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 0.02 - 2026-08-20 09:02:27 - 0.0.0.0:8155
This epoch 986 / 986 cells. Recorded 986 results. Learning rate 0.02.
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	bfloat16|none|tween_chain|tricameral|simd	8.87	3.3	12.1	359.0	20.5
throughput	float32|none|[T][S][L]Cache|tricameral|simd	6.88	1.5	1.8	1087.3	34.9
availability	uint64|none|[T][S][L]Cache|tricameral|simd	3.37	1.5	1.6	607.4	35.5
lucy score	bfloat16|none|[T][S][L]|tricameral|simd	21.33	1.5	9.0	706.2	33.5
mobile score (trap)	binary|none|[T][S]Sparse|tricameral|simd	5.41	1.5	1.9	894.7	32.4
acc/sec	bfloat16|none|[T][S][L]|tricameral|simd	21.33	1.5	9.0	706.2	33.5

Lucy axis champions (this tide)

Axis	Mode	DType	Arch	Value
hard_acc	Mesh[T]Chain	bfloat16	tricameralx3	12.96
throughput	[T][S][L]Cache	float32	tricameralx3	1087.34
availability	[T][S][L]Cache	uint64	tricameralx3	35.55
score	[T][S][L]	bfloat16	tricameralx3	21.33
soft_acc	tween_chain	bfloat16	tricameralx3	3.32
acc_thru	[T][S][L]	bfloat16	tricameralx3	63.72
realtime	[T][S][L]Cache	float32	tricameralx3	379.65
adapt	Mesh[T]Chain	bfloat16	tricameralx3	3.64
keep_learn	step_sgd	bfloat16	tricameralx3	10.57
acc_per_sec	[T][S][L]	bfloat16	tricameralx3	0.96
stability	sgd	fp4	tricameralx3	100.00
mobile_score	[T][S]Sparse	binary	tricameralx3	514.71
lpd	step_sgd	bfloat16	tricameralx3	0.95
mspeed	step_tween_chain	float64	tricameralx3	1.00
mavail	step_tween_chain	float64	tricameralx3	1.00
mix	step_sgd	bfloat16	tricameralx3	0.95
gold_std	step_sgd	bfloat16	tricameralx3	172.19

Best settings per train mode

Mode	DType	Format	Score	Soft	Acc	Avail	n
[T][S][L]	bfloat16	none	21.3	1.5	9.0	33.5	34
[T][S][L]Cache	bfloat16	none	15.8	1.5	5.9	35.1	34
step_tween_chain	float32	none	14.6	2.5	8.9	24.9	34
step_sgd	bfloat16	none	12.8	3.1	12.2	23.9	34
Mesh[T]Chain	bfloat16	none	9.3	3.3	13.0	20.3	34
sgd	float32	none	9.3	3.0	9.1	20.1	34
Mesh[T][S]Sparse	bfloat16	none	9.3	1.5	3.8	34.0	34
tween_chain	bfloat16	none	8.9	3.3	12.1	20.5	34
MeshBP	bfloat16	none	8.3	3.1	11.2	20.6	34
Mesh[T][S][FP]	bfloat16	none	8.3	1.5	7.2	25.1	34
[T][S][FP]	bfloat16	none	7.7	1.5	7.0	24.5	34
[T][S][HP]Async	bfloat16	none	7.3	1.5	6.6	24.6	34

[T][S]Sparse	fp4	none	6.2	1.5	2.5	33.6	34
[T][S][HP]	bfloat16	none	5.3	1.5	4.5	25.2	34
[T][S]	bfloat16	none	5.0	1.5	4.4	24.8	34
Mesh[T][S]	bfloat16	none	4.6	1.5	4.1	24.7	34
Step[T][S][L]	float32	none	4.2	1.5	2.0	27.8	34
Step[T][S][L]Cache	float32	none	3.9	1.5	1.8	28.3	34
[T]Alt	bfloat16	none	2.4	1.5	8.6	13.2	34
Step[T][S][FP]	float32	none	2.3	1.5	2.2	20.5	34
Step[T][S][HP]Async	fp4	none	2.0	1.5	2.7	20.6	34
Step[T][S]	fp4	none	2.0	1.5	2.6	20.5	34
Step[T][S]Sparse	fp4	none	1.9	1.5	2.4	20.7	34
Mesh[T]Alt	bfloat16	none	1.8	1.5	6.7	13.2	34
Step[T][S][HP]	float32	none	1.8	1.5	1.8	20.2	34
step_tween	fp4	none	1.7	1.5	2.4	20.1	34
tween	float32	none	1.4	1.5	1.9	17.8	34
Mesh[T]	fp4	none	1.3	1.5	2.5	17.3	34
Step[T]Alt	fp4	none	0.8	1.5	2.7	13.5	34

Best dtype per mode

Mode	Winner dtype	Score	Soft	Acc
[T][S][L]	bfloat16	21.3	1.5	9.0
[T][S][L]Cache	bfloat16	15.8	1.5	5.9
step_tween_chain	float32	14.6	2.5	8.9
step_sgd	bfloat16	12.8	3.1	12.2
Mesh[T]Chain	bfloat16	9.3	3.3	13.0
sgd	float32	9.3	3.0	9.1
Mesh[T][S]Sparse	bfloat16	9.3	1.5	3.8
tween_chain	bfloat16	8.9	3.3	12.1
MeshBP	bfloat16	8.3	3.1	11.2
Mesh[T][S][FP]	bfloat16	8.3	1.5	7.2
[T][S][FP]	bfloat16	7.7	1.5	7.0
[T][S][HP]Async	bfloat16	7.3	1.5	6.6
[T][S]Sparse	fp4	6.2	1.5	2.5
[T][S][HP]	bfloat16	5.3	1.5	4.5
[T][S]	bfloat16	5.0	1.5	4.4
Mesh[T][S]	bfloat16	4.6	1.5	4.1
Step[T][S][L]	float32	4.2	1.5	2.0
Step[T][S][L]Cache	float32	3.9	1.5	1.8
[T]Alt	bfloat16	2.4	1.5	8.6
Step[T][S][FP]	float32	2.3	1.5	2.2
Step[T][S][HP]Async	fp4	2.0	1.5	2.7
Step[T][S]	fp4	2.0	1.5	2.6
Step[T][S]Sparse	fp4	1.9	1.5	2.4
Mesh[T]Alt	bfloat16	1.8	1.5	6.7
Step[T][S][HP]	float32	1.8	1.5	1.8
step_tween	fp4	1.7	1.5	2.4
tween	float32	1.4	1.5	1.9
Mesh[T]	fp4	1.3	1.5	2.5
Step[T]Alt	fp4	0.8	1.5	2.7

Best mode per dtype

DType	Winner mode	Score	Soft	Acc

bfloat16	[T][S][L]	21.3	1.5	9.0
float32	step_tween_chain	14.6	2.5	8.9
float64	step_tween_chain	11.3	2.4	9.8
float16	[T][S][L]Cache	9.4	1.5	4.5
uint8	step_sgd	7.4	1.5	5.3
int4	[T][S][L]Cache	6.9	1.5	2.0
int	step_sgd	6.5	2.4	9.3
fp4	[T][S][L]Cache	6.5	1.5	2.5
int64	step_sgd	6.3	2.0	7.6
uint64	step_tween_chain	6.3	1.6	7.1
uint16	step_sgd	6.1	1.6	7.0
int2	[T][S][L]	6.0	1.5	2.4
int16	step_tween_chain	5.8	1.6	6.9
uint32	step_sgd	5.7	1.5	6.8
complex128	step_sgd	5.7	2.1	7.9
ternary	[T][S][L]Cache	5.6	1.5	1.7
binary	[T][S]Sparse	5.4	1.5	1.9
int8	Mesh[T][S]Sparse	5.3	1.5	1.6
uint	step_sgd	5.1	1.6	6.0
complex64	step_tween_chain	5.0	1.7	6.7
int32	step_sgd	4.9	1.6	5.6
uint4	[T][S][L]Cache	4.7	1.5	2.2
uintptr	step_tween_chain	4.6	1.6	5.9
uint2	Mesh[T][S]Sparse	4.4	1.5	2.4
fp8e4m3	[T][S][L]Cache	3.5	1.5	2.2
fp8e5m2	[T][S]Sparse	3.1	1.5	1.7
nf4	Mesh[T][S]Sparse	2.6	1.5	1.8
int3	Mesh[T][S]Sparse	2.1	1.5	1.9
uint3	[T][S]Sparse	2.1	1.5	1.8
uint6	[T][S]Sparse	1.8	1.5	2.0
int5	[T][S][L]Cache	1.8	1.5	1.8
uint5	Mesh[T][S]Sparse	1.7	1.5	1.7
int6	Mesh[T][S]Sparse	1.6	1.5	1.8
fp6	[T][S][L]Cache	1.6	1.5	1.8

Leaderboard (Lucy Score)

#	Cell	Score	Soft	Acc	Thru	Avail
1	bfloat16|none|[T][S][L]|tricameral|simd	21.3	1.5	9.0	706.2	33.5
2	bfloat16|none|[T][S][L]Cache|tricameral|simd	15.8	1.5	5.9	759.7	35.1
3	float32|none|step_tween_chain|tricameral|simd	14.6	2.5	8.9	658.7	24.9
4	bfloat16|none|step_sgd|tricameral|simd	12.8	3.1	12.2	439.9	23.9
5	float64|none|step_tween_chain|tricameral|simd	11.3	2.4	9.8	461.6	25.1
6	bfloat16|none|step_tween_chain|tricameral|simd	11.1	2.9	10.9	431.9	23.5
7	float16|none|[T][S][L]Cache|tricameral|simd	9.4	1.5	4.5	587.7	35.5
8	bfloat16|none|Mesh[T]Chain|tricameral|simd	9.3	3.3	13.0	354.1	20.3
9	float32|none|sgd|tricameral|simd	9.3	3.0	9.1	508.4	20.1
10	bfloat16|none|Mesh[T][S]Sparse|tricameral|simd	9.3	1.5	3.8	714.4	34.0
11	bfloat16|none|tween_chain|tricameral|simd	8.9	3.3	12.1	359.0	20.5
12	float32|none|step_sgd|tricameral|simd	8.6	2.0	5.8	622.9	23.8
13	bfloat16|none|sgd|tricameral|simd	8.5	3.1	12.1	351.3	20.0
14	bfloat16|none|MeshBP|tricameral|simd	8.3	3.1	11.2	361.6	20.6
15	bfloat16|none|Mesh[T][S][FP]|tricameral|simd	8.3	1.5	7.2	460.7	25.1
16	bfloat16|none|[T][S][FP]|tricameral|simd	7.7	1.5	7.0	450.3	24.5

#	Cell	Score	Soft	Acc	Thru	Avail
17	float32|none|Mesh[T]Chain|tricameral|simd	7.5	1.9	6.7	529.2	21.0
18	uint8|none|step_sgd|tricameral|simd	7.4	1.5	5.3	572.5	24.5
19	float64|none|step_sgd|tricameral|simd	7.4	2.1	6.2	469.1	25.4
20	bfloat16|none|[T][S][HP]Async|tricameral|simd	7.3	1.5	6.6	451.0	24.6

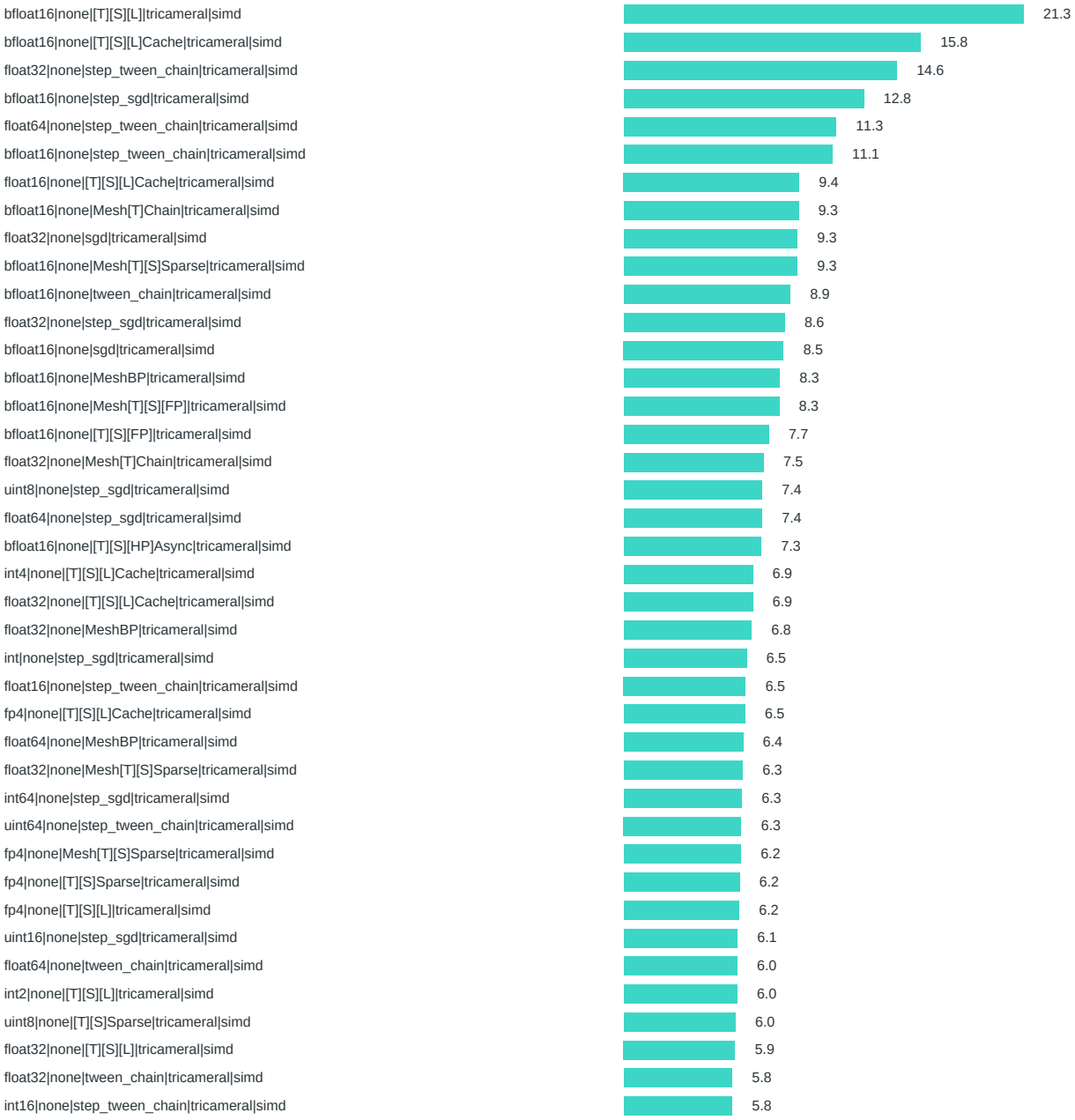
Leaderboard (SoftAcc)

#	Cell	Score	Soft	Acc	Thru	Avail
1	bfloat16|none|tween_chain|tricameral|simd	8.9	3.3	12.1	359.0	20.5
2	bfloat16|none|Mesh[T]Chain|tricameral|simd	9.3	3.3	13.0	354.1	20.3
3	bfloat16|none|sgd|tricameral|simd	8.5	3.1	12.1	351.3	20.0
4	bfloat16|none|step_sgd|tricameral|simd	12.8	3.1	12.2	439.9	23.9
5	bfloat16|none|MeshBP|tricameral|simd	8.3	3.1	11.2	361.6	20.6
6	float32|none|sgd|tricameral|simd	9.3	3.0	9.1	508.4	20.1
7	bfloat16|none|step_tween_chain|tricameral|simd	11.1	2.9	10.9	431.9	23.5
8	float64|none|tween_chain|tricameral|simd	6.0	2.6	8.5	351.1	20.3
9	float64|none|MeshBP|tricameral|simd	6.4	2.5	8.1	371.4	21.2
10	float32|none|step_tween_chain|tricameral|simd	14.6	2.5	8.9	658.7	24.9
11	float64|none|step_tween_chain|tricameral|simd	11.3	2.4	9.8	461.6	25.1
12	int|none|step_sgd|tricameral|simd	6.5	2.4	9.3	283.9	24.9
13	float16|none|step_tween_chain|tricameral|simd	6.5	2.2	8.0	336.6	24.0
14	float64|none|step_sgd|tricameral|simd	7.4	2.1	6.2	469.1	25.4
15	float32|none|MeshBP|tricameral|simd	6.8	2.1	6.7	505.8	20.2
16	int64|none|step_sgd|tricameral|simd	6.3	2.0	7.6	335.5	24.6
17	float32|none|step_sgd|tricameral|simd	8.6	2.0	5.8	622.9	23.8
18	float32|none|Mesh[T]Chain|tricameral|simd	7.5	1.9	6.7	529.2	21.0
19	float32|none|tween_chain|tricameral|simd	5.8	1.8	5.7	503.4	20.3
20	uint64|none|step_tween_chain|tricameral|simd	6.3	1.6	7.1	358.1	24.5

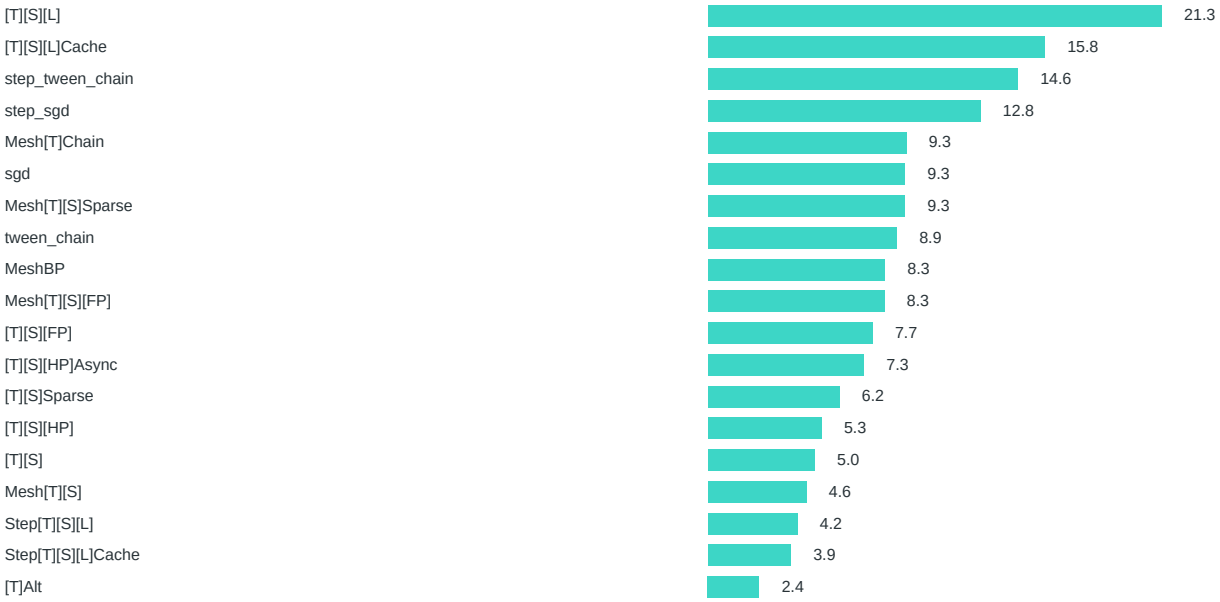
Leaderboard (hard Acc)

#	Cell	Score	Soft	Acc	Thru	Avail
1	bfloat16|none|Mesh[T]Chain|tricameral|simd	9.3	3.3	13.0	354.1	20.3
2	bfloat16|none|step_sgd|tricameral|simd	12.8	3.1	12.2	439.9	23.9
3	bfloat16|none|sgd|tricameral|simd	8.5	3.1	12.1	351.3	20.0
4	bfloat16|none|tween_chain|tricameral|simd	8.9	3.3	12.1	359.0	20.5
5	bfloat16|none|MeshBP|tricameral|simd	8.3	3.1	11.2	361.6	20.6
6	bfloat16|none|step_tween_chain|tricameral|simd	11.1	2.9	10.9	431.9	23.5
7	float64|none|step_tween_chain|tricameral|simd	11.3	2.4	9.8	461.6	25.1
8	int|none|step_sgd|tricameral|simd	6.5	2.4	9.3	283.9	24.9
9	float32|none|sgd|tricameral|simd	9.3	3.0	9.1	508.4	20.1
10	bfloat16|none|[T][S][L]|tricameral|simd	21.3	1.5	9.0	706.2	33.5
11	float32|none|step_tween_chain|tricameral|simd	14.6	2.5	8.9	658.7	24.9
12	float64|none|tween_chain|tricameral|simd	6.0	2.6	8.5	351.1	20.3
13	float64|none|MeshBP|tricameral|simd	6.4	2.5	8.1	371.4	21.2
14	float16|none|step_tween_chain|tricameral|simd	6.5	2.2	8.0	336.6	24.0
15	int64|none|step_sgd|tricameral|simd	6.3	2.0	7.6	335.5	24.6
16	bfloat16|none|Mesh[T][S][FP]|tricameral|simd	8.3	1.5	7.2	460.7	25.1
17	uint64|none|step_tween_chain|tricameral|simd	6.3	1.6	7.1	358.1	24.5
18	bfloat16|none|[T][S][FP]|tricameral|simd	7.7	1.5	7.0	450.3	24.5
19	uint16|none|step_sgd|tricameral|simd	6.1	1.6	7.0	356.5	24.4
20	int16|none|step_tween_chain|tricameral|simd	5.8	1.6	6.9	336.9	24.7

Top scores



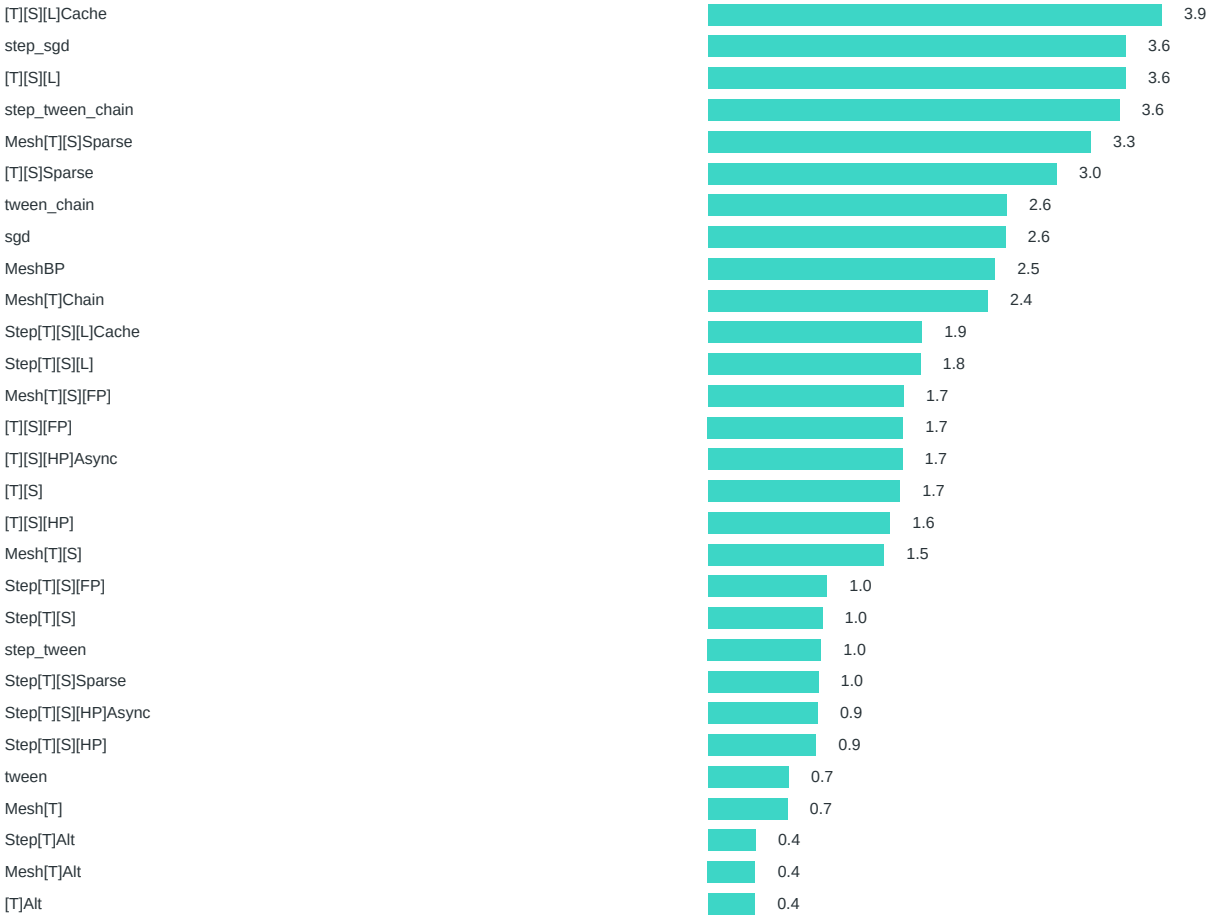
Best settings per mode



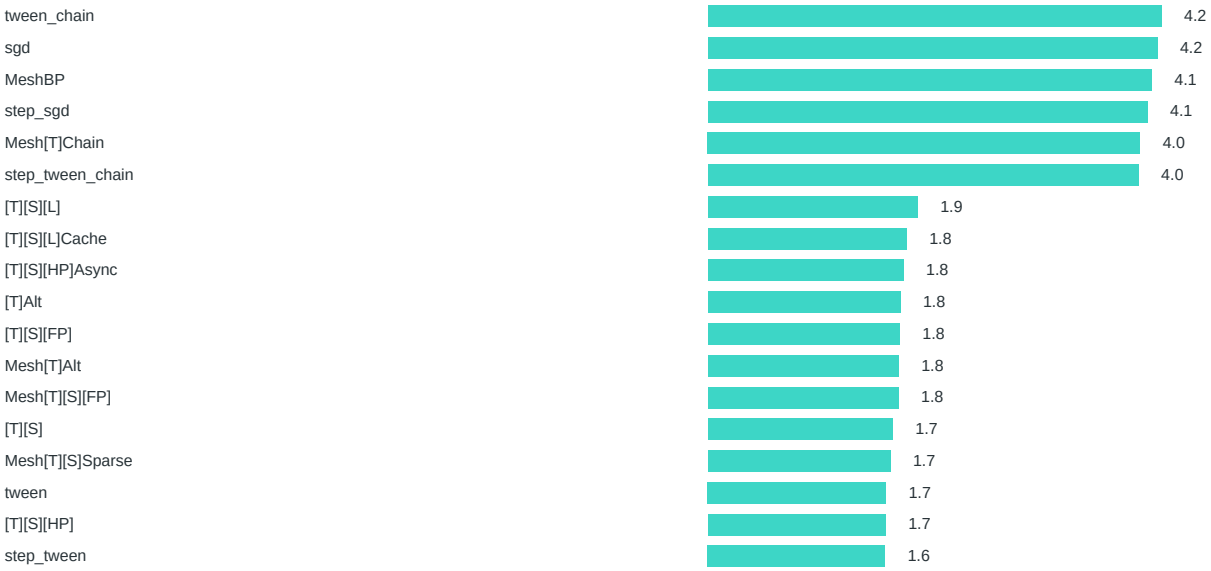
Best settings per mode



Mean Score by train mode



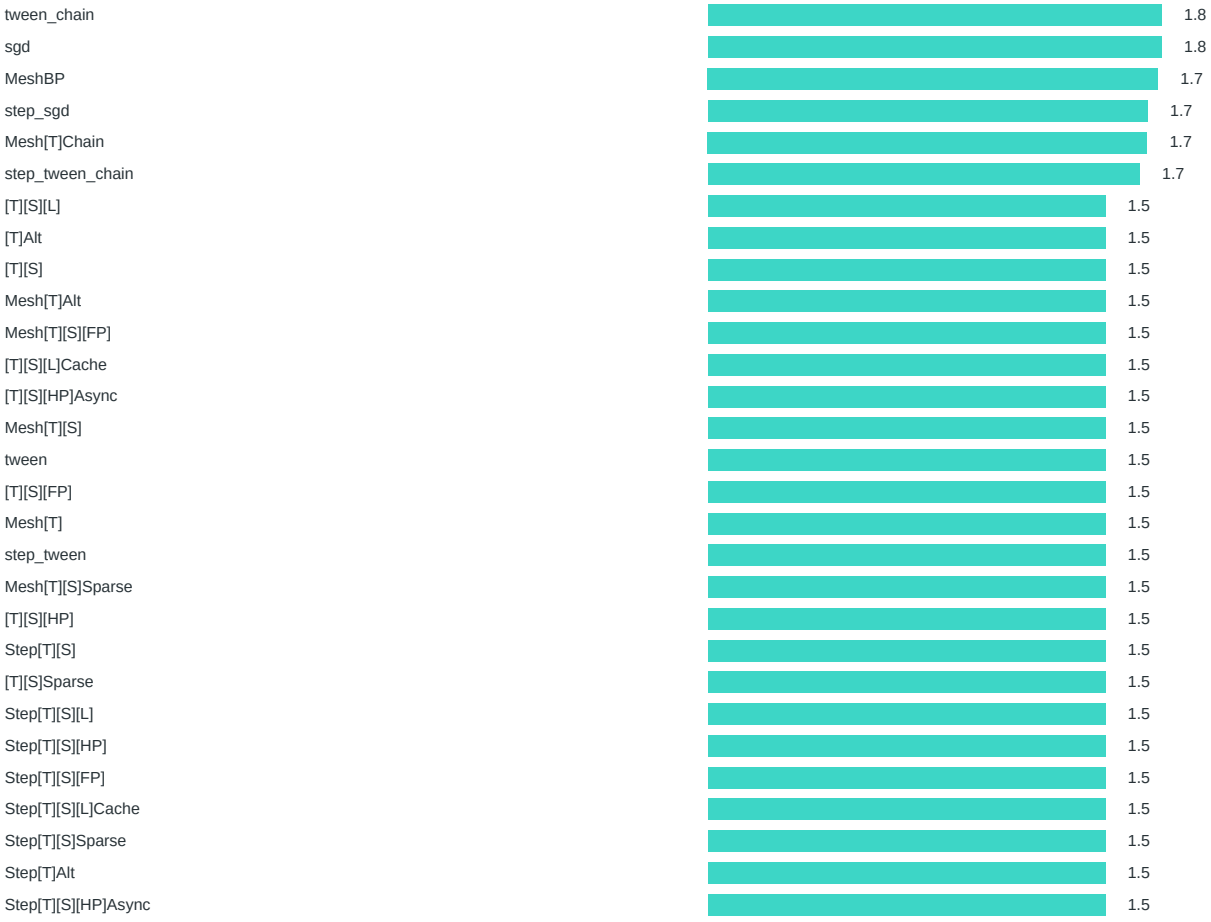
Mean hard Acc by train mode



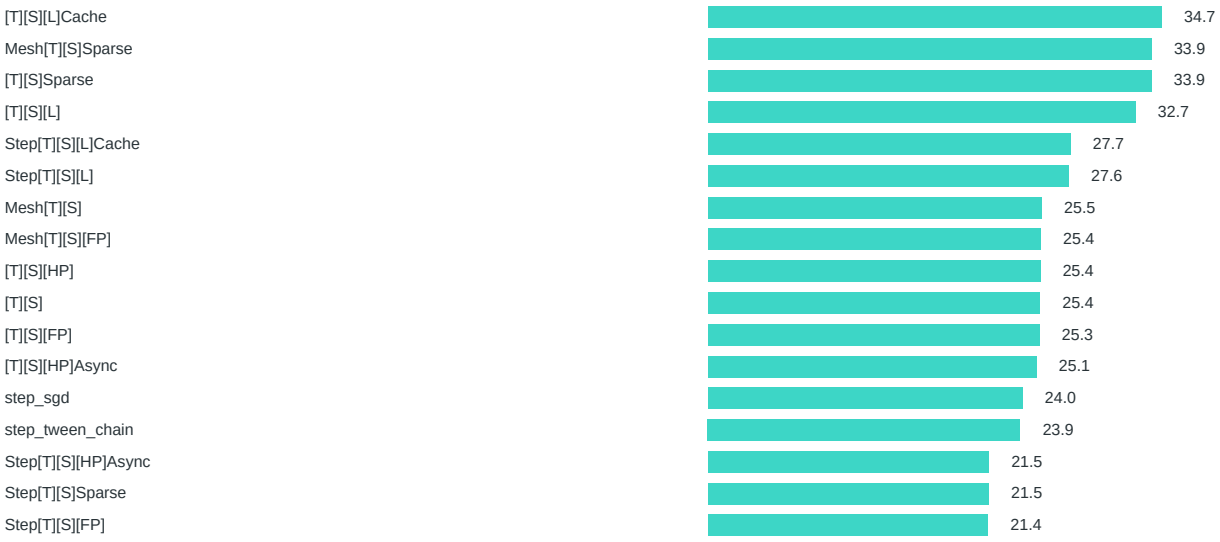
Mean hard Acc by train mode



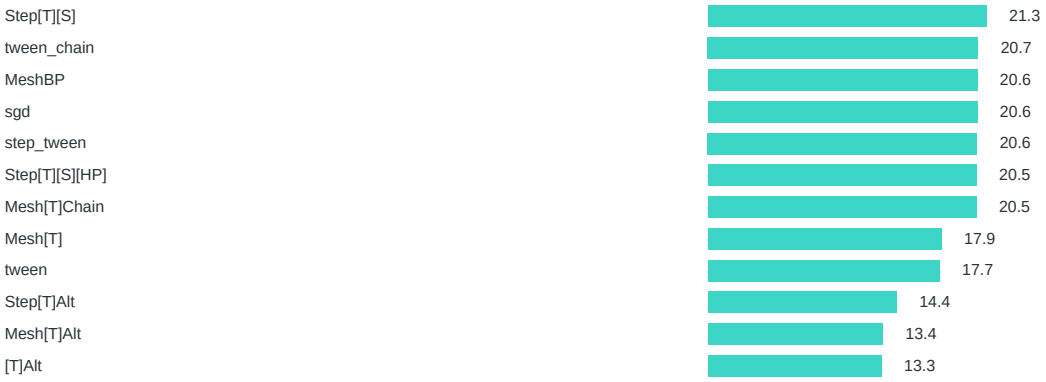
Mean SoftAcc by train mode



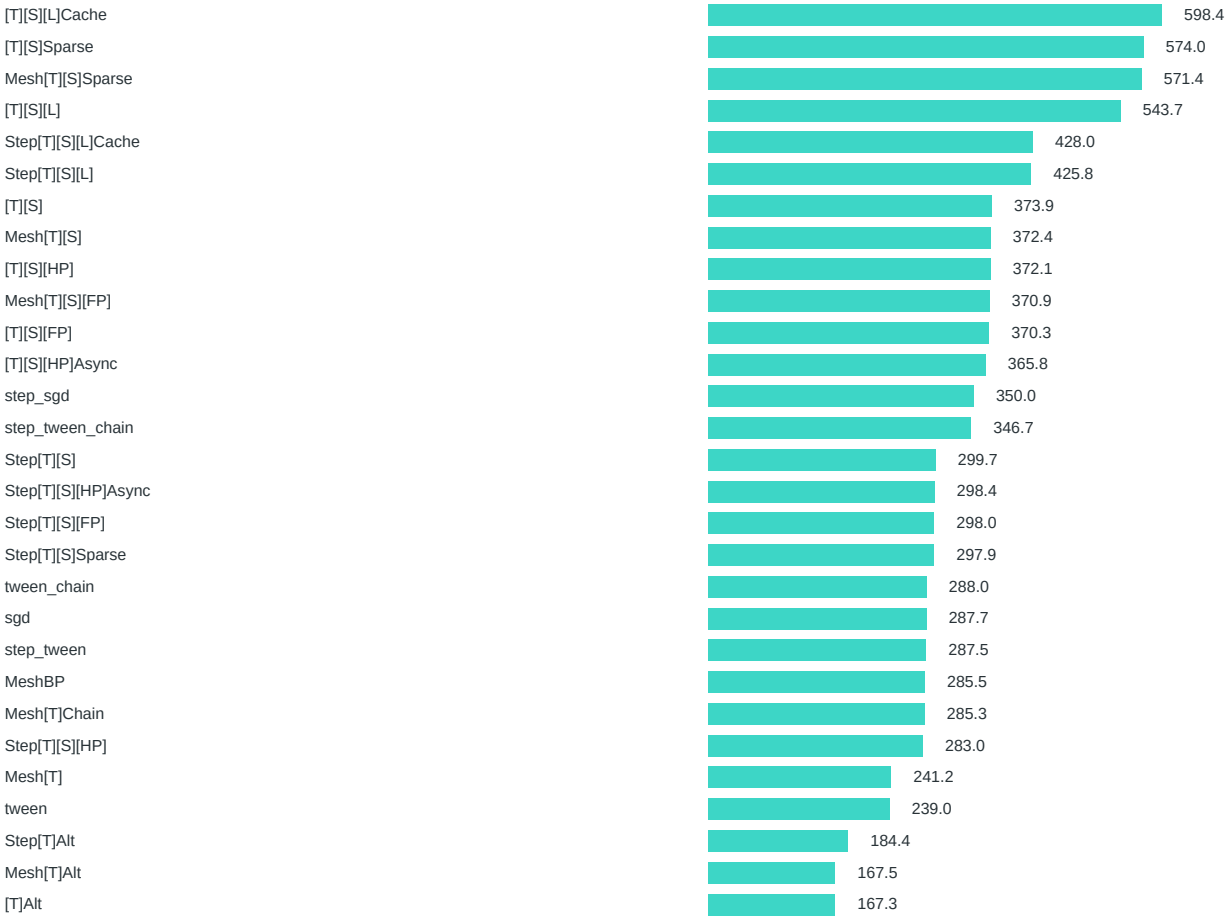
Mean Availability by train mode



Mean Availability by train mode



Mean Throughput by train mode



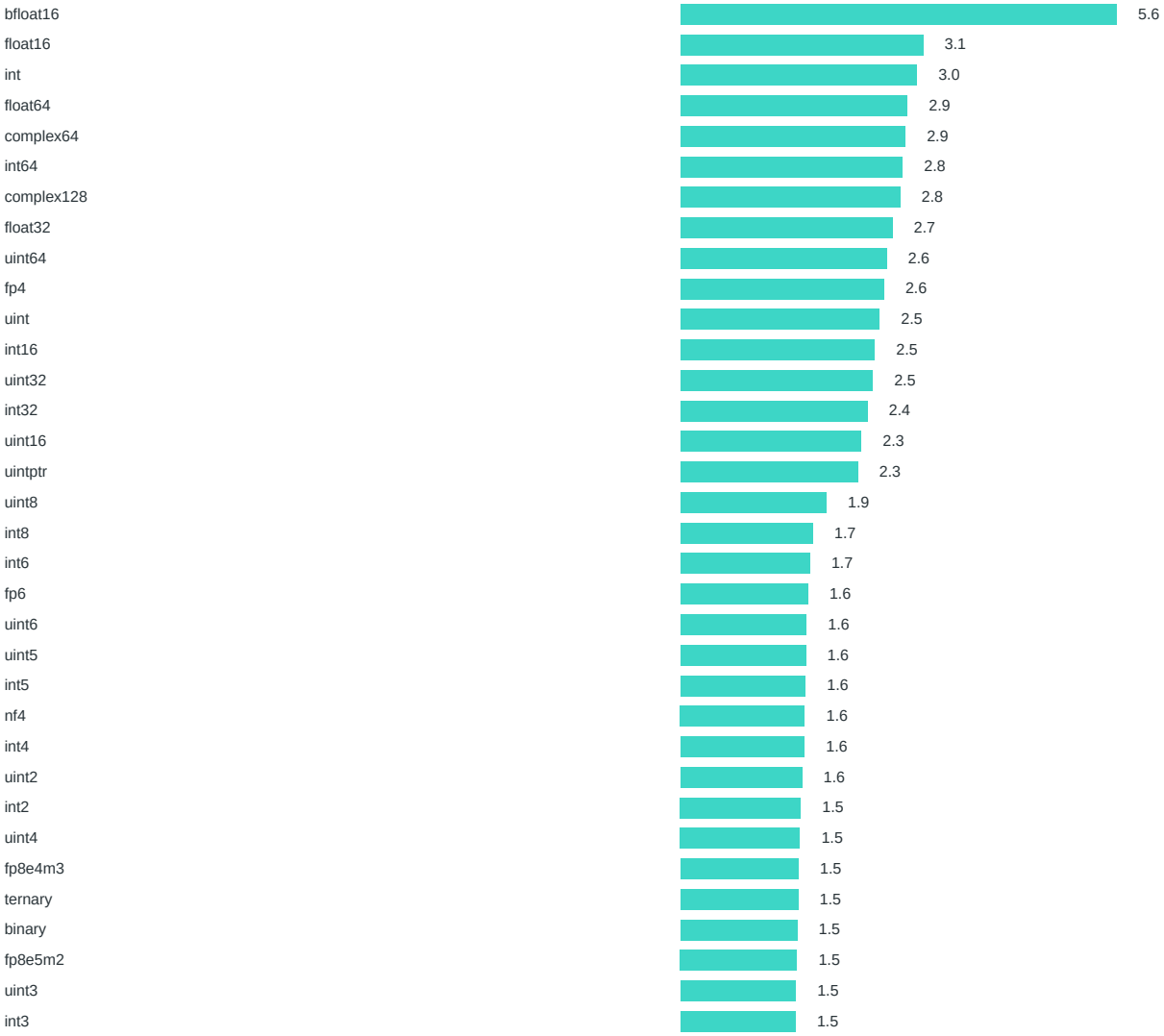
Mean Score by dtype



Mean Score by dtype



Mean hard Acc by dtype



Mean Score by arch



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

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

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	8	1	4	5	4	7	6	2	1	1	1	5
Mesh[T]	1	1	1	1	1	1	1	1	0	1	1	0
Mesh[T]Alt	2	0	0	0	0	0	1	1	0	0	0	0
Mesh[T]Chain	9	1	3	3	5	7	5	2	1	1	1	5
Mesh[T][S]	5	2	1	1	2	2	2	3	1	1	1	1
Mesh[T][S][FP]	8	2	2	1	1	3	2	3	1	1	1	1
Mesh[T][S]Sparse	9	4	2	3	3	6	4	6	1	2	2	2
Step[T]Alt	0	0	0	0	0	1	1	1	0	0	0	0
Step[T][S]	2	1	1	1	1	2	1	2	1	1	1	1
Step[T][S][FP]	1	1	1	1	1	2	1	2	1	1	1	1
Step[T][S][HP]	1	1	1	1	1	2	1	2	0	1	1	1
Step[T][S][HP]Async	1	1	1	1	1	1	1	2	0	1	1	1
Step[T][S][L]	2	3	2	1	2	4	2	4	1	1	2	2
Step[T][S][L]Cache	2	3	1	1	1	4	2	4	1	1	1	1
Step[T][S]Sparse	2	1	1	1	1	1	1	2	0	1	1	1
[T]Alt	2	0	0	0	1	1	1	1	0	0	0	0
[T][S]	5	3	1	1	2	3	2	3	1	1	1	1
[T][S][FP]	8	2	1	1	2	3	2	3	1	1	1	2
[T][S][HP]	5	2	1	1	2	2	2	3	1	1	2	1
[T][S][HP]Async	7	2	2	1	1	2	2	2	1	1	2	1
[T][S][L]	21	2	3	3	4	6	3	6	1	2	3	2
[T][S][L]Cache	16	5	3	2	9	7	4	6	2	4	2	4
[T][S]Sparse	4	5	2	2	3	4	6	6	1	3	3	2
sgd	9	1	4	4	5	9	6	2	1	1	1	3
step_sgd	13	1	6	5	6	9	7	3	1	1	1	7
step_tween	2	1	1	1	1	1	1	2	1	1	1	1
step_tween_chain	11	2	5	5	6	15	11	2	1	1	1	4
tween	1	1	1	1	1	1	1	1	0	1	1	1
tween_chain	9	1	4	4	5	6	6	2	0	0	1	4

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	3	1	1	4	1	1	1	5	2	1	1	1
Mesh[T]	1	1	0	1	1	0	0	1	1	1	1	1
Mesh[T]Alt	0	0	0	0	1	0	0	0	1	0	0	0
Mesh[T]Chain	3	1	0	2	1	0	0	4	2	1	1	4
Mesh[T][S]	2	2	1	1	2	1	0	1	2	1	2	1
Mesh[T][S][FP]	1	2	1	1	2	1	1	1	2	1	2	1
Mesh[T][S]Sparse	3	4	2	3	5	1	2	4	5	3	4	3
Step[T]Alt	0	0	0	0	1	0	0	0	1	0	0	0
Step[T][S]	1	1	1	1	1	1	0	1	1	1	1	1
Step[T][S][FP]	1	1	1	1	1	1	1	1	1	1	1	1
Step[T][S][HP]	1	1	1	1	1	0	1	1	2	1	1	2
Step[T][S][HP]Async	1	1	1	1	1	0	0	1	2	1	1	1
Step[T][S][L]	1	2	1	2	4	1	1	2	3	1	3	1
Step[T][S][L]Cache	1	4	1	2	3	1	1	1	3	2	4	1
Step[T][S]Sparse	1	1	1	1	2	1	1	1	1	1	1	1
[T]Alt	0	0	0	0	0	0	0	0	0	0	0	0
[T][S]	1	2	1	2	2	1	1	2	2	1	2	1
[T][S][FP]	1	2	1	2	2	1	1	2	2	1	2	1
[T][S][HP]	2	2	1	1	2	1	1	2	4	1	2	1
[T][S][HP]Async	2	1	1	2	2	1	1	2	3	1	2	1
[T][S][L]	4	6	1	4	4	1	1	3	5	2	3	3
[T][S][L]Cache	3	5	1	3	7	2	1	3	4	2	6	3
[T][S]Sparse	3	5	1	2	5	1	1	3	5	2	5	2
sgd	4	2	1	4	2	1	1	5	2	1	1	3
step_sgd	5	2	1	5	2	1	1	6	3	1	1	5
step_tween	1	1	0	1	1	0	0	1	2	1	1	1
step_tween_chain	6	1	1	4	2	1	1	5	3	1	1	4
tween	1	1	0	1	1	0	0	1	1	0	1	1
tween_chain	3	1	1	3	1	0	1	5	5	1	1	4

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	2	1	1	4	1	1	0	4	3	2
Mesh[T]	1	1	0	1	1	0	0	1	1	1
Mesh[T]Alt	0	0	0	0	0	0	0	0	1	0
Mesh[T]Chain	2	1	0	4	1	0	1	4	2	3
Mesh[T][S]	1	1	1	2	1	1	1	2	2	1
Mesh[T][S][FP]	1	1	1	2	2	1	1	2	2	1
Mesh[T][S]Sparse	3	4	2	4	2	2	1	3	6	3
Step[T]Alt	1	0	0	0	0	0	0	1	1	0
Step[T][S]	1	1	1	1	1	0	0	1	2	1
Step[T][S][FP]	1	1	1	1	1	1	0	1	1	1
Step[T][S][HP]	1	1	1	1	1	0	0	1	1	1
Step[T][S][HP]Async	1	1	1	1	1	0	0	1	1	1
Step[T][S][L]	2	1	1	2	2	1	1	2	2	2
Step[T][S][L]Cache	2	2	1	2	2	1	1	2	3	2
Step[T][S]Sparse	1	1	1	1	1	1	1	1	1	1
[T]Alt	0	0	0	0	0	0	0	0	1	0
[T][S]	2	1	1	1	2	1	1	1	4	1
[T][S][FP]	1	2	1	1	1	1	1	1	2	1
[T][S][HP]	2	2	1	1	1	1	1	1	2	1
[T][S][HP]Async	2	1	1	2	2	1	1	3	1	1
[T][S][L]	3	3	1	3	3	1	1	4	5	4
[T][S][L]Cache	3	3	1	3	5	2	1	3	5	3
[T][S]Sparse	3	3	2	2	2	1	2	3	6	3
sgd	3	1	1	2	1	1	1	4	3	2
step_sgd	6	1	1	6	1	1	1	5	7	5
step_tween	1	1	1	1	1	1	0	1	2	1
step_tween_chain	3	1	1	5	1	1	1	6	4	5
tween	1	1	0	1	0	0	0	1	1	1
tween_chain	4	1	1	4	1	1	1	4	2	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	11	2	9	10	6	7	8	3	2	2	1	11
Mesh[T]	2	2	2	2	2	1	1	3	1	2	1	1
Mesh[T]Alt	7	1	2	2	2	1	2	3	2	2	1	2
Mesh[T]Chain	13	1	7	6	9	7	7	3	2	1	2	10
Mesh[T][S]	4	2	2	2	2	1	1	3	2	1	1	2
Mesh[T][S][FP]	7	2	2	1	2	2	1	3	1	2	2	1
Mesh[T][S]Sparse	4	1	2	2	2	2	2	3	1	2	1	1
Step[T]Alt	2	2	2	1	1	1	2	3	2	2	1	2
Step[T][S]	2	1	2	2	2	2	2	3	2	1	1	2
Step[T][S][FP]	2	1	1	2	2	2	1	3	2	1	2	1
Step[T][S][HP]	2	1	2	1	2	2	1	2	2	2	2	1
Step[T][S][HP]Async	2	1	2	1	2	1	1	3	2	2	2	1
Step[T][S][L]	2	1	2	1	2	2	1	3	1	2	2	2
Step[T][S][L]Cache	1	1	1	2	1	2	2	3	1	1	1	1
Step[T][S]Sparse	2	2	1	1	1	1	2	2	1	1	1	2
[T]Alt	9	1	1	2	3	2	2	3	1	1	1	2
[T][S]	4	2	2	2	2	2	1	3	1	1	2	1
[T][S][FP]	7	2	1	1	2	2	2	2	2	1	1	2
[T][S][HP]	5	1	1	2	2	1	2	2	1	2	2	2
[T][S][HP]Async	7	2	2	1	1	1	2	2	2	1	2	2
[T][S][L]	9	1	2	2	2	2	1	2	2	2	2	2
[T][S][L]Cache	6	1	2	1	4	2	2	3	2	2	1	2
[T][S]Sparse	2	2	1	1	1	1	2	2	2	2	2	1
sgd	12	1	8	9	9	9	8	3	2	1	2	7
step_sgd	12	1	8	7	7	6	6	3	2	1	1	9
step_tween	2	1	2	2	2	1	2	2	2	2	1	1
step_tween_chain	11	2	7	7	8	9	10	2	3	2	1	6
tween	2	2	2	2	1	2	2	3	2	2	1	1
tween_chain	12	1	7	9	9	6	8	3	1	1	1	8

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	6	1	2	8	1	2	2	8	2	2	2	3
Mesh[T]	1	2	1	1	2	1	2	2	1	2	1	2
Mesh[T]Alt	2	2	1	1	2	3	1	2	2	1	2	2
Mesh[T]Chain	6	2	1	4	1	2	2	8	2	2	1	7
Mesh[T][S]	2	1	1	2	1	1	1	1	2	2	2	1
Mesh[T][S][FP]	1	2	1	2	1	2	2	1	2	2	2	2
Mesh[T][S]Sparse	2	1	2	2	1	1	2	2	2	2	1	2
Step[T]Alt	1	2	1	1	2	1	2	1	1	1	2	2
Step[T][S]	2	2	1	1	2	2	2	2	1	2	1	2
Step[T][S][FP]	2	1	2	1	2	2	2	2	1	2	1	2
Step[T][S][HP]	2	2	2	2	1	2	2	2	2	1	1	3
Step[T][S][HP]Async	1	1	1	2	1	1	2	1	2	2	1	2
Step[T][S][L]	1	1	2	1	2	2	1	2	1	1	1	1
Step[T][S][L]Cache	1	2	1	2	1	1	2	1	1	2	2	1
Step[T][S]Sparse	1	1	1	1	2	2	2	2	1	2	1	2
[T]Alt	2	1	2	1	2	1	1	1	1	3	1	2
[T][S]	1	2	1	2	2	1	2	2	1	2	2	2
[T][S][FP]	1	2	2	2	2	2	2	2	1	1	1	1
[T][S][HP]	2	1	2	1	1	1	2	2	2	1	2	1
[T][S][HP]Async	2	1	1	2	2	2	2	2	2	1	1	2
[T][S][L]	2	2	1	2	2	2	2	1	2	1	1	2
[T][S][L]Cache	2	2	1	1	2	2	1	1	1	1	2	2
[T][S]Sparse	2	2	1	1	2	1	1	1	1	1	1	1
sgd	7	2	2	7	2	2	2	8	2	1	1	5
step_sgd	6	2	1	6	1	2	2	8	2	1	2	6
step_tween	1	2	1	1	2	1	1	2	2	2	2	2
step_tween_chain	7	1	1	5	2	2	2	6	2	2	1	6
tween	2	2	2	2	1	2	1	2	2	1	2	2
tween_chain	5	1	2	5	1	1	2	9	4	2	1	9

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	3	2	1	6	2	2	1	7	3	5
Mesh[T]	2	1	1	1	2	2	1	2	2	2
Mesh[T]Alt	2	2	1	2	2	1	0	2	2	1
Mesh[T]Chain	4	1	1	6	2	2	2	6	2	5
Mesh[T][S]	1	2	1	2	1	2	1	2	1	2
Mesh[T][S][FP]	1	1	1	2	2	2	1	2	1	1
Mesh[T][S]Sparse	2	2	1	2	1	2	1	2	2	2
Step[T]Alt	2	1	1	1	2	1	1	2	1	1
Step[T][S]	2	1	2	1	1	1	1	1	2	1
Step[T][S][FP]	2	1	1	2	2	2	1	2	1	1
Step[T][S][HP]	2	1	2	2	2	1	2	2	1	1
Step[T][S][HP]Async	2	1	2	2	1	1	1	1	1	2
Step[T][S][L]	1	1	2	2	1	2	1	2	1	2
Step[T][S][L]Cache	2	2	2	2	1	2	2	2	1	2
Step[T][S]Sparse	2	2	1	1	1	2	2	1	1	1
[T]Alt	2	1	2	1	1	1	3	2	2	1
[T][S]	2	2	2	1	2	2	2	1	3	1
[T][S][FP]	1	2	2	1	1	1	2	2	2	2
[T][S][HP]	2	2	1	1	1	2	2	1	1	1
[T][S][HP]Async	2	1	2	2	2	2	2	3	1	1
[T][S][L]	1	2	1	2	2	1	1	2	2	2
[T][S][L]Cache	1	1	1	2	2	2	2	2	2	2
[T][S]Sparse	1	1	2	1	1	1	2	2	2	2
sgd	6	1	2	4	1	2	2	6	3	3
step_sgd	7	2	1	7	1	2	2	5	5	6
step_tween	2	2	1	2	2	2	1	2	2	2
step_tween_chain	3	1	1	6	1	2	2	7	3	6
tween	1	2	2	1	1	2	1	2	1	2
tween_chain	7	1	2	6	2	2	3	7	2	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	3	2	2	3	2	2	3	2	2	2	2	3
Mesh[T]	2	2	2	2	2	2	2	2	2	2	2	2
Mesh[T]Alt	2	2	2	2	2	2	2	2	2	2	2	2
Mesh[T]Chain	3	2	2	2	2	2	2	2	2	2	2	3
Mesh[T][S]	2	2	2	2	2	2	2	2	2	2	2	2
Mesh[T][S][FP]	2	2	2	2	2	2	2	2	2	2	2	2
Mesh[T][S]Sparse	2	2	2	2	2	2	2	2	2	2	2	2
Step[T]Alt	2	2	2	2	2	2	2	2	2	2	2	2
Step[T][S]	2	2	2	2	2	2	2	2	2	2	2	2
Step[T][S][FP]	2	2	2	2	2	2	2	2	2	2	2	2
Step[T][S][HP]	2	2	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	2	2
Step[T][S][L]	2	2	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	2	2
Step[T][S]Sparse	2	2	2	2	2	2	2	2	2	2	2	2
[T]Alt	2	2	2	2	2	2	2	2	2	2	2	2
[T][S]	2	2	2	2	2	2	2	2	2	2	2	2
[T][S][FP]	2	2	2	2	2	2	2	2	2	2	2	2
[T][S][HP]	2	2	2	2	2	2	2	2	2	2	2	2
[T][S][HP]Async	2	2	2	2	2	2	2	2	2	2	2	2
[T][S][L]	2	2	2	2	2	2	2	2	2	2	2	2
[T][S][L]Cache	2	2	2	2	2	2	2	2	2	2	2	2
[T][S]Sparse	2	2	2	2	2	2	2	2	2	2	2	2
sgd	3	2	2	3	2	3	3	2	2	2	2	2
step_sgd	3	2	2	2	2	2	2	2	2	2	2	2
step_tween	2	2	2	2	2	2	2	2	2	2	2	2
step_tween_chain	3	2	2	2	2	3	2	2	2	2	2	2
tween	2	2	2	2	2	2	2	2	2	2	2	2
tween_chain	3	2	2	2	2	2	3	2	2	2	2	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	2	2	2	2	2	2	2	2	2	2	2	2
Mesh[T]	2	2	2	2	2	2	2	2	2	2	2	2
Mesh[T]Alt	2	2	2	2	2	2	2	2	2	2	2	2
Mesh[T]Chain	2	2	2	2	2	2	2	2	2	2	2	2
Mesh[T][S]	2	2	2	2	2	2	2	2	2	2	2	2
Mesh[T][S][FP]	2	2	2	2	2	2	2	2	2	2	2	2
Mesh[T][S]Sparse	2	2	2	2	2	2	2	2	2	2	2	2
Step[T]Alt	2	2	2	2	2	2	2	2	2	2	2	2
Step[T][S]	2	2	2	2	2	2	2	2	2	2	2	2
Step[T][S][FP]	2	2	2	2	2	2	2	2	2	2	2	2
Step[T][S][HP]	2	2	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	2	2
Step[T][S][L]	2	2	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	2	2
Step[T][S]Sparse	2	2	2	2	2	2	2	2	2	2	2	2
[T]Alt	2	2	2	2	2	2	2	2	2	2	2	2
[T][S]	2	2	2	2	2	2	2	2	2	2	2	2
[T][S][FP]	2	2	2	2	2	2	2	2	2	2	2	2
[T][S][HP]	2	2	2	2	2	2	2	2	2	2	2	2
[T][S][HP]Async	2	2	2	2	2	2	2	2	2	2	2	2
[T][S][L]	2	2	2	2	2	2	2	2	2	2	2	2
[T][S][L]Cache	2	2	2	2	2	2	2	2	2	2	2	2
[T][S]Sparse	2	2	2	2	2	2	2	2	2	2	2	2
sgd	2	2	2	2	2	2	2	2	2	2	2	2
step_sgd	2	2	2	2	2	2	2	2	2	2	2	2
step_tween	2	2	2	2	2	2	2	2	2	2	2	2
step_tween_chain	2	2	2	2	2	2	2	2	2	2	2	2
tween	2	2	2	2	2	2	2	2	2	2	2	2
tween_chain	2	2	2	2	2	2	2	3	2	2	2	2

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	2	2	2	2	2	2	2	2	2	2
Mesh[T]	2	2	2	2	2	2	2	2	2	2
Mesh[T]Alt	2	2	2	2	2	2	2	2	2	2
Mesh[T]Chain	2	2	2	2	2	2	2	2	2	2
Mesh[T][S]	2	2	2	2	2	2	2	2	2	2
Mesh[T][S][FP]	2	2	2	2	2	2	2	2	2	2
Mesh[T][S]Sparse	2	2	2	2	2	2	2	2	2	2
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	2	2	2	2	2	2	2	2	2	2
[T][S]	2	2	2	2	2	2	2	2	2	2
[T][S][FP]	2	2	2	2	2	2	2	2	2	2
[T][S][HP]	2	2	2	2	2	2	2	2	2	2
[T][S][HP]Async	2	2	2	2	2	2	2	2	2	2
[T][S][L]	2	2	2	2	2	2	2	2	2	2
[T][S][L]Cache	2	2	2	2	2	2	2	2	2	2
[T][S]Sparse	2	2	2	2	2	2	2	2	2	2
sgd	2	2	2	2	2	2	2	2	2	2
step_sgd	2	2	2	2	2	2	2	2	2	2
step_tween	2	2	2	2	2	2	2	2	2	2
step_tween_chain	2	2	2	2	2	2	2	2	2	2
tween	2	2	2	2	2	2	2	2	2	2
tween_chain	2	2	2	2	2	2	2	2	2	2

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	21	18	21	21	21	20	21	20	21	21	20	21
Mesh[T]	17	15	19	18	18	18	18	17	18	18	18	19
Mesh[T]Alt	13	11	14	14	14	13	15	13	14	14	14	15
Mesh[T]Chain	20	18	21	21	21	21	20	20	21	21	20	21
Mesh[T][S]	25	23	27	27	26	24	26	25	27	27	26	26
Mesh[T][S][FP]	25	22	27	26	26	25	27	24	26	27	25	26
Mesh[T][S]Sparse	34	33	35	34	34	34	34	34	35	34	34	34
Step[T]Alt	14	12	15	15	15	14	16	13	15	15	15	16
Step[T][S]	20	19	22	22	22	21	22	20	22	22	22	22
Step[T][S][FP]	21	19	23	23	21	20	22	21	22	22	21	23
Step[T][S][HP]	20	17	21	21	20	20	21	19	21	21	20	21
Step[T][S][HP]Async	21	19	22	22	22	21	22	21	22	23	21	22
Step[T][S][L]	28	27	28	28	28	28	28	27	27	28	28	28
Step[T][S][L]Cache	28	27	28	28	29	28	28	27	27	28	27	28
Step[T][S]Sparse	21	19	22	22	22	21	21	21	22	23	21	22
[T]Alt	13	11	14	14	14	13	13	13	14	14	14	14
[T][S]	25	23	26	26	26	25	26	24	26	27	25	26
[T][S][FP]	25	23	27	26	26	24	26	25	26	26	25	26
[T][S][HP]	25	23	27	27	26	25	26	24	27	27	25	27
[T][S][HP]Async	25	23	27	26	26	25	26	24	26	26	25	26
[T][S][L]	33	29	33	34	33	34	34	34	33	32	32	33
[T][S][L]Cache	35	34	35	35	35	35	35	34	35	35	34	35
[T][S]Sparse	33	32	34	34	34	34	34	34	34	35	34	34
sgd	20	18	22	21	21	20	20	20	21	21	21	21
step_sgd	24	20	25	25	24	24	25	23	24	25	24	25
step_tween	20	18	21	21	21	21	22	20	21	21	20	22
step_tween_chain	24	20	25	25	24	25	25	22	24	25	24	25
tween	17	15	18	18	18	18	18	17	18	18	17	18
tween_chain	20	17	22	21	21	20	20	20	21	21	21	22

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	19	21	22	22	20	21	17	21
Mesh[T]	18	16	18	18	16	18	18	19	18	19	15	18
Mesh[T]Alt	14	11	14	14	12	14	14	14	13	14	11	14
Mesh[T]Chain	21	18	21	22	19	21	21	21	20	21	17	21
Mesh[T][S]	27	22	27	26	23	26	27	27	24	26	23	26
Mesh[T][S][FP]	27	22	26	26	23	27	27	26	24	26	22	26
Mesh[T][S]Sparse	34	32	34	34	33	35	34	34	33	34	33	34
Step[T]Alt	15	12	15	15	12	15	14	15	14	15	11	15
Step[T][S]	22	19	22	22	19	22	21	22	21	21	19	22
Step[T][S][FP]	22	18	22	22	19	23	22	22	21	22	19	22
Step[T][S][HP]	22	18	20	22	19	21	21	22	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]	29	25	27	28	27	27	27	28	28	27	26	28
Step[T][S][L]Cache	28	26	28	28	27	28	28	28	28	27	27	28
Step[T][S]Sparse	22	18	22	22	20	22	22	22	21	22	19	22
[T]Alt	14	11	14	14	12	14	14	14	13	13	11	13
[T][S]	26	22	26	26	23	26	27	26	25	25	22	26
[T][S][FP]	26	22	26	26	23	26	26	26	24	26	22	26
[T][S][HP]	25	22	26	26	23	26	26	25	24	25	22	26
[T][S][HP]Async	26	22	26	26	23	26	26	26	24	25	21	26
[T][S][L]	34	30	32	34	32	32	32	34	32	32	29	34
[T][S][L]Cache	35	33	35	35	34	35	35	35	35	34	33	35
[T][S]Sparse	34	33	34	34	33	34	35	34	33	34	33	34
sgd	22	18	21	21	19	21	22	21	20	21	17	21
step_sgd	26	21	25	25	22	24	24	25	24	24	20	26
step_tween	22	18	20	21	18	21	20	22	19	20	17	21
step_tween_chain	25	20	25	26	22	24	25	25	23	23	19	24
tween	19	16	18	19	16	18	18	18	17	18	15	17
tween_chain	22	18	21	21	19	21	21	21	21	21	18	21

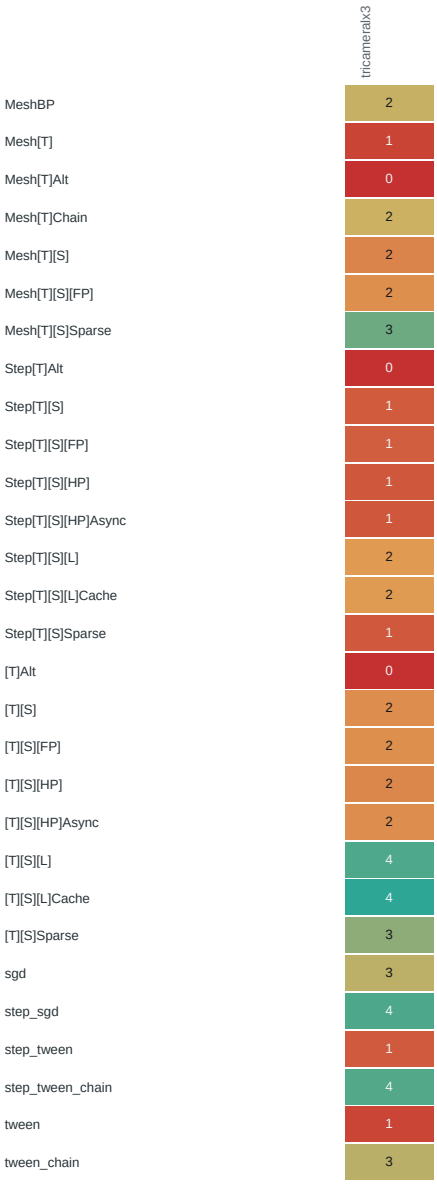
Honesty - mean Avail, every mode x dtype (cols 25-34)

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

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	21	21	21	20	21	21	21	22	20	21
Mesh[T]	19	18	18	18	18	18	18	18	18	18
Mesh[T]Alt	13	13	14	13	14	13	13	14	13	14
Mesh[T]Chain	21	20	21	21	21	21	21	21	21	21
Mesh[T][S]	26	26	26	26	26	26	26	26	25	25
Mesh[T][S][FP]	26	26	26	25	26	26	26	26	25	26
Mesh[T][S]Sparse	34	34	34	34	34	34	35	34	34	34
Step[T]Alt	16	14	14	14	15	15	15	14	14	15
Step[T][S]	22	21	22	21	21	22	22	22	21	22
Step[T][S][FP]	22	22	22	21	22	22	21	22	21	22
Step[T][S][HP]	21	21	21	21	21	21	21	21	21	21
Step[T][S][HP]Async	22	22	22	22	21	22	22	22	22	23
Step[T][S][L]	28	28	28	29	27	27	28	28	28	28
Step[T][S][L]Cache	28	27	28	28	29	27	27	28	27	28
Step[T][S]Sparse	22	21	22	22	22	22	22	22	21	22
[T]Alt	14	13	13	13	14	14	14	13	13	13
[T][S]	26	26	26	26	25	26	26	26	25	26
[T][S][FP]	26	26	26	26	26	26	26	25	25	26
[T][S][HP]	26	25	26	26	26	26	26	25	25	26
[T][S][HP]Async	25	25	25	26	26	26	26	26	24	26
[T][S][L]	34	33	32	33	34	32	32	34	32	34
[T][S][L]Cache	35	34	35	35	35	34	34	36	34	36
[T][S]Sparse	34	34	35	34	34	35	34	34	34	34
sgd	20	21	20	21	22	21	21	21	21	21
step_sgd	24	24	25	24	25	24	24	25	25	25
step_tween	21	21	22	22	21	20	21	21	21	21
step_tween_chain	24	24	24	24	24	24	24	25	24	25
tween	17	18	18	18	18	19	18	18	18	18
tween_chain	21	21	21	21	21	21	21	21	22	21

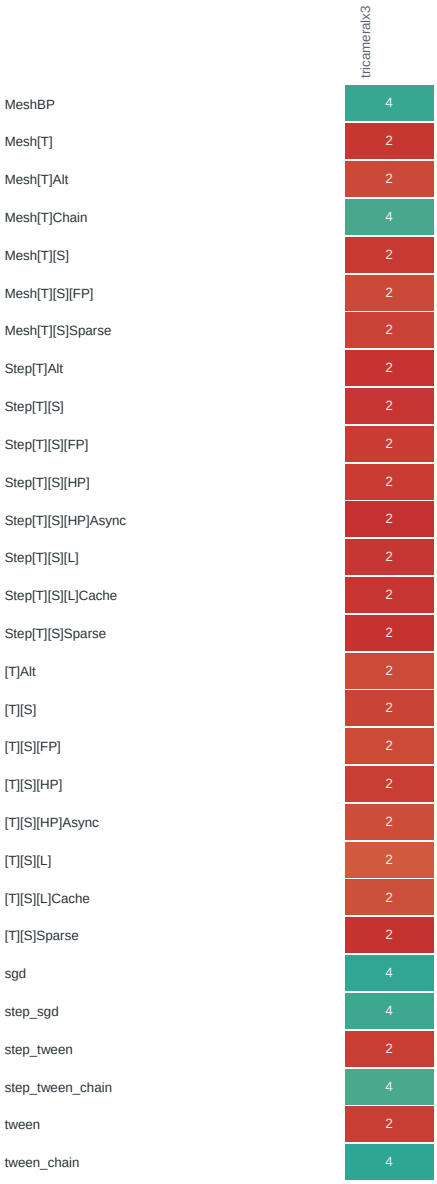
Mean Score, every mode x arch

Mean Score, every mode x arch



Mean hard Acc, every mode x arch

Mean hard Acc, every mode x arch

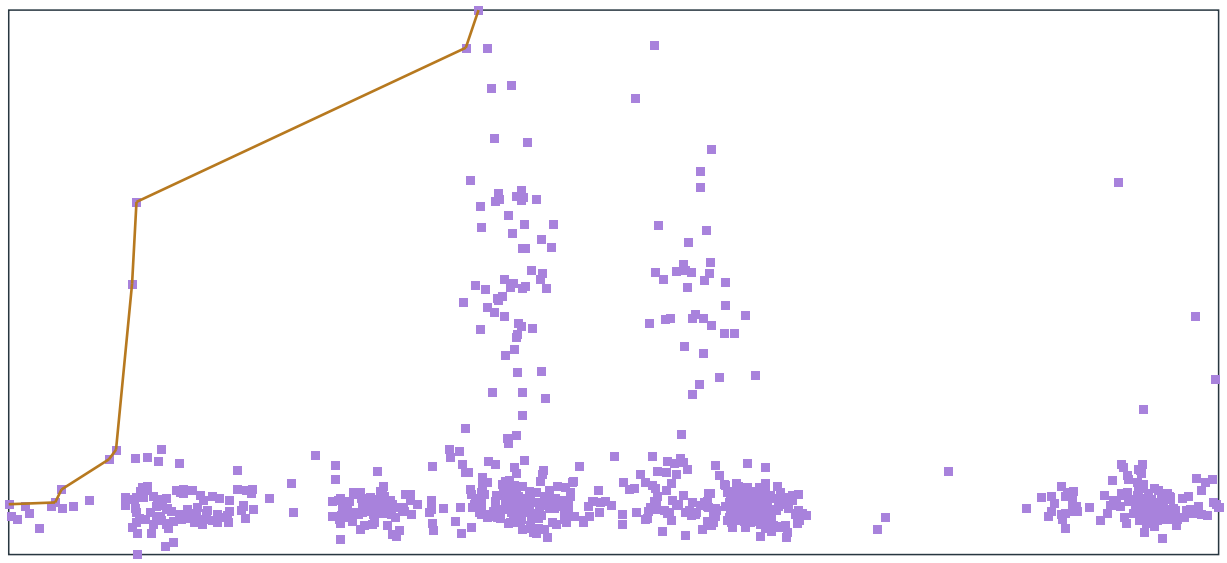


Mean Avail, every mode x arch

Mean Avail, every mode x arch

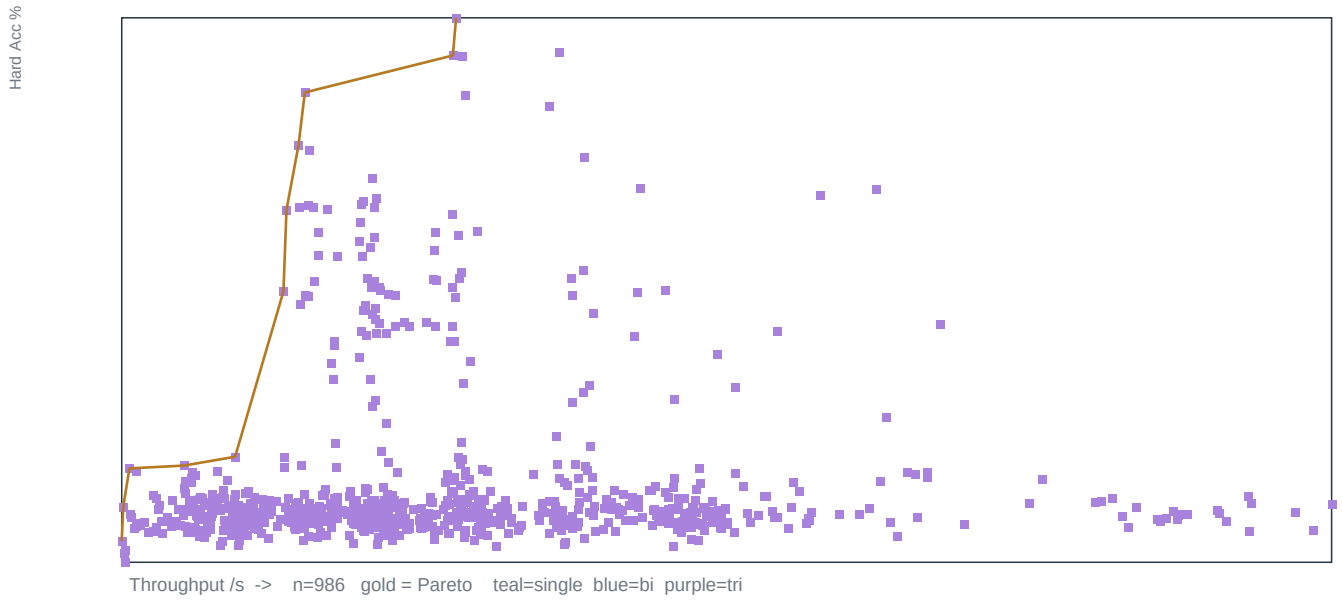
	tricameratx3
MeshBP	21
Mesh[T]	18
Mesh[T]Alt	13
Mesh[T]Chain	21
Mesh[T][S]	26
Mesh[T][S][FP]	25
Mesh[T][S]Sparse	34
Step[T]Alt	14
Step[T][S]	21
Step[T][S][FP]	21
Step[T][S][HP]	21
Step[T][S][HP]Async	21
Step[T][S][L]	28
Step[T][S][L]Cache	28
Step[T][S]Sparse	21
[T]Alt	13
[T][S]	25
[T][S][FP]	25
[T][S][HP]	25
[T][S][HP]Async	25
[T][S][L]	33
[T][S][L]Cache	35
[T][S]Sparse	34
sgd	21
step_sgd	24
step_tween	21
step_tween_chain	24
tween	18
tween_chain	21

Pillars - Availability vs hard Acc

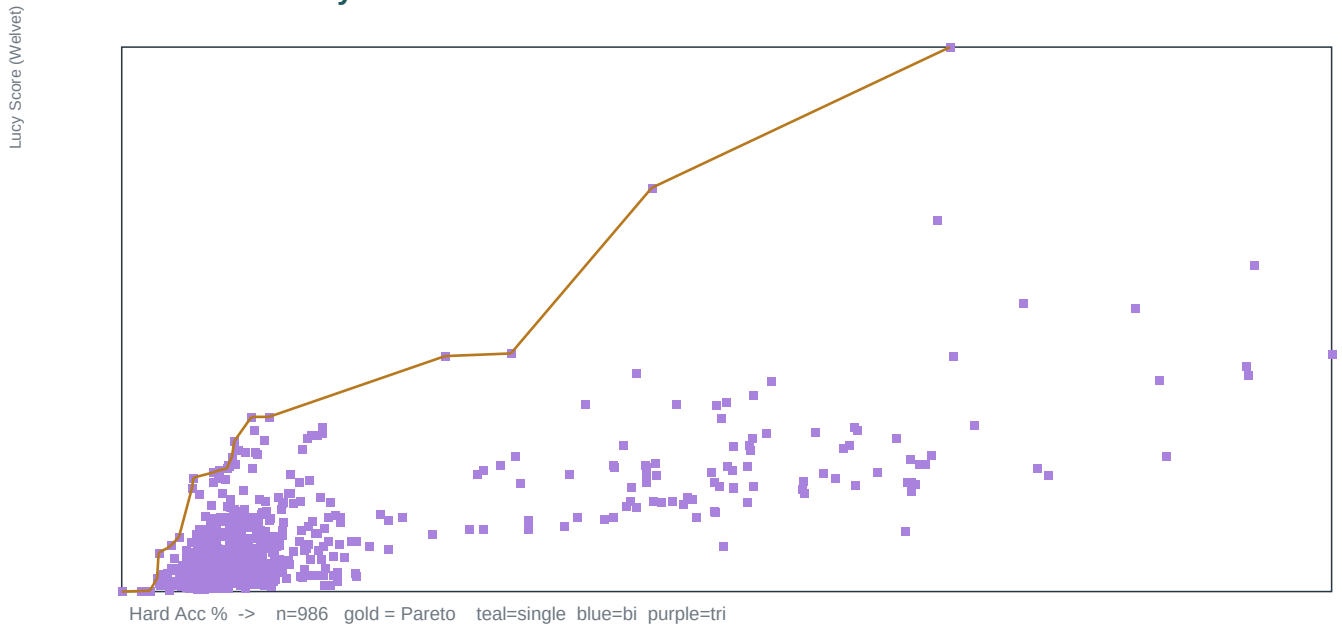



Availability % -> n=986 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

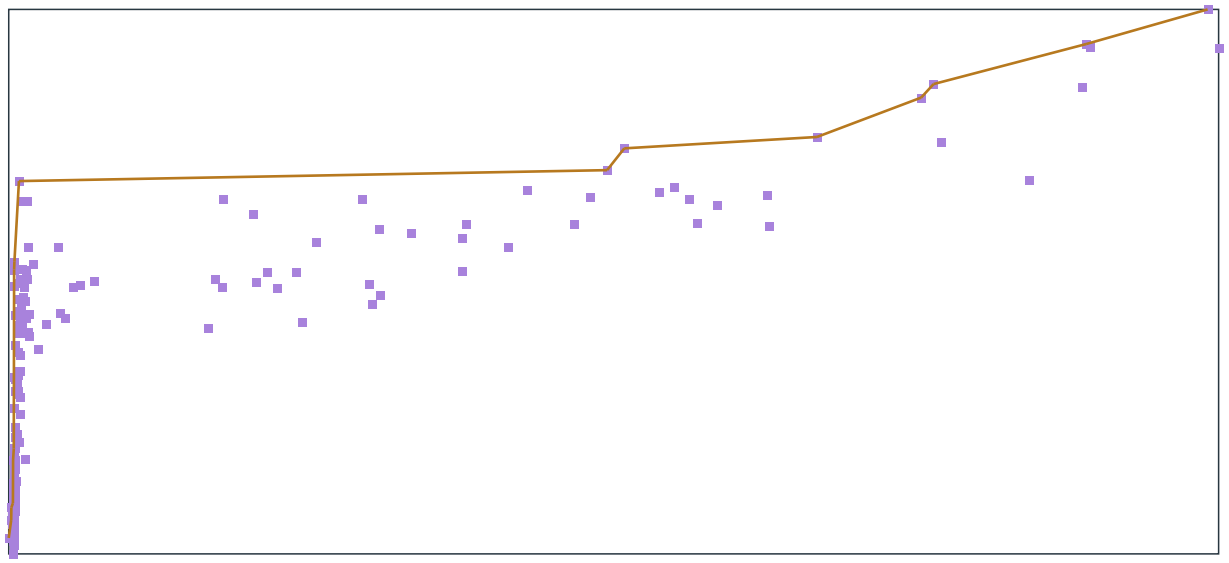
Pillars - Throughput vs hard Acc



Pareto - hard Acc vs Lucy Score

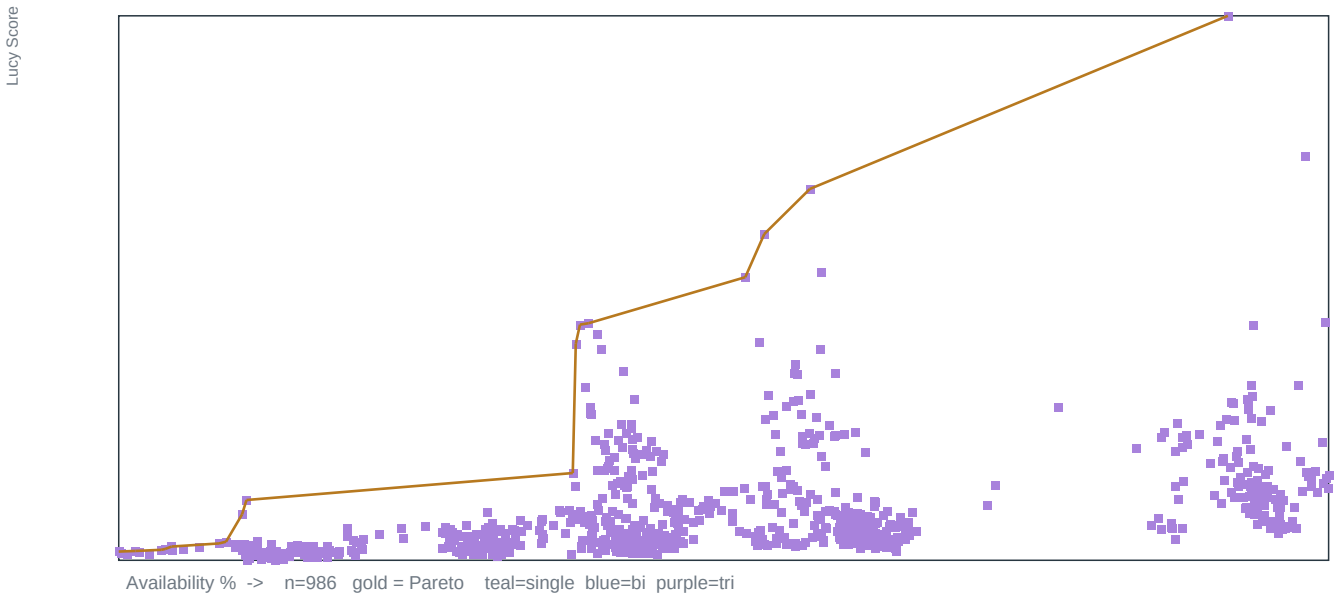


SoftAcc (serve-confidence) vs hard Acc




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

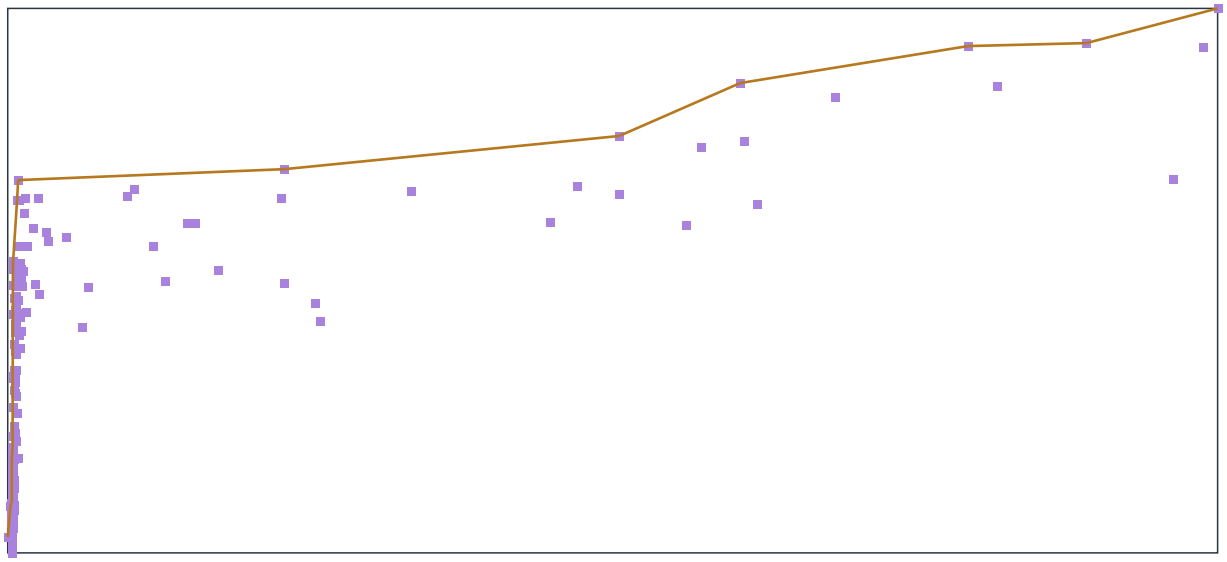
Avail vs Lucy Score (duty clock)



Pillars - Throughput vs Availability



AdaptPct vs hard Acc



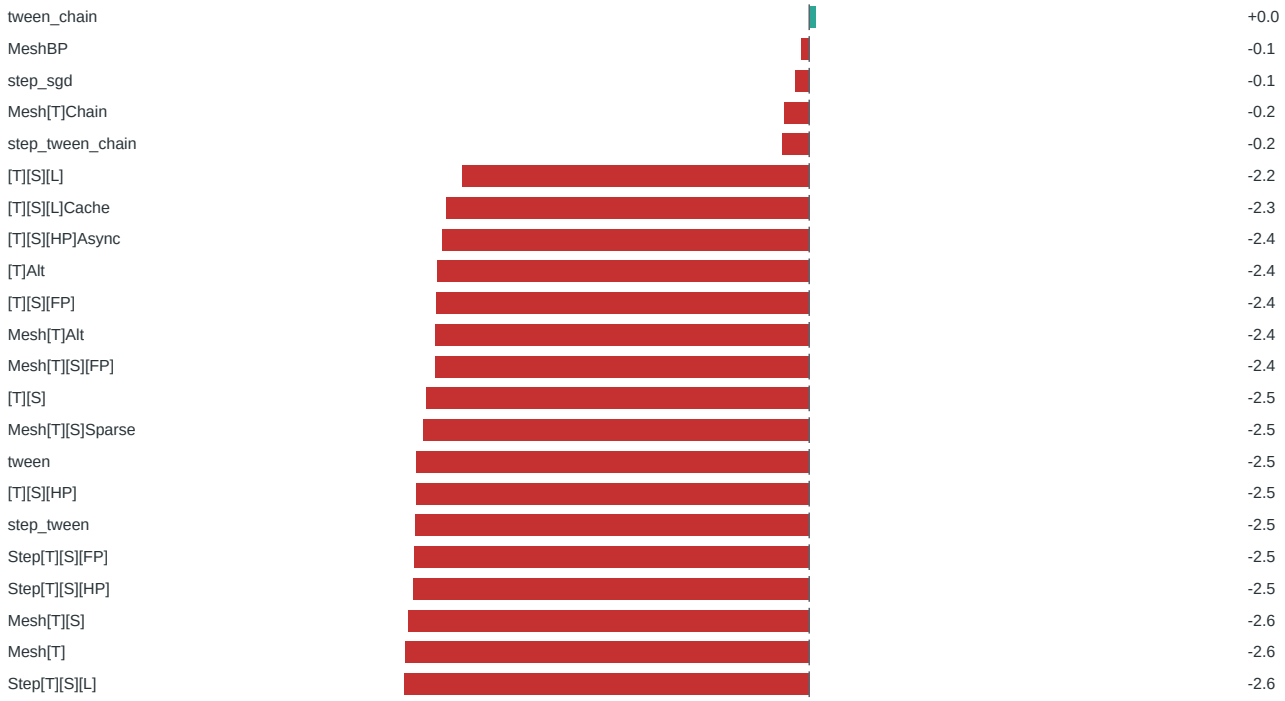

AdaptPct % -> n=986 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

vs sgd - matched dtype x format x arch

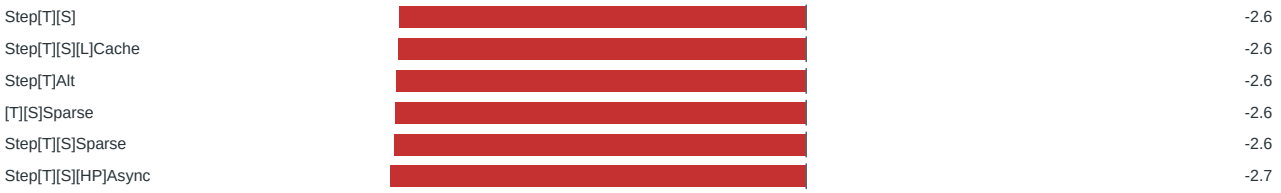
AccDelta is the honest column. ScoreDelta is usually Availability (duty clock), not a better chain rule. Acc win = AccDelta > 0.5. Score win = ScoreDelta > 1. Baseline is discovered from the board, not a frozen StepBP list.

mode	n	AccD	Acc win%	SoftD	AvailD	ThruD	ScoreD	Score win%
tween_chain	34	+0.0	26	+0.0	+0.1	+0	+0.0	15
MeshBP	34	-0.1	26	-0.0	+0.0	-2	-0.1	6
step_sgd	34	-0.1	18	-0.1	+3.4	+62	+1.0	35
Mesh[T]Chain	34	-0.2	24	-0.1	-0.1	-2	-0.2	12
step_tween_chain	34	-0.2	21	-0.1	+3.3	+59	+1.0	26
[T][S][L]	34	-2.2	6	-0.2	+12.1	+256	+1.0	41
[T][S][L]Cache	34	-2.3	6	-0.2	+14.1	+311	+1.4	50
[T][S][HP]Async	34	-2.4	6	-0.2	+4.5	+78	-0.9	3
[T]Alt	34	-2.4	6	-0.2	-7.3	-120	-2.2	0
[T][S][FP]	34	-2.4	3	-0.2	+4.7	+83	-0.9	6
Mesh[T]Alt	34	-2.4	9	-0.2	-7.2	-120	-2.2	0
Mesh[T][S][FP]	34	-2.4	9	-0.2	+4.8	+83	-0.9	9
[T][S]	34	-2.5	9	-0.2	+4.8	+86	-0.9	9
Mesh[T][S]Sparse	34	-2.5	6	-0.2	+13.3	+284	+0.7	47
tween	34	-2.5	6	-0.2	-2.9	-49	-1.9	0
[T][S][HP]	34	-2.5	3	-0.2	+4.8	+84	-1.0	6
step_tween	34	-2.5	6	-0.2	-0.0	-0	-1.6	0
Step[T][S][FP]	34	-2.5	0	-0.2	+0.8	+10	-1.5	0
Step[T][S][HP]	34	-2.5	0	-0.2	-0.1	-5	-1.6	0
Mesh[T][S]	34	-2.6	6	-0.2	+4.9	+85	-1.1	9
Mesh[T]	34	-2.6	3	-0.2	-2.7	-46	-1.9	0
Step[T][S][L]	34	-2.6	0	-0.2	+7.0	+138	-0.7	12
Step[T][S]	34	-2.6	3	-0.2	+0.7	+12	-1.6	0
Step[T][S][L]Cache	34	-2.6	6	-0.2	+7.1	+140	-0.7	18
Step[T]Alt	34	-2.6	3	-0.2	-6.2	-103	-2.2	0
[T][S]Sparse	34	-2.6	3	-0.2	+13.3	+286	+0.4	44
Step[T][S]Sparse	34	-2.6	6	-0.2	+0.9	+10	-1.6	0
Step[T][S][HP]Async	34	-2.7	3	-0.2	+0.9	+11	-1.6	0

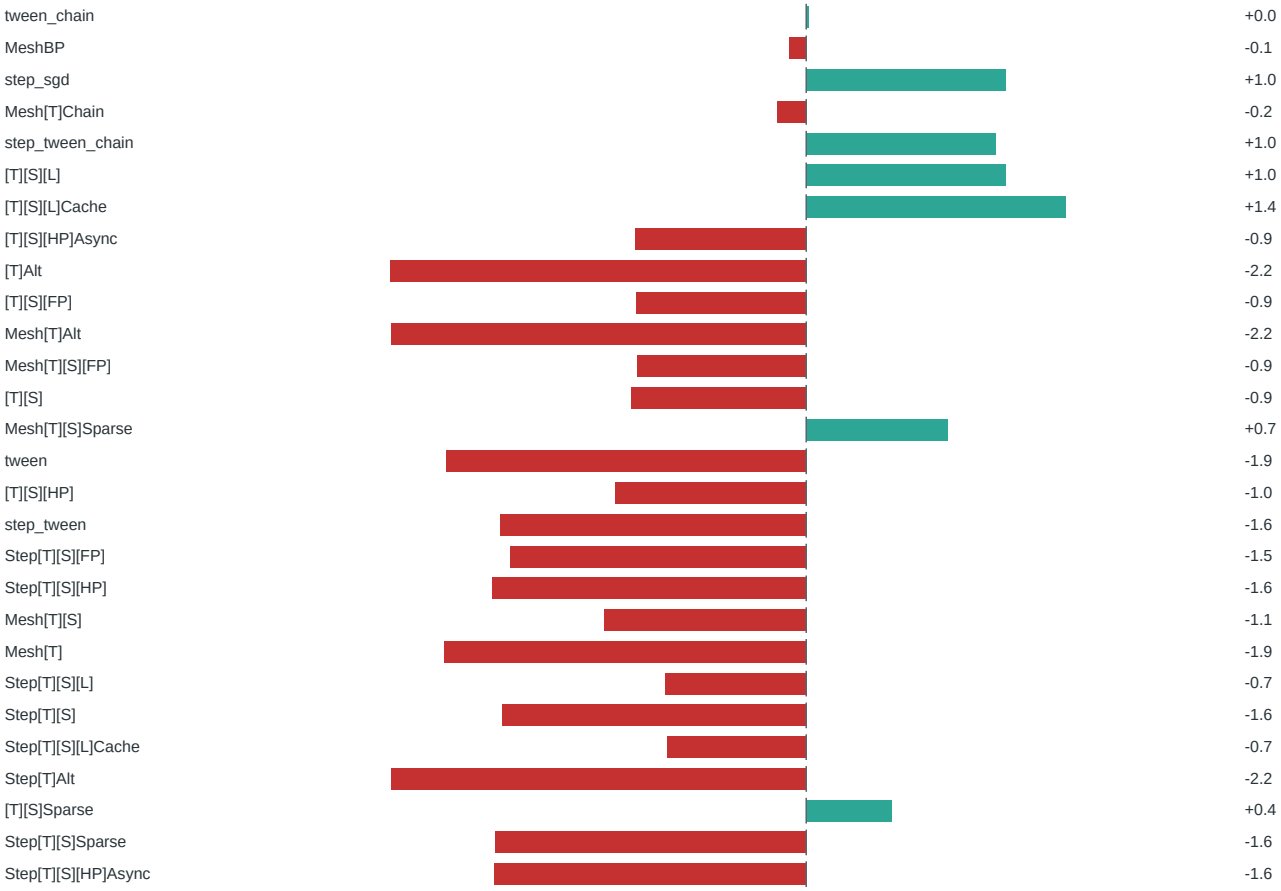
mean AccD vs sgd



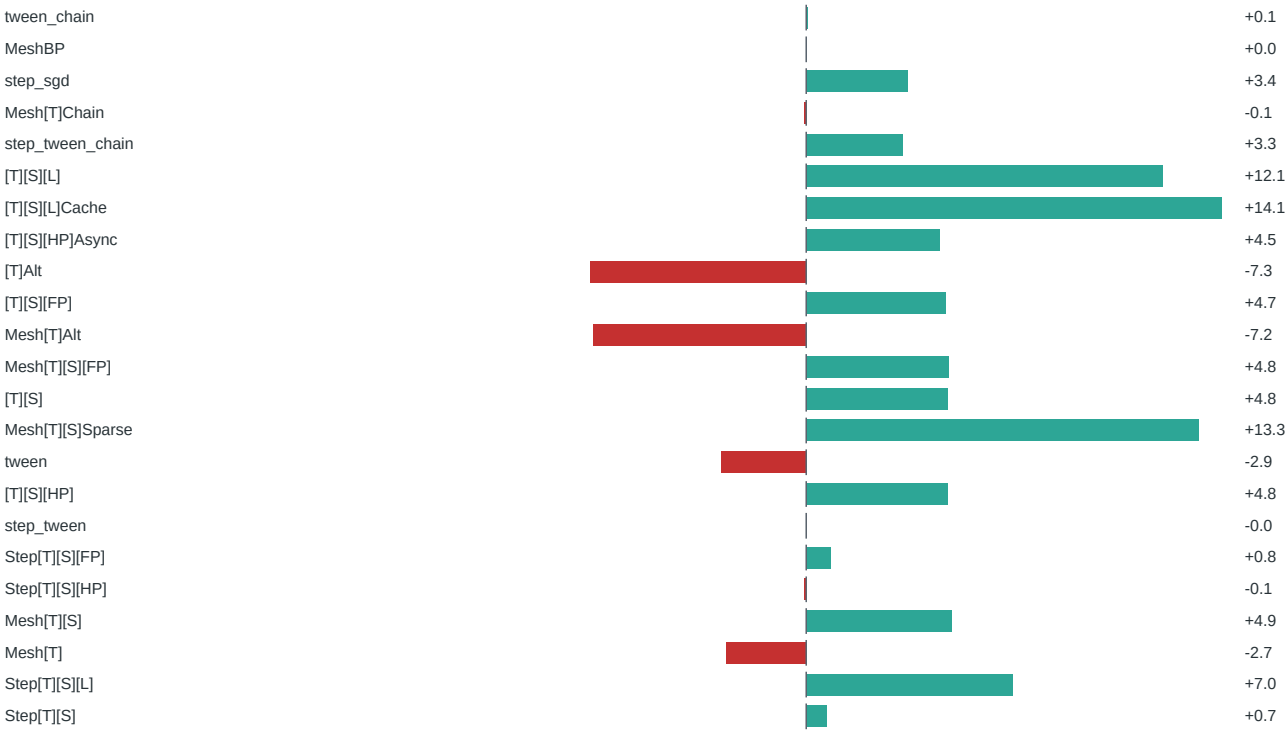
mean AccD vs sgd



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	-1	+0	+1	+1	-2	-2	+0	+0	+0	+0	-0	+5
Mesh[T]	-10	+0	-6	-7	-7	-8	-7	-0	-1	+0	-0	-6
Mesh[T]Alt	-5	+0	-6	-7	-7	-8	-6	+0	-0	+1	-0	-5
Mesh[T]Chain	+1	+0	-1	-2	-0	-2	-1	+0	+0	+0	+1	+3
Mesh[T][S]	-8	+1	-6	-7	-7	-8	-7	-0	-0	-0	-0	-5
Mesh[T][S][FP]	-5	+1	-6	-7	-7	-7	-7	-0	-1	+1	-0	-5
Mesh[T][S]Sparse	-8	+0	-6	-7	-7	-7	-6	-0	-1	+0	-0	-5
Step[T]Alt	-10	+0	-6	-7	-8	-8	-6	-0	-0	+0	-0	-5
Step[T][S]	-10	+0	-6	-7	-7	-8	-6	-0	-0	+0	-1	-4
Step[T][S][FP]	-10	+0	-6	-7	-7	-7	-7	-0	-0	+0	-0	-5
Step[T][S][HP]	-10	-0	-6	-7	-7	-7	-7	-0	-0	+0	-0	-5
Step[T][S][HP]Async	-10	+0	-6	-7	-7	-8	-7	-0	-0	+0	+0	-5
Step[T][S][L]	-10	+0	-6	-7	-7	-7	-7	-0	-0	+0	-0	-5
Step[T][S][L]Cache	-11	+0	-6	-7	-8	-7	-6	-0	-0	+0	-1	-5
Step[T][S]Sparse	-10	+1	-6	-7	-7	-8	-6	-0	-0	-0	-0	-5
[T]Alt	-4	+0	-6	-7	-6	-7	-6	-0	-1	-0	-0	-5
[T][S]	-8	+1	-6	-7	-7	-7	-7	+0	-1	+0	+0	-5
[T][S][FP]	-5	+0	-6	-8	-7	-7	-6	-0	-0	-0	-0	-5
[T][S][HP]	-8	+0	-6	-7	-7	-8	-6	-0	-1	+0	+0	-5
[T][S][HP]Async	-5	+1	-6	-7	-8	-8	-6	-0	-0	-0	+0	-5
[T][S][L]	-3	-0	-6	-7	-7	-7	-7	-0	-0	+1	+0	-5
[T][S][L]Cache	-6	+0	-6	-7	-4	-7	-6	-0	-0	+1	-0	-4
[T][S]Sparse	-10	+1	-6	-7	-7	-8	-6	-0	-0	+0	+0	-5
step_sgd	+0	+0	+0	-2	-2	-3	-2	+0	-0	-0	-0	+3
step_tween	-10	+0	-6	-7	-7	-8	-6	-0	+0	+0	-0	-5
step_tween_chain	-1	+0	-1	-2	-1	-0	+2	-0	+1	+0	-0	-1
tween	-10	+1	-6	-7	-7	-7	-6	+0	-0	+0	-0	-5
tween_chain	-0	-0	-1	+0	-0	-3	+0	-0	-1	-0	-0	+1

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	-1	-0	+1	-1	+0	+0	-1	-0	+0	+0	-2
Mesh[T]	-5	-1	-1	-6	+0	-0	-1	-7	-1	+0	-0	-3
Mesh[T]Alt	-5	-1	-1	-6	+0	+1	-1	-7	-0	-0	+0	-3
Mesh[T]Chain	-1	-1	-1	-3	-0	-0	-1	-0	-0	+1	-0	+2
Mesh[T][S]	-5	-1	-0	-5	-0	-0	-1	-7	-1	+1	+0	-4
Mesh[T][S][FP]	-6	-1	-0	-5	-0	-0	-1	-7	-0	+0	+0	-3
Mesh[T][S]Sparse	-5	-1	+0	-5	-0	-0	-0	-6	-1	+1	+0	-3
Step[T]Alt	-5	-1	-0	-5	-0	-0	-1	-7	-1	-0	+0	-3
Step[T][S]	-5	-1	-0	-6	-0	-0	-1	-7	-1	+1	-0	-3
Step[T][S][FP]	-5	-1	+0	-6	-0	+0	-0	-6	-1	+0	+0	-3
Step[T][S][HP]	-5	-1	-0	-5	-1	-0	-0	-7	-1	-0	+0	-2
Step[T][S][HP]Async	-5	-1	-0	-5	-0	-0	-1	-7	-0	+1	-0	-3
Step[T][S][L]	-6	-1	+0	-6	+0	+0	-1	-7	-1	+0	+0	-4
Step[T][S][L]Cache	-5	-0	-0	-5	-0	-0	-0	-7	-1	+1	+1	-4
Step[T][S]Sparse	-6	-1	-0	-6	-0	+0	-1	-7	-1	+0	-0	-3
[T]Alt	-5	-1	+0	-6	-0	-1	-2	-7	-1	+1	+0	-3
[T][S]	-6	-1	-1	-5	-0	-1	-1	-7	-1	+0	+1	-3
[T][S][FP]	-5	-0	+0	-5	-0	-0	-1	-6	-1	+0	+0	-4
[T][S][HP]	-4	-1	-0	-6	-1	-1	-1	-6	+0	+0	+0	-4
[T][S][HP]Async	-4	-1	-0	-5	-0	-0	-1	-6	-0	-0	+0	-3
[T][S][L]	-5	-0	-0	-5	-0	+0	-0	-7	-0	+0	+0	-3
[T][S][L]Cache	-5	-1	-0	-6	+0	+0	-1	-7	-1	+0	+0	-3
[T][S]Sparse	-5	-1	-0	-6	-0	-0	-1	-7	-1	-0	+0	-4
step_sgd	-1	-1	-0	-1	-1	-0	-0	-1	-0	+0	+0	+1
step_tween	-5	-1	-1	-6	+0	-1	-1	-7	-0	+1	+0	-3
step_tween_chain	+0	-1	-0	-2	-0	-0	-1	-2	-0	+1	-0	+1
tween	-5	-1	-0	-5	-0	+0	-1	-6	-1	+0	+1	-3
tween_chain	-2	-1	-0	-2	-0	-1	-0	+0	+2	+0	+0	+4

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	-3	+1	-0	+2	+1	-0	-0	+1	+0	+1
Mesh[T]	-4	+0	-0	-3	+1	-0	-1	-4	-1	-2
Mesh[T]Alt	-4	+1	-0	-2	+0	-1	-1	-4	-1	-2
Mesh[T]Chain	-3	-0	-0	+2	+0	-1	+1	+0	-1	+2
Mesh[T][S]	-5	+0	-1	-3	+0	-0	-1	-4	-2	-2
Mesh[T][S][FP]	-5	+0	-0	-2	+1	-0	-0	-4	-2	-2
Mesh[T][S]Sparse	-5	+1	-0	-2	-0	-0	-1	-4	-1	-2
Step[T]Alt	-4	+0	-0	-3	+1	-1	-1	-4	-2	-2
Step[T][S]	-5	+0	-0	-3	+0	-1	-1	-5	-1	-2
Step[T][S][FP]	-5	+0	-0	-2	+0	-0	-1	-4	-2	-2
Step[T][S][HP]	-5	-0	-0	-3	+0	-1	-0	-4	-2	-2
Step[T][S][HP]Async	-5	+0	+0	-3	+0	-1	-1	-5	-2	-2
Step[T][S][L]	-5	+0	+0	-2	+0	-0	-1	-4	-2	-2
Step[T][S][L]Cache	-5	+0	+0	-3	+0	-0	-0	-4	-2	-2
Step[T][S]Sparse	-4	+1	-0	-3	-0	-0	-0	-5	-2	-2
[T]Alt	-5	+0	+0	-3	-0	-1	+1	-4	-2	-2
[T][S]	-5	+0	+0	-3	+1	-0	-0	-5	-1	-2
[T][S][FP]	-5	+1	-0	-3	+0	-1	+0	-4	-1	-2
[T][S][HP]	-5	+1	-0	-3	+0	-0	-0	-5	-2	-2
[T][S][HP]Async	-4	+0	-0	-2	+1	-0	-0	-3	-2	-2
[T][S][L]	-5	+1	-0	-2	+0	-1	-1	-4	-1	-1
[T][S][L]Cache	-5	+0	-0	-3	+1	-0	-0	-4	-1	-2
[T][S]Sparse	-5	+0	+0	-3	+0	-1	+0	-4	-1	-2
step_sgd	+1	+0	-0	+3	-0	-0	+0	-1	+2	+3
step_tween	-5	+1	-0	-3	+0	-0	-1	-4	-1	-2
step_tween_chain	-3	+0	-0	+2	+0	+0	+0	+1	-1	+3
tween	-5	+0	+0	-3	-0	-0	-0	-4	-2	-1
tween_chain	+1	+0	+0	+2	+1	-0	+1	+1	-1	+2

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	+0	+0	+1	-2	-2	+1	+0	+0	+0	-0	+2
Mesh[T]	-7	+0	-3	-4	-5	-8	-5	-1	-0	-0	-0	-3
Mesh[T]Alt	-7	-1	-4	-4	-5	-9	-5	-1	-0	-0	-1	-3
Mesh[T]Chain	+1	+0	-1	-1	-0	-2	-1	+0	+0	+0	+0	+1
Mesh[T][S]	-4	+1	-2	-3	-3	-7	-4	+1	+0	+0	+0	-2
Mesh[T][S][FP]	-0	+2	-2	-3	-4	-7	-4	+1	+0	+1	+0	-2
Mesh[T][S]Sparse	+1	+3	-2	-2	-3	-3	-2	+4	+1	+2	+1	-1
Step[T]Alt	-8	-0	-4	-4	-5	-9	-5	-1	-0	-0	-1	-3
Step[T][S]	-7	+0	-3	-3	-4	-8	-4	+0	-0	+0	-0	-2
Step[T][S][FP]	-7	+0	-3	-3	-4	-7	-5	+0	-0	+0	+0	-2
Step[T][S][HP]	-7	-0	-3	-4	-4	-7	-5	-0	-0	+0	-0	-2
Step[T][S][HP]Async	-7	+0	-3	-4	-4	-8	-5	+0	-0	+0	+0	-2
Step[T][S][L]	-6	+2	-2	-3	-3	-5	-4	+2	+0	+1	+1	-2
Step[T][S][L]Cache	-7	+2	-3	-3	-4	-5	-4	+2	+0	+1	+0	-2
Step[T][S]Sparse	-7	+1	-3	-4	-4	-8	-5	-0	-0	+0	-0	-2
[T]Alt	-6	-0	-4	-4	-5	-9	-5	-1	-0	-0	-1	-3
[T][S]	-4	+2	-2	-3	-4	-7	-4	+1	+0	+1	+1	-2
[T][S][FP]	-1	+1	-3	-3	-3	-7	-3	+1	+0	+0	+0	-2
[T][S][HP]	-3	+1	-3	-3	-4	-7	-4	+1	+0	+1	+1	-2
[T][S][HP]Async	-1	+2	-2	-3	-4	-7	-4	+1	+0	+0	+1	-2
[T][S][L]	+13	+1	-1	-2	-1	-3	-2	+4	+1	+2	+2	-1
[T][S][L]Cache	+7	+4	-1	-2	+4	-2	-2	+5	+1	+3	+2	+0
[T][S]Sparse	-4	+5	-2	-2	-3	-5	-0	+4	+1	+2	+2	-1
step_sgd	+4	+0	+2	+1	+0	-1	+2	+1	+0	-0	+0	+3
step_tween	-7	+0	-3	-4	-4	-8	-4	-0	+0	+0	-0	-3
step_tween_chain	+3	+1	+1	+1	+1	+5	+6	+0	+0	+0	+0	+1
tween	-8	+0	-3	-4	-5	-8	-5	-1	-0	-0	-0	-3
tween_chain	+0	-0	-0	-0	-0	-3	+0	-0	-0	-0	-0	+1

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	-1	-1	-0	+0	-1	+0	+0	-0	-0	+0	+0	-1
Mesh[T]	-4	-1	-0	-4	-0	-0	-0	-4	-1	+0	-0	-2
Mesh[T]Alt	-4	-2	-0	-4	-1	-0	-1	-4	-2	-0	-1	-2
Mesh[T]Chain	-1	-1	-0	-2	-0	-0	-0	-0	-0	+0	-0	+1
Mesh[T][S]	-2	-0	+0	-3	+0	+0	-0	-4	-0	+1	+1	-1
Mesh[T][S][FP]	-3	+0	+0	-3	+0	+0	+0	-3	+0	+1	+1	-1
Mesh[T][S]Sparse	-1	+2	+2	-1	+3	+1	+1	-1	+3	+2	+4	+0
Step[T]Alt	-4	-1	-0	-4	-1	-0	-0	-4	-2	-0	-0	-2
Step[T][S]	-3	-0	-0	-3	-0	-0	-0	-4	-1	+0	+0	-2
Step[T][S][FP]	-3	-1	+0	-3	-0	+0	-0	-3	-1	+0	+0	-1
Step[T][S][HP]	-3	-1	-0	-3	-1	-0	-0	-4	-1	-0	+0	-1
Step[T][S][HP]Async	-3	-1	-0	-3	-0	-0	-0	-4	-0	+1	+0	-2
Step[T][S][L]	-3	+0	+1	-3	+2	+1	-0	-3	+1	+1	+2	-1
Step[T][S][L]Cache	-3	+2	+0	-2	+1	+0	+0	-3	+0	+1	+3	-1
Step[T][S]Sparse	-3	-1	-0	-3	+0	+0	-0	-4	-1	+0	+0	-2
[T]Alt	-4	-2	-0	-4	-1	-0	-1	-4	-2	-0	-1	-2
[T][S]	-3	+0	+0	-3	+1	+0	+0	-3	+0	+0	+1	-1
[T][S][FP]	-3	+0	+0	-2	+1	+0	+0	-3	+0	+0	+1	-2
[T][S][HP]	-2	-0	+0	-3	-0	+0	+0	-3	+1	+0	+1	-2
[T][S][HP]Async	-2	-0	+0	-3	+0	+0	+0	-3	+1	+0	+1	-1
[T][S][L]	-0	+4	+1	-0	+3	+1	+1	-2	+3	+1	+2	+0
[T][S][L]Cache	-1	+3	+1	-1	+5	+1	+1	-2	+2	+1	+5	+0
[T][S]Sparse	-1	+3	+1	-3	+3	+1	+1	-2	+2	+1	+4	-1
step_sgd	+1	-0	+0	+1	+0	+0	+0	+2	+1	+0	+1	+2
step_tween	-3	-1	-0	-3	-0	-0	-0	-4	-1	+0	+0	-2
step_tween_chain	+2	-0	+0	+0	+0	+0	-0	+0	+1	+1	+0	+2
tween	-3	-1	-0	-3	-1	-0	-0	-4	-1	-0	+0	-2
tween_chain	-1	-1	-0	-1	-0	-0	-0	+0	+3	+0	+0	+2

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	-2	+1	-0	+1	+0	-0	-0	+1	-0	+1
Mesh[T]	-3	-0	-0	-2	+0	-0	-0	-3	-2	-1
Mesh[T]Alt	-3	-0	-0	-2	-1	-0	-1	-3	-2	-1
Mesh[T]Chain	-1	-0	-0	+1	+0	-0	+0	+0	-1	+1
Mesh[T][S]	-2	+1	+0	-1	+0	+0	-0	-2	-1	-0
Mesh[T][S][FP]	-2	+1	+0	-1	+1	+0	+0	-2	-1	-0
Mesh[T][S]Sparse	-1	+4	+1	+1	+1	+1	+1	-0	+2	+1
Step[T]Alt	-3	-0	-0	-2	-0	-0	-0	-3	-2	-1
Step[T][S]	-2	+0	+0	-2	-0	-0	-0	-3	-1	-1
Step[T][S][FP]	-2	+0	-0	-1	+0	-0	-0	-2	-2	-1
Step[T][S][HP]	-2	-0	+0	-1	+0	-0	-0	-3	-2	-1
Step[T][S][HP]Async	-2	+0	+0	-1	-0	-0	-0	-3	-2	-1
Step[T][S][L]	-2	+1	+1	+0	+1	+0	+0	-2	-1	+0
Step[T][S][L]Cache	-2	+1	+1	-0	+1	+0	+0	-1	-1	-0
Step[T][S]Sparse	-2	+0	-0	-2	-0	+0	-0	-3	-2	-1
[T]Alt	-3	-0	-0	-2	-1	-0	-0	-3	-3	-1
[T][S]	-2	+1	+0	-1	+1	+0	+0	-2	+1	-1
[T][S][FP]	-2	+1	+0	-1	+0	+0	+0	-2	-1	-0
[T][S][HP]	-2	+1	+0	-1	+0	+0	+0	-2	-1	-1
[T][S][HP]Async	-2	+1	+0	-1	+1	+0	+0	-1	-2	-0
[T][S][L]	-1	+2	+1	+1	+2	+1	+0	+1	+2	+2
[T][S][L]Cache	-1	+2	+1	+1	+4	+1	+1	-0	+2	+1
[T][S]Sparse	-1	+2	+2	+0	+2	+1	+1	-0	+3	+1
step_sgd	+3	+1	+0	+3	+0	+0	+0	+1	+4	+3
step_tween	-2	+1	-0	-1	+0	-0	-0	-2	-1	-1
step_tween_chain	-1	+0	+0	+2	+0	+0	+0	+3	+0	+3
tween	-3	-0	-0	-2	-0	-0	-0	-3	-2	-1
tween_chain	+1	+0	+0	+1	+0	-0	+0	+1	-1	+1

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	-0	-1	-0	-1	+0	+1	-0	+0	+1	-0	+0
Mesh[T]	-3	-2	-3	-3	-3	-2	-3	-2	-3	-2	-3	-2
Mesh[T]Alt	-7	-7	-8	-8	-7	-7	-6	-7	-8	-6	-7	-6
Mesh[T]Chain	+0	+0	-1	-1	-0	+1	+0	+0	-0	+1	-0	-0
Mesh[T][S]	+5	+5	+5	+5	+5	+4	+6	+5	+5	+6	+5	+6
Mesh[T][S][FP]	+5	+4	+5	+5	+5	+5	+7	+5	+5	+6	+5	+5
Mesh[T][S]Sparse	+14	+15	+13	+13	+13	+14	+13	+14	+13	+13	+13	+13
Step[T]Alt	-6	-6	-7	-7	-6	-6	-5	-6	-7	-5	-6	-5
Step[T][S]	+0	+1	+0	+1	+1	+1	+2	+1	+1	+2	+1	+1
Step[T][S][FP]	+1	+1	+1	+1	+0	+0	+2	+1	+1	+2	+1	+2
Step[T][S][HP]	+0	-1	-1	-0	-1	+0	+1	-0	-0	+0	-0	-0
Step[T][S][HP]Async	+1	+1	-0	+1	+1	+1	+2	+1	+1	+2	+1	+1
Step[T][S][L]	+8	+9	+6	+6	+7	+8	+7	+7	+6	+8	+7	+7
Step[T][S][L]Cache	+8	+9	+6	+7	+8	+8	+7	+7	+6	+8	+7	+7
Step[T][S]Sparse	+1	+1	+1	+1	+1	+1	+1	+1	+1	+2	+1	+1
[T]Alt	-7	-7	-8	-8	-7	-7	-7	-7	-8	-7	-7	-7
[T][S]	+5	+5	+4	+5	+5	+5	+5	+4	+5	+6	+4	+5
[T][S][FP]	+5	+5	+5	+5	+4	+4	+6	+5	+5	+6	+4	+5
[T][S][HP]	+5	+5	+5	+5	+4	+5	+6	+4	+5	+6	+5	+6
[T][S][HP]Async	+5	+5	+5	+5	+4	+5	+5	+4	+5	+6	+4	+5
[T][S][L]	+13	+11	+11	+12	+12	+14	+14	+14	+11	+12	+12	+12
[T][S][L]Cache	+15	+16	+13	+13	+14	+15	+15	+14	+13	+15	+14	+14
[T][S]Sparse	+13	+14	+12	+12	+13	+14	+14	+14	+13	+14	+13	+13
step_sgd	+4	+2	+3	+4	+3	+4	+5	+3	+3	+4	+3	+4
step_tween	-0	-0	-1	-0	-0	+1	+2	+0	-1	+1	-0	+1
step_tween_chain	+3	+2	+3	+4	+3	+5	+5	+3	+3	+4	+3	+4
tween	-3	-3	-3	-3	-4	-2	-3	-3	-3	-3	-3	-3
tween_chain	+0	-0	-0	-0	-0	+0	-0	+0	-0	+1	-0	+1

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	+0	+0	-0	-0	-0	+0	+1	-0	+0	-0	+0
Mesh[T]	-4	-2	-4	-3	-2	-3	-4	-2	-2	-2	-3	-2
Mesh[T]Alt	-8	-7	-7	-8	-7	-7	-8	-7	-7	-8	-7	-7
Mesh[T]Chain	-0	+0	+0	+0	+0	-1	-1	+0	-0	-0	+0	+0
Mesh[T][S]	+5	+4	+6	+5	+4	+5	+5	+6	+3	+5	+5	+5
Mesh[T][S][FP]	+5	+4	+5	+5	+4	+5	+5	+5	+3	+5	+4	+5
Mesh[T][S]Sparse	+13	+14	+13	+12	+14	+13	+13	+13	+13	+13	+15	+13
Step[T]Alt	-7	-6	-6	-6	-7	-6	-7	-6	-6	-6	-6	-6
Step[T][S]	+1	+1	+1	+1	-0	+1	-0	+1	+0	-0	+2	+1
Step[T][S][FP]	+0	+0	+1	+1	+1	+1	+0	+1	+0	+1	+1	+1
Step[T][S][HP]	+0	-0	-1	+0	-0	-1	-0	+1	-1	-0	-0	+1
Step[T][S][HP]Async	+1	+1	+1	+0	+0	+1	+0	+1	+0	+1	+1	+1
Step[T][S][L]	+7	+7	+6	+7	+8	+6	+6	+7	+7	+6	+9	+7
Step[T][S][L]Cache	+6	+8	+7	+7	+8	+6	+6	+7	+7	+6	+9	+8
Step[T][S]Sparse	+0	+0	+1	+0	+1	+1	+1	+1	+0	+1	+2	+1
[T]Alt	-8	-7	-7	-8	-7	-7	-8	-7	-7	-8	-7	-8
[T][S]	+5	+3	+5	+4	+4	+5	+5	+5	+4	+4	+5	+5
[T][S][FP]	+4	+4	+5	+4	+4	+5	+4	+6	+4	+5	+5	+5
[T][S][HP]	+4	+4	+5	+5	+4	+5	+5	+5	+4	+4	+5	+6
[T][S][HP]Async	+5	+4	+5	+5	+4	+4	+4	+5	+3	+4	+4	+5
[T][S][L]	+12	+12	+11	+13	+13	+11	+11	+13	+12	+11	+11	+13
[T][S][L]Cache	+14	+14	+13	+14	+15	+13	+13	+14	+14	+13	+16	+15
[T][S]Sparse	+13	+14	+13	+13	+14	+13	+13	+13	+13	+13	+15	+13
step_sgd	+4	+3	+4	+4	+3	+3	+3	+4	+4	+3	+2	+5
step_tween	-0	+0	-1	-0	-1	-0	-1	+1	-1	-1	+0	+0
step_tween_chain	+3	+2	+3	+5	+3	+3	+3	+4	+3	+2	+2	+3
tween	-2	-3	-3	-3	-2	-3	-3	-3	-3	-4	-2	-3
tween_chain	+0	+0	-0	-0	-0	-0	-1	+0	+1	-0	+0	-0

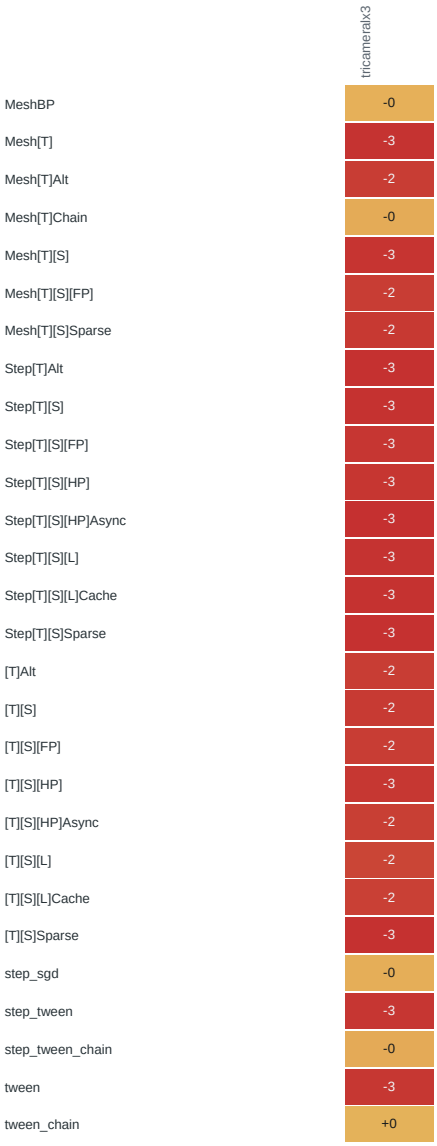
AvailD vs sgd, every mode x dtype (cols 25-34)

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

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	+1	+0	+1	-0	-2	+0	-0	+1	-1	+0
Mesh[T]	-1	-3	-2	-2	-4	-3	-3	-3	-2	-3
Mesh[T]Alt	-7	-8	-7	-7	-9	-8	-8	-7	-8	-7
Mesh[T]Chain	+1	-1	+1	+0	-2	-0	-0	-0	-0	-0
Mesh[T][S]	+6	+5	+6	+5	+4	+5	+5	+5	+4	+4
Mesh[T][S][FP]	+6	+5	+6	+5	+3	+5	+5	+5	+4	+5
Mesh[T][S]Sparse	+14	+13	+14	+14	+12	+13	+13	+13	+13	+13
Step[T]Alt	-4	-6	-6	-6	-8	-6	-6	-6	-6	-6
Step[T][S]	+2	+0	+1	+0	-1	+1	+0	+1	-0	+1
Step[T][S][FP]	+2	+1	+1	+1	-0	+1	+0	+1	-0	+1
Step[T][S][HP]	+1	+0	+1	+1	-1	+0	-0	+0	-0	+0
Step[T][S][HP]Async	+2	+1	+2	+2	-1	+1	+1	+2	+1	+2
Step[T][S][L]	+8	+7	+7	+8	+5	+6	+6	+7	+7	+7
Step[T][S][L]Cache	+8	+6	+7	+8	+6	+6	+6	+7	+6	+7
Step[T][S]Sparse	+2	+0	+2	+1	-1	+1	+1	+1	+0	+1
[T]Alt	-6	-8	-7	-7	-8	-7	-8	-7	-8	-8
[T][S]	+6	+5	+6	+5	+3	+5	+5	+5	+4	+5
[T][S][FP]	+6	+5	+6	+5	+3	+5	+5	+5	+4	+5
[T][S][HP]	+6	+4	+5	+5	+3	+5	+5	+5	+4	+5
[T][S][HP]Async	+5	+4	+5	+5	+3	+5	+4	+5	+3	+5
[T][S][L]	+14	+12	+12	+13	+11	+11	+11	+13	+11	+13
[T][S][L]Cache	+15	+13	+14	+15	+13	+13	+13	+15	+13	+14
[T][S]Sparse	+14	+13	+14	+14	+12	+14	+13	+13	+13	+13
step_sgd	+4	+3	+4	+4	+2	+3	+2	+4	+4	+4
step_tween	+1	+0	+1	+1	-2	-1	+0	+0	-0	+0
step_tween_chain	+5	+3	+3	+4	+2	+3	+3	+4	+3	+4
tween	-3	-3	-2	-2	-5	-2	-3	-3	-3	-3
tween_chain	+1	+0	+1	+1	-1	+0	-1	+0	+1	+0

AccD vs sgd, every mode x arch

AccD vs sgd, every mode x arch



Family collapse - Step* vs non-Step

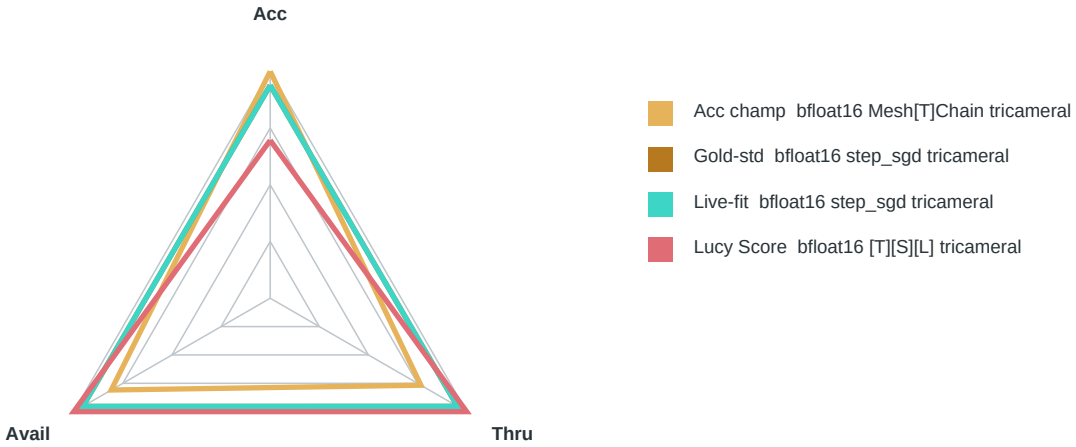
Step* is a 1D pipe (one sample enters layer 0 per tick; output is the sample that entered depth ticks ago). Non-Step of the same family is a full-chain update. AccD is a real scheduler split, not leftover warm-up forwards.

step	plain	n	mean |AccD|
Step[T]Alt	[T]Alt	34	0.59
Step[T][S]	[T][S]	34	0.38
Step[T][S][FP]	[T][S][FP]	34	0.52
Step[T][S][HP]	[T][S][HP]	34	0.41
Step[T][S][HP]Async	[T][S][HP]Async	34	0.49
Step[T][S][L]	[T][S][L]	34	0.60
Step[T][S][L]Cache	[T][S][L]Cache	34	0.54
Step[T][S]Sparse	[T][S]Sparse	34	0.32
step_sgd	sgd	34	0.88
step_tween	tween	34	0.35
step_tween_chain	tween_chain	34	0.97

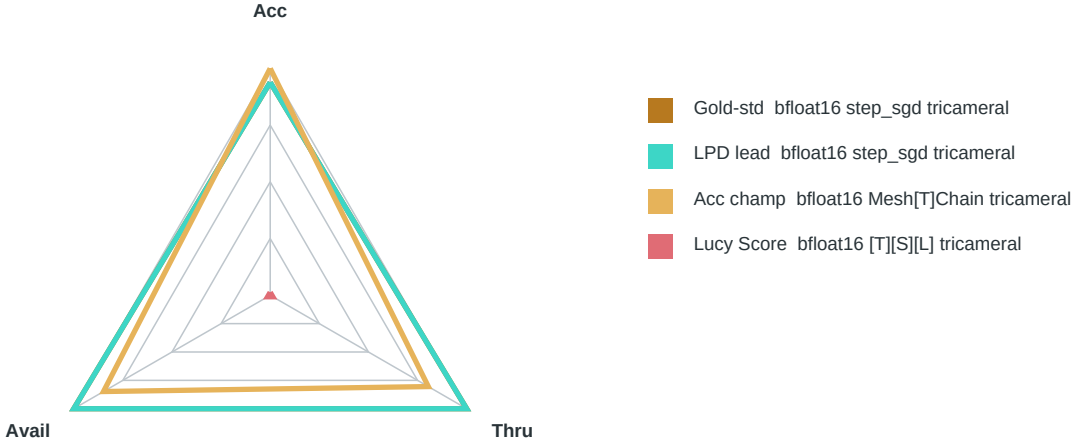
Consciousness - Acc, Throughput, Availability

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|Mesh[T]Chain|tricameral|simd Acc 13.0 Thru 354 Avail 20.3% 172.2 KiB (RAM reference)
Lucy Score champ (T x Avail x Acc) bfloat16|none|[T][S][L]|tricameral|simd Score 21.3 Acc 9.0 Soft 2 172.2 KiB
Live-fit champ (best Q) bfloat16|none|step_sgd|tricameral|simd Acc 12.2 Thru 440 Avail 23.9% 172.2 KiB
Gold-std (2+ pillars, Acc keep >= 80%, then smallest then fastest): bfloat16|none|step_sgd|tricameral|simd mode step_sgd Acc 12.2 Thru 440 172.2 KiB
Board fastest float32|none|[T][S][L]Cache|tricameral|simd Thru 1087 (traps may own this) Best availability uint64|none|[T][S][L]Cache|tricameral|simd 35.5%
Learner Thru peak 462 learner Avail peak 25.1%

Consciousness radar - Acc / Thru / Avail vs learner peaks



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



No gold cell yet. Need all three pillars at 80% of learner peaks in one fifth of Acc-champ RAM.

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

Mode	n	Acc	KiB	Thru	Cell
step_sgd	1	12.2	172.2	440	bfloat16 step_sgd tricameral
step_tween_chain	1	10.9	172.2	432	bfloat16 step_tween_chain tricameral

Mode	n	Acc	KiB	Thru	Cell
MeshBP	2	11.2	172.2	362	bfloat16 MeshBP tricameral
tween_chain	1	12.1	172.2	359	bfloat16 tween_chain tricameral
Mesh[T]Chain	1	13.0	172.2	354	bfloat16 Mesh[T]Chain 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
keep	bfloat16 step_sgd tricameral	94	95	95	95	100	1.0	0.95	12.2	440	172.2
keep	bfloat16 step_tween_chain tricameral	84	94	94	90	100	1.0	0.90	10.9	432	172.2
keep	bfloat16 Mesh[T]Chain tricameral	100	77	81	85	100	1.0	0.85	13.0	354	172.2
keep	bfloat16 tween_chain tricameral	93	78	82	84	100	1.0	0.84	12.1	359	172.2
acc	bfloat16 sgd tricameral	93	76	80	83	100	1.0	0.83	12.1	351	172.2
keep	bfloat16 MeshBP tricameral	86	78	82	82	100	1.0	0.82	11.2	362	172.2
-	float64 step_tween_chain tricameral	75	100	100	91	400	0.2	0.23	9.8	462	688.8
-	int step_sgd tricameral	72	62	99	76	400	0.2	0.19	9.3	284	688.8
keep	int MeshBP tricameral	87	49	84	71	400	0.2	0.18	11.2	227	688.8
-	complex64 MeshBP tricameral	77	50	85	69	400	0.2	0.17	9.9	231	688.8
-	int Mesh[T]Chain tricameral	77	48	82	67	400	0.2	0.17	10.0	222	688.8
-	bfloat16 [T][S][L] tricameral	70	100	100	89	100	1.0	0.00	9.0	706	172.2
-	float32 step_tween_chain tricameral	69	100	99	88	200	0.5	0.00	8.9	659	344.4
-	float32 sgd tricameral	70	100	80	82	200	0.5	0.00	9.1	508	344.4
-	bfloat16 Mesh[T][S][FP] tricameral	55	100	100	82	100	1.0	0.00	7.2	461	172.2
-	bfloat16 [T][S][FP] tricameral	54	98	98	80	100	1.0	0.00	7.0	450	172.2
-	bfloat16 [T][S][HP]Async tricameral	51	98	98	79	100	1.0	0.00	6.6	451	172.2
-	float64 step_sgd tricameral	48	100	100	78	400	0.2	0.00	6.2	469	688.8
-	bfloat16 [T][S][L]Cache tricameral	46	100	100	77	100	1.0	0.00	5.9	760	172.2
-	float32 Mesh[T]Chain tricameral	52	100	84	76	200	0.5	0.00	6.7	529	344.4

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

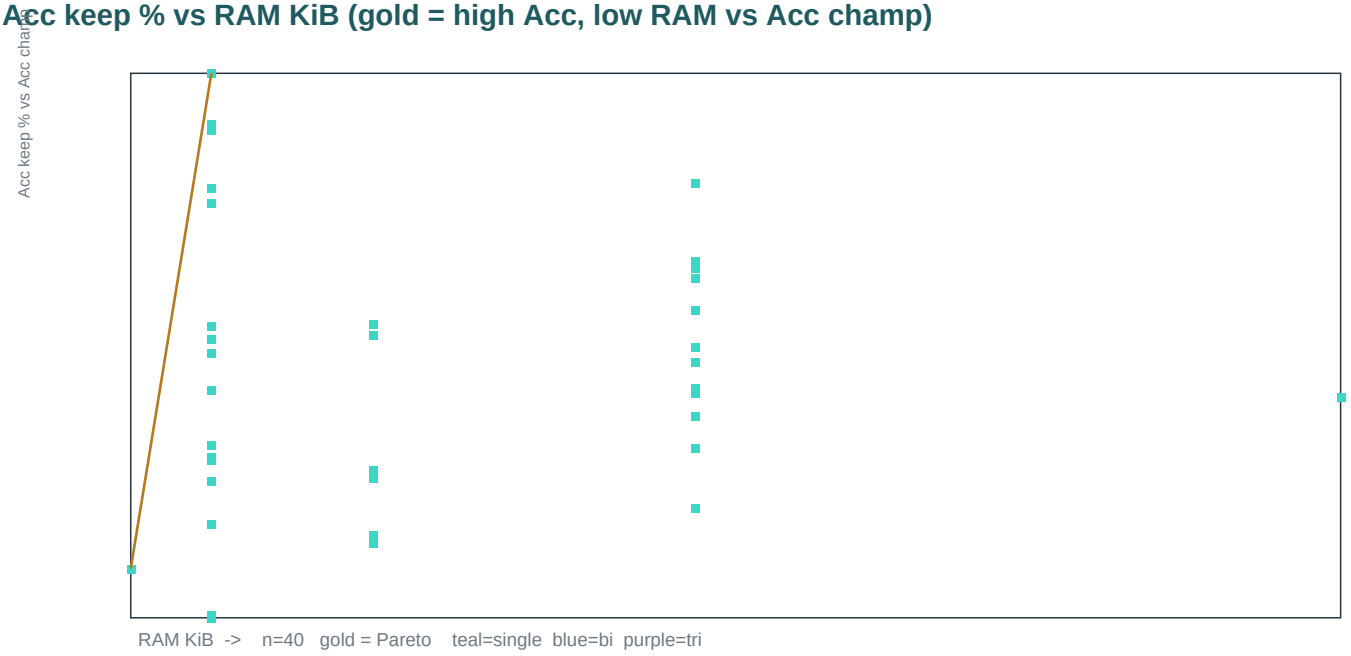
Band	Cell	Acc%	Thru%	Avail%	Q%	LPD	Thru	Avail
keep	bfloat16 step_sgd tricameral	94	95	95	95	0.95	440	23.9
-	float64 step_tween_chain tricameral	75	100	100	91	0.23	462	25.1
keep	bfloat16 step_tween_chain tricameral	84	94	94	90	0.90	432	23.5
keep	bfloat16 Mesh[T]Chain tricameral	100	77	81	85	0.85	354	20.3
keep	bfloat16 tween_chain tricameral	93	78	82	84	0.84	359	20.5
acc	bfloat16 sgd tricameral	93	76	80	83	0.83	351	20.0
keep	bfloat16 MeshBP tricameral	86	78	82	82	0.82	362	20.6
-	int step_sgd tricameral	72	62	99	76	0.19	284	24.9
keep	int MeshBP tricameral	87	49	84	71	0.18	227	21.0
-	complex64 MeshBP tricameral	77	50	85	69	0.17	231	21.3

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

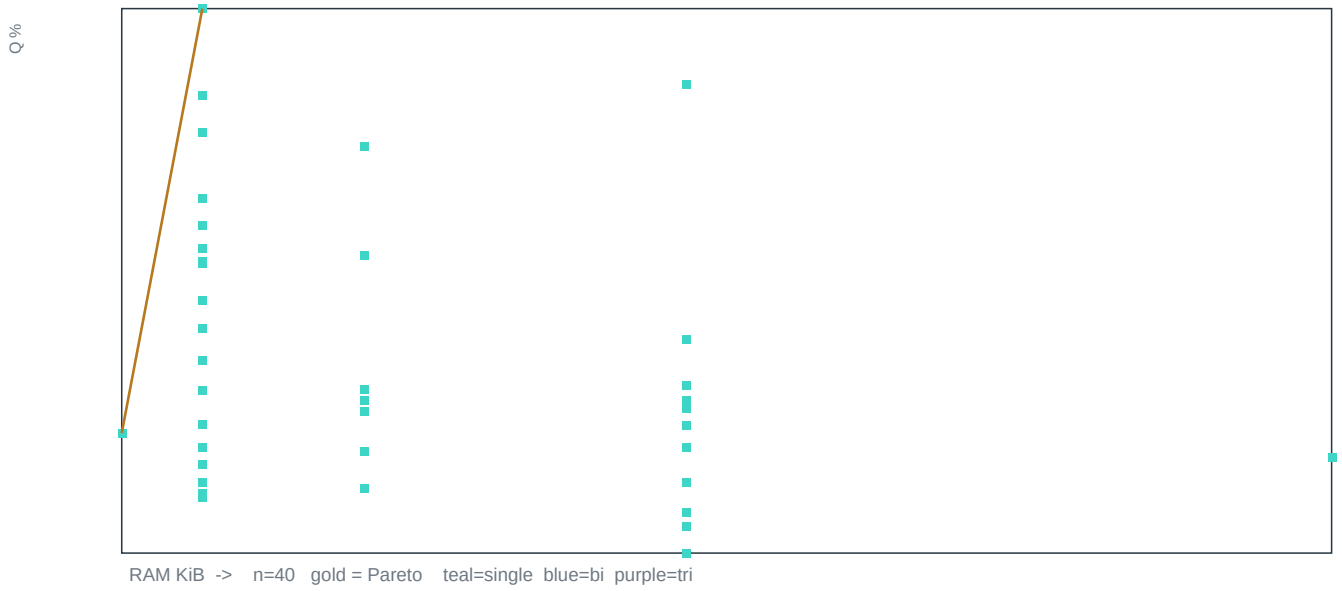
Band	Cell	Acc%	Thru%	Avail%	Q%	RAM%	xSmall	LPD	Acc	Thru	KiB
trap	binary sgd tricameral	9	86	71	38	6	16.0	0.00	1.1	398	10.8
trap	binary step_sgd tricameral	10	98	79	42	6	16.0	0.00	1.2	451	10.8
trap	binary tween tricameral	15	72	61	41	6	16.0	0.00	2.0	333	10.8
trap	binary tween_chain tricameral	6	84	70	34	6	16.0	0.00	0.8	387	10.8
trap	binary step_tween tricameral	11	87	71	40	6	16.0	0.00	1.4	400	10.8
trap	binary step_tween_chain tricameral	13	100	81	47	6	16.0	0.00	1.6	467	10.8
trap	binary MeshBP tricameral	12	85	70	42	6	16.0	0.00	1.6	393	10.8
trap	binary Mesh[T] tricameral	12	73	62	38	6	16.0	0.00	1.6	337	10.8
trap	binary Mesh[T]Chain tricameral	11	87	72	41	6	16.0	0.00	1.5	400	10.8

trap	binary [T][S] tricameral	17	100	93	54	6	16.0	0.00	2.1	555	10.8

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

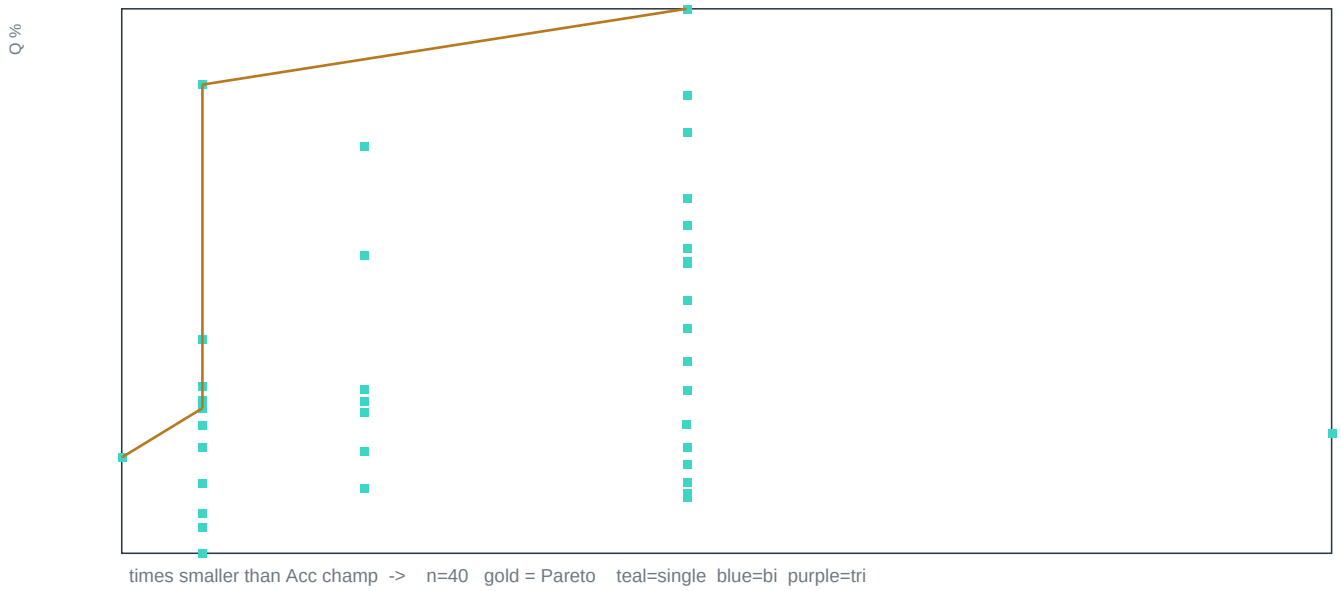


Q% vs RAM KiB (gold = high consciousness, low RAM)



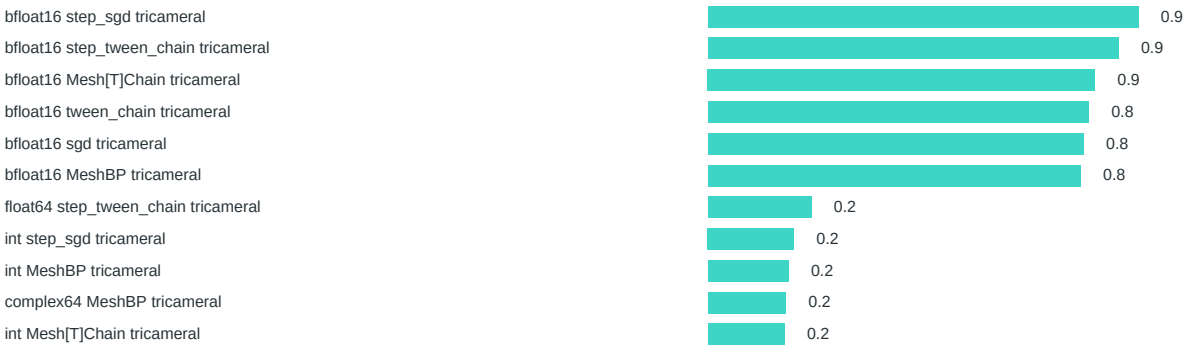
Q% vs shrink vs Acc champ (gold = upper right)

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

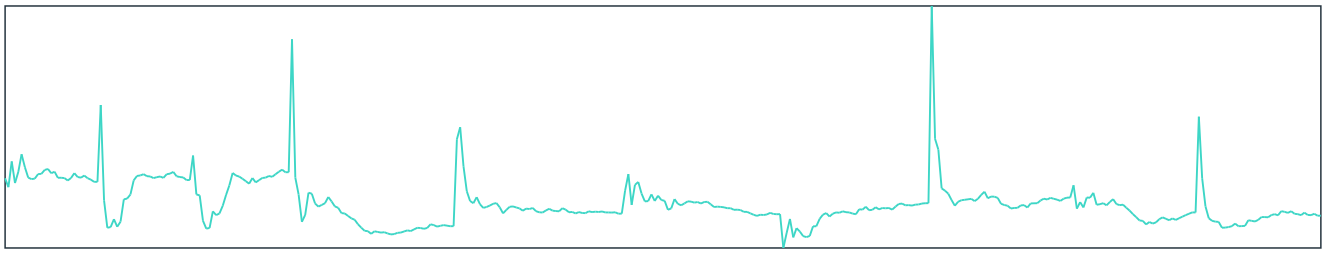


times smaller than Acc champ -> n=40 gold = Pareto teal=single blue=bi purple=tri

Top Lucy density (LPD)

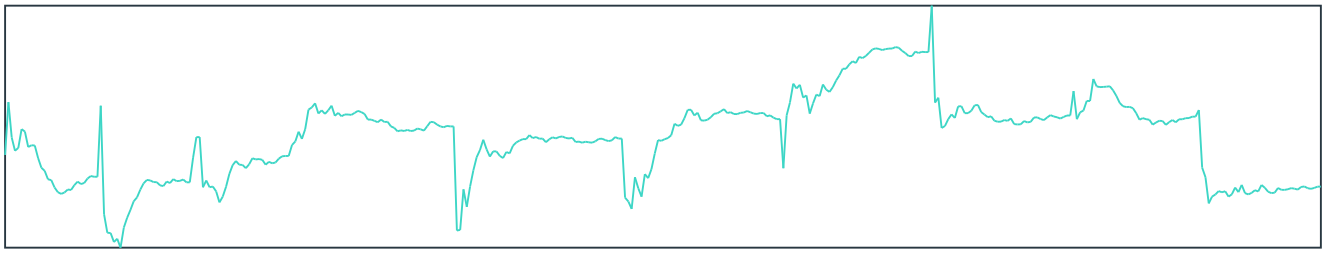


Live pulse (Score)



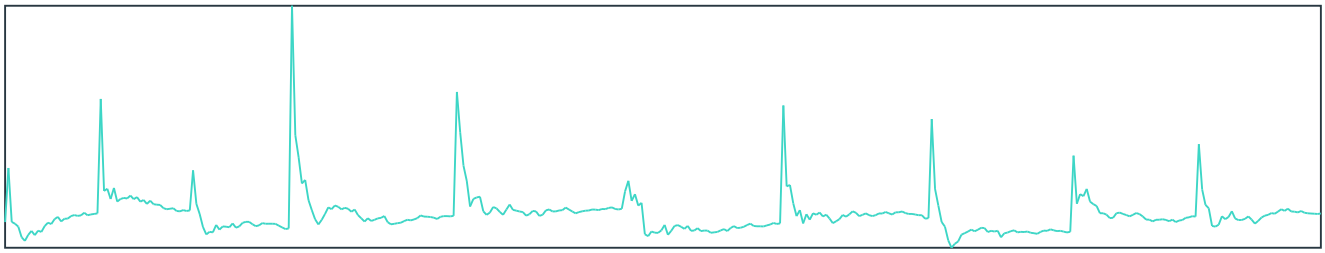
n=400 min=0.27 max=2.08

Live pulse (SoftAcc)



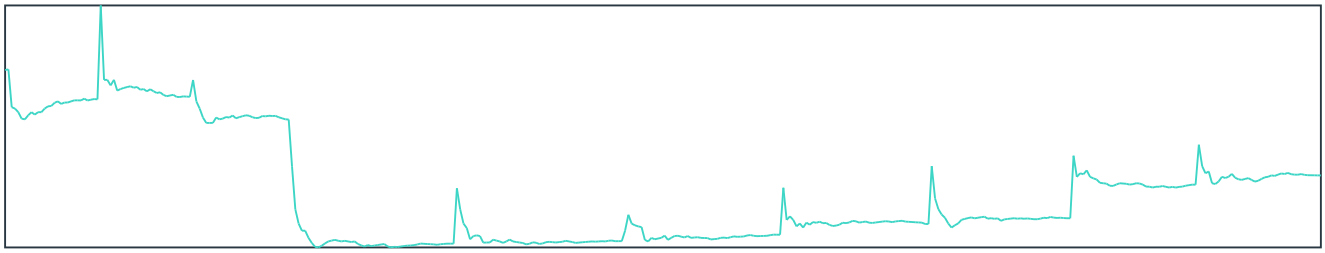
n=400 min=1.54 max=1.54

Live pulse (Availability)



n=400 min=20.88 max=30.51

Live pulse (Throughput)



n=400 min=131.54 max=311.21

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