is discovered from the board, not a frozen StepBP list.

mode	n	AccD	Acc win%	SoftD	AvailD	ThruD	ScoreD	Score win%
[T][S][L]Cache	34	+1.6	65	+0.7	+14.5	+311	+10.8	100
[T]Alt	34	+1.5	71	+1.9	-5.2	-93	-1.1	0
Mesh[T]Alt	34	+1.4	74	+2.0	-4.9	-90	-1.1	0
Step[T][S][HP]Async	34	+1.2	38	-0.7	+1.4	+6	+1.3	35
Step[T][S]Sparse	34	+1.2	38	-0.7	+1.4	+6	+1.2	35
tween	34	+1.2	38	-0.9	-2.4	-53	-0.1	29
Step[T]Alt	34	+1.1	38	-0.6	-5.6	-108	-1.1	12
Step[T][S]	34	+1.1	38	-0.7	+1.2	+7	+1.1	35
Step[T][S][HP]	34	+1.1	38	-0.7	+0.5	-10	+0.7	32
Step[T][S][FP]	34	+1.1	38	-0.7	+1.3	+6	+1.1	38
Mesh[T]	34	+1.0	38	-0.9	-2.2	-52	-0.2	29
Step[T][S][L]Cache	34	+1.0	38	-0.8	+7.6	+135	+4.2	79
Step[T][S][L]	34	+1.0	38	-0.8	+7.6	+136	+4.3	85
step_tween	34	+1.0	38	-0.9	+0.3	-11	+0.7	32
[T][S][L]	34	+0.7	32	+0.6	+13.0	+274	+7.4	100
[T][S]	34	+0.3	26	+0.5	+5.4	+88	+2.1	94
Mesh[T][S]	34	+0.3	26	+0.5	+5.4	+86	+2.1	88
tween_chain	34	+0.2	29	+0.1	+0.5	+0	+0.3	9
step_tween_chain	34	+0.1	32	+0.0	+3.7	+60	+1.3	44
Mesh[T][S]Sparse	34	+0.1	18	-0.1	+13.7	+290	+6.8	100
[T][S][HP]	34	+0.0	18	-0.1	+5.5	+90	+1.9	76
step_sgd	34	+0.0	18	-0.0	+3.7	+62	+1.3	41
Mesh[T]Chain	34	+0.0	26	-0.0	+0.6	+1	+0.2	12
[T][S]Sparse	34	+0.0	24	-0.3	+13.7	+289	+6.6	100
Mesh[T][S][FP]	34	-0.0	18	-0.1	+5.5	+88	+1.8	71
[T][S][FP]	34	-0.0	18	-0.1	+5.4	+89	+1.8	76
MeshBP	34	-0.2	29	-0.2	+0.4	-3	-0.0	15
[T][S][HP]Async	34	-0.4	12	-0.5	+5.4	+86	+1.5	50

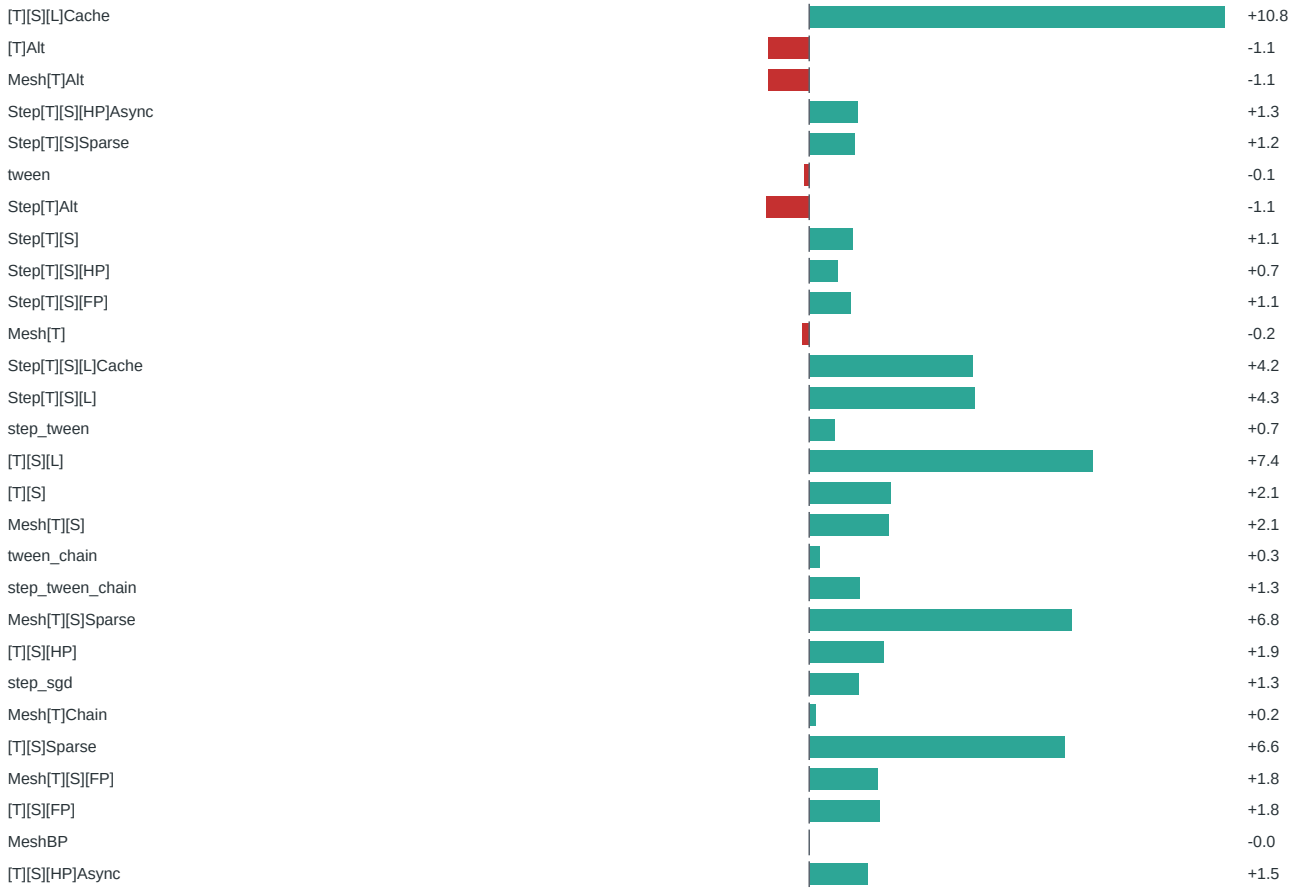
mean AccD vs sgd



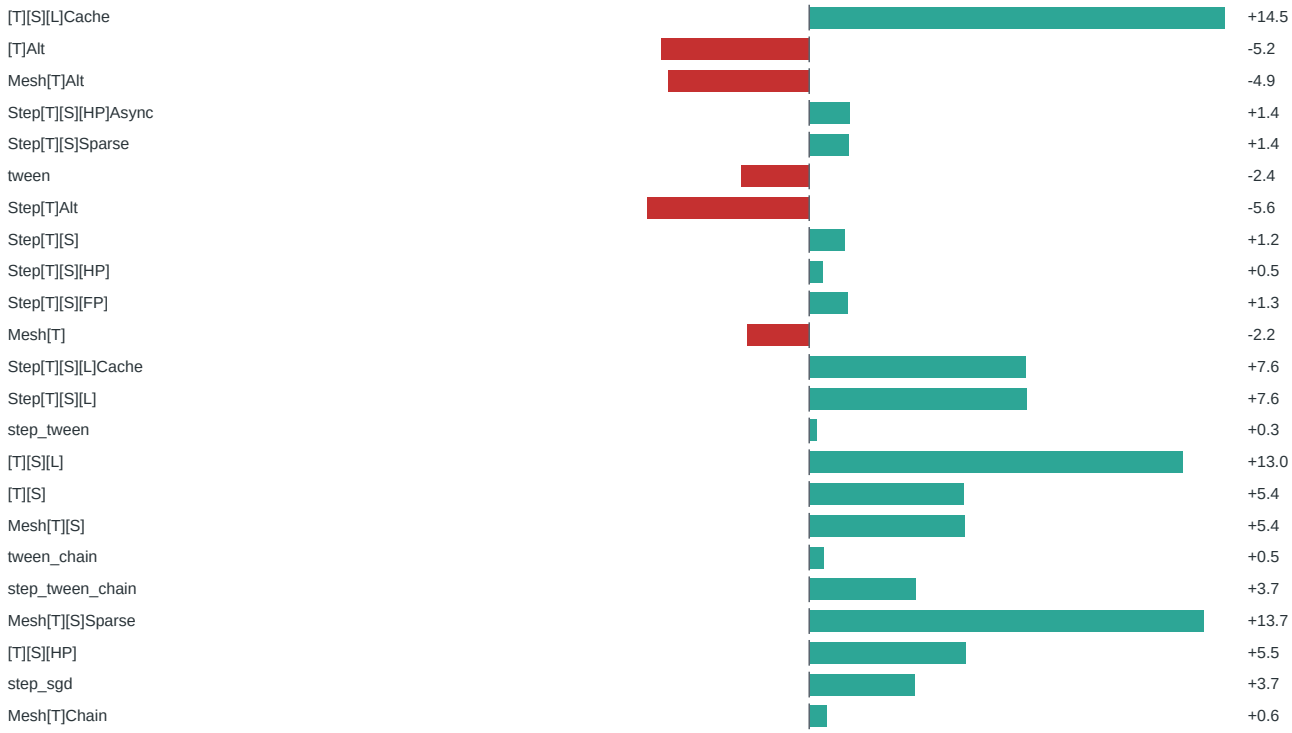
mean AccD vs sgd



mean ScoreD vs sgd (duty clock)



mean AvailD vs sgd



mean AvailD vs sgd



AccD vs sgd, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	-0	+1	-0	+0	+0	-0	+1	-0	-0	+0	-0	+0
Mesh[T]	+7	+0	+7	+8	+6	+6	+6	-0	-2	+7	+4	+8
Mesh[T]Alt	+0	+3	-0	+1	-0	-0	+0	+7	+2	+2	-1	+2
Mesh[T]Chain	-0	+2	-0	+0	+0	+0	+0	+0	+0	+0	-1	+3
Mesh[T][S]	+0	+1	+0	+0	+1	+0	+0	+4	-1	+1	-1	+2
Mesh[T][S][FP]	-0	+1	-0	+0	-0	-0	+0	-0	+0	+0	-0	+0
Mesh[T][S]Sparse	-0	+1	-0	+0	-0	+0	+0	-0	-1	+0	-1	+0
Step[T]Alt	+7	-0	+6	+7	+8	+6	+7	-0	-1	+5	+4	+6
Step[T][S]	+8	+0	+6	+6	+6	+6	+7	-0	-1	+5	+5	+8
Step[T][S][FP]	+5	+0	+8	+6	+7	+8	+7	+0	-1	+6	+4	+8
Step[T][S][HP]	+7	+0	+7	+7	+8	+6	+6	-0	-2	+6	+4	+7
Step[T][S][HP]Async	+8	-0	+6	+7	+6	+8	+8	-0	-2	+6	+5	+7
Step[T][S][L]	+7	-0	+7	+7	+6	+6	+7	-1	-2	+6	+4	+6
Step[T][S][L]Cache	+6	-1	+5	+7	+7	+6	+6	-0	-2	+6	+5	+8
Step[T][S]Sparse	+7	+0	+6	+6	+8	+7	+7	-0	-2	+6	+4	+7
[T]Alt	-0	+2	-0	+0	+0	-0	+0	+7	+1	+1	-1	+3
[T][S]	+0	+1	+0	+0	-0	+0	+0	+4	-0	+1	-1	+2
[T][S][FP]	-0	+1	-1	+0	-0	-0	+0	-0	-0	+0	-1	+0
[T][S][HP]	-1	+0	-0	+0	-0	+0	+0	-0	-0	+1	-0	+0
[T][S][HP]Async	-0	+0	-0	-0	-0	+0	+0	-0	-2	-0	-1	+0
[T][S][L]	-0	+1	-0	-0	+0	-0	-0	-0	+0	-0	-1	+0
[T][S][L]Cache	-0	+3	-0	+0	+0	-0	+0	-0	+2	+0	-0	-0
[T][S]Sparse	-0	-0	-0	+1	+0	+0	+1	-0	-0	+2	-1	+1
step_sgd	-0	+1	-1	+0	-0	+0	+0	-0	-1	+0	-0	+0
step_tween	+8	+0	+5	+7	+6	+7	+7	-0	-2	+5	+4	+6
step_tween_chain	-0	+2	-0	-0	+0	-0	+1	-0	+0	+0	-0	+0
tween	+8	+0	+6	+7	+7	+6	+7	-0	-2	+6	+5	+5
tween_chain	+0	+2	-0	-0	+0	-0	+0	-0	+0	+1	-0	+0

AccD vs sgd, every mode x dtype (cols 13-24)

AccD vs sgd, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	+1	-0	+0	-4	-1	+3	-1	+1	+2	-3	+4	-1
Mesh[T]	-1	-3	-3	-2	-1	+2	-2	+6	+1	-1	+1	-2
Mesh[T]Alt	+1	+0	+1	+1	+0	+5	+1	+2	+4	+2	+4	-0
Mesh[T]Chain	-0	-1	+0	-3	-1	+3	-4	-0	+3	+1	+4	-3
Mesh[T][S]	-0	-2	-1	-1	-1	+3	-0	+3	+3	-0	+3	-1
Mesh[T][S][FP]	-1	-0	+0	-2	+0	+3	-0	+0	+3	+1	+2	-1
Mesh[T][S]Sparse	+0	-1	-0	-2	-0	+2	+0	+0	+3	+1	+4	-2
Step[T]Alt	-1	-2	-2	-3	-2	+2	-2	+7	+2	-0	+2	-2
Step[T][S]	-1	-3	-2	-2	-2	+1	-2	+8	+2	-1	+2	-1
Step[T][S][FP]	-1	-3	-2	-2	-2	+1	-2	+7	+2	-2	+1	-2
Step[T][S][HP]	-1	-3	-3	-2	-2	+2	-1	+7	+1	-1	+2	-2
Step[T][S][HP]Async	-1	-2	-2	-2	-2	+2	-2	+8	+2	-1	+3	-2
Step[T][S][L]	-1	-3	-2	-2	-2	+1	-2	+8	+2	-1	+2	-2
Step[T][S][L]Cache	-1	-2	-2	-3	-2	+2	-2	+6	+1	-1	+2	-2
Step[T][S]Sparse	-1	-3	-2	-2	-2	+2	-1	+7	+1	-1	+2	-2
[T]Alt	+1	-0	+1	+1	+2	+5	+1	+3	+5	+2	+4	+1
[T][S]	-0	-2	-1	-1	-0	+3	-0	+2	+3	-0	+3	-1
[T][S][FP]	+0	+2	+0	-2	-1	+3	-0	+1	+3	-1	+2	-1
[T][S][HP]	-1	-1	-0	-0	+0	+4	+0	+0	+3	+1	+2	-2
[T][S][HP]Async	-1	+3	-1	-2	-0	+3	-1	+0	+3	-2	+2	-2
[T][S][L]	+0	-0	+0	+0	+0	+4	+0	+0	+4	+2	+4	+1
[T][S][L]Cache	+3	+2	+1	+2	+2	+5	+2	-0	+6	+3	+6	+1
[T][S]Sparse	+0	-1	-0	-2	-1	+3	-1	+1	+3	+0	+3	-1
step_sgd	+1	-1	-0	-2	-0	+4	-1	+0	+4	+0	+3	-2
step_tween	-1	-2	-2	-2	-3	+1	-2	+7	+2	-2	+2	-2
step_tween_chain	-1	-0	-0	-1	-1	+1	+1	+1	+3	-1	+4	-0
tween	-1	-2	-2	-2	-2	+3	-2	+7	+2	-1	+2	-2
tween_chain	+1	-1	-0	-0	-0	+1	-1	+0	+4	+1	+3	-2

AccD vs sgd, every mode x dtype (cols 25-34)

AccD vs sgd, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	+1	-3	+1	-2	+2	-1	-1	-1	+0	-2
Mesh[T]	-1	-2	-1	-1	-1	-2	-2	-2	-2	-2
Mesh[T]Alt	+2	+1	+2	+3	+1	+1	+1	+1	+2	+1
Mesh[T]Chain	+1	+1	+1	-0	-1	-1	+0	-2	+0	-3
Mesh[T][S]	+0	-0	-1	+0	-0	-1	-1	-1	-0	-0
Mesh[T][S][FP]	-0	-1	-1	-1	-1	-1	+0	-3	-1	+1
Mesh[T][S]Sparse	-0	+0	-0	+1	-1	-1	+0	-1	-2	-1
Step[T]Alt	-0	-1	-1	-1	-1	-2	-1	-3	-2	-2
Step[T][S]	-1	-2	-1	-1	-1	-2	-2	-3	-2	-2
Step[T][S][FP]	-1	-2	-1	-1	-1	-2	-2	-3	-2	-2
Step[T][S][HP]	-1	-2	-2	-0	-1	-2	-2	-2	-2	-2
Step[T][S][HP]Async	-1	-2	-1	-1	-1	-2	-2	-2	-2	-1
Step[T][S][L]	-2	-1	-1	-0	-1	-2	-2	-3	-2	-2
Step[T][S][L]Cache	-1	-1	-2	-0	-1	-2	-2	-3	-2	-2
Step[T][S]Sparse	-1	-1	-2	-0	-1	-3	-2	-2	-2	-1
[T]Alt	+2	+1	+1	+2	+2	+1	+0	+0	+2	+1
[T][S]	+0	-1	-0	+1	+0	-1	-1	-2	-1	-1
[T][S][FP]	+0	-1	-1	-0	-1	-0	-1	-1	-0	-2
[T][S][HP]	-1	-1	-1	-1	+1	-2	-2	-1	+0	+0
[T][S][HP]Async	-1	-1	-0	+0	-0	-1	-2	-3	-1	-1
[T][S][L]	+1	+0	+2	+2	+1	+0	+0	+0	+1	+0
[T][S][L]Cache	+3	+1	+2	+3	+3	+1	+2	+0	+2	+2
[T][S]Sparse	-1	-1	-0	-0	-0	-1	-1	-1	-1	-1
step_sgd	-0	-0	-1	+1	+0	-1	-1	-0	-1	-1
step_tween	-2	-2	-2	-1	-2	-2	-1	-2	-2	-1
step_tween_chain	+1	+0	-1	+1	+1	-0	-0	-1	-2	+1
tween	-1	-3	-1	-1	-1	-3	-2	-2	-1	-2
tween_chain	+1	+0	+1	-0	+1	-2	-0	-1	+0	-0

ScoreD vs sgd, every mode x dtype (cols 1-12)

ScoreD vs sgd, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	+0	+1	-0	+0	+0	+0	+1	-0	-0	+0	-0	+0
Mesh[T]	+3	-1	+2	+3	+2	+4	+3	-1	-1	+2	+1	+2
Mesh[T]Alt	+0	-2	-0	+0	+0	+0	+0	+1	-1	-0	-0	-0
Mesh[T]Chain	+0	+1	-0	+0	+0	+0	+0	+0	-0	+0	-0	+1
Mesh[T][S]	+2	+4	+1	+1	+2	+2	+1	+6	+1	+1	+1	+3
Mesh[T][S][FP]	+1	+3	+1	+1	+1	+2	+2	+1	+1	+1	+1	+1
Mesh[T][S]Sparse	+5	+15	+2	+3	+4	+7	+5	+5	+3	+4	+3	+3
Step[T]Alt	+1	-2	+1	+1	+1	+2	+2	-1	-1	+0	+0	+1
Step[T][S]	+7	+1	+3	+3	+4	+8	+6	+0	-0	+3	+3	+4
Step[T][S][FP]	+4	+1	+5	+4	+5	+9	+6	+0	-0	+3	+3	+4
Step[T][S][HP]	+5	-0	+3	+3	+4	+7	+5	-0	-1	+2	+2	+4
Step[T][S][HP]Async	+7	+0	+4	+4	+4	+10	+6	-0	-1	+3	+3	+4
Step[T][S][L]	+12	+5	+8	+8	+8	+16	+13	+1	+0	+6	+6	+6
Step[T][S][L]Cache	+12	+5	+6	+8	+9	+17	+11	+2	+0	+6	+7	+7
Step[T][S]Sparse	+6	+1	+4	+4	+5	+8	+6	-0	-1	+3	+3	+4
[T]Alt	+0	-2	-0	+0	+0	+0	+0	+1	-1	-1	-0	-0
[T][S]	+1	+4	+1	+1	+1	+2	+2	+5	+1	+1	+1	+2
[T][S][FP]	+1	+4	+0	+1	+1	+2	+1	+1	+1	+1	+1	+1
[T][S][HP]	+1	+3	+1	+1	+1	+2	+2	+1	+1	+2	+1	+1
[T][S][HP]Async	+1	+3	+1	+1	+1	+2	+2	+1	+0	+1	+1	+1
[T][S][L]	+4	+14	+3	+2	+3	+7	+4	+5	+4	+2	+3	+3
[T][S][L]Cache	+4	+26	+3	+3	+4	+7	+5	+5	+6	+3	+3	+3
[T][S]Sparse	+5	+12	+3	+4	+4	+8	+6	+5	+4	+6	+3	+3
step_sgd	+0	+3	+0	+1	+1	+1	+1	+1	+0	+1	+1	+1
step_tween	+5	-1	+2	+4	+3	+7	+5	-0	-1	+2	+2	+3
step_tween_chain	+1	+3	+0	+0	+1	+1	+2	+0	+1	+0	+1	+1
tween	+4	-1	+2	+2	+3	+5	+4	-1	-1	+1	+2	+2
tween_chain	+0	+2	-0	+0	+0	+0	+0	-0	-0	+0	+0	+0

ScoreD vs sgd, every mode x dtype (cols 13-24)

ScoreD vs sgd, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	+0	+0	+0	-2	-1	+1	-0	+0	+1	-1	+3	-0
Mesh[T]	-2	-3	-1	-2	-2	+0	-1	+2	+1	-1	-0	-2
Mesh[T]Alt	-2	-4	-1	-2	-3	+0	-1	-0	-0	-1	+0	-2
Mesh[T]Chain	-1	-0	+0	-1	-1	+1	-1	+0	+3	+0	+3	-1
Mesh[T][S]	+2	-0	+1	+2	+2	+2	+1	+4	+6	+2	+5	+2
Mesh[T][S][FP]	+1	+2	+2	+1	+4	+2	+1	+1	+6	+3	+4	+2
Mesh[T][S]Sparse	+8	+15	+5	+5	+16	+4	+4	+4	+18	+7	+18	+5
Step[T]Alt	-2	-4	-2	-3	-4	-0	-1	+1	-1	-1	-1	-2
Step[T][S]	-0	-2	-0	-1	-1	+0	-0	+5	+2	-0	+2	-1
Step[T][S][FP]	-1	-3	-1	-1	-1	+1	-1	+5	+2	-0	+2	-1
Step[T][S][HP]	-1	-2	-1	-1	-1	+1	-0	+4	+2	-0	+1	-1
Step[T][S][HP]Async	-1	-1	-1	-1	-1	+1	-1	+5	+2	+0	+2	-1
Step[T][S][L]	+2	+3	+0	+1	+4	+1	+0	+10	+7	+1	+8	+2
Step[T][S][L]Cache	+2	+3	+1	+1	+4	+2	+0	+8	+6	+1	+7	+1
Step[T][S]Sparse	-1	-2	-1	-1	-1	+1	-0	+5	+2	-0	+2	-1
[T]Alt	-2	-4	-1	-2	-3	-0	-1	-0	-0	-1	+0	-2
[T][S]	+2	+1	+1	+2	+3	+2	+1	+3	+7	+2	+6	+2
[T][S][FP]	+2	+5	+2	+1	+3	+2	+1	+1	+6	+2	+4	+2
[T][S][HP]	+1	+2	+2	+2	+3	+3	+1	+1	+7	+3	+5	+1
[T][S][HP]Async	+1	+7	+1	+1	+3	+2	+1	+1	+6	+0	+4	+0
[T][S][L]	+8	+15	+5	+9	+16	+5	+3	+4	+19	+7	+16	+9
[T][S][L]Cache	+13	+26	+7	+13	+26	+8	+6	+3	+28	+10	+28	+10
[T][S]Sparse	+8	+15	+5	+6	+14	+5	+3	+4	+16	+6	+15	+6
step_sgd	+2	+1	+1	-0	+2	+2	+0	+1	+7	+2	+4	+1
step_tween	-1	-2	-1	-1	-2	+0	-1	+4	+3	-1	+1	-1
step_tween_chain	+1	+1	+1	+1	+1	+1	+1	+1	+6	+1	+5	+1
tween	-1	-3	-1	-2	-3	+0	-1	+3	+1	-1	+0	-2
tween_chain	+0	-1	-0	-0	+0	+0	-0	+0	+4	+1	+2	-1

ScoreD vs sgd, every mode x dtype (cols 25-34)

ScoreD vs sgd, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	+0	-2	+0	-2	+1	-0	-0	-0	-0	-1
Mesh[T]	-1	-2	-1	-1	-1	-1	-1	-2	-3	-2
Mesh[T]Alt	-2	-2	-1	-1	-2	-1	-1	-2	-3	-2
Mesh[T]Chain	+1	+0	+0	+0	-1	-0	+0	-1	+0	-1
Mesh[T][S]	+2	+2	+1	+3	+1	+1	+1	+2	+2	+2
Mesh[T][S][FP]	+2	+1	+1	+2	+1	+1	+2	+0	+1	+3
Mesh[T][S]Sparse	+7	+8	+5	+10	+6	+4	+4	+8	+8	+5
Step[T]Alt	-2	-2	-1	-2	-2	-1	-1	-3	-4	-2
Step[T][S]	-0	-1	-0	-0	-1	-0	-0	-1	-2	-1
Step[T][S][FP]	+0	-1	-0	+0	-1	-0	-0	-1	-2	-1
Step[T][S][HP]	-1	-1	-1	-0	-1	-1	-1	-1	-2	-1
Step[T][S][HP]Async	-0	-1	-0	+0	-1	-1	-0	-1	-2	-0
Step[T][S][L]	+2	+2	+1	+3	+2	+1	+1	+1	+3	+1
Step[T][S][L]Cache	+3	+2	+1	+3	+2	+1	+0	+1	+2	+2
Step[T][S]Sparse	+0	-1	-0	+0	-1	-1	-0	-1	-2	-0
[T]Alt	-1	-2	-1	-1	-2	-1	-1	-2	-3	-2
[T][S]	+2	+2	+1	+3	+2	+1	+1	+2	+2	+2
[T][S][FP]	+3	+1	+1	+2	+2	+1	+1	+1	+2	+1
[T][S][HP]	+1	+2	+1	+1	+3	+0	+1	+2	+4	+2
[T][S][HP]Async	+1	+1	+1	+2	+2	+1	+0	-0	+1	+1
[T][S][L]	+10	+8	+6	+10	+9	+4	+3	+9	+13	+7
[T][S][L]Cache	+15	+12	+8	+13	+13	+6	+7	+11	+21	+11
[T][S]Sparse	+7	+6	+5	+7	+7	+4	+3	+7	+11	+6
step_sgd	+2	+2	+0	+2	+2	+1	+0	+1	+1	+1
step_tween	-1	-1	-0	-1	-1	-1	-0	-1	-1	-1
step_tween_chain	+2	+2	+0	+2	+2	+1	+1	+2	-0	+2
tween	-2	-2	-1	-1	-2	-1	-1	-2	-2	-2
tween_chain	+1	+0	+0	-0	+1	-1	+0	-1	-0	-0

AvailD vs sgd, every mode x dtype (cols 1-12)

AvailD vs sgd, every mode x dtype (cols 1-12)

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	+1	+1	-0	-0	+1	+1	+1	+1	-0	+0	+1	-0
Mesh[T]	-1	-2	-2	-1	-1	-1	-1	-2	-3	-2	-1	-3
Mesh[T]Alt	+2	-6	+0	+0	+2	+2	+0	-6	-8	-4	+2	-7
Mesh[T]Chain	+1	+1	+1	+1	+1	+1	+2	+1	-0	+1	+1	-0
Mesh[T][S]	+6	+5	+5	+5	+6	+6	+6	+5	+5	+6	+6	+6
Mesh[T][S][FP]	+5	+5	+6	+6	+6	+6	+6	+5	+5	+5	+6	+5
Mesh[T][S]Sparse	+15	+15	+13	+13	+14	+15	+14	+14	+13	+14	+14	+13
Step[T]Alt	-5	-6	-6	-6	-5	-4	-4	-6	-7	-5	-5	-6
Step[T][S]	+2	+2	+0	+1	+2	+2	+3	+1	+0	+2	+2	+1
Step[T][S][FP]	+2	+2	+1	+2	+2	+3	+2	+1	+0	+2	+2	+1
Step[T][S][HP]	+1	-0	+0	+1	+1	+2	+2	+1	-0	+1	+1	+0
Step[T][S][HP]Async	+3	+1	+2	+1	+2	+3	+2	+1	+0	+2	+2	+2
Step[T][S][L]	+9	+9	+7	+8	+8	+9	+9	+8	+6	+8	+8	+6
Step[T][S][L]Cache	+9	+10	+6	+8	+8	+9	+8	+8	+5	+8	+8	+6
Step[T][S]Sparse	+2	+2	+2	+2	+3	+3	+2	+1	+0	+2	+2	+1
[T]Alt	+2	-6	-0	-1	+1	+1	+1	-7	-8	-5	+1	-7
[T][S]	+5	+4	+5	+6	+7	+5	+6	+4	+6	+5	+6	+6
[T][S][FP]	+5	+5	+5	+6	+6	+5	+6	+5	+5	+5	+6	+5
[T][S][HP]	+5	+5	+5	+6	+6	+6	+7	+4	+5	+6	+7	+6
[T][S][HP]Async	+5	+5	+5	+6	+6	+5	+6	+5	+6	+6	+6	+6
[T][S][L]	+14	+14	+12	+13	+14	+15	+15	+14	+11	+13	+14	+14
[T][S][L]Cache	+14	+17	+12	+13	+14	+15	+15	+15	+13	+15	+14	+15
[T][S]Sparse	+14	+15	+13	+14	+14	+15	+14	+14	+13	+14	+14	+13
step_sgd	+3	+2	+3	+4	+4	+4	+5	+3	+3	+4	+4	+4
step_tween	+1	-1	+0	+1	+1	+2	+1	-0	-1	+1	+1	+0
step_tween_chain	+3	+3	+4	+4	+4	+5	+5	+2	+3	+2	+5	+3
tween	-1	-2	-3	-2	-1	-0	-1	-3	-3	-2	-1	-3
tween_chain	+1	+1	-0	+1	+1	+1	+2	+0	-1	+1	+1	-0

AvailD vs sgd, every mode x dtype (cols 13-24)

AvailD vs sgd, every mode x dtype (cols 13-24)

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	-0	+1	+0	+0	+0	+0	-0	+1	+0	+1	+1	+1
Mesh[T]	-3	-2	-3	-2	-2	-3	-3	-2	-2	-2	-3	-3
Mesh[T]Alt	-7	-7	-7	-6	-7	-7	-7	-6	-7	-6	-6	-7
Mesh[T]Chain	-0	+1	+0	+1	+0	+1	+0	+1	+1	+1	+0	+1
Mesh[T][S]	+4	+4	+5	+6	+5	+6	+6	+6	+5	+6	+5	+6
Mesh[T][S][FP]	+5	+4	+6	+6	+5	+6	+6	+6	+5	+6	+5	+6
Mesh[T][S]Sparse	+13	+15	+13	+13	+15	+14	+13	+14	+14	+14	+15	+13
Step[T]Alt	-6	-6	-7	-6	-5	-6	-6	-5	-5	-5	-6	-6
Step[T][S]	+1	+1	+1	+2	+2	+1	+0	+2	+1	+1	+2	+1
Step[T][S][FP]	+1	+0	+0	+1	+2	+1	+1	+2	+1	+2	+2	+2
Step[T][S][HP]	+0	-0	+0	+1	+0	+0	-0	+1	+1	+0	-0	+1
Step[T][S][HP]Async	+1	+1	+1	+2	+1	+1	+1	+2	+1	+2	+1	+1
Step[T][S][L]	+6	+9	+6	+7	+9	+7	+6	+8	+8	+7	+10	+8
Step[T][S][L]Cache	+7	+8	+6	+7	+9	+7	+6	+8	+8	+7	+9	+8
Step[T][S]Sparse	+1	+1	+1	+1	+1	+1	+1	+2	+1	+1	+1	+1
[T]Alt	-7	-7	-7	-6	-7	-7	-7	-6	-7	-6	-6	-7
[T][S]	+5	+5	+5	+6	+4	+6	+6	+6	+5	+6	+5	+6
[T][S][FP]	+4	+4	+5	+6	+5	+6	+6	+6	+5	+6	+5	+6
[T][S][HP]	+5	+4	+5	+6	+4	+6	+6	+6	+5	+6	+5	+5
[T][S][HP]Async	+5	+4	+6	+6	+5	+5	+6	+6	+5	+6	+5	+5
[T][S][L]	+13	+14	+12	+13	+14	+12	+12	+15	+12	+12	+13	+13
[T][S][L]Cache	+14	+16	+14	+15	+16	+14	+14	+15	+15	+14	+17	+15
[T][S]Sparse	+13	+15	+13	+14	+15	+14	+13	+13	+14	+14	+15	+14
step_sgd	+3	+2	+4	+4	+3	+4	+3	+4	+4	+5	+3	+4
step_tween	-0	-1	-1	+1	+0	-0	-1	+1	+1	+1	-0	+0
step_tween_chain	+4	+3	+4	+4	+3	+4	+3	+5	+4	+4	+4	+4
tween	-3	-3	-4	-3	-2	-3	-4	-2	-2	-2	-2	-2
tween_chain	-0	-0	-0	+0	+1	+1	-0	+1	+1	+1	+1	+1

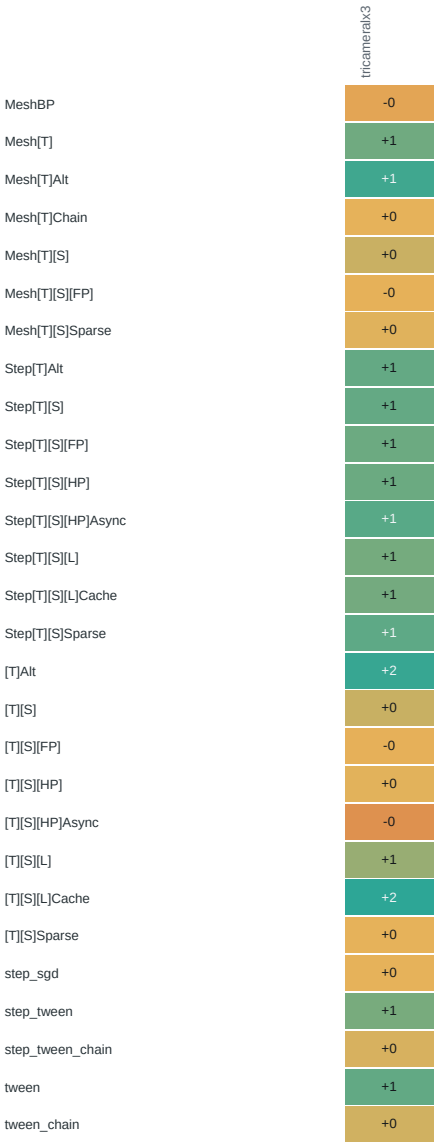
AvailD vs sgd, every mode x dtype (cols 25-34)

AvailD vs sgd, every mode x dtype (cols 25-34)

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	+0	+0	+0	-0	+1	+1	+0	+1	-0	+0
Mesh[T]	-2	-3	-3	-2	-2	-2	-2	-2	-3	-2
Mesh[T]Alt	-6	-7	-6	-7	-7	-7	-7	-7	-7	-7
Mesh[T]Chain	+1	-0	+1	+1	+0	+1	+0	+1	+0	+1
Mesh[T][S]	+5	+5	+5	+6	+4	+6	+6	+6	+4	+5
Mesh[T][S][FP]	+6	+5	+6	+6	+5	+6	+6	+6	+4	+5
Mesh[T][S]Sparse	+14	+13	+14	+14	+13	+14	+14	+14	+13	+12
Step[T]Alt	-5	-6	-6	-6	-6	-6	-6	-5	-6	-5
Step[T][S]	+1	+0	+1	+1	+1	+1	+1	+2	+1	+1
Step[T][S][FP]	+2	+1	+1	+2	+1	+1	+1	+1	+1	+1
Step[T][S][HP]	+0	+0	+0	+0	-0	+0	-0	+1	+0	+0
Step[T][S][HP]Async	+1	+0	+1	+2	+1	+1	+1	+1	+1	+1
Step[T][S][L]	+8	+7	+7	+7	+7	+7	+7	+8	+7	+7
Step[T][S][L]Cache	+8	+7	+7	+7	+7	+6	+7	+8	+7	+7
Step[T][S]Sparse	+2	+0	+1	+2	+1	+1	+1	+2	+0	+1
[T]Alt	-7	-7	-7	-6	-8	-7	-6	-6	-7	-7
[T][S]	+5	+5	+5	+5	+5	+6	+6	+6	+4	+6
[T][S][FP]	+6	+5	+6	+6	+5	+6	+6	+5	+4	+5
[T][S][HP]	+5	+5	+6	+5	+5	+6	+6	+6	+5	+5
[T][S][HP]Async	+5	+5	+5	+6	+5	+5	+6	+6	+4	+5
[T][S][L]	+13	+12	+12	+13	+12	+12	+12	+13	+11	+13
[T][S][L]Cache	+15	+15	+14	+14	+14	+14	+14	+15	+14	+14
[T][S]Sparse	+14	+13	+14	+14	+13	+14	+13	+13	+13	+13
step_sgd	+5	+4	+4	+4	+4	+4	+3	+4	+3	+3
step_tween	+1	-0	+1	+0	-0	-0	+0	+0	+0	-0
step_tween_chain	+4	+3	+4	+4	+4	+3	+4	+5	+3	+4
tween	-3	-2	-3	-2	-3	-3	-3	-3	-3	-3
tween_chain	+1	+0	+0	+0	-0	-0	+1	+0	-0	+0

AccD vs sgd, every mode x arch

AccD vs sgd, every mode x arch



Family collapse - Step* vs non-Step

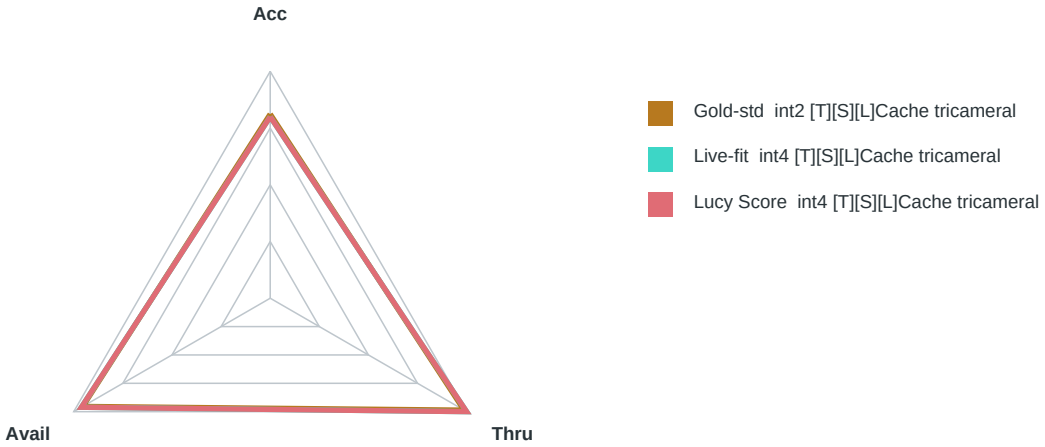
Step* is a 1D pipe (one sample enters layer 0 per tick; output is the sample that entered depth ticks ago). Non-Step of the same family is a full-chain update. AccD is a real scheduler split, not leftover warm-up forwards.

step	plain	n	mean |AccD|
Step[T]Alt	[T]Alt	34	3.79
Step[T][S]	[T][S]	34	2.67
Step[T][S][FP]	[T][S][FP]	34	2.84
Step[T][S][HP]	[T][S][HP]	34	2.74
Step[T][S][HP]Async	[T][S][HP]Async	34	2.70
Step[T][S][L]	[T][S][L]	34	3.49
Step[T][S][L]Cache	[T][S][L]Cache	34	4.33
Step[T][S]Sparse	[T][S]Sparse	34	2.53
step_sgd	sgd	34	0.91
step_tween	tween	34	0.49
step_tween_chain	tween_chain	34	0.69

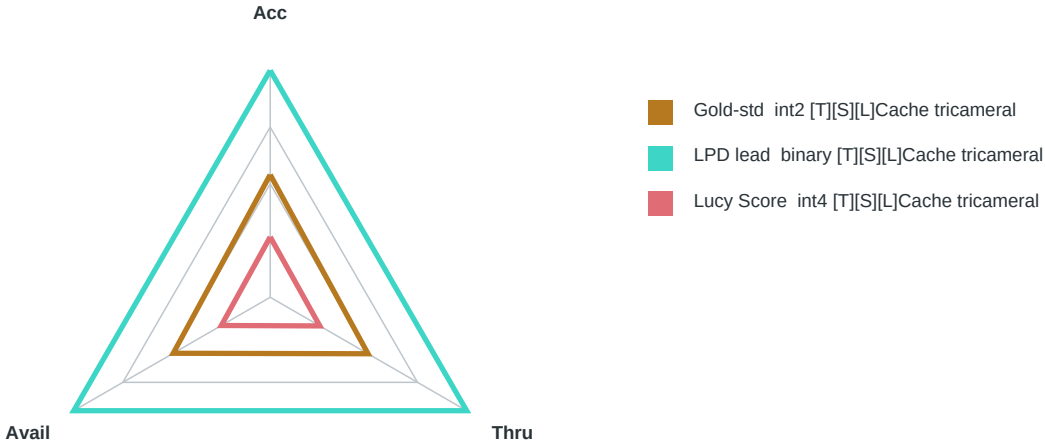
Consciousness - Acc, Throughput, Availability

Synthetic organism / Lucy density: can the net run and train at the same time in a small box. Lucy Score = Throughput x Availability x Acc / 10,000 (hard Acc; SoftAcc is serve-confidence only). SGD that blocks serve dies on Availability. Q = geomean Acc/Thru/Avail vs learner peaks (traps do not set Thru/Avail). LPD = Q x shrink vs Acc-champ RAM; 0 unless Acc keep >=70%. Gold = all 3 pillars >=80% at <=20% Acc-champ RAM. Gold-std = Acc >=80% plus Thru or Avail, then smallest then fastest. Score/MiB is the binary trap.
Acc champ bfloat16|none|Step[T][S]|tricameral|simd Acc 11.2 Thru 368 Avail 20.8% 172.2 KiB (RAM reference)
Lucy Score champ (T x Avail x Acc) int4|none|[T][S][L]Cache|tricameral|simd Score 31.7 Acc 9.0 Soft 5 43.0 KiB
Live-fit champ (best Q) int4|none|[T][S][L]Cache|tricameral|simd Acc 9.0 Thru 1033 Avail 34.2% 43.0 KiB
Gold-std (2+ pillars, Acc keep >= 80%, then smallest then fastest): int2|none|[T][S][L]Cache|tricameral|simd mode [T][S][L]Cache Acc 9.1 Thru 1019 21.5 KiB
Board fastest float32|none|[T][S][L]|tricameral|simd Thru 1126 (traps may own this) Best availability int|none|[T][S][L]Cache|tricameral|simd 35.7%
Learner Thru peak 1033 learner Avail peak 35.6%

Consciousness radar - Acc / Thru / Avail vs learner peaks



Memory density radar - same pillars x shrink vs Acc champ (traps sit at origin)



Gold - trifecta >=80% at <=20% of Acc-champ RAM

Band	Cell	Acc%	Thru%	Avail%	Q%	RAM%	xSmall	LPD	Acc	Thru	KiB
gold	int2 [T][S][L]Cache tricameral	81	99	95	91	12	8.0	7.31	9.1	1019	21.5

Gold-standard train modes - 2+ pillars, Acc keep >= 80%, smallest then fastest

Mode	n	Acc	KiB	Thru	Cell
[T][S][L]Cache	1	9.1	21.5	1019	int2 [T][S][L]Cache tricameral
Step[T][S][L]	2	9.5	688.8	556	float64 Step[T][S][L] tricameral

Lucy density (LPD) - Q x shrink vs Acc-champ RAM; 0 if Acc keep < 70%

Band	Cell	Acc%	Thru%	Avail%	Q%	RAM%	xSmall	LPD	Acc	Thru	KiB
-	binary [T][S][L]Cache tricameral	75	99	97	90	6	16.0	14.33	8.4	1023	10.8
gold	int2 [T][S][L]Cache tricameral	81	99	95	91	12	8.0	7.31	9.1	1019	21.5
-	ternary [T][S][L]Cache tricameral	77	99	96	90	12	8.0	7.22	8.7	1025	21.5
acc	int2 [T][S][HP]Async tricameral	91	53	63	67	12	8.0	5.38	10.2	552	21.5
-	int2 [T][S][FP] tricameral	80	54	63	64	12	8.0	5.16	8.9	556	21.5
-	int4 [T][S][L]Cache tricameral	80	100	96	92	25	4.0	3.66	9.0	1033	43.0
-	uint3 [T][S][L]Cache tricameral	75	34	98	63	19	5.3	3.34	8.4	349	32.3
-	int3 [T][S][L]Cache tricameral	73	33	99	62	19	5.3	3.30	8.1	342	32.3
-	uint4 [T][S][L]Cache tricameral	75	56	98	75	25	4.0	2.98	8.4	581	43.1
-	nf4 [T][S][L]Cache tricameral	75	42	97	67	25	4.0	2.70	8.4	435	43.0
-	int5 [T][S][L]Cache tricameral	76	28	99	59	31	3.2	1.90	8.5	288	53.8
-	uint5 [T][S][L]Cache tricameral	71	29	98	59	31	3.2	1.89	8.0	304	53.8
-	int8 [T][S][L]Cache tricameral	79	99	95	91	50	2.0	1.82	8.9	1026	86.1
-	uint8 [T][S][L]Cache tricameral	75	90	97	87	50	2.0	1.74	8.4	928	86.1
-	uint3 Mesh[T]Alt tricameral	73	10	40	31	19	5.3	1.65	8.1	107	32.3
acc	fp4 Mesh[T]Alt tricameral	84	20	36	40	25	4.0	1.58	9.4	211	43.0
-	uint6 [T][S][L]Cache tricameral	77	26	99	59	38	2.7	1.56	8.7	274	64.6
acc	fp4 [T]Alt tricameral	91	19	34	39	25	4.0	1.56	10.2	199	43.0
-	fp6 [T][S][L]Cache tricameral	77	25	98	57	38	2.7	1.52	8.6	257	64.6
-	int6 [T][S][L]Cache tricameral	75	25	99	57	38	2.7	1.52	8.4	258	64.6

Consciousness rank - Q = geomean Acc/Thru/Avail keep

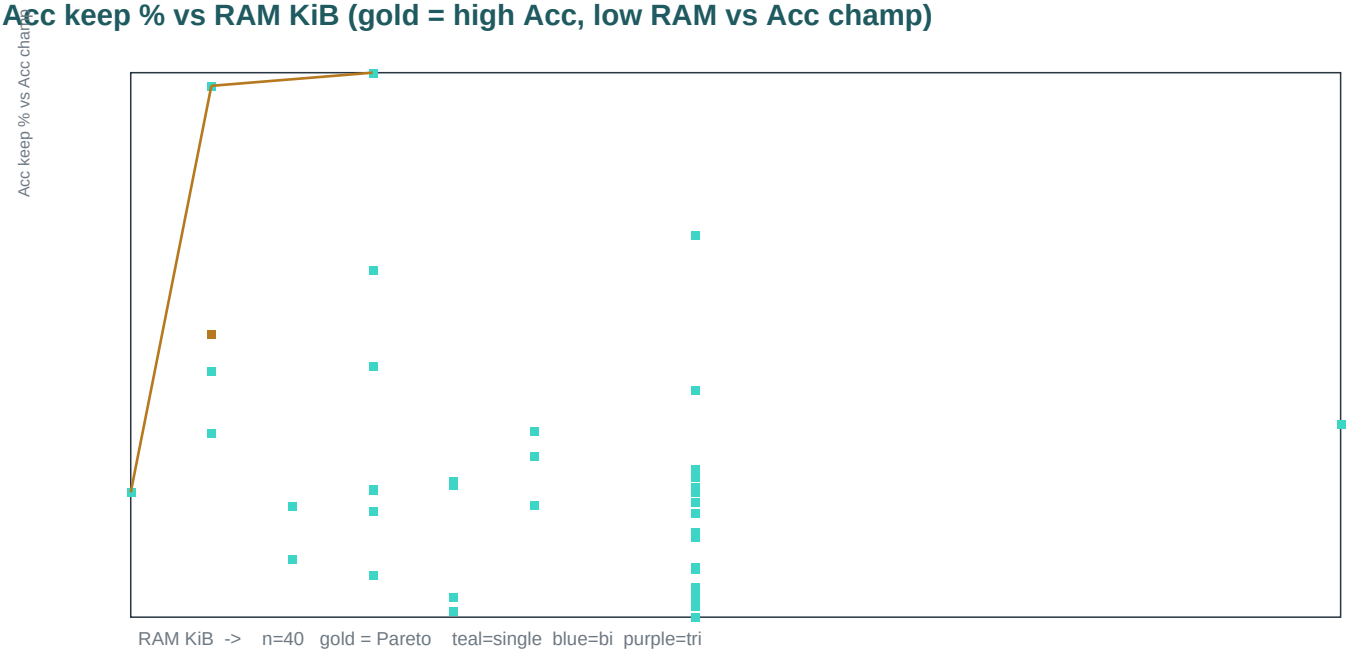
Band	Cell	Acc%	Thru%	Avail%	Q%	LPD	Thru	Avail
-	int4 [T][S][L]Cache tricameral	80	100	96	92	3.66	1033	34.2
gold	int2 [T][S][L]Cache tricameral	81	99	95	91	7.31	1019	33.9
-	int8 [T][S][L]Cache tricameral	79	99	95	91	1.82	1026	33.9
-	ternary [T][S][L]Cache tricameral	77	99	96	90	7.22	1025	34.0
-	binary [T][S][L]Cache tricameral	75	99	97	90	14.33	1023	34.4
-	uint8 [T][S][L]Cache tricameral	75	90	97	87	1.74	928	34.5
-	float32 Step[T][S][L]Cache tricameral	80	75	79	78	0.39	774	28.0
-	uint16 [T][S][L]Cache tricameral	78	58	100	77	0.77	604	35.6
-	float32 Step[T][S][L] tricameral	77	74	78	77	0.38	769	27.8
-	uint4 [T][S][L]Cache tricameral	75	56	98	75	2.98	581	34.9

Trap - tiny RAM, Acc keep < 70% (Score/MiB and SoftAcc Score lie here)

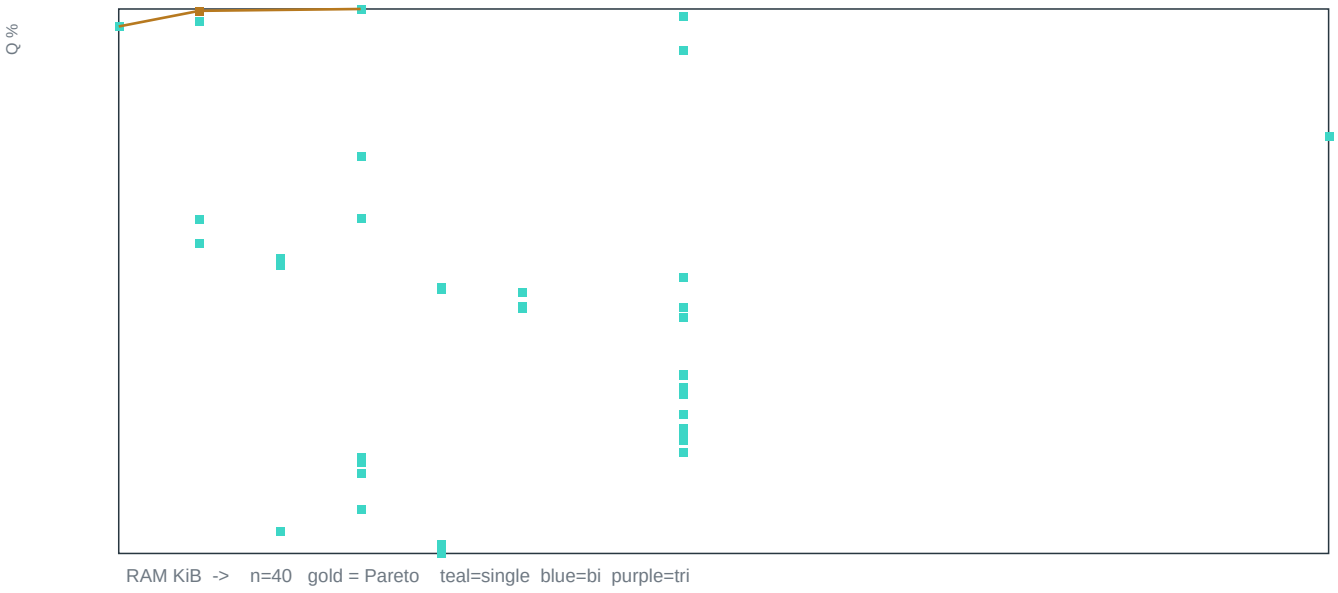
Band	Cell	Acc%	Thru%	Avail%	Q%	RAM%	xSmall	LPD	Acc	Thru	KiB
trap	binary sgd tricameral	46	41	49	45	6	16.0	0.00	5.2	420	10.8
trap	binary step_sgd tricameral	59	47	56	54	6	16.0	0.00	6.6	487	10.8
trap	binary tween tricameral	50	32	42	41	6	16.0	0.00	5.6	330	10.8
trap	binary tween_chain tricameral	64	42	51	51	6	16.0	0.00	7.1	431	10.8
trap	binary step_tween tricameral	46	36	47	43	6	16.0	0.00	5.2	374	10.8
trap	binary step_tween_chain tricameral	61	48	57	55	6	16.0	0.00	6.8	493	10.8
trap	binary MeshBP tricameral	58	41	51	49	6	16.0	0.00	6.5	424	10.8
trap	binary Mesh[T] tricameral	49	33	43	41	6	16.0	0.00	5.5	338	10.8
trap	binary Mesh[T]Chain tricameral	61	41	51	50	6	16.0	0.00	6.8	427	10.8

Band	Cell	Acc%	Thru%	Avail%	Q%	RAM%	xSmall	LPD	Acc	Thru	KiB
trap	binary [T][S] tricameral	57	52	61	57	6	16.0	0.00	6.4	539	10.8

Acc keep % vs RAM KiB (gold = high Acc, low RAM vs Acc champ)

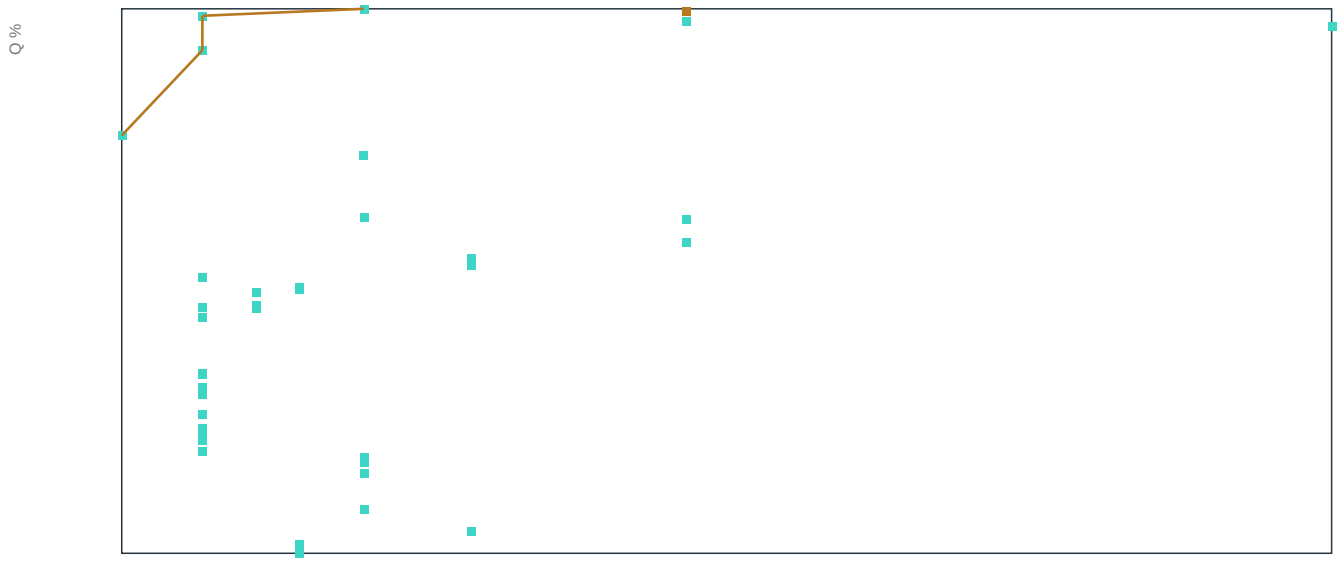


Q% vs RAM KiB (gold = high consciousness, low RAM)



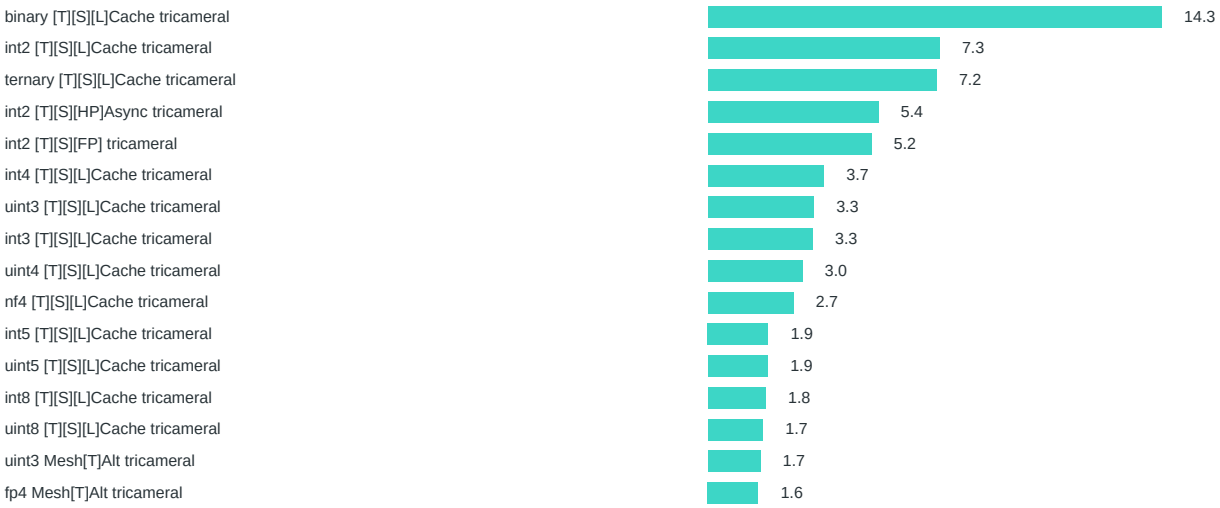
Q% vs shrink vs Acc champ (gold = upper right)

Q% vs shrink vs Acc champ (gold = upper right)

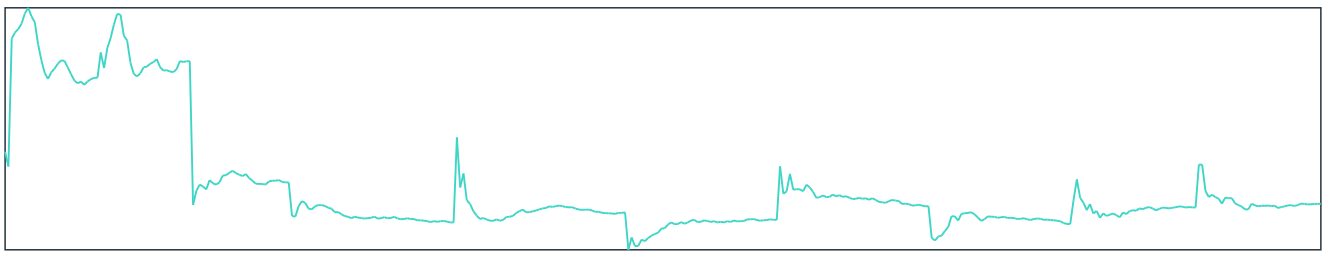


times smaller than Acc champ -> n=40 gold = Pareto teal=single blue=bi purple=tri

Top Lucy density (LPD)



Live pulse (Score)



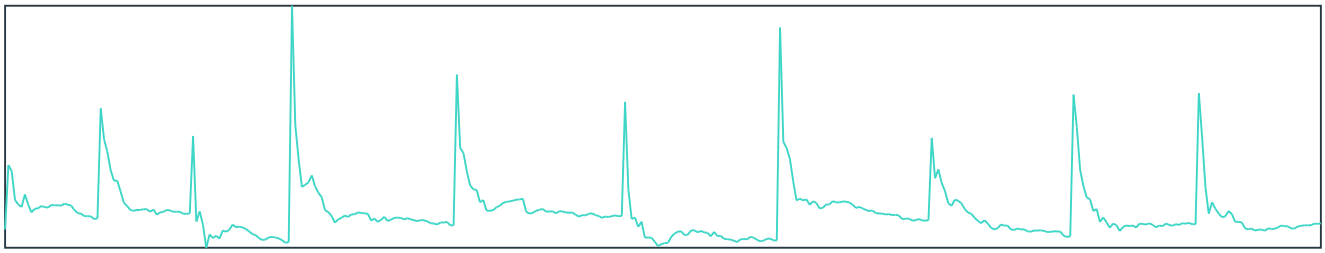
n=400 min=0.75 max=6.37

Live pulse (SoftAcc)



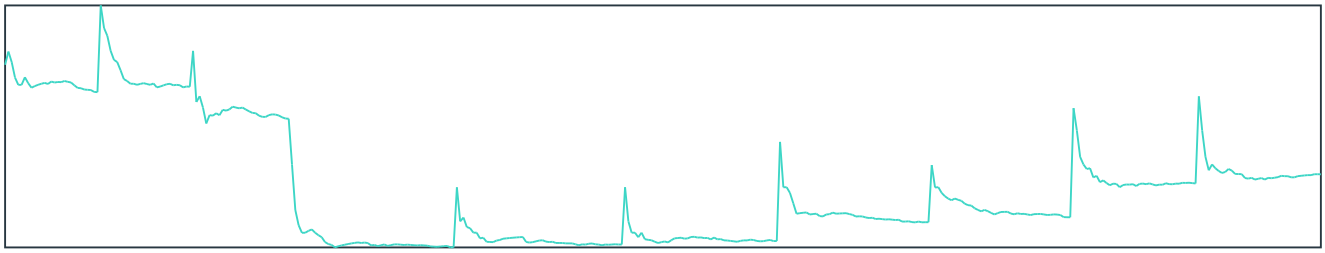
n=400 min=1.54 max=3.12

Live pulse (Availability)



n=400 min=21.17 max=30.71

Live pulse (Throughput)



n=400 min=133.61 max=303.80

Queue by train mode (this epoch)

Mode	Done	Run	Left	Total
sgd	34	0	0	34
step_sgd	34	0	0	34
tween	34	0	0	34
tween_chain	34	0	0	34
step_tween	34	0	0	34
step_tween_chain	34	0	0	34
MeshBP	34	0	0	34
Mesh[T]	34	0	0	34
Mesh[T]Chain	34	0	0	34
[T][S]	34	0	0	34
Step[T][S]	34	0	0	34
[T]Alt	34	0	0	34
Step[T]Alt	34	0	0	34
[T][S][HP]	34	0	0	34
[T][S][L]	34	0	0	34
[T][S][FP]	34	0	0	34
[T][S][L]Cache	34	0	0	34
[T][S][HP]Async	34	0	0	34
[T][S]Sparse	34	0	0	34
Mesh[T][S]	34	0	0	34
Mesh[T]Alt	34	0	0	34
Mesh[T][S][FP]	34	0	0	34
Mesh[T][S]Sparse	34	0	0	34
Step[T][S][HP]	34	0	0	34
Step[T][S][L]	34	0	0	34
Step[T][S][FP]	34	0	0	34
Step[T][S][L]Cache	34	0	0	34
Step[T][S][HP]Async	34	0	0	34

Step[T][S]Sparse	34	0	0	34