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 08:53:53 - 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 - cameralx5 - 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|cameralx5|simd	10.15	3.7	13.6	331.2	22.5
throughput	float32|none|[T][S][L]Cache|cameralx5|simd	5.37	1.5	1.6	927.7	36.5
availability	int32|none|[T][S][L]Cache|cameralx5|simd	3.21	1.5	1.6	533.6	37.4
lucy score	bfloat16|none|[T][S][L]|cameralx5|simd	17.65	1.5	7.7	647.3	35.3
mobile score (trap)	binary|none|Mesh[T][S]Sparse|cameralx5|simd	8.34	1.5	2.9	827.8	35.3
acc/sec	float32|none|step_sgd|cameralx5|simd	15.38	3.0	10.4	562.4	26.3

Lucy axis champions (this tide)

Axis	Mode	DType	Arch	Value
hard_acc	Mesh[T]Chain	bfloat16	cameralx5	13.68
throughput	[T][S][L]Cache	float32	cameralx5	927.65
availability	[T][S][L]Cache	int32	cameralx5	37.39
score	[T][S][L]	bfloat16	cameralx5	17.65
soft_acc	tween_chain	bfloat16	cameralx5	3.71
acc_thru	step_sgd	float32	cameralx5	58.57
realtime	[T][S][L]Cache	float32	cameralx5	338.23
adapt	tween_chain	bfloat16	cameralx5	3.97
keep_learn	tween_chain	float32	cameralx5	10.33
acc_per_sec	step_sgd	float32	cameralx5	0.87
stability	sgd	fp4	cameralx5	100.00
mobile_score	Mesh[T][S]Sparse	binary	cameralx5	726.25
lpd	step_sgd	bfloat16	cameralx5	0.83
mspeed	step_sgd	float32	cameralx5	1.00
mavail	step_sgd	complex64	cameralx5	1.00
mix	step_sgd	float32	cameralx5	0.89
gold_std	step_sgd	bfloat16	cameralx5	188.19

Best settings per train mode

Mode	DType	Format	Score	Soft	Acc	Avail	n
[T][S][L]	bfloat16	none	17.7	1.5	7.7	35.3	34
[T][S][L]Cache	bfloat16	none	15.6	1.5	6.0	37.1	34
step_sgd	float32	none	15.4	3.0	10.4	26.3	34
step_tween_chain	bfloat16	none	12.2	3.2	11.9	25.7	34
tween_chain	float32	none	11.4	3.3	10.7	23.1	34
sgd	float32	none	11.2	2.7	8.6	24.0	34
Mesh[T]Chain	bfloat16	none	9.9	3.6	13.7	22.4	34
[T][S]	bfloat16	none	9.2	1.5	8.1	27.0	34
MeshBP	float64	none	8.9	3.1	10.2	24.4	34
[T][S][HP]	bfloat16	none	8.5	1.5	7.6	27.0	34
Mesh[T][S]Sparse	binary	none	8.3	1.5	2.9	35.3	34
[T][S][HP]Async	bfloat16	none	8.0	1.5	7.5	26.6	34

[T][S]Sparse	fp4	none	7.9	1.5	3.2	35.6	34
[T][S][FP]	bfloat16	none	7.8	1.5	7.2	26.7	34
Mesh[T][S][FP]	bfloat16	none	7.1	1.5	6.5	26.8	34
Mesh[T][S]	bfloat16	none	5.7	1.5	5.3	26.5	34
Step[T][S][L]	fp4	none	4.0	1.5	2.7	29.3	34
Step[T][S][L]Cache	int2	none	3.6	1.5	2.0	28.6	34
[T]Alt	bfloat16	none	2.7	1.6	9.3	15.2	34
Mesh[T]Alt	bfloat16	none	2.5	1.6	9.0	15.0	34
Step[T][S]	fp4	none	2.2	1.5	2.7	22.7	34
Step[T][S]Sparse	fp4	none	2.1	1.5	2.8	22.2	34
Step[T][S][FP]	fp4	none	2.0	1.5	2.8	22.2	34
Step[T][S][HP]Async	fp4	none	2.0	1.5	2.8	22.0	34
step_tween	fp4	none	2.0	1.5	2.6	22.1	34
Step[T][S][HP]	fp4	none	1.8	1.5	2.7	21.6	34
tween	fp4	none	1.7	1.5	2.7	20.1	34
Mesh[T]	int8	none	1.4	1.5	1.9	19.8	34
Step[T]Alt	fp4	none	0.8	1.5	2.4	15.5	34

Best dtype per mode

Mode	Winner dtype	Score	Soft	Acc
[T][S][L]	bfloat16	17.7	1.5	7.7
[T][S][L]Cache	bfloat16	15.6	1.5	6.0
step_sgd	float32	15.4	3.0	10.4
step_tween_chain	bfloat16	12.2	3.2	11.9
tween_chain	float32	11.4	3.3	10.7
sgd	float32	11.2	2.7	8.6
Mesh[T]Chain	bfloat16	9.9	3.6	13.7
[T][S]	bfloat16	9.2	1.5	8.1
MeshBP	float64	8.9	3.1	10.2
[T][S][HP]	bfloat16	8.5	1.5	7.6
Mesh[T][S]Sparse	binary	8.3	1.5	2.9
[T][S][HP]Async	bfloat16	8.0	1.5	7.5
[T][S]Sparse	fp4	7.9	1.5	3.2
[T][S][FP]	bfloat16	7.8	1.5	7.2
Mesh[T][S][FP]	bfloat16	7.1	1.5	6.5
Mesh[T][S]	bfloat16	5.7	1.5	5.3
Step[T][S][L]	fp4	4.0	1.5	2.7
Step[T][S][L]Cache	int2	3.6	1.5	2.0
[T]Alt	bfloat16	2.7	1.6	9.3
Mesh[T]Alt	bfloat16	2.5	1.6	9.0
Step[T][S]	fp4	2.2	1.5	2.7
Step[T][S]Sparse	fp4	2.1	1.5	2.8
Step[T][S][FP]	fp4	2.0	1.5	2.8
Step[T][S][HP]Async	fp4	2.0	1.5	2.8
step_tween	fp4	2.0	1.5	2.6
Step[T][S][HP]	fp4	1.8	1.5	2.7
tween	fp4	1.7	1.5	2.7
Mesh[T]	int8	1.4	1.5	1.9
Step[T]Alt	fp4	0.8	1.5	2.4

Best mode per dtype

DType	Winner mode	Score	Soft	Acc

bfloat16	[T][S][L]	17.7	1.5	7.7
float32	step_sgd	15.4	3.0	10.4
float64	step_sgd	11.1	3.2	8.8
int64	step_tween_chain	9.0	2.8	9.8
float16	step_tween_chain	8.7	3.1	10.3
binary	Mesh[T][S]Sparse	8.3	1.5	2.9
complex64	step_sgd	8.3	2.9	9.8
uint64	step_sgd	8.3	1.7	8.6
uint16	step_sgd	7.9	1.8	8.3
fp4	[T][S]Sparse	7.9	1.5	3.2
uint8	sgd	7.9	1.5	7.7
complex128	step_sgd	7.5	3.0	9.9
uint	step_sgd	7.4	1.6	8.4
int16	step_tween_chain	7.3	1.6	8.0
int32	step_tween_chain	7.0	1.8	7.6
int	step_tween_chain	6.9	3.2	8.9
int4	[T][S][L]Cache	6.8	1.5	2.1
uint32	MeshBP	6.1	2.2	9.4
int8	[T][S]Sparse	5.7	1.5	1.8
uintptr	step_tween_chain	5.7	1.6	7.3
ternary	[T][S][L]Cache	5.5	1.5	1.8
int2	Mesh[T][S]Sparse	5.2	1.5	1.8
uint4	Mesh[T][S]Sparse	3.7	1.5	2.0
fp8e5m2	[T][S][L]Cache	3.1	1.5	1.6
nf4	[T][S]Sparse	3.1	1.5	2.1
fp8e4m3	[T][S]Sparse	2.8	1.5	1.8
uint3	[T][S]Sparse	2.8	1.5	2.2
uint5	[T][S]Sparse	2.7	1.5	2.5
uint2	Mesh[T][S]Sparse	2.5	1.5	1.4
int3	[T][S]Sparse	2.0	1.5	1.7
int6	step_sgd	2.0	1.5	4.5
uint6	[T][S][L]Cache	1.9	1.5	2.0
fp6	[T][S]Sparse	1.9	1.5	2.1
int5	[T][S]Sparse	1.8	1.5	1.8

Leaderboard (Lucy Score)

#	Cell	Score	Soft	Acc	Thru	Avail
1	bfloat16|none|[T][S][L]|cameralx5|simd	17.7	1.5	7.7	647.3	35.3
2	bfloat16|none|[T][S][L]Cache|cameralx5|simd	15.6	1.5	6.0	701.6	37.1
3	float32|none|step_sgd|cameralx5|simd	15.4	3.0	10.4	562.4	26.3
4	bfloat16|none|step_sgd|cameralx5|simd	12.8	3.3	11.8	415.1	26.2
5	bfloat16|none|step_tween_chain|cameralx5|simd	12.2	3.2	11.9	399.2	25.7
6	float32|none|tween_chain|cameralx5|simd	11.4	3.3	10.7	462.5	23.1
7	float32|none|step_tween_chain|cameralx5|simd	11.3	2.4	8.4	530.3	25.6
8	float32|none|sgd|cameralx5|simd	11.2	2.7	8.6	542.3	24.0
9	float64|none|step_sgd|cameralx5|simd	11.1	3.2	8.8	449.1	28.1
10	bfloat16|none|sgd|cameralx5|simd	10.9	3.5	12.8	368.7	23.1
11	bfloat16|none|tween_chain|cameralx5|simd	10.1	3.7	13.6	331.2	22.5
12	float64|none|step_tween_chain|cameralx5|simd	10.0	2.7	8.7	420.5	27.4
13	bfloat16|none|Mesh[T]Chain|cameralx5|simd	9.9	3.6	13.7	323.1	22.4
14	bfloat16|none|[T][S]|cameralx5|simd	9.2	1.5	8.1	421.8	27.0
15	int64|none|step_tween_chain|cameralx5|simd	9.0	2.8	9.8	331.6	27.6
16	float64|none|MeshBP|cameralx5|simd	8.9	3.1	10.2	358.2	24.4

#	Cell	Score	Soft	Acc	Thru	Avail
17	float16|none|step_tween_chain|cameralx5|simd	8.7	3.1	10.3	323.6	26.1
18	float32|none|MeshBP|cameralx5|simd	8.7	2.8	8.2	457.6	23.0
19	bfloat16|none|[T][S][HP]|cameralx5|simd	8.5	1.5	7.6	415.5	27.0
20	float64|none|tween_chain|cameralx5|simd	8.5	3.1	10.1	352.7	24.0

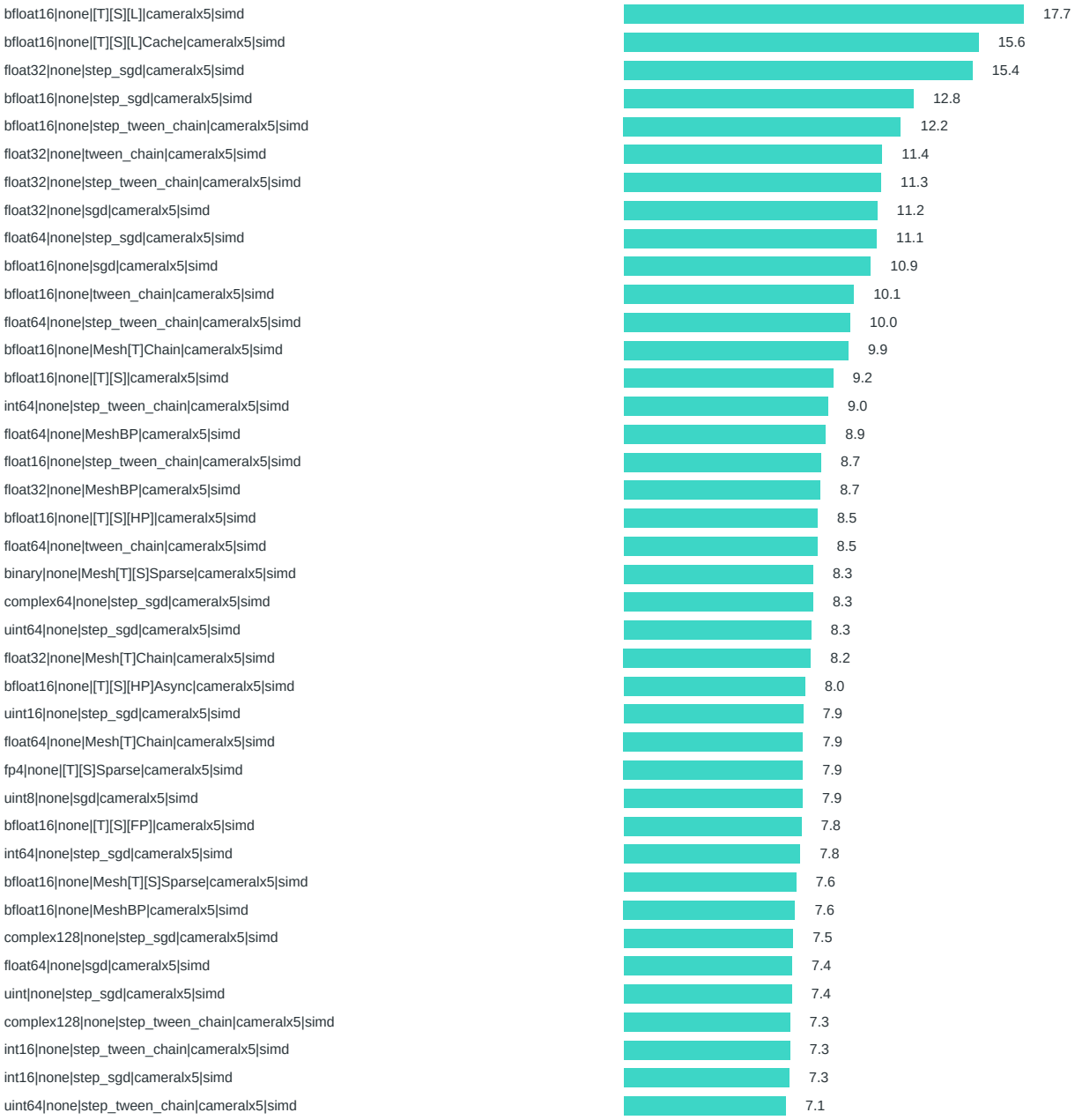
Leaderboard (SoftAcc)

#	Cell	Score	Soft	Acc	Thru	Avail
1	bfloat16|none|tween_chain|cameralx5|simd	10.1	3.7	13.6	331.2	22.5
2	bfloat16|none|Mesh[T]Chain|cameralx5|simd	9.9	3.6	13.7	323.1	22.4
3	bfloat16|none|sgd|cameralx5|simd	10.9	3.5	12.8	368.7	23.1
4	bfloat16|none|step_sgd|cameralx5|simd	12.8	3.3	11.8	415.1	26.2
5	float32|none|tween_chain|cameralx5|simd	11.4	3.3	10.7	462.5	23.1
6	float64|none|step_sgd|cameralx5|simd	11.1	3.2	8.8	449.1	28.1
7	bfloat16|none|step_tween_chain|cameralx5|simd	12.2	3.2	11.9	399.2	25.7
8	float16|none|step_tween_chain|cameralx5|simd	8.7	3.1	10.3	323.6	26.1
9	float64|none|tween_chain|cameralx5|simd	8.5	3.1	10.1	352.7	24.0
10	complex128|none|step_tween_chain|cameralx5|simd	7.3	3.1	10.0	270.9	27.2
11	float64|none|MeshBP|cameralx5|simd	8.9	3.1	10.2	358.2	24.4
12	float64|none|Mesh[T]Chain|cameralx5|simd	7.9	3.0	9.8	339.6	23.7
13	bfloat16|none|MeshBP|cameralx5|simd	7.6	3.0	11.0	312.7	21.9
14	float32|none|step_sgd|cameralx5|simd	15.4	3.0	10.4	562.4	26.3
15	complex128|none|step_sgd|cameralx5|simd	7.5	3.0	9.9	275.7	27.3
16	float32|none|Mesh[T]Chain|cameralx5|simd	8.2	3.0	8.3	442.4	22.6
17	complex64|none|step_sgd|cameralx5|simd	8.3	2.9	9.8	296.9	28.7
18	float32|none|MeshBP|cameralx5|simd	8.7	2.8	8.2	457.6	23.0
19	int64|none|step_tween_chain|cameralx5|simd	9.0	2.8	9.8	331.6	27.6
20	float64|none|step_tween_chain|cameralx5|simd	10.0	2.7	8.7	420.5	27.4

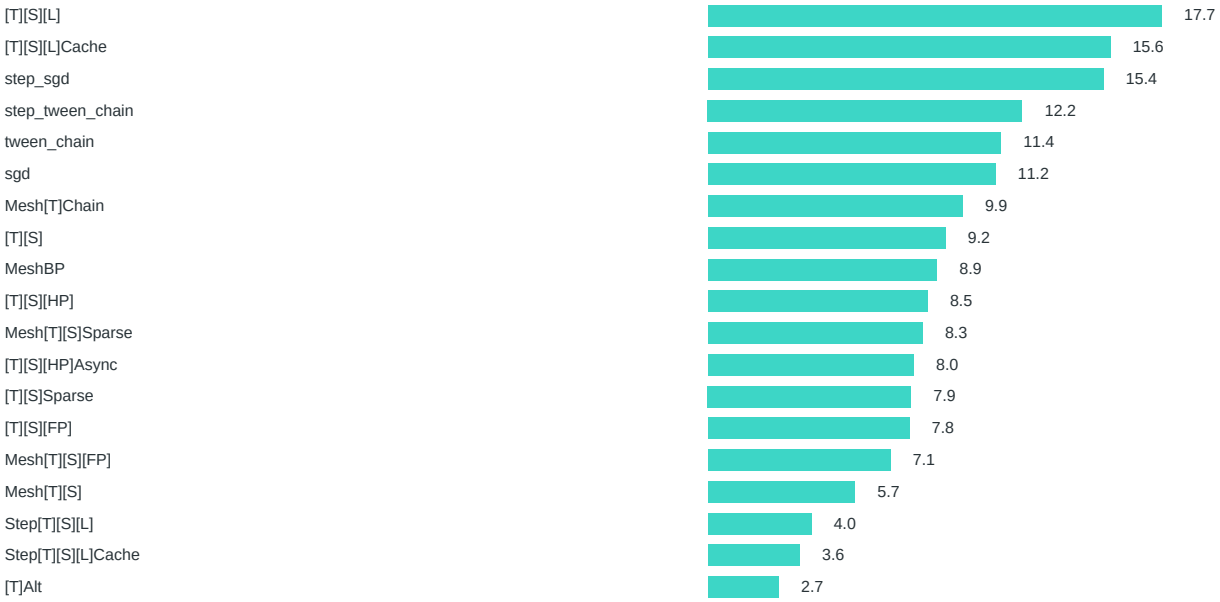
Leaderboard (hard Acc)

#	Cell	Score	Soft	Acc	Thru	Avail
1	bfloat16|none|Mesh[T]Chain|cameralx5|simd	9.9	3.6	13.7	323.1	22.4
2	bfloat16|none|tween_chain|cameralx5|simd	10.1	3.7	13.6	331.2	22.5
3	bfloat16|none|sgd|cameralx5|simd	10.9	3.5	12.8	368.7	23.1
4	bfloat16|none|step_tween_chain|cameralx5|simd	12.2	3.2	11.9	399.2	25.7
5	bfloat16|none|step_sgd|cameralx5|simd	12.8	3.3	11.8	415.1	26.2
6	bfloat16|none|MeshBP|cameralx5|simd	7.6	3.0	11.0	312.7	21.9
7	float32|none|tween_chain|cameralx5|simd	11.4	3.3	10.7	462.5	23.1
8	float32|none|step_sgd|cameralx5|simd	15.4	3.0	10.4	562.4	26.3
9	float16|none|step_tween_chain|cameralx5|simd	8.7	3.1	10.3	323.6	26.1
10	float64|none|MeshBP|cameralx5|simd	8.9	3.1	10.2	358.2	24.4
11	float64|none|tween_chain|cameralx5|simd	8.5	3.1	10.1	352.7	24.0
12	complex128|none|step_tween_chain|cameralx5|simd	7.3	3.1	10.0	270.9	27.2
13	complex128|none|step_sgd|cameralx5|simd	7.5	3.0	9.9	275.7	27.3
14	int64|none|step_tween_chain|cameralx5|simd	9.0	2.8	9.8	331.6	27.6
15	float64|none|Mesh[T]Chain|cameralx5|simd	7.9	3.0	9.8	339.6	23.7
16	complex64|none|step_sgd|cameralx5|simd	8.3	2.9	9.8	296.9	28.7
17	float64|none|step_sgd|cameralx5|simd	11.1	3.2	8.8	449.1	28.1
18	float64|none|step_tween_chain|cameralx5|simd	10.0	2.7	8.7	420.5	27.4
19	uint64|none|step_sgd|cameralx5|simd	8.3	1.7	8.6	350.1	27.4
20	float32|none|sgd|cameralx5|simd	11.2	2.7	8.6	542.3	24.0

Top scores



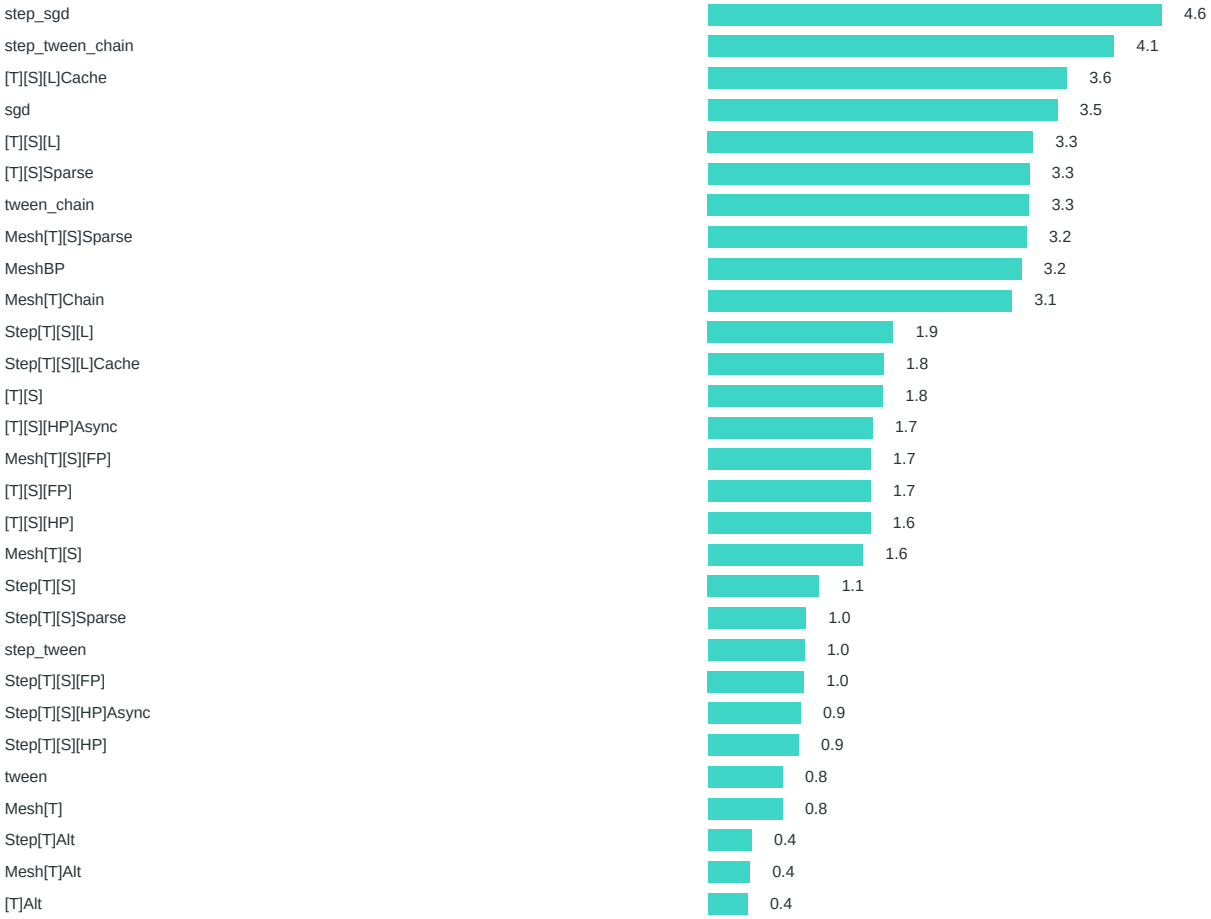
Best settings per mode



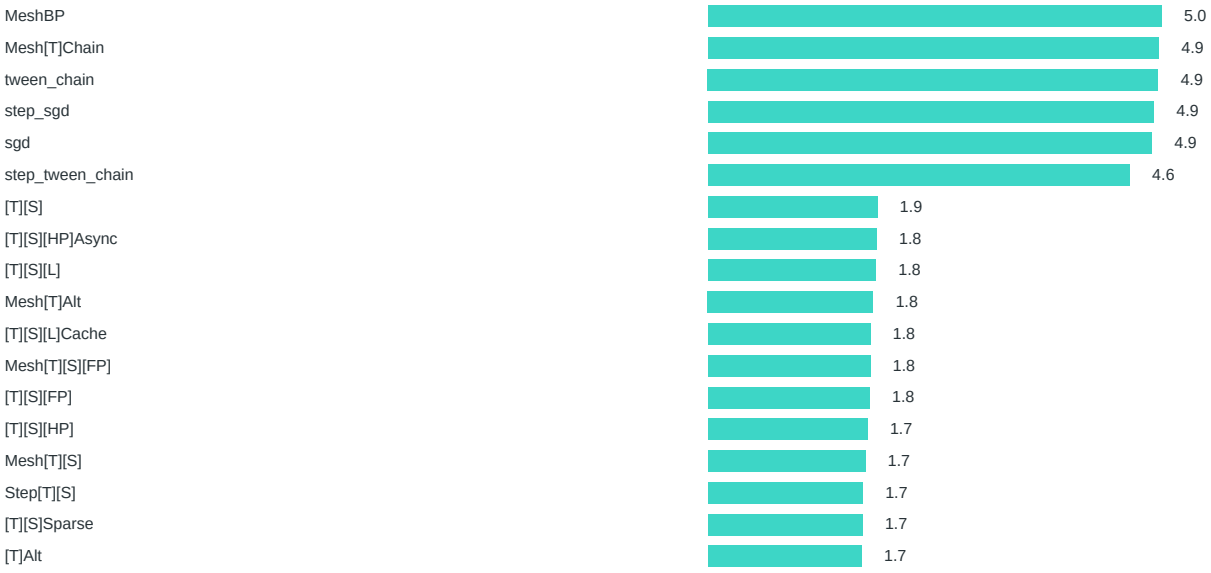
Best settings per mode



Mean Score by train mode



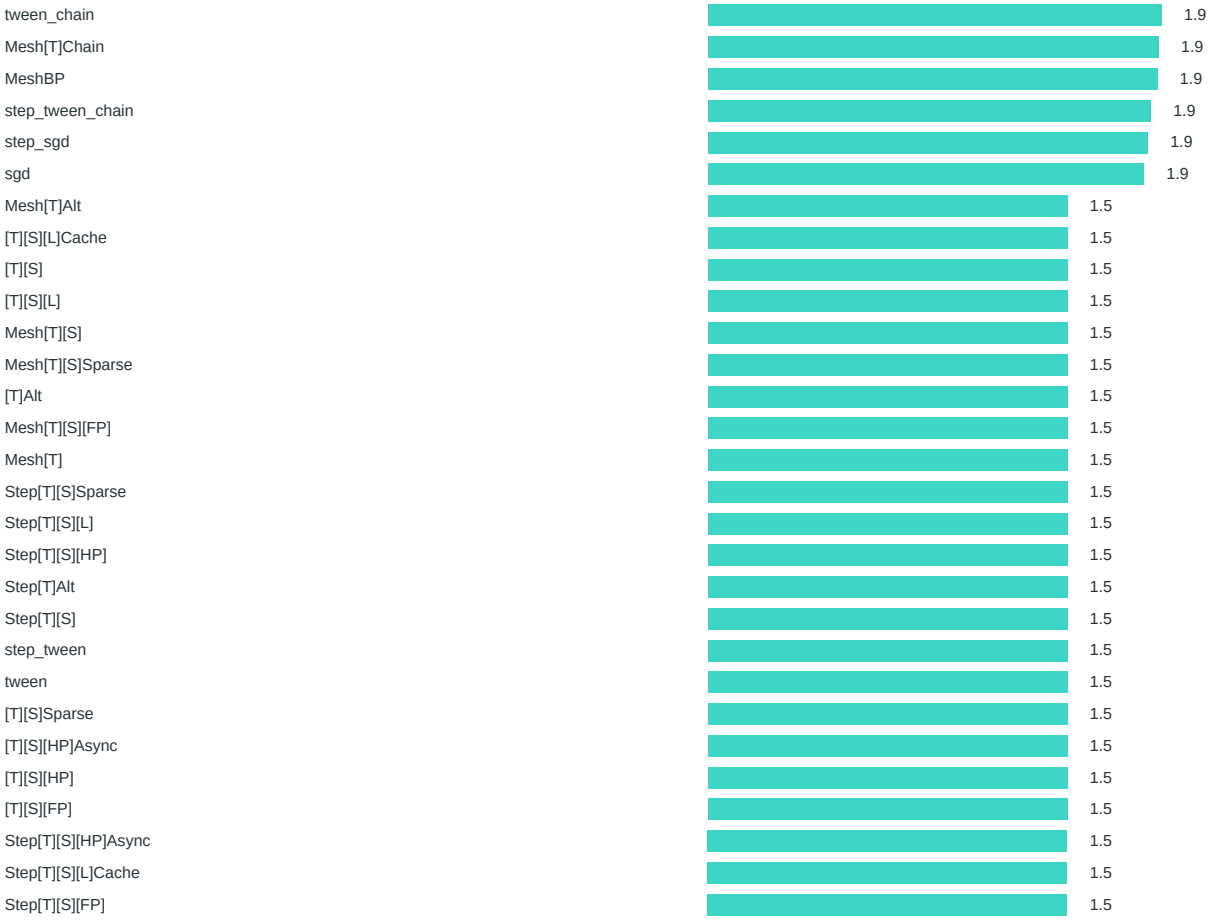
Mean hard Acc by train mode



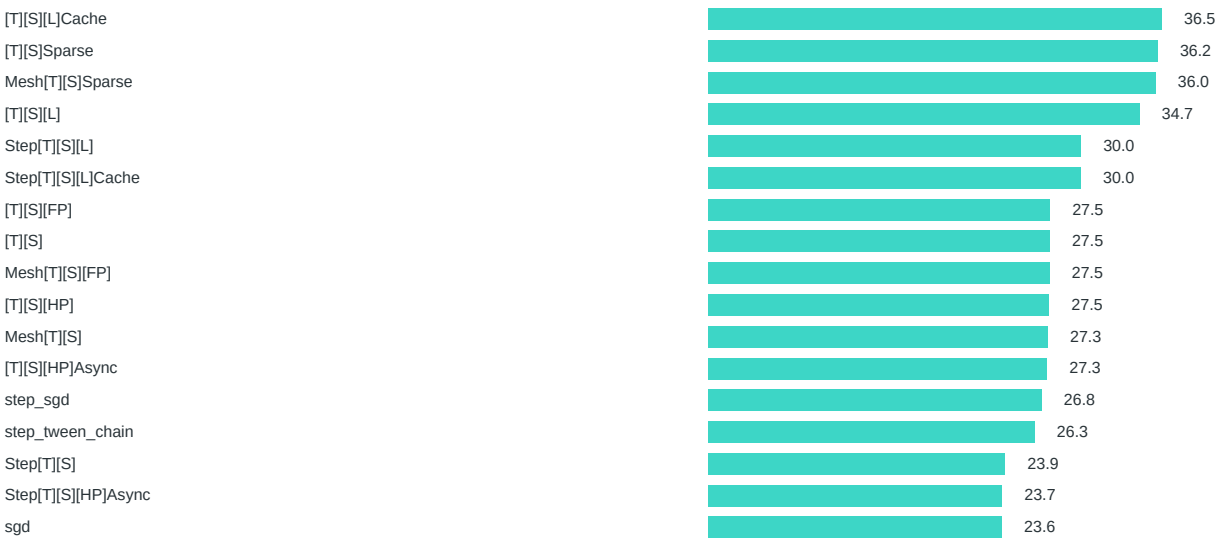
Mean hard Acc by train mode



Mean SoftAcc by train mode



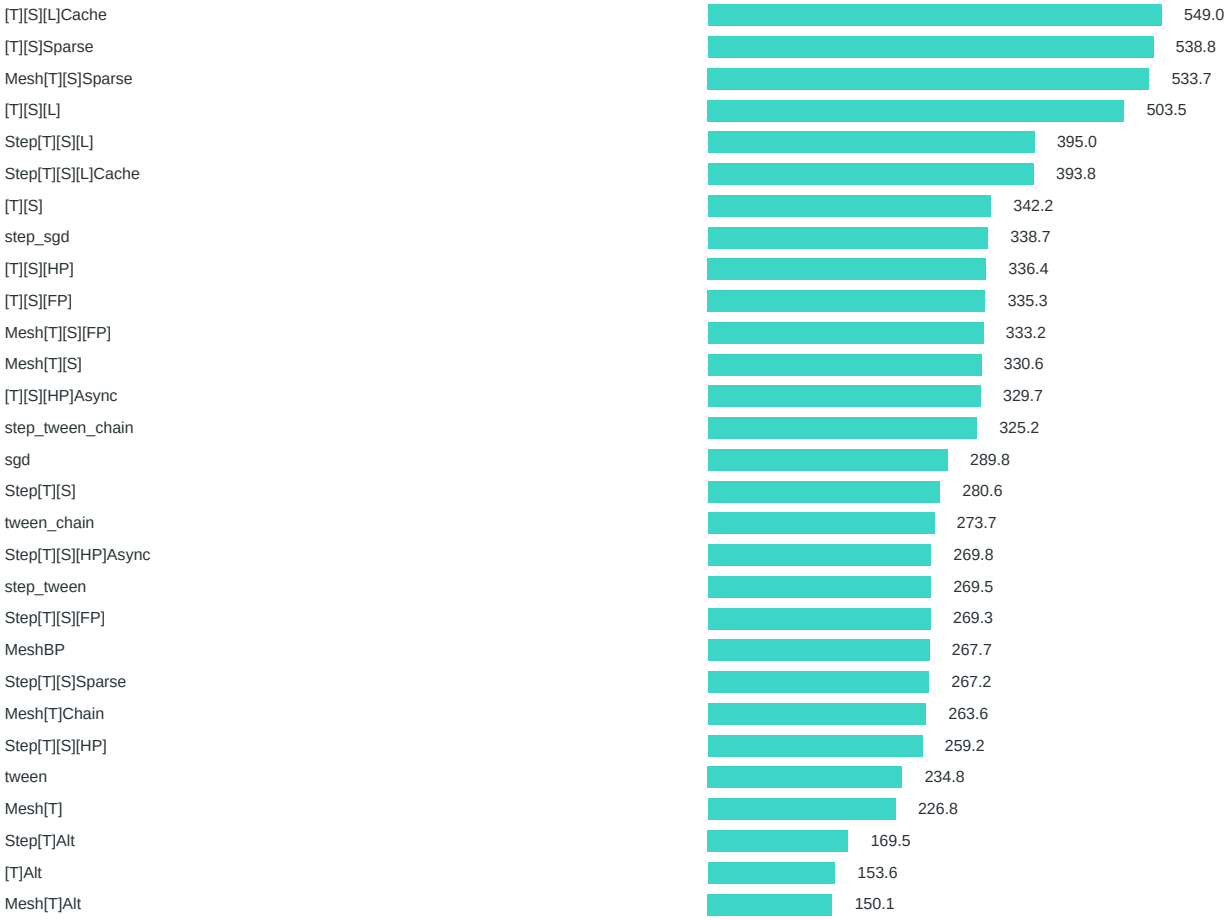
Mean Availability by train mode



Mean Availability by train mode



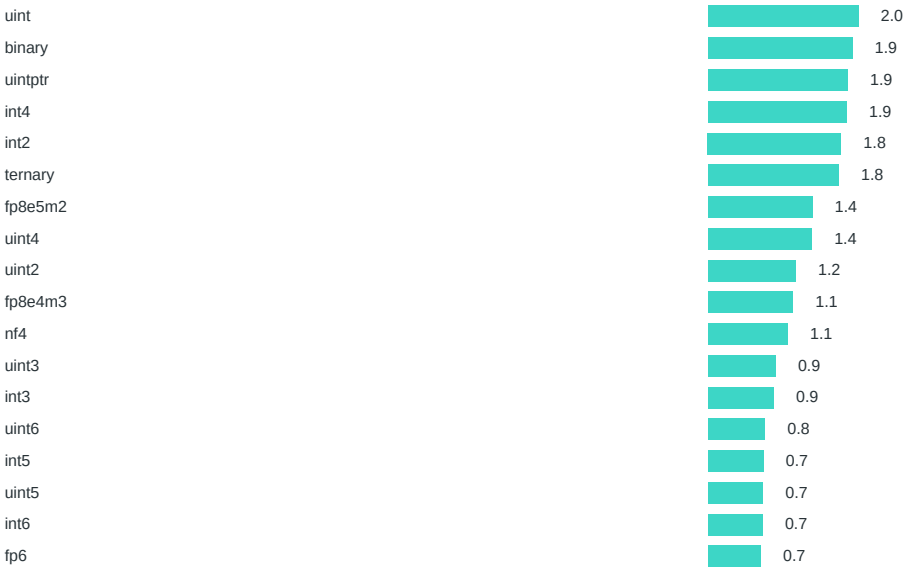
Mean Throughput by train mode



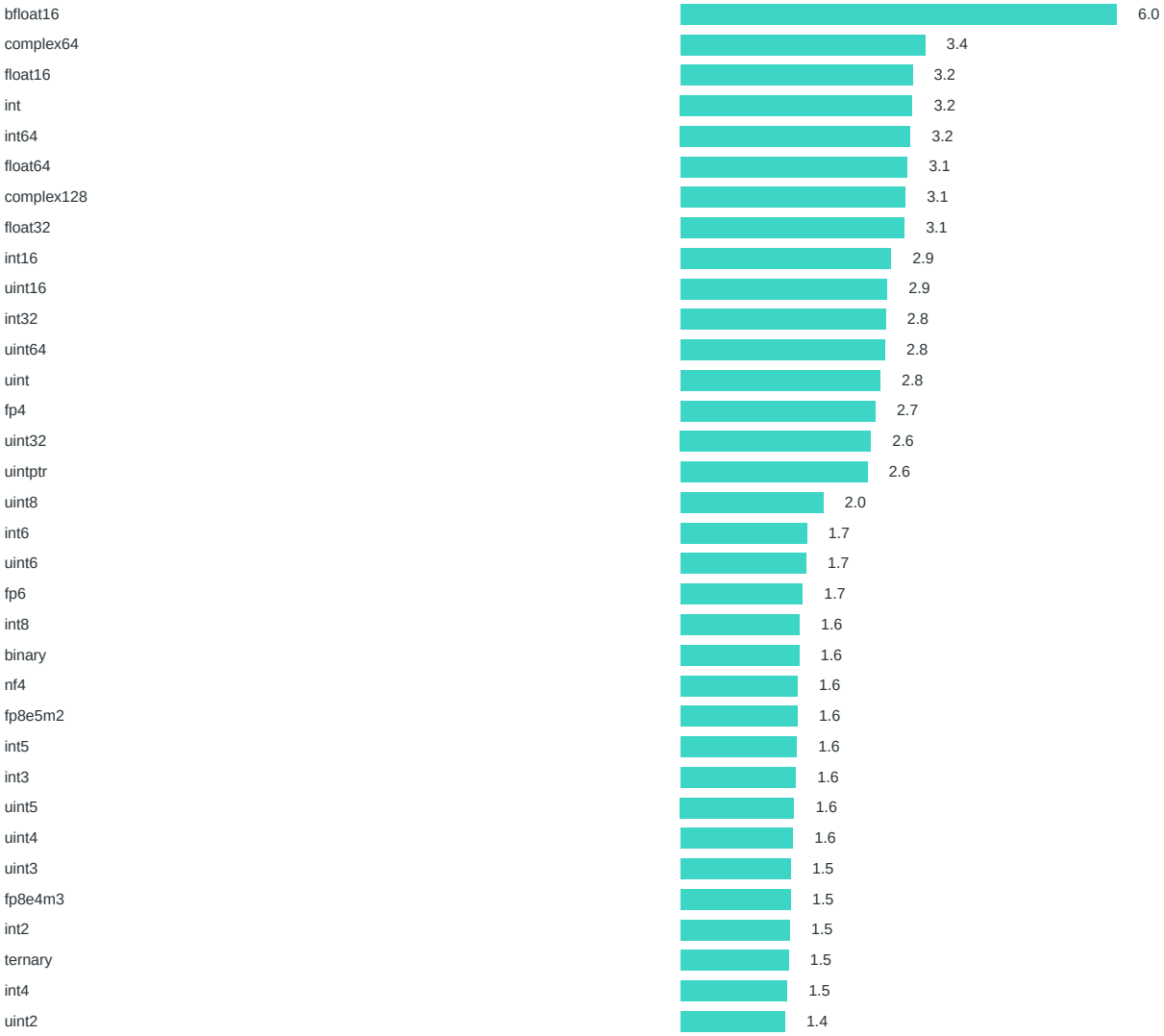
Mean Score by dtype



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	6	5	6	9	9	2	1	1	1	5
Mesh[T]	1	1	1	1	1	1	1	1	0	1	1	1
Mesh[T]Alt	3	0	0	0	1	1	0	1	0	0	0	0
Mesh[T]Chain	10	1	4	6	4	8	8	2	1	1	1	5
Mesh[T][S]	6	2	1	1	1	2	2	3	1	1	1	1
Mesh[T][S][FP]	7	2	1	1	2	3	2	3	1	1	1	2
Mesh[T][S]Sparse	8	8	3	2	4	4	5	7	1	2	3	3
Step[T]Alt	1	1	0	0	0	1	1	1	0	0	0	0
Step[T][S]	1	1	1	1	2	2	2	2	0	1	1	1
Step[T][S][FP]	1	1	1	1	1	2	1	2	1	1	1	1
Step[T][S][HP]	2	1	1	1	1	1	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]	3	3	1	2	2	2	3	4	1	1	2	2
Step[T][S][L]Cache	2	3	2	1	2	2	2	3	1	2	2	1
Step[T][S]Sparse	1	1	1	1	1	1	1	2	0	1	1	1
[T]Alt	3	0	0	0	1	0	0	1	0	0	0	0
[T][S]	9	2	1	1	1	2	2	3	1	1	1	1
[T][S][FP]	8	2	1	2	1	3	2	3	1	1	1	1
[T][S][HP]	9	2	1	2	2	2	2	3	1	1	2	1
[T][S][HP]Async	8	2	2	2	1	2	2	3	1	1	1	1
[T][S][L]	18	4	2	3	3	6	3	6	1	2	3	3
[T][S][L]Cache	16	4	2	2	6	5	4	7	1	2	3	2
[T][S]Sparse	5	5	2	3	3	7	3	8	2	3	3	3
sgd	11	1	4	6	7	11	7	2	1	1	2	6
step_sgd	13	2	7	8	7	15	11	3	1	1	2	6
step_tween	2	1	1	1	1	2	1	2	1	1	1	1
step_tween_chain	12	1	7	6	9	11	10	3	1	1	1	7
tween	1	1	0	1	1	1	1	2	0	0	1	1
tween_chain	10	1	4	6	5	11	9	2	1	1	1	5

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	6	1	1	5	1	1	1	6	3	1	1	3
Mesh[T]	1	1	0	1	1	0	0	1	1	1	1	1
Mesh[T]Alt	0	0	0	0	0	0	0	0	0	1	0	0
Mesh[T]Chain	6	1	1	5	2	1	1	5	2	1	1	4
Mesh[T][S]	2	2	1	2	2	1	1	1	3	1	1	2
Mesh[T][S][FP]	1	2	1	1	2	1	1	2	2	1	2	2
Mesh[T][S]Sparse	2	5	2	3	5	2	1	4	4	2	4	2
Step[T]Alt	0	1	0	0	1	0	0	0	1	0	0	0
Step[T][S]	1	1	1	1	1	1	0	1	2	1	1	1
Step[T][S][FP]	1	1	1	1	1	1	0	1	1	1	1	1
Step[T][S][HP]	1	1	1	1	1	1	0	1	1	1	1	1
Step[T][S][HP]Async	1	1	1	1	1	1	0	1	2	1	1	1
Step[T][S][L]	1	2	1	2	3	1	1	2	3	1	2	2
Step[T][S][L]Cache	2	4	1	2	3	1	1	2	2	2	3	1
Step[T][S]Sparse	1	1	1	1	1	1	1	1	1	1	1	1
[T]Alt	0	0	0	0	0	0	0	0	0	0	0	0
[T][S]	1	3	1	1	2	1	1	2	2	1	3	1
[T][S][FP]	2	1	1	1	2	1	1	1	2	1	2	1
[T][S][HP]	1	2	1	1	1	1	1	1	3	1	2	1
[T][S][HP]Async	1	1	1	2	2	1	1	1	2	1	2	2
[T][S][L]	3	3	2	3	4	2	1	3	3	2	3	4
[T][S][L]Cache	3	3	2	3	7	2	2	4	4	3	5	3
[T][S]Sparse	3	5	2	3	3	2	1	3	6	3	4	2
sgd	6	1	1	5	1	1	1	6	3	1	1	5
step_sgd	7	2	1	6	2	1	2	8	4	1	2	7
step_tween	1	1	1	1	1	0	1	1	1	1	1	1
step_tween_chain	7	2	1	7	1	1	1	9	3	1	1	4
tween	1	1	0	1	1	0	0	1	1	1	1	1
tween_chain	5	1	1	5	1	1	1	6	2	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	5	1	1	6	1	1	1	5	3	5
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	6	1	0	3	1	1	1	5	4	3
Mesh[T][S]	1	2	1	1	2	1	1	1	2	1
Mesh[T][S][FP]	2	1	1	1	2	1	1	1	2	2
Mesh[T][S]Sparse	3	3	2	2	4	1	1	3	4	2
Step[T]Alt	1	0	0	1	1	0	0	0	1	0
Step[T][S]	1	1	1	1	1	1	1	1	2	1
Step[T][S][FP]	1	1	1	1	1	0	1	1	1	1
Step[T][S][HP]	1	1	0	1	1	0	1	1	1	1
Step[T][S][HP]Async	1	1	1	1	1	1	0	1	1	1
Step[T][S][L]	2	2	1	2	2	1	1	2	4	1
Step[T][S][L]Cache	2	1	1	2	2	1	1	2	2	1
Step[T][S]Sparse	1	1	1	1	1	1	0	1	2	1
[T]Alt	0	0	0	0	0	0	0	0	0	0
[T][S]	2	1	1	2	2	1	1	2	3	1
[T][S][FP]	1	2	1	2	2	1	1	2	2	1
[T][S][HP]	1	1	1	2	1	1	1	1	2	1
[T][S][HP]Async	2	2	1	2	2	1	1	1	2	1
[T][S][L]	3	2	2	3	3	1	1	3	4	2
[T][S][L]Cache	3	2	2	3	3	1	2	3	5	2
[T][S]Sparse	3	2	3	3	3	3	1	2	4	3
sgd	6	1	1	4	1	1	1	4	8	5
step_sgd	8	1	1	6	2	1	2	8	2	6
step_tween	1	1	1	1	1	1	0	1	2	1
step_tween_chain	7	1	1	4	1	1	1	7	3	6
tween	1	1	0	1	1	0	0	1	1	1
tween_chain	5	1	1	5	1	1	1	6	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	1	11	9	9	8	10	3	2	2	2	9
Mesh[T]	2	2	2	2	1	1	2	3	1	2	2	2
Mesh[T]Alt	9	1	1	1	4	2	2	3	1	1	2	2
Mesh[T]Chain	14	2	8	12	8	8	10	2	2	2	2	10
Mesh[T][S]	5	2	2	2	1	1	1	3	2	1	1	2
Mesh[T][S][FP]	7	1	2	1	2	2	1	3	2	1	1	2
Mesh[T][S]Sparse	3	3	2	1	2	1	2	3	1	1	2	2
Step[T]Alt	2	2	2	2	1	1	2	2	2	2	1	2
Step[T][S]	2	1	2	2	2	1	2	3	1	2	2	2
Step[T][S][FP]	2	1	2	1	2	2	2	3	2	2	1	1
Step[T][S][HP]	2	1	2	2	2	1	1	3	1	1	1	1
Step[T][S][HP]Async	1	1	1	1	2	1	2	3	1	2	1	2
Step[T][S][L]	2	2	1	2	1	1	2	3	2	1	2	2
Step[T][S][L]Cache	2	1	2	1	2	1	1	2	2	2	2	1
Step[T][S]Sparse	2	2	1	1	2	1	2	3	1	2	2	2
[T]Alt	9	1	2	1	2	1	1	2	1	1	1	2
[T][S]	8	2	1	2	1	2	2	3	2	2	2	1
[T][S][FP]	7	2	2	2	1	2	2	3	2	2	1	1
[T][S][HP]	8	2	1	2	2	2	2	3	1	1	2	2
[T][S][HP]Async	7	1	2	2	2	2	2	3	1	1	1	2
[T][S][L]	8	2	2	2	2	2	1	3	1	2	2	2
[T][S][L]Cache	6	1	1	1	3	2	2	3	2	1	2	1
[T][S]Sparse	2	2	1	2	1	2	1	3	2	2	2	2
sgd	13	2	7	10	10	9	8	3	3	1	2	9
step_sgd	12	2	10	10	7	10	9	3	2	1	2	7
step_tween	2	2	1	2	2	1	1	3	2	1	2	2
step_tween_chain	12	1	10	9	10	8	9	3	2	1	2	9
tween	2	2	1	1	2	2	1	3	1	1	1	2
tween_chain	14	2	8	11	7	11	10	2	3	2	2	9

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

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

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	3	3	3	3	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	4	2	2	4	2	3	3	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	3	3	3	2	2	2	2	3
step_sgd	3	2	3	3	2	3	3	2	2	2	2	2
step_tween	2	2	2	2	2	2	2	2	2	2	2	2
step_tween_chain	3	2	3	3	3	2	3	2	2	2	2	3
tween	2	2	2	2	2	2	2	2	2	2	2	2
tween_chain	4	2	3	3	2	3	3	2	2	2	2	3

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	3	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	3	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	3	2	2	2	2
step_sgd	2	2	2	2	2	2	2	3	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	3	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	22	20	24	23	23	23	24	22	23	24	23	23
Mesh[T]	20	18	21	21	21	20	21	19	21	21	21	22
Mesh[T]Alt	15	13	16	16	15	15	16	14	16	16	15	16
Mesh[T]Chain	22	20	24	24	23	23	24	22	24	24	23	23
Mesh[T][S]	27	24	29	29	27	26	28	26	29	28	28	28
Mesh[T][S][FP]	27	25	29	28	27	26	28	26	28	29	28	28
Mesh[T][S]Sparse	35	35	37	36	36	35	36	36	37	37	36	36
Step[T]Alt	16	14	18	17	17	16	17	15	18	17	17	17
Step[T][S]	23	22	25	24	24	23	24	23	25	25	24	25
Step[T][S][FP]	23	22	25	24	23	22	24	22	24	25	24	25
Step[T][S][HP]	22	20	24	24	23	23	23	22	24	24	23	24
Step[T][S][HP]Async	23	21	25	25	24	23	24	22	25	25	24	24
Step[T][S][L]	30	29	30	31	31	30	30	29	30	30	30	30
Step[T][S][L]Cache	30	30	31	30	30	30	30	29	30	31	30	30
Step[T][S]Sparse	23	22	25	24	24	23	24	22	24	25	24	24
[T]Alt	15	13	16	16	15	15	16	14	16	16	15	16
[T][S]	27	25	29	29	27	26	27	26	29	29	27	29
[T][S][FP]	27	25	28	29	27	27	28	26	29	28	28	29
[T][S][HP]	27	24	29	29	27	26	28	26	29	28	27	28
[T][S][HP]Async	27	24	29	29	27	26	28	26	28	28	27	28
[T][S][L]	35	31	35	36	35	36	36	36	34	34	35	36
[T][S][L]Cache	37	36	37	37	37	36	37	36	36	36	36	37
[T][S]Sparse	36	35	36	37	36	36	36	36	37	36	36	36
sgd	23	21	25	24	24	24	24	22	24	24	24	25
step_sgd	26	24	27	29	27	26	28	25	27	27	27	28
step_tween	22	20	24	24	23	23	24	22	24	24	23	24
step_tween_chain	26	23	27	27	26	26	27	25	27	27	26	28
tween	21	18	21	21	21	21	21	20	21	21	21	21
tween_chain	23	20	24	24	23	23	24	22	24	23	24	24

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	24	21	24	24	21	24	24	24	23	23	20	24
Mesh[T]	21	19	21	21	19	21	21	21	20	20	18	21
Mesh[T]Alt	16	13	16	16	14	16	16	16	15	16	12	16
Mesh[T]Chain	24	21	24	23	21	23	24	23	22	23	20	23
Mesh[T][S]	28	24	28	28	25	29	29	28	26	28	24	29
Mesh[T][S][FP]	29	24	29	28	25	29	29	29	26	28	24	28
Mesh[T][S]Sparse	36	35	37	36	35	36	36	36	35	36	35	36
Step[T]Alt	18	14	17	17	14	17	17	17	16	17	13	17
Step[T][S]	25	22	25	25	22	25	25	24	23	24	21	24
Step[T][S][FP]	24	21	24	24	22	25	25	24	22	24	21	24
Step[T][S][HP]	24	20	24	24	21	24	24	24	22	23	19	23
Step[T][S][HP]Async	25	21	25	24	21	25	25	24	23	24	21	25
Step[T][S][L]	30	29	30	30	30	30	30	30	30	30	29	31
Step[T][S][L]Cache	30	29	30	31	30	30	30	30	29	29	29	31
Step[T][S]Sparse	24	21	25	24	21	25	25	24	22	24	21	24
[T]Alt	16	13	16	16	13	16	16	16	14	15	13	16
[T][S]	28	24	29	28	25	29	29	28	26	28	25	28
[T][S][FP]	29	24	29	28	25	28	29	28	26	28	24	28
[T][S][HP]	28	24	29	28	24	29	29	28	26	28	24	28
[T][S][HP]Async	29	24	28	28	25	29	29	28	26	28	25	28
[T][S][L]	35	33	35	35	34	34	34	36	34	34	31	36
[T][S][L]Cache	37	35	37	37	36	36	36	37	36	36	35	37
[T][S]Sparse	37	35	37	37	35	36	36	36	36	37	35	37
sgd	25	21	24	25	22	24	24	24	23	24	21	24
step_sgd	28	24	28	28	24	27	28	28	26	27	23	28
step_tween	24	20	24	23	21	24	24	23	22	24	20	24
step_tween_chain	28	23	27	28	24	27	27	28	25	27	22	27
tween	21	18	21	21	18	21	21	21	20	21	18	21
tween_chain	24	21	24	24	21	24	24	24	23	23	21	24

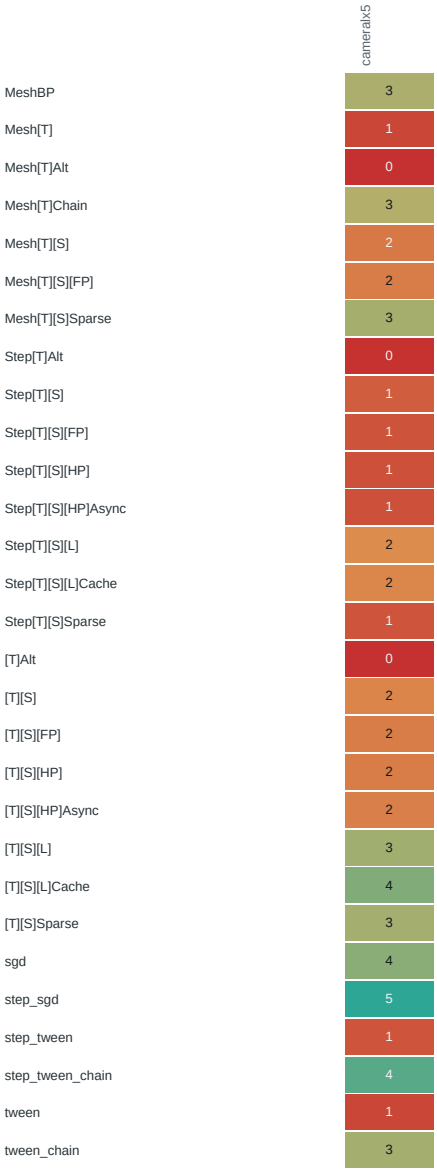
Honesty - mean Avail, every mode x dtype (cols 25-34)

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

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	23	23	24	23	24	23	23	24	23	24
Mesh[T]	20	21	21	21	21	21	21	21	21	21
Mesh[T]Alt	15	15	15	15	16	16	16	15	15	16
Mesh[T]Chain	23	23	24	23	23	23	23	23	23	24
Mesh[T][S]	28	27	28	28	28	28	28	27	27	28
Mesh[T][S][FP]	28	28	28	28	27	28	29	27	26	29
Mesh[T][S]Sparse	36	36	37	36	36	37	37	36	36	36
Step[T]Alt	17	17	17	17	17	17	17	17	16	17
Step[T][S]	24	24	24	24	24	24	25	24	24	25
Step[T][S][FP]	24	24	24	24	24	25	24	24	23	24
Step[T][S][HP]	24	23	23	23	24	24	24	24	23	23
Step[T][S][HP]Async	24	24	24	24	24	24	25	24	23	24
Step[T][S][L]	30	30	30	31	30	30	30	31	30	30
Step[T][S][L]Cache	31	30	30	30	30	31	30	30	30	30
Step[T][S]Sparse	24	24	24	24	24	24	25	24	23	24
[T]Alt	16	15	16	15	16	16	15	15	15	15
[T][S]	28	28	28	27	28	28	29	28	26	28
[T][S][FP]	28	28	28	28	28	28	29	28	27	28
[T][S][HP]	28	28	28	28	27	29	28	28	27	28
[T][S][HP]Async	28	27	28	28	28	28	28	28	27	28
[T][S][L]	35	35	34	35	36	34	34	36	34	35
[T][S][L]Cache	37	36	36	37	37	36	37	37	36	37
[T][S]Sparse	36	36	37	36	36	37	36	36	36	36
sgd	24	24	23	24	24	24	24	24	24	24
step_sgd	27	27	27	28	27	27	27	27	27	27
step_tween	24	23	23	23	23	23	23	23	23	24
step_tween_chain	27	27	27	27	27	27	27	27	26	27
tween	21	21	21	21	21	21	21	21	21	21
tween_chain	24	24	23	24	23	24	24	24	23	24

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

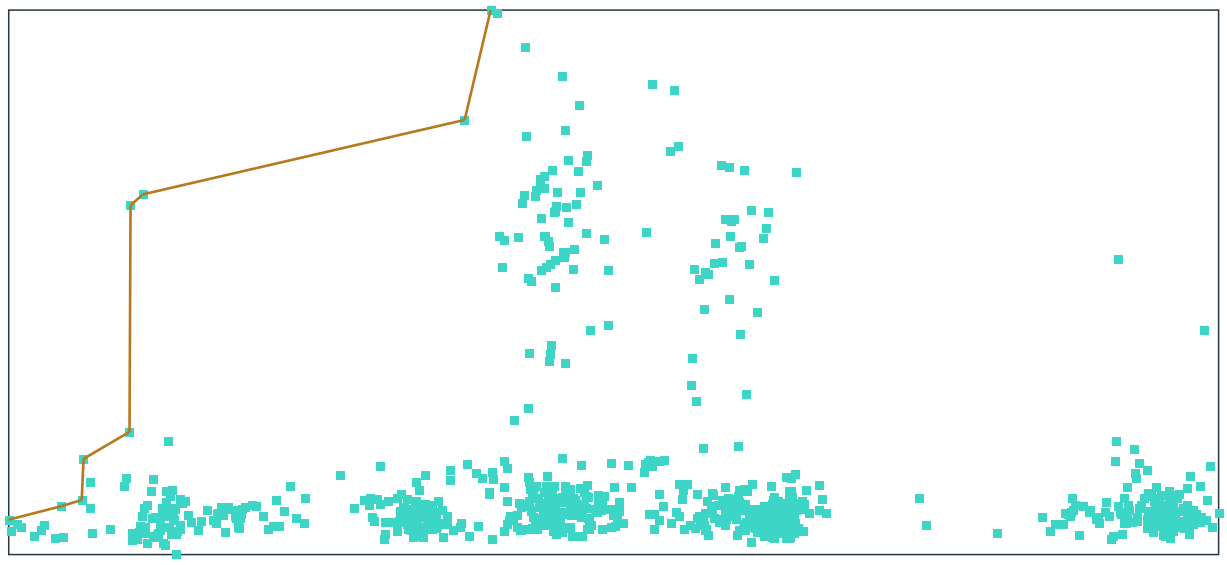


Mean Avail, every mode x arch

Mean Avail, every mode x arch

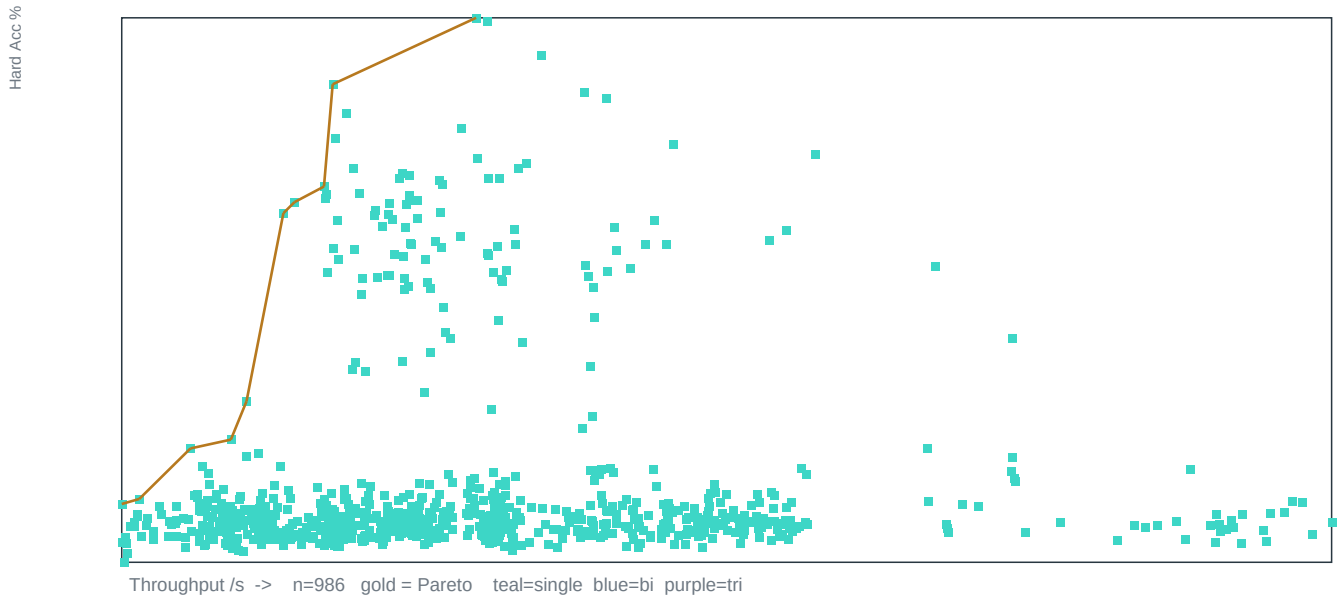
	cameralx5
MeshBP	23
Mesh[T]	20
Mesh[T]Alt	15
Mesh[T]Chain	23
Mesh[T][S]	27
Mesh[T][S][FP]	27
Mesh[T][S]Sparse	36
Step[T]Alt	17
Step[T][S]	24
Step[T][S][FP]	24
Step[T][S][HP]	23
Step[T][S][HP]Async	24
Step[T][S][L]	30
Step[T][S][L]Cache	30
Step[T][S]Sparse	24
[T]Alt	15
[T][S]	28
[T][S][FP]	28
[T][S][HP]	27
[T][S][HP]Async	27
[T][S][L]	35
[T][S][L]Cache	37
[T][S]Sparse	36
sgd	24
step_sgd	27
step_tween	23
step_tween_chain	26
tween	21
tween_chain	23

Pillars - Availability vs hard Acc

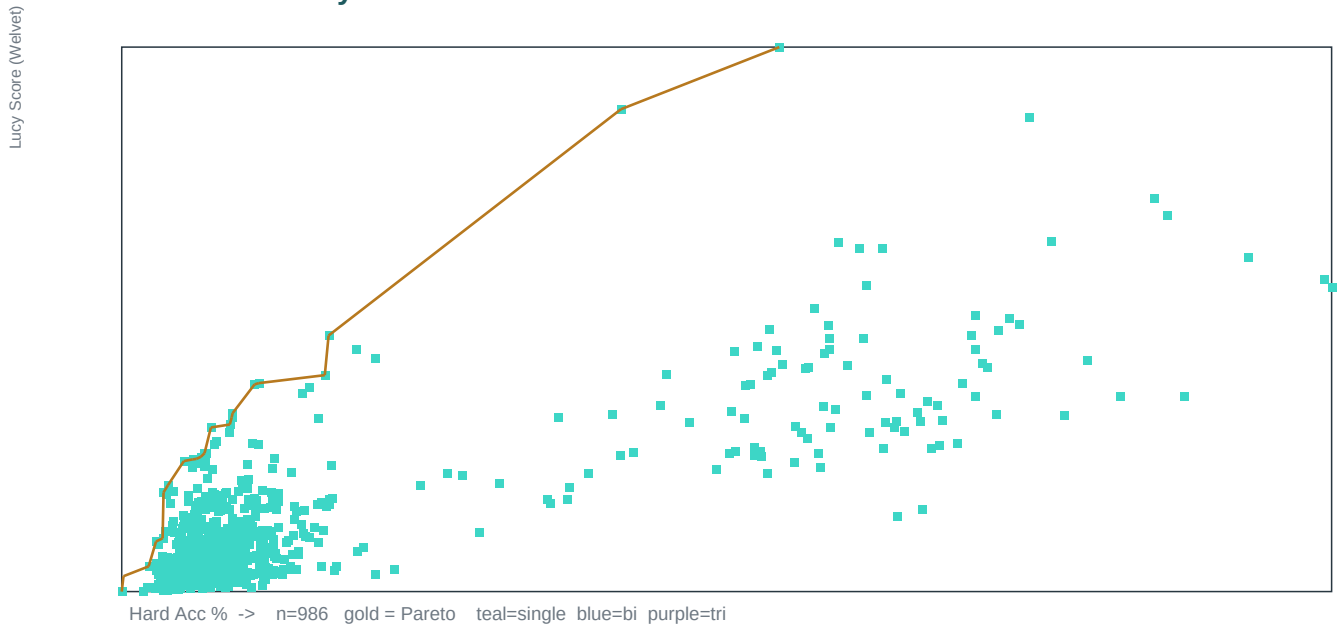



Availability % -> n=986 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

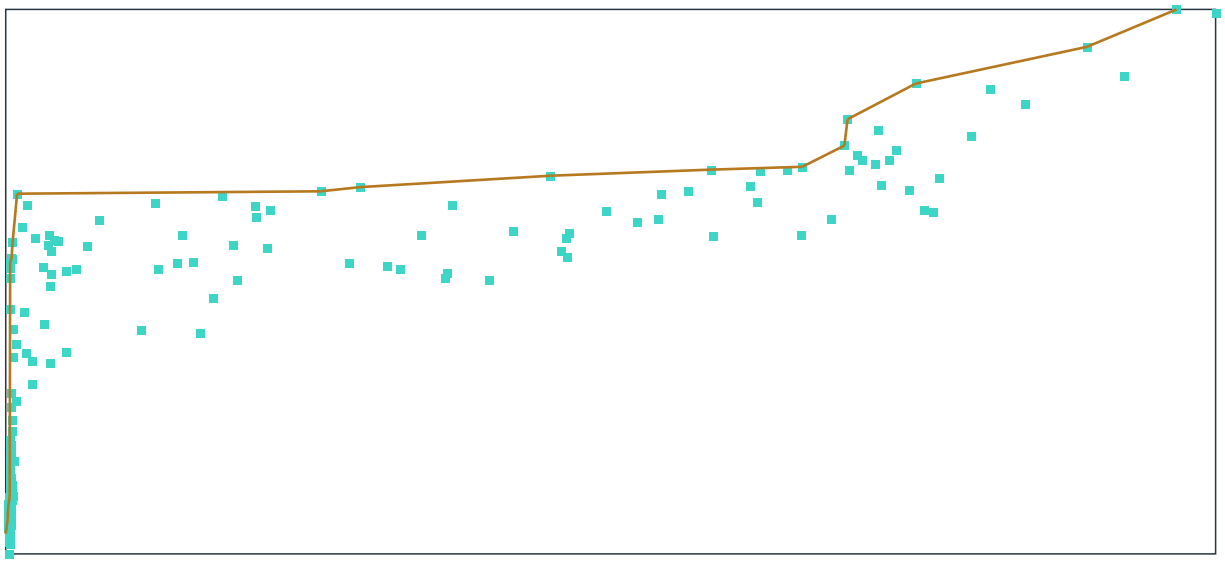
Pillars - Throughput vs hard Acc



Pareto - hard Acc vs Lucy Score

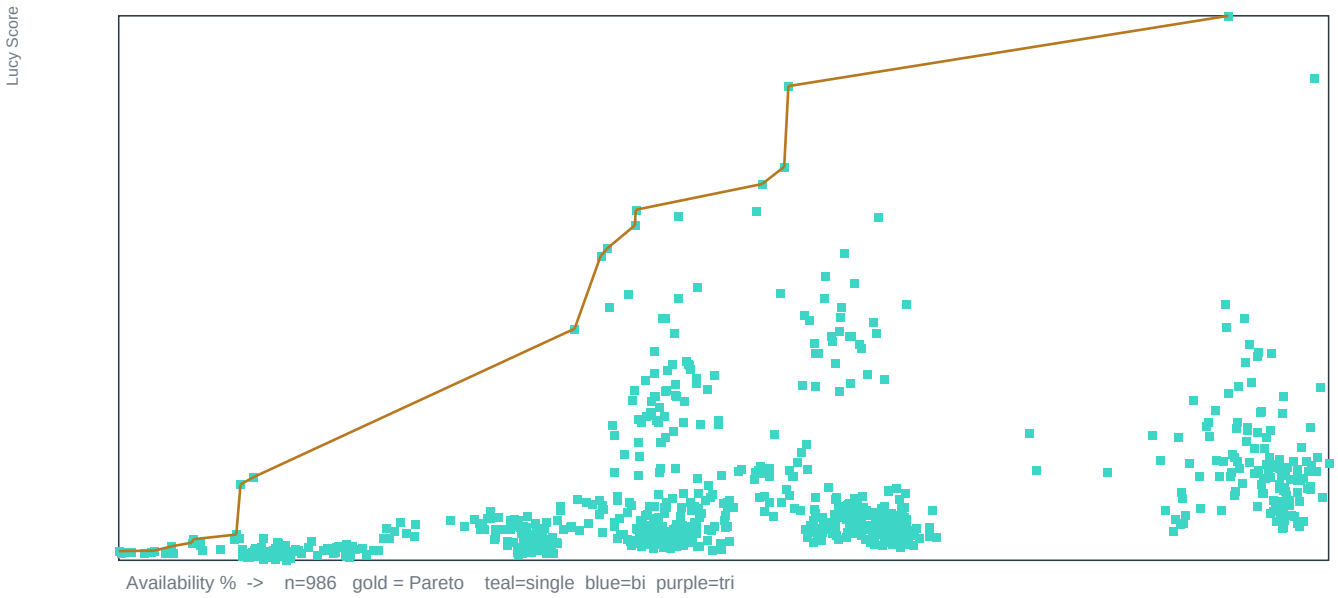


SoftAcc (serve-confidence) vs hard Acc




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

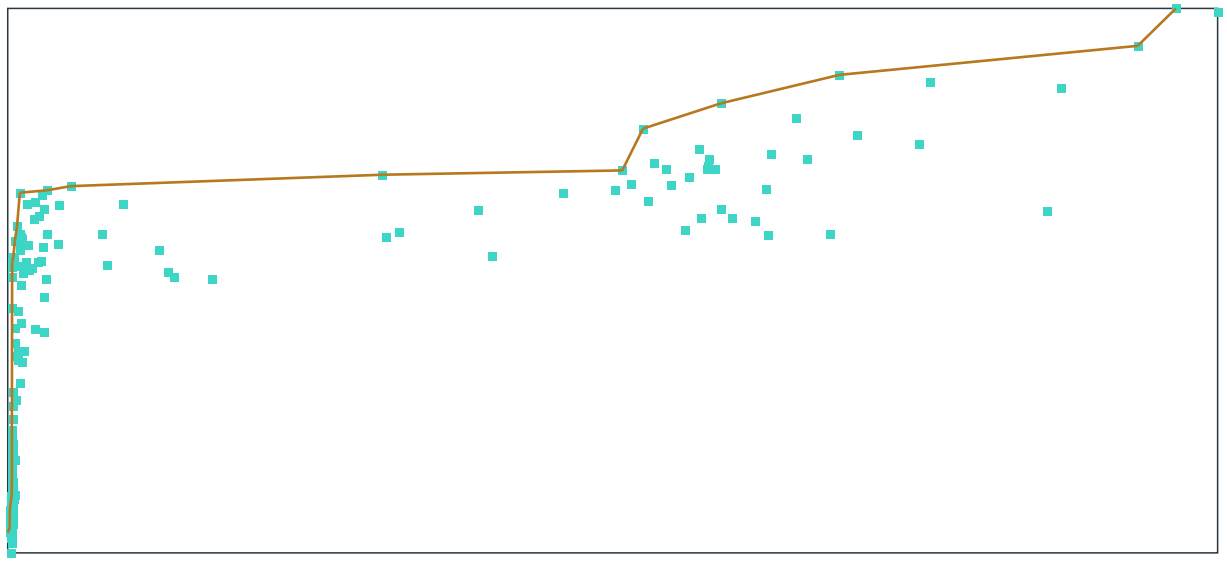
Avail vs Lucy Score (duty clock)



Pillars - Throughput vs Availability



AdaptPct vs hard Acc



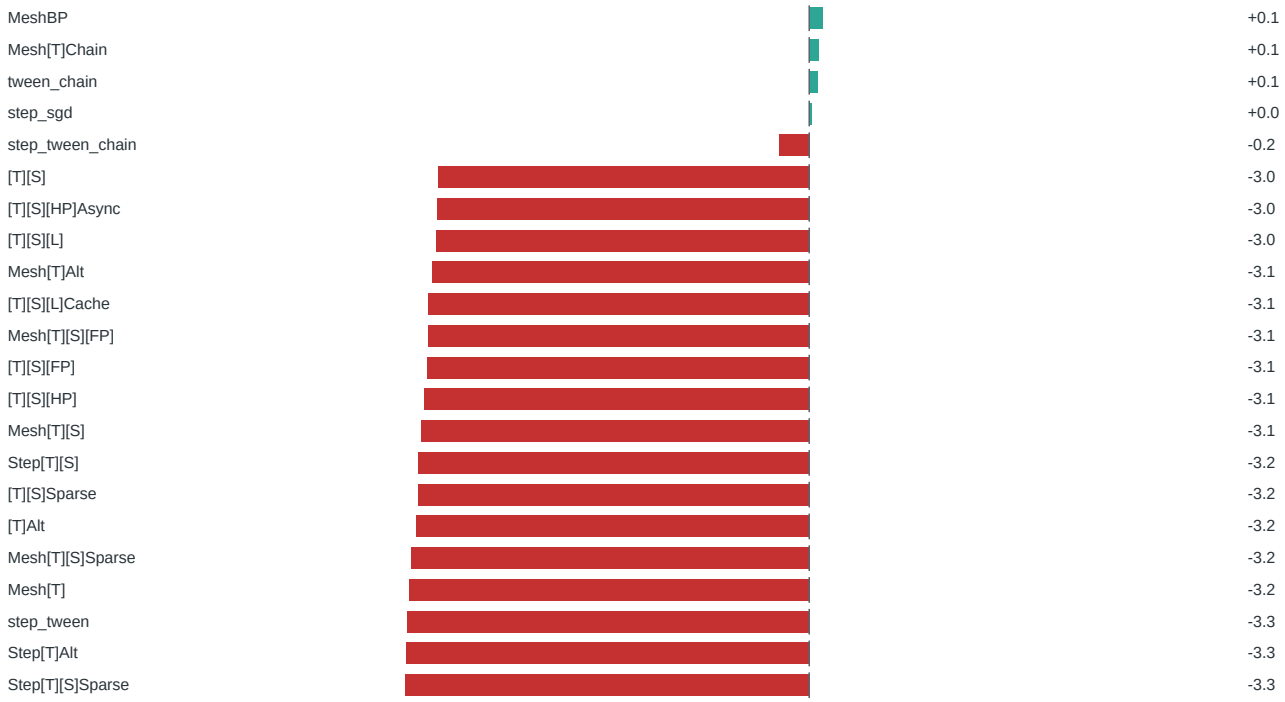

AdaptPct % -> n=986 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

vs sgd - matched dtype x format x arch

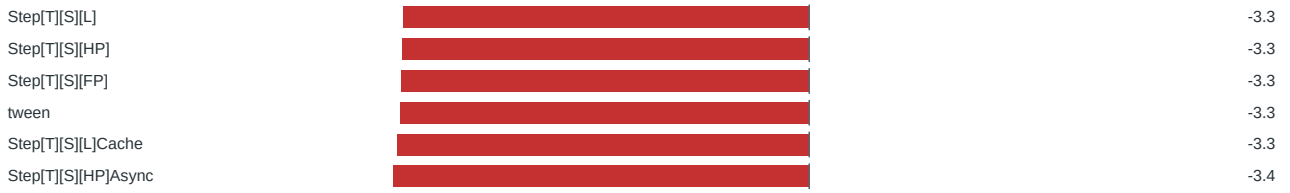
AccDelta is the honest column. ScoreDelta is usually Availability (duty clock), not a better chain rule. Acc win = AccDelta > 0.5. Score win = ScoreDelta > 1. Baseline is discovered from the board, not a frozen StepBP list.

mode	n	AccD	Acc win%	SoftD	AvailD	ThruD	ScoreD	Score win%
MeshBP	34	+0.1	26	+0.1	-0.6	-22	-0.4	12
Mesh[T]Chain	34	+0.1	35	+0.1	-0.8	-26	-0.5	0
tween_chain	34	+0.1	26	+0.1	-0.4	-16	-0.3	6
step_sgd	34	+0.0	26	+0.0	+3.2	+49	+1.1	44
step_tween_chain	34	-0.2	24	+0.0	+2.6	+35	+0.6	29
[T][S]	34	-3.0	9	-0.3	+3.9	+52	-1.8	9
[T][S][HP]Async	34	-3.0	9	-0.3	+3.7	+40	-1.9	9
[T][S][L]	34	-3.0	3	-0.3	+11.1	+214	-0.2	32
Mesh[T]Alt	34	-3.1	3	-0.3	-8.5	-140	-3.1	0
[T][S][L]Cache	34	-3.1	3	-0.3	+12.9	+259	+0.1	44
Mesh[T][S][FP]	34	-3.1	3	-0.3	+3.8	+43	-1.9	6
[T][S][FP]	34	-3.1	9	-0.3	+3.9	+46	-1.9	9
[T][S][HP]	34	-3.1	0	-0.3	+3.8	+47	-1.9	0
Mesh[T][S]	34	-3.1	6	-0.3	+3.7	+41	-2.0	6
Step[T][S]	34	-3.2	6	-0.3	+0.3	-9	-2.4	0
[T][S]Sparse	34	-3.2	12	-0.3	+12.5	+249	-0.3	44
[T]Alt	34	-3.2	0	-0.3	-8.4	-136	-3.1	0
Mesh[T][S]Sparse	34	-3.2	6	-0.3	+12.4	+244	-0.3	29
Mesh[T]	34	-3.2	15	-0.3	-3.2	-63	-2.8	0
step_tween	34	-3.3	3	-0.3	-0.6	-20	-2.6	0
Step[T]Alt	34	-3.3	9	-0.3	-7.1	-120	-3.1	0
Step[T][S]Sparse	34	-3.3	9	-0.3	-0.0	-23	-2.6	0
Step[T][S][L]	34	-3.3	0	-0.3	+6.4	+105	-1.7	15
Step[T][S][HP]	34	-3.3	3	-0.3	-0.7	-31	-2.6	0
Step[T][S][FP]	34	-3.3	3	-0.3	-0.0	-20	-2.6	0
tween	34	-3.3	3	-0.3	-3.0	-55	-2.8	0
Step[T][S][L]Cache	34	-3.3	6	-0.3	+6.4	+104	-1.8	15
Step[T][S][HP]Async	34	-3.4	6	-0.3	+0.0	-20	-2.6	0

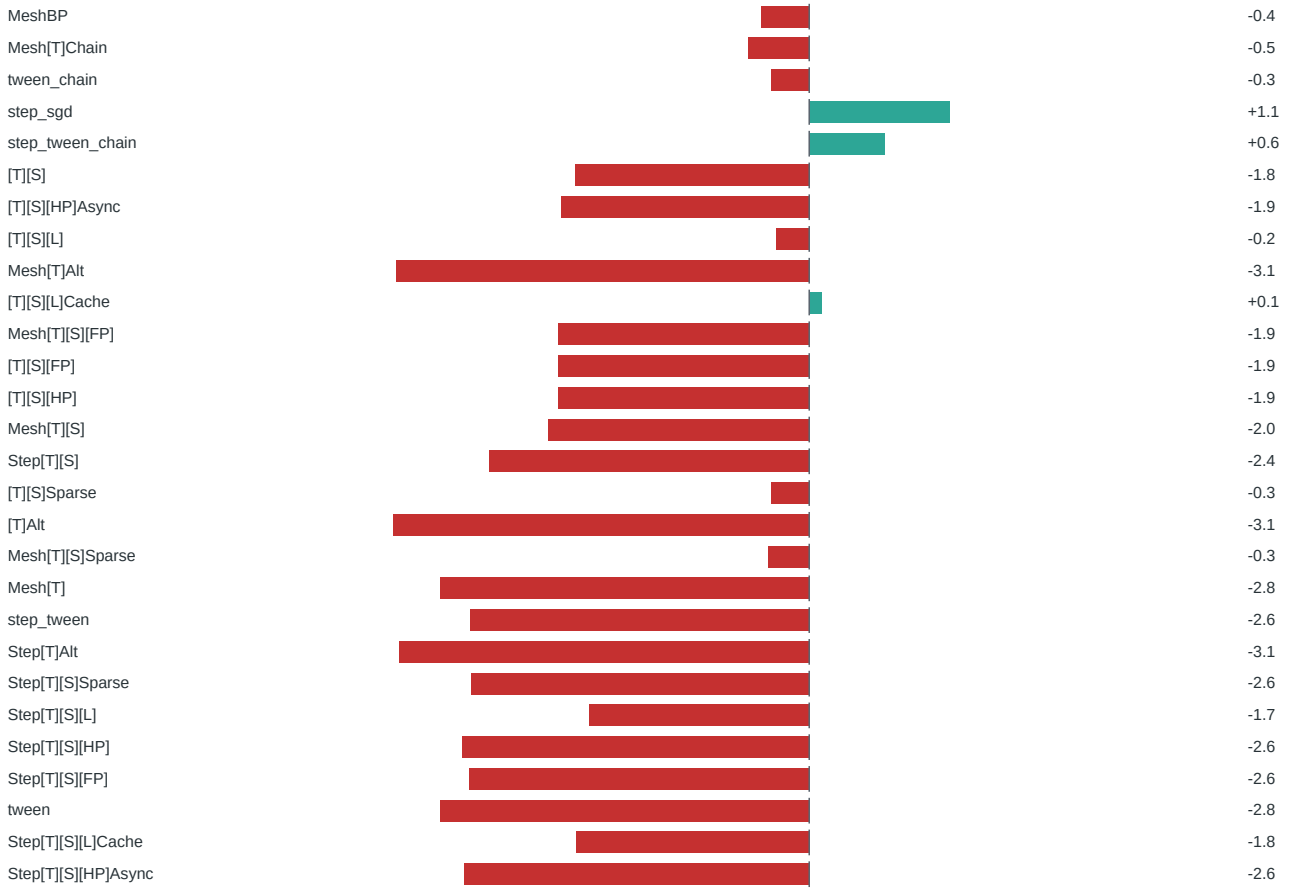
mean AccD vs sgd



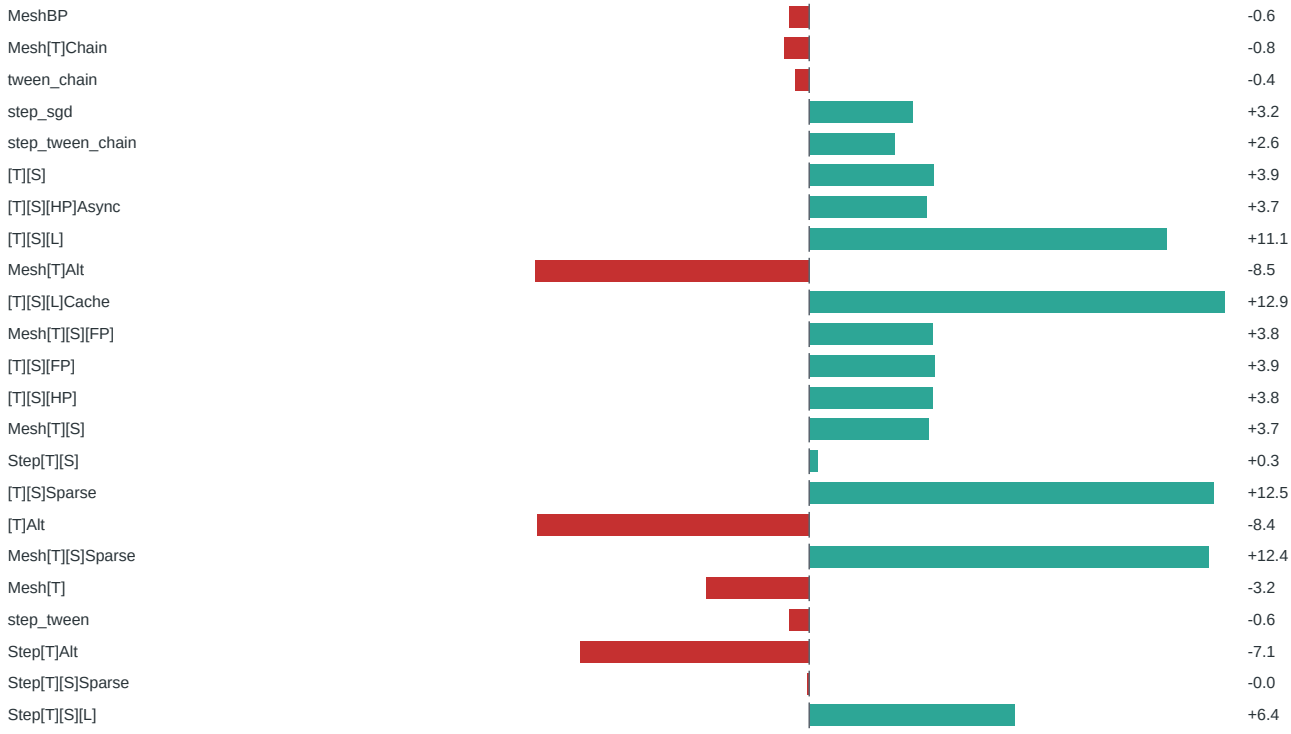
mean AccD vs sgd



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

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

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

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	-1	-0	-1	+0	-1	-1	-1	-0	-1
Mesh[T]	-3	-2	-4	-4	-3	-4	-3	-3	-4	-3	-3	-3
Mesh[T]Alt	-8	-8	-9	-8	-9	-9	-8	-8	-8	-9	-9	-9
Mesh[T]Chain	-1	-1	-1	-0	-1	-1	-0	-1	-1	-1	-1	-1
Mesh[T][S]	+3	+4	+4	+4	+4	+2	+4	+3	+5	+4	+4	+4
Mesh[T][S][FP]	+4	+4	+4	+4	+4	+2	+4	+3	+4	+4	+4	+4
Mesh[T][S]Sparse	+12	+15	+12	+12	+13	+11	+12	+13	+12	+13	+12	+12
Step[T]Alt	-7	-7	-7	-7	-7	-8	-7	-7	-7	-7	-7	-7
Step[T][S]	+0	+1	-0	+0	+1	-1	+0	+0	+0	+1	+0	+0
Step[T][S][FP]	-0	+1	-0	+0	-0	-2	+0	-0	+0	+0	+0	+0
Step[T][S][HP]	-1	-1	-1	-0	-0	-1	-1	-1	-0	-1	-1	-1
Step[T][S][HP]Async	-0	-0	-0	+0	+0	-1	+0	-0	+0	+1	+0	-0
Step[T][S][L]	+7	+9	+5	+6	+7	+6	+6	+7	+6	+6	+7	+6
Step[T][S][L]Cache	+7	+9	+6	+6	+7	+6	+6	+7	+6	+6	+6	+6
Step[T][S]Sparse	+0	+1	-0	-0	+0	-1	+0	-0	-0	+1	-0	-0
[T]Alt	-8	-8	-9	-8	-8	-9	-8	-8	-8	-9	-8	-9
[T][S]	+4	+4	+4	+4	+3	+2	+4	+3	+5	+4	+3	+4
[T][S][FP]	+4	+4	+3	+5	+4	+3	+4	+3	+5	+4	+4	+4
[T][S][HP]	+4	+4	+4	+4	+4	+2	+4	+3	+5	+4	+4	+4
[T][S][HP]Async	+3	+4	+4	+4	+3	+2	+4	+3	+4	+4	+3	+4
[T][S][L]	+12	+11	+11	+12	+12	+12	+12	+13	+10	+10	+11	+11
[T][S][L]Cache	+14	+15	+12	+13	+14	+12	+13	+13	+12	+12	+13	+13
[T][S]Sparse	+13	+15	+12	+13	+13	+12	+12	+13	+12	+12	+12	+12
step_sgd	+3	+3	+3	+4	+3	+2	+4	+3	+3	+3	+4	+4
step_tween	-1	-1	-1	-1	-0	-1	-0	-0	-0	-1	-0	-1
step_tween_chain	+3	+2	+2	+3	+3	+2	+3	+2	+3	+3	+2	+3
tween	-3	-3	-4	-3	-2	-3	-3	-2	-3	-3	-3	-4
tween_chain	-1	-1	-1	-0	-0	-1	+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	-1	-0	-1	-1	-1	-0	-1	-0	-0	-1	-1	-0
Mesh[T]	-4	-2	-3	-3	-3	-3	-3	-3	-3	-4	-3	-3
Mesh[T]Alt	-9	-8	-9	-9	-8	-9	-8	-9	-9	-8	-8	-8
Mesh[T]Chain	-1	-0	-0	-1	-1	-1	-1	-1	-1	-1	-0	-1
Mesh[T][S]	+3	+3	+4	+3	+3	+5	+5	+4	+3	+3	+3	+4
Mesh[T][S][FP]	+4	+3	+4	+3	+3	+5	+4	+4	+2	+4	+4	+4
Mesh[T][S]Sparse	+12	+14	+12	+11	+13	+12	+12	+12	+12	+12	+14	+12
Step[T]Alt	-7	-7	-7	-8	-8	-7	-7	-7	-7	-7	-7	-7
Step[T][S]	+0	+1	+0	+0	-0	+1	+1	-0	-0	-0	+1	+0
Step[T][S][FP]	-1	-0	+0	-1	-0	+1	+1	-0	-1	-0	+0	-0
Step[T][S][HP]	-1	-1	-0	-1	-1	-0	-0	-1	-1	-1	-1	-1
Step[T][S][HP]Async	-0	-0	+0	-1	-1	+1	+0	-0	-1	-0	+1	+0
Step[T][S][L]	+5	+8	+6	+6	+8	+6	+6	+6	+7	+6	+8	+7
Step[T][S][L]Cache	+5	+8	+5	+6	+8	+6	+6	+6	+6	+5	+8	+7
Step[T][S]Sparse	-1	+0	+0	-1	-1	+1	+1	-0	-2	-0	+1	-0
[T]Alt	-9	-8	-8	-9	-9	-8	-8	-8	-9	-9	-8	-8
[T][S]	+4	+3	+4	+4	+3	+5	+5	+4	+3	+4	+4	+4
[T][S][FP]	+4	+3	+4	+3	+3	+4	+5	+4	+3	+4	+3	+4
[T][S][HP]	+3	+3	+4	+3	+2	+4	+5	+4	+3	+4	+4	+4
[T][S][HP]Async	+4	+3	+4	+3	+3	+4	+5	+4	+3	+4	+4	+4
[T][S][L]	+11	+12	+10	+11	+12	+10	+10	+12	+11	+10	+11	+12
[T][S][L]Cache	+12	+13	+12	+13	+14	+12	+12	+13	+13	+12	+15	+13
[T][S]Sparse	+12	+14	+12	+12	+13	+12	+12	+12	+12	+12	+14	+12
step_sgd	+3	+3	+3	+3	+2	+3	+4	+4	+3	+3	+2	+4
step_tween	-1	-1	-0	-1	-1	-0	-0	-1	-1	-0	-1	-0
step_tween_chain	+3	+2	+3	+3	+2	+3	+3	+3	+2	+3	+2	+2
tween	-3	-3	-3	-4	-4	-3	-3	-4	-3	-3	-3	-3
tween_chain	-1	-0	-1	-1	-1	-0	-0	-0	-0	-1	+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	-1	+0	-1	+0	-1	-1	-0	-1	-0
Mesh[T]	-4	-3	-3	-3	-3	-4	-3	-3	-3	-3
Mesh[T]Alt	-9	-8	-8	-9	-8	-9	-8	-8	-9	-8
Mesh[T]Chain	-1	-1	+0	-1	-1	-1	-0	-0	-1	-0
Mesh[T][S]	+3	+3	+5	+3	+4	+4	+4	+4	+3	+4
Mesh[T][S][FP]	+4	+4	+5	+4	+4	+4	+5	+4	+3	+5
Mesh[T][S]Sparse	+12	+12	+13	+12	+12	+13	+13	+13	+12	+12
Step[T]Alt	-7	-7	-7	-8	-6	-8	-7	-7	-7	-7
Step[T][S]	+0	-0	+1	-0	+0	+0	+1	+0	+0	+1
Step[T][S][FP]	-0	+0	+1	-0	+0	+0	+0	+0	-1	-0
Step[T][S][HP]	-1	-1	-0	-1	+0	-1	-0	-0	-0	-1
Step[T][S][HP]Async	+0	-0	+1	+0	+0	+0	+1	+0	-1	+0
Step[T][S][L]	+6	+6	+6	+6	+7	+6	+6	+7	+6	+6
Step[T][S][L]Cache	+7	+6	+7	+6	+7	+6	+6	+7	+6	+6
Step[T][S]Sparse	-0	-0	+1	-1	+1	-0	+1	-0	-0	-0
[T]Alt	-8	-9	-8	-9	-8	-9	-8	-8	-8	-9
[T][S]	+4	+4	+5	+3	+5	+4	+5	+4	+3	+4
[T][S][FP]	+4	+4	+5	+4	+4	+4	+5	+4	+3	+4
[T][S][HP]	+4	+4	+5	+3	+4	+4	+5	+4	+3	+4
[T][S][HP]Async	+4	+3	+4	+3	+4	+4	+4	+4	+3	+4
[T][S][L]	+11	+11	+11	+11	+12	+10	+10	+12	+11	+11
[T][S][L]Cache	+13	+13	+13	+12	+14	+12	+13	+13	+13	+13
[T][S]Sparse	+12	+12	+13	+12	+13	+13	+12	+12	+12	+12
step_sgd	+3	+3	+4	+3	+4	+3	+4	+4	+4	+3
step_tween	-0	-1	-0	-1	-0	-1	-0	-1	-0	-0
step_tween_chain	+3	+3	+3	+2	+3	+3	+3	+4	+3	+3
tween	-3	-3	-2	-3	-3	-3	-3	-3	-3	-3
tween_chain	-0	-0	-0	-1	-0	-1	-0	+0	-0	-0

AccD vs sgd, every mode x arch

AccD vs sgd, every mode x arch



Family collapse - Step* vs non-Step

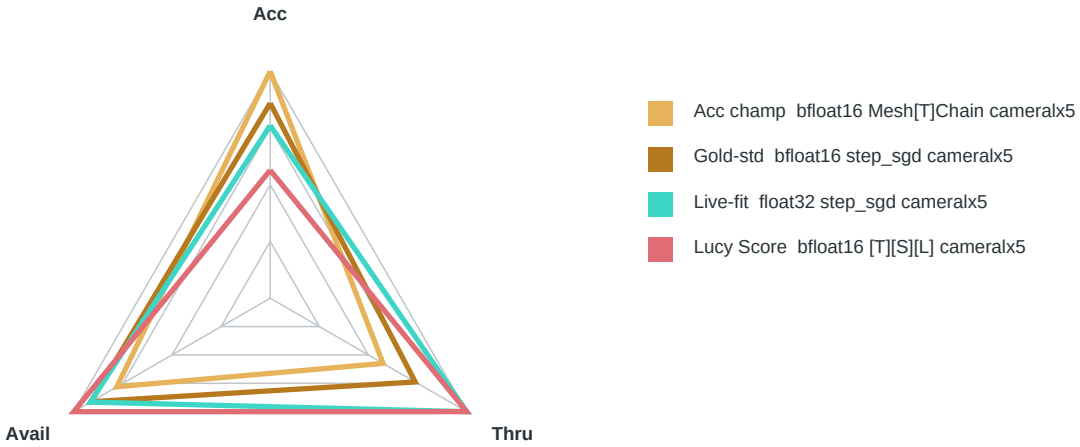
Step* is a 1D pipe (one sample enters layer 0 per tick; output is the sample that entered depth ticks ago). Non-Step of the same family is a full-chain update. AccD is a real scheduler split, not leftover warm-up forwards.

step	plain	n	mean |AccD|
Step[T]Alt	[T]Alt	34	0.56
Step[T][S]	[T][S]	34	0.60
Step[T][S][FP]	[T][S][FP]	34	0.51
Step[T][S][HP]	[T][S][HP]	34	0.48
Step[T][S][HP]Async	[T][S][HP]Async	34	0.53
Step[T][S][L]	[T][S][L]	34	0.46
Step[T][S][L]Cache	[T][S][L]Cache	34	0.50
Step[T][S]Sparse	[T][S]Sparse	34	0.30
step_sgd	sgd	34	1.02
step_tween	tween	34	0.31
step_tween_chain	tween_chain	34	0.95

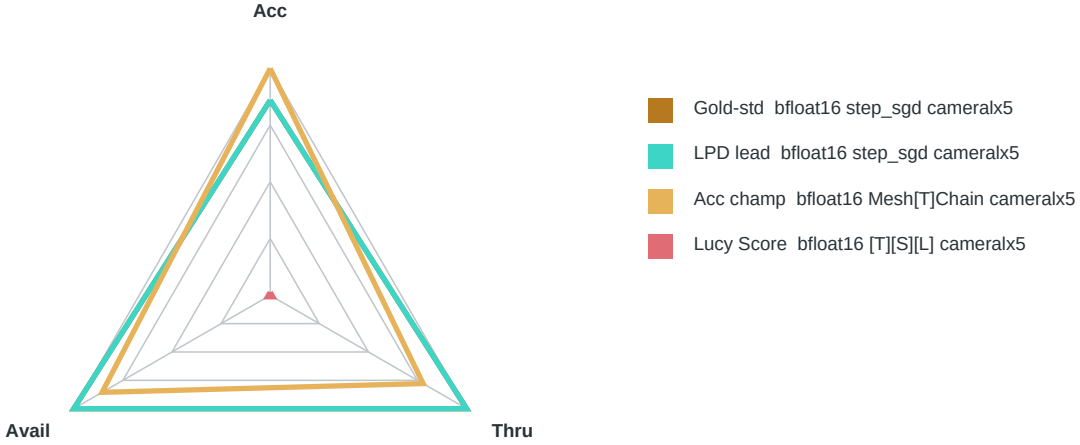
Consciousness - Acc, Throughput, Availability

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|cameralx5|simd Acc 13.7 Thru 323 Avail 22.4% 188.2 KiB (RAM reference)
Lucy Score champ (T x Avail x Acc) bfloat16|none|[T][S][L]|cameralx5|simd Score 17.7 Acc 7.7 Soft 2 188.2 KiB
Live-fit champ (best Q) float32|none|step_sgd|cameralx5|simd Acc 10.4 Thru 562 Avail 26.3% 376.4 KiB
Gold-std (2+ pillars, Acc keep >= 80%, then smallest then fastest): bfloat16|none|step_sgd|cameralx5|simd mode step_sgd Acc 11.8 Thru 415 188.2 KiB
Board fastest float32|none|[T][S][L]Cache|cameralx5|simd Thru 928 (traps may own this) Best availability int32|none|[T][S][L]Cache|cameralx5|simd 37.4%
Learner Thru peak 562 learner Avail peak 28.7%

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	11.8	188.2	415	bfloat16 step_sgd cameralx5
step_tween_chain	1	11.9	188.2	399	bfloat16 step_tween_chain cameralx5

Mode	n	Acc	KiB	Thru	Cell
sgd	1	12.8	188.2	369	bfloat16 sgd cameralx5
tween_chain	1	11.4	752.8	231	complex64 tween_chain cameralx5
Mesh[T]Chain	1	12.1	752.8	222	complex64 Mesh[T]Chain cameralx5

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 cameralx5	86	74	91	83	100	1.0	0.83	11.8	415	188.2
keep	bfloat16 step_tween_chain cameralx5	87	71	90	82	100	1.0	0.82	11.9	399	188.2
keep	bfloat16 sgd cameralx5	93	66	81	79	100	1.0	0.79	12.8	369	188.2
acc	bfloat16 tween_chain cameralx5	99	59	79	77	100	1.0	0.77	13.6	331	188.2
acc	bfloat16 Mesh[T]Chain cameralx5	100	57	78	77	100	1.0	0.77	13.7	323	188.2
-	float16 step_tween_chain cameralx5	75	58	91	73	100	1.0	0.73	10.3	324	188.2
acc	bfloat16 MeshBP cameralx5	81	56	76	70	100	1.0	0.70	11.0	313	188.2
-	float16 sgd cameralx5	71	53	82	68	100	1.0	0.68	9.7	299	188.2
-	float32 step_sgd cameralx5	76	100	92	89	200	0.5	0.44	10.4	562	376.4
-	float32 tween_chain cameralx5	78	82	81	80	200	0.5	0.40	10.7	462	376.4
-	int64 step_tween_chain cameralx5	72	59	96	74	400	0.2	0.19	9.8	332	752.8
-	float64 MeshBP cameralx5	75	64	85	74	400	0.2	0.18	10.2	358	752.8
-	float64 tween_chain cameralx5	74	63	84	73	400	0.2	0.18	10.1	353	752.8
-	complex64 step_sgd cameralx5	72	53	100	72	400	0.2	0.18	9.8	297	752.8
-	float64 Mesh[T]Chain cameralx5	72	60	82	71	400	0.2	0.18	9.8	340	752.8
keep	complex64 Mesh[T]Chain cameralx5	88	39	83	66	400	0.2	0.17	12.1	222	752.8
-	int64 MeshBP cameralx5	72	48	84	66	400	0.2	0.17	9.8	269	752.8
keep	complex64 tween_chain cameralx5	83	41	84	66	400	0.2	0.17	11.4	231	752.8
-	complex64 sgd cameralx5	74	42	85	64	400	0.2	0.16	10.1	236	752.8
-	int Mesh[T]Chain cameralx5	70	38	82	60	400	0.2	0.15	9.6	216	752.8

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

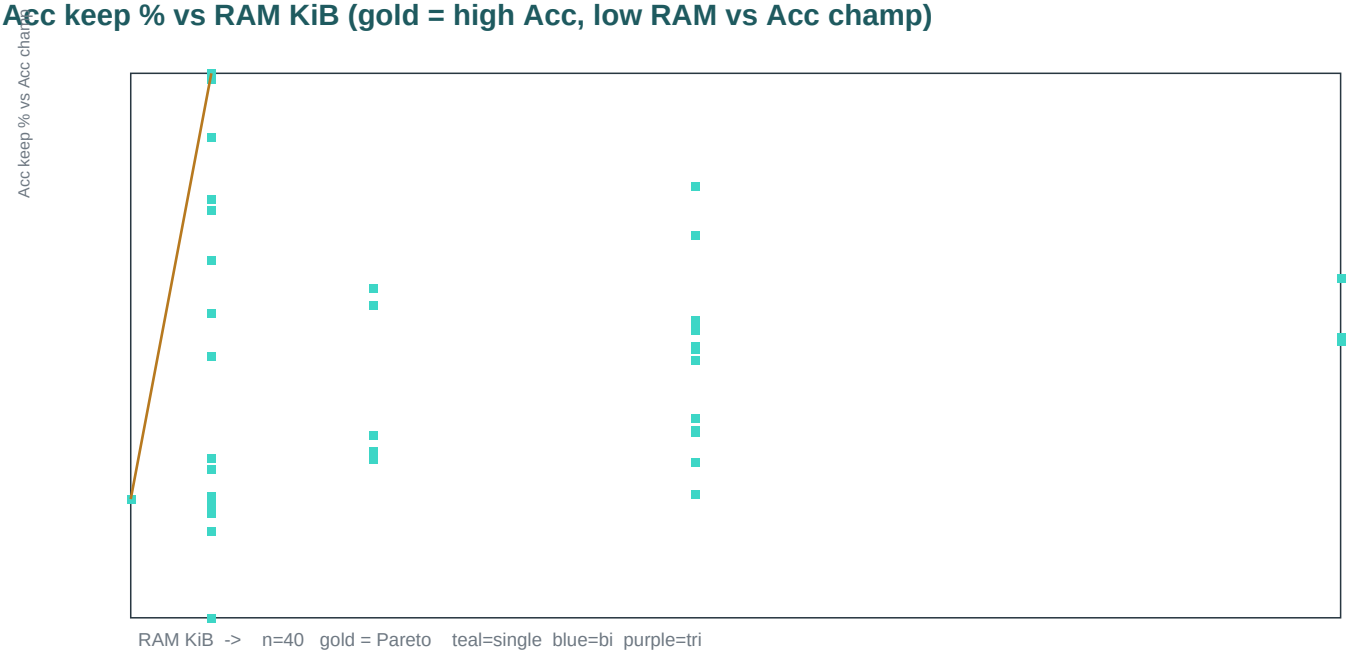
Band	Cell	Acc%	Thru%	Avail%	Q%	LPD	Thru	Avail
-	float32 step_sgd cameralx5	76	100	92	89	0.44	562	26.3
keep	bfloat16 step_sgd cameralx5	86	74	91	83	0.83	415	26.2
keep	bfloat16 step_tween_chain cameralx5	87	71	90	82	0.82	399	25.7
-	float32 tween_chain cameralx5	78	82	81	80	0.40	462	23.1
keep	bfloat16 sgd cameralx5	93	66	81	79	0.79	369	23.1
acc	bfloat16 tween_chain cameralx5	99	59	79	77	0.77	331	22.5
acc	bfloat16 Mesh[T]Chain cameralx5	100	57	78	77	0.77	323	22.4
-	int64 step_tween_chain cameralx5	72	59	96	74	0.19	332	27.6
-	float64 MeshBP cameralx5	75	64	85	74	0.18	358	24.4
-	float16 step_tween_chain cameralx5	75	58	91	73	0.73	324	26.1

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

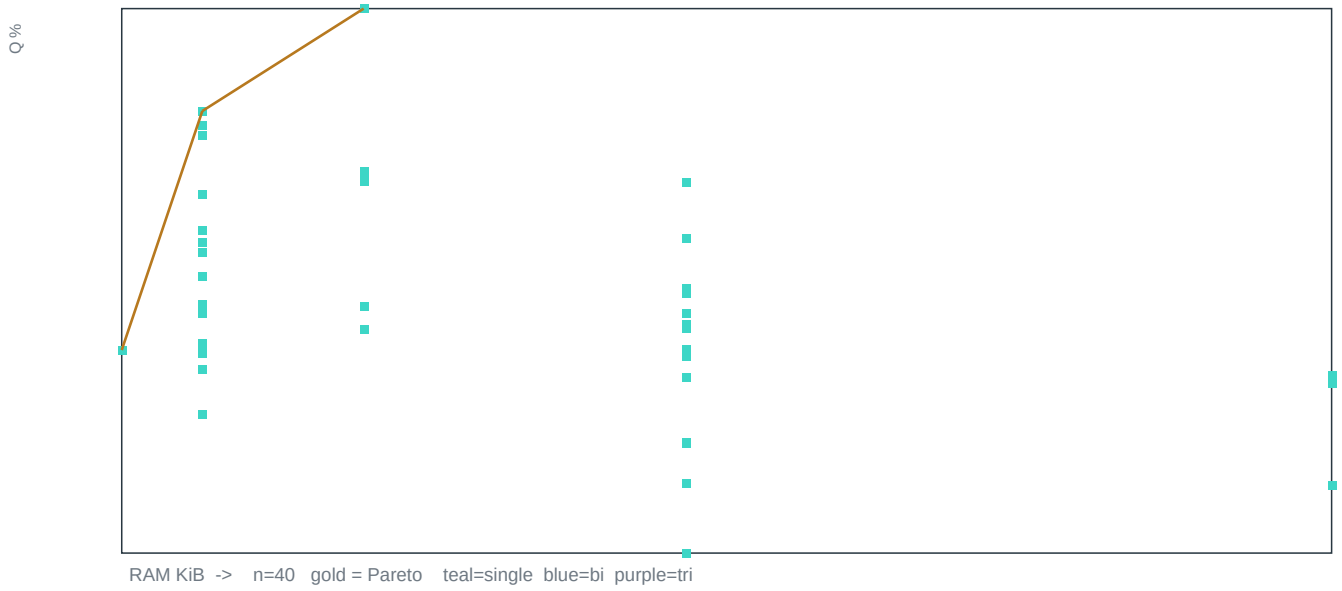
Band	Cell	Acc%	Thru%	Avail%	Q%	RAM%	xSmall	LPD	Acc	Thru	KiB
trap	binary sgd cameralx5	13	69	72	40	6	16.0	0.00	1.7	388	11.8
trap	binary step_sgd cameralx5	15	82	82	46	6	16.0	0.00	2.0	459	11.8
trap	binary tween cameralx5	14	57	63	37	6	16.0	0.00	1.9	318	11.8
trap	binary tween_chain cameralx5	14	64	70	40	6	16.0	0.00	2.0	362	11.8
trap	binary step_tween cameralx5	13	63	68	38	6	16.0	0.00	1.7	352	11.8
trap	binary step_tween_chain cameralx5	11	77	79	40	6	16.0	0.00	1.5	431	11.8
trap	binary MeshBP cameralx5	8	64	71	33	6	16.0	0.00	1.1	360	11.8
trap	binary Mesh[T] cameralx5	17	56	64	39	6	16.0	0.00	2.3	316	11.8
trap	binary Mesh[T]Chain cameralx5	13	62	69	39	6	16.0	0.00	1.8	351	11.8

trap	binary [T][S] cameralx5	12	86	87	45	6	16.0	0.00	1.7	485	11.8

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

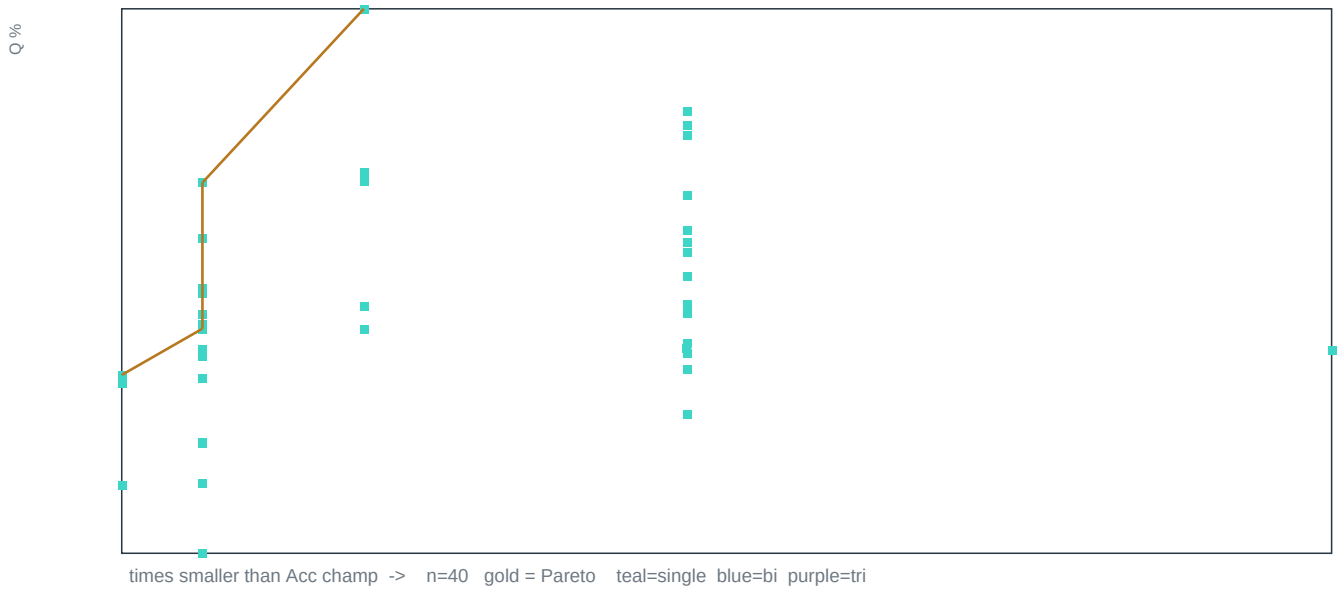


Q% vs RAM KiB (gold = high consciousness, low RAM)

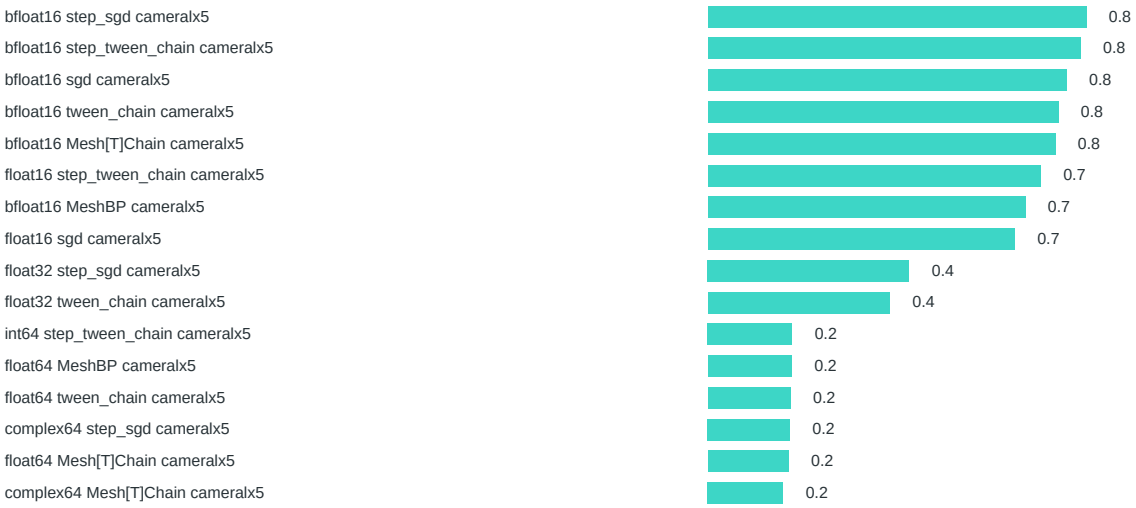


Q% vs shrink vs Acc champ (gold = upper right)

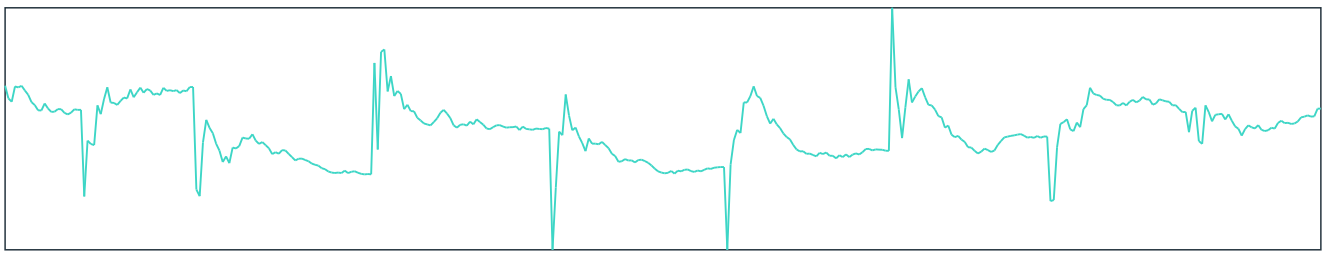
Q% vs shrink vs Acc champ (gold = upper right)



Top Lucy density (LPD)

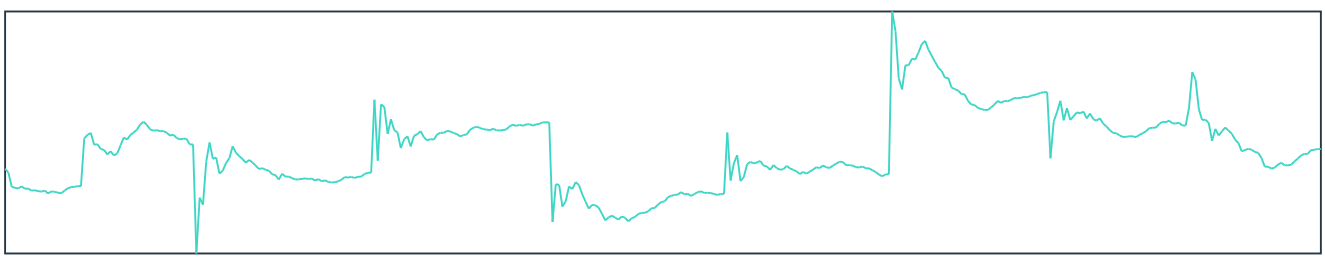


Live pulse (Score)



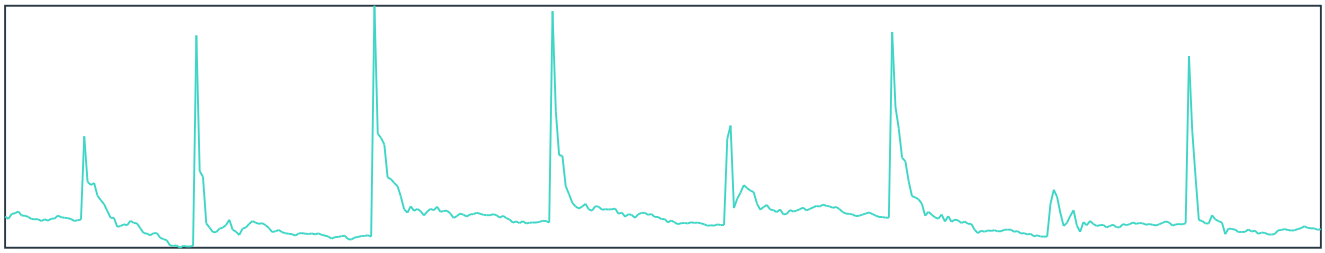
n=400 min=0.00 max=1.26

Live pulse (SoftAcc)



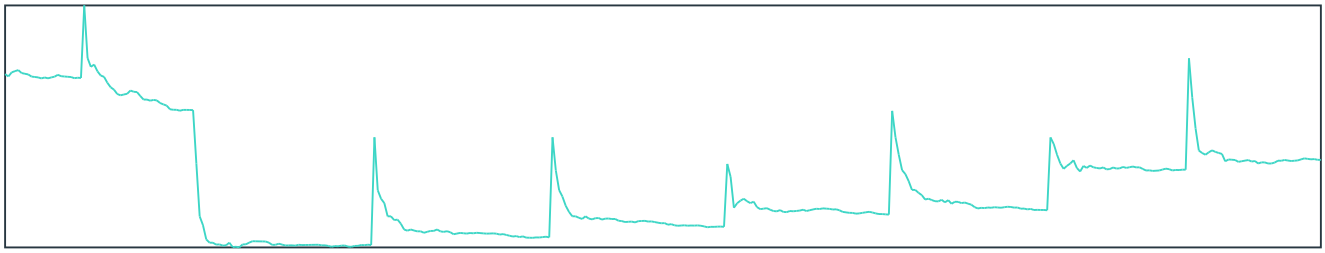
n=400 min=1.54 max=1.54

Live pulse (Availability)



n=400 min=23.81 max=32.43

Live pulse (Throughput)



n=400 min=125.12 max=271.82

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