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 13:39:13 - 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 - cameralx15 - tinyshakespeare - 4096 windows - seq 32 - causal MHA - A->B->A2 - SIMD

Lucy champions (this tide)

Axis	Cell	Score	Soft	Acc	Thru	Avail
hard acc	float16|none|tween_chain|cameralx15|simd	7.46	4.1	12.9	260.5	22.3
throughput	float32|none|[T][S]Sparse|cameralx15|simd	3.19	1.5	1.2	710.0	38.8
availability	float64|none|Mesh[T][S]Sparse|cameralx15|simd	2.88	1.5	1.5	502.6	39.0
lucy score	float32|none|step_sgd|cameralx15|simd	14.61	3.9	12.4	425.6	27.7
mobile score (trap)	binary|none|Mesh[T][S]Sparse|cameralx15|simd	3.70	1.5	1.5	631.1	38.4
acc/sec	float32|none|step_sgd|cameralx15|simd	14.61	3.9	12.4	425.6	27.7

Lucy axis champions (this tide)

Axis	Mode	DType	Arch	Value
hard_acc	MeshBP	bfloat16	cameralx15	13.54
throughput	[T][S]Sparse	float32	cameralx15	709.95
availability	Mesh[T][S]Sparse	float64	cameralx15	38.95
score	step_sgd	float32	cameralx15	14.61
soft_acc	tween_chain	float16	cameralx15	4.13
acc_thru	step_sgd	float32	cameralx15	52.83
realtime	[T][S]Sparse	float32	cameralx15	275.50
adapt	step_sgd	float32	cameralx15	4.32
keep_learn	step_sgd	float32	cameralx15	10.29
acc_per_sec	step_sgd	float32	cameralx15	0.65
stability	sgd	fp4	cameralx15	100.00
mobile_score	Mesh[T][S]Sparse	binary	cameralx15	226.05
lpd	step_tween_chain	float16	cameralx15	0.84
mspeed	step_tween_chain	float32	cameralx15	1.00
mavail	step_sgd	float64	cameralx15	1.00
mix	step_sgd	float32	cameralx15	0.96
gold_std	step_tween_chain	float16	cameralx15	268.19

Best settings per train mode

Mode	DType	Format	Score	Soft	Acc	Avail	n
step_sgd	float32	none	14.6	3.9	12.4	27.7	34
[T][S][L]	bfloat16	none	12.5	1.6	8.2	36.3	34
step_tween_chain	float32	none	12.2	3.5	10.1	28.0	34
[T][S][L]Cache	bfloat16	none	10.4	1.6	5.8	38.4	34
sgd	float32	none	9.8	3.9	12.1	23.7	34
tween_chain	float32	none	9.7	3.7	11.8	23.9	34
MeshBP	float32	none	9.4	3.8	11.3	24.1	34
Mesh[T]Chain	float32	none	8.8	3.6	10.7	23.8	34
[T][S][HP]Async	bfloat16	none	7.7	1.5	8.8	29.1	34
[T][S][FP]	bfloat16	none	7.7	1.5	8.6	29.3	34
Mesh[T][S]	bfloat16	none	7.2	1.6	8.1	29.2	34
[T][S][HP]	bfloat16	none	7.0	1.5	7.9	29.2	34

[T][S]	bfloat16	none	6.5	1.5	7.4	29.0	34
[T][S]Sparse	int8	none	5.6	1.5	2.1	38.7	34
Mesh[T][S]Sparse	fp4	none	4.8	1.5	2.6	38.6	34
Mesh[T][S][FP]	bfloat16	none	4.5	1.5	5.1	29.3	34
Step[T][S][L]	int8	none	3.9	1.5	2.5	30.8	34
Step[T][S][L]Cache	float32	none	3.0	1.5	1.9	31.7	34
[T]Alt	bfloat16	none	2.2	1.6	9.5	16.2	34
Mesh[T]Alt	bfloat16	none	2.1	1.6	9.0	16.3	34
Step[T][S]	int8	none	1.9	1.5	2.2	24.2	34
Step[T][S]Sparse	bfloat16	none	1.7	1.5	2.6	25.6	34
Step[T][S][FP]	bfloat16	none	1.6	1.5	2.5	25.4	34
Step[T][S][HP]Async	fp4	none	1.5	1.5	2.6	24.3	34
Step[T][S][HP]	fp4	none	1.5	1.5	2.7	23.8	34
step_tween	float32	none	1.5	1.5	1.7	24.8	34
tween	int8	none	1.4	1.5	2.3	20.7	34
Mesh[T]	fp4	none	1.2	1.5	2.9	20.8	34
Step[T]Alt	float32	none	0.7	1.5	1.5	17.9	34

Best dtype per mode

Mode	Winner dtype	Score	Soft	Acc
step_sgd	float32	14.6	3.9	12.4
[T][S][L]	bfloat16	12.5	1.6	8.2
step_tween_chain	float32	12.2	3.5	10.1
[T][S][L]Cache	bfloat16	10.4	1.6	5.8
sgd	float32	9.8	3.9	12.1
tween_chain	float32	9.7	3.7	11.8
MeshBP	float32	9.4	3.8	11.3
Mesh[T]Chain	float32	8.8	3.6	10.7
[T][S][HP]Async	bfloat16	7.7	1.5	8.8
[T][S][FP]	bfloat16	7.7	1.5	8.6
Mesh[T][S]	bfloat16	7.2	1.6	8.1
[T][S][HP]	bfloat16	7.0	1.5	7.9
[T][S]	bfloat16	6.5	1.5	7.4
[T][S]Sparse	int8	5.6	1.5	2.1
Mesh[T][S]Sparse	fp4	4.8	1.5	2.6
Mesh[T][S][FP]	bfloat16	4.5	1.5	5.1
Step[T][S][L]	int8	3.9	1.5	2.5
Step[T][S][L]Cache	float32	3.0	1.5	1.9
[T]Alt	bfloat16	2.2	1.6	9.5
Mesh[T]Alt	bfloat16	2.1	1.6	9.0
Step[T][S]	int8	1.9	1.5	2.2
Step[T][S]Sparse	bfloat16	1.7	1.5	2.6
Step[T][S][FP]	bfloat16	1.6	1.5	2.5
Step[T][S][HP]Async	fp4	1.5	1.5	2.6
Step[T][S][HP]	fp4	1.5	1.5	2.7
step_tween	float32	1.5	1.5	1.7
tween	int8	1.4	1.5	2.3
Mesh[T]	fp4	1.2	1.5	2.9
Step[T]Alt	float32	0.7	1.5	1.5

Best mode per dtype

DType	Winner mode	Score	Soft	Acc

float32	step_sgd	14.6	3.9	12.4
bfloat16	[T][S][L]	12.5	1.6	8.2
float64	step_sgd	11.4	3.9	12.8
float16	step_tween_chain	9.8	3.6	12.1
int64	step_sgd	7.8	3.7	12.1
int32	step_sgd	7.4	3.0	11.6
uint16	step_sgd	7.3	3.1	11.4
uint32	step_sgd	6.9	2.9	10.8
complex64	step_tween_chain	6.5	3.6	11.5
int	step_tween_chain	6.4	3.6	11.8
complex128	step_sgd	6.4	3.8	11.6
uint64	step_tween_chain	6.2	2.3	9.6
int16	step_tween_chain	6.2	2.8	9.6
uint	step_tween_chain	5.8	2.9	10.7
uintptr	step_sgd	5.8	3.1	10.8
int8	[T][S]Sparse	5.6	1.5	2.1
fp4	[T][S]Sparse	4.9	1.5	2.6
int4	[T][S]Sparse	4.4	1.5	1.8
uint8	[T][S]Sparse	4.2	1.5	1.8
ternary	Mesh[T][S]Sparse	3.9	1.5	1.5
int2	[T][S][L]Cache	3.7	1.5	1.7
binary	Mesh[T][S]Sparse	3.7	1.5	1.5
uint2	[T][S]Sparse	2.9	1.5	2.1
fp8e5m2	[T][S]Sparse	2.3	1.5	1.5
uint4	[T][S]Sparse	2.1	1.5	1.5
nf4	Mesh[T][S]Sparse	2.0	1.5	1.8
fp8e4m3	[T][S][L]Cache	1.8	1.5	1.6
uint3	Mesh[T][S]Sparse	1.8	1.5	2.0
uint5	[T][S]Sparse	1.3	1.5	1.9
uint6	[T][S][L]Cache	1.3	1.5	2.2
int3	Mesh[T][S]Sparse	1.2	1.5	1.4
int5	[T][S]Sparse	1.2	1.5	1.7
fp6	Mesh[T][S]Sparse	1.1	1.5	1.8
int6	[T][S][L]Cache	0.9	1.5	1.6

Leaderboard (Lucy Score)

#	Cell	Score	Soft	Acc	Thru	Avail
1	float32|none|step_sgd|cameralx15|simd	14.6	3.9	12.4	425.6	27.7
2	bfloat16|none|[T][S][L]|cameralx15|simd	12.5	1.6	8.2	422.0	36.3
3	float32|none|step_tween_chain|cameralx15|simd	12.2	3.5	10.1	430.7	28.0
4	float64|none|step_sgd|cameralx15|simd	11.4	3.9	12.8	311.7	28.4
5	float64|none|step_tween_chain|cameralx15|simd	10.6	3.8	12.0	313.2	28.3
6	bfloat16|none|[T][S][L]Cache|cameralx15|simd	10.4	1.6	5.8	465.7	38.4
7	float16|none|step_tween_chain|cameralx15|simd	9.8	3.6	12.1	317.6	25.6
8	float32|none|sgd|cameralx15|simd	9.8	3.9	12.1	343.8	23.7
9	float32|none|tween_chain|cameralx15|simd	9.7	3.7	11.8	343.4	23.9
10	bfloat16|none|step_tween_chain|cameralx15|simd	9.4	3.7	11.9	286.0	27.6
11	float32|none|MeshBP|cameralx15|simd	9.4	3.8	11.3	343.1	24.1
12	bfloat16|none|step_sgd|cameralx15|simd	9.2	3.7	11.7	284.7	27.5
13	float32|none|Mesh[T]Chain|cameralx15|simd	8.8	3.6	10.7	345.5	23.8
14	float16|none|step_sgd|cameralx15|simd	8.5	3.5	10.7	314.9	25.2
15	int64|none|step_sgd|cameralx15|simd	7.8	3.7	12.1	229.4	28.1
16	bfloat16|none|[T][S][HP]Async|cameralx15|simd	7.7	1.5	8.8	303.8	29.1

#	Cell	Score	Soft	Acc	Thru	Avail
17	bfloat16|none|[T][S][FP]|cameralx15|simd	7.7	1.5	8.6	305.5	29.3
18	float16|none|MeshBP|cameralx15|simd	7.6	3.9	13.0	262.3	22.2
19	float16|none|tween_chain|cameralx15|simd	7.5	4.1	12.9	260.5	22.3
20	bfloat16|none|MeshBP|cameralx15|simd	7.5	3.9	13.5	230.9	23.8

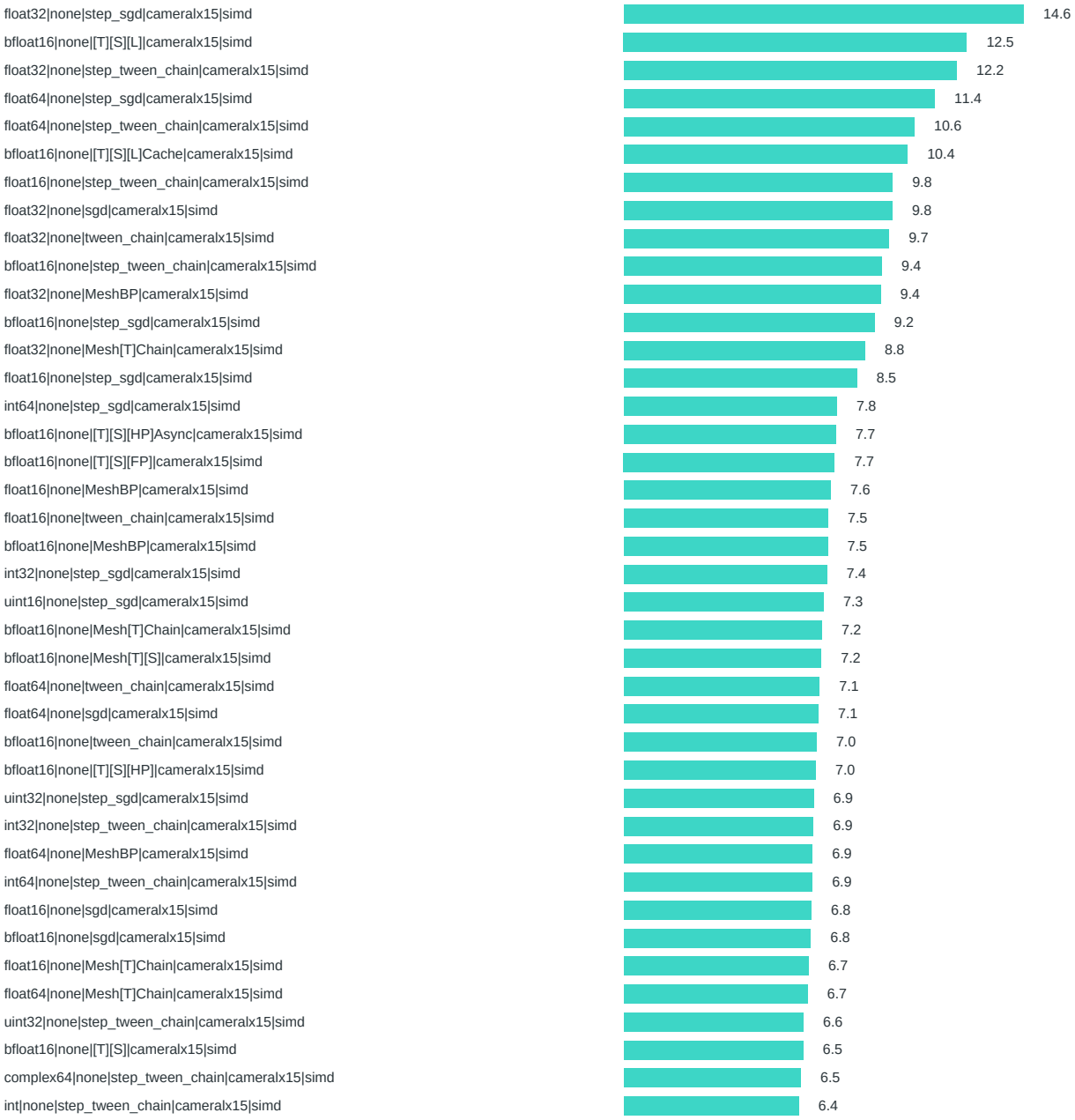
Leaderboard (SoftAcc)

#	Cell	Score	Soft	Acc	Thru	Avail
1	float16|none|tween_chain|cameralx15|simd	7.5	4.1	12.9	260.5	22.3
2	float64|none|tween_chain|cameralx15|simd	7.1	3.9	11.9	248.7	24.2
3	float16|none|MeshBP|cameralx15|simd	7.6	3.9	13.0	262.3	22.2
4	bfloat16|none|Mesh[T]Chain|cameralx15|simd	7.2	3.9	13.3	229.7	23.8
5	bfloat16|none|MeshBP|cameralx15|simd	7.5	3.9	13.5	230.9	23.8
6	float64|none|step_sgd|cameralx15|simd	11.4	3.9	12.8	311.7	28.4
7	float64|none|sgd|cameralx15|simd	7.1	3.9	11.8	250.8	24.0
8	float32|none|step_sgd|cameralx15|simd	14.6	3.9	12.4	425.6	27.7
9	float32|none|sgd|cameralx15|simd	9.8	3.9	12.1	343.8	23.7
10	float16|none|sgd|cameralx15|simd	6.8	3.8	12.1	259.6	21.7
11	bfloat16|none|tween_chain|cameralx15|simd	7.0	3.8	12.9	230.4	23.6
12	float32|none|MeshBP|cameralx15|simd	9.4	3.8	11.3	343.1	24.1
13	float64|none|step_tween_chain|cameralx15|simd	10.6	3.8	12.0	313.2	28.3
14	bfloat16|none|sgd|cameralx15|simd	6.8	3.8	12.7	230.0	23.4
15	float32|none|tween_chain|cameralx15|simd	9.7	3.7	11.8	343.4	23.9
16	bfloat16|none|step_sgd|cameralx15|simd	9.2	3.7	11.7	284.7	27.5
17	int64|none|step_sgd|cameralx15|simd	7.8	3.7	12.1	229.4	28.1
18	bfloat16|none|step_tween_chain|cameralx15|simd	9.4	3.7	11.9	286.0	27.6
19	float64|none|MeshBP|cameralx15|simd	6.9	3.7	11.4	250.3	24.2
20	float64|none|Mesh[T]Chain|cameralx15|simd	6.7	3.6	10.9	253.4	24.3

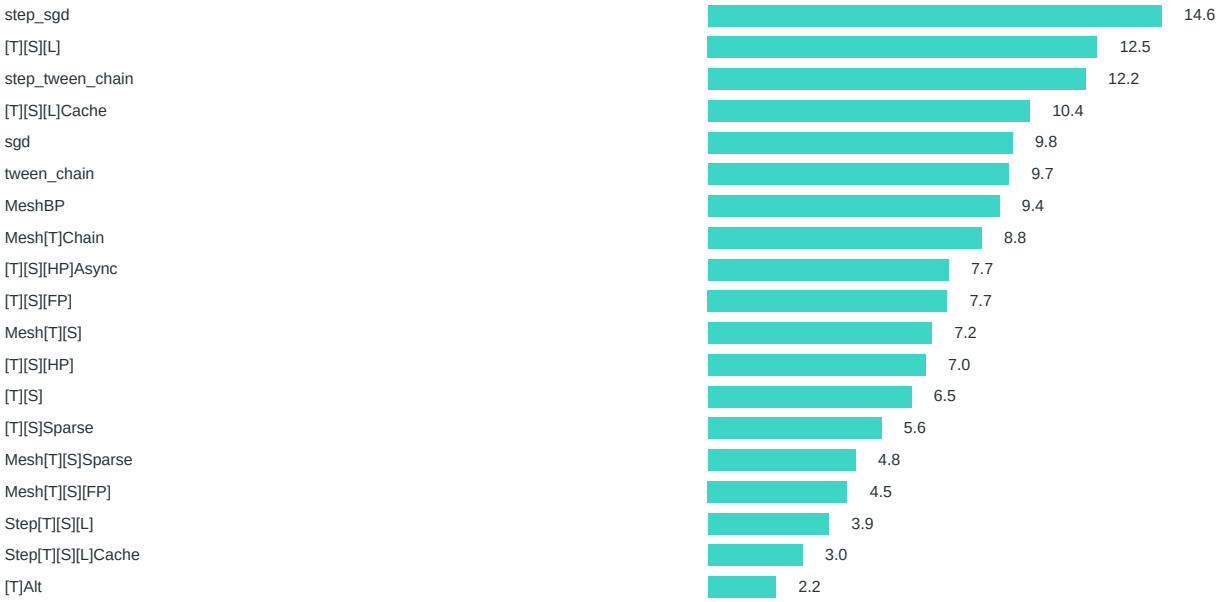
Leaderboard (hard Acc)

#	Cell	Score	Soft	Acc	Thru	Avail
1	bfloat16|none|MeshBP|cameralx15|simd	7.5	3.9	13.5	230.9	23.8
2	bfloat16|none|Mesh[T]Chain|cameralx15|simd	7.2	3.9	13.3	229.7	23.8
3	float16|none|MeshBP|cameralx15|simd	7.6	3.9	13.0	262.3	22.2
4	bfloat16|none|tween_chain|cameralx15|simd	7.0	3.8	12.9	230.4	23.6
5	float16|none|tween_chain|cameralx15|simd	7.5	4.1	12.9	260.5	22.3
6	float64|none|step_sgd|cameralx15|simd	11.4	3.9	12.8	311.7	28.4
7	bfloat16|none|sgd|cameralx15|simd	6.8	3.8	12.7	230.0	23.4
8	float32|none|step_sgd|cameralx15|simd	14.6	3.9	12.4	425.6	27.7
9	float16|none|sgd|cameralx15|simd	6.8	3.8	12.1	259.6	21.7
10	int64|none|step_sgd|cameralx15|simd	7.8	3.7	12.1	229.4	28.1
11	float32|none|sgd|cameralx15|simd	9.8	3.9	12.1	343.8	23.7
12	float16|none|step_tween_chain|cameralx15|simd	9.8	3.6	12.1	317.6	25.6
13	float64|none|step_tween_chain|cameralx15|simd	10.6	3.8	12.0	313.2	28.3
14	bfloat16|none|step_tween_chain|cameralx15|simd	9.4	3.7	11.9	286.0	27.6
15	float64|none|tween_chain|cameralx15|simd	7.1	3.9	11.9	248.7	24.2
16	float32|none|tween_chain|cameralx15|simd	9.7	3.7	11.8	343.4	23.9
17	int|none|step_tween_chain|cameralx15|simd	6.4	3.6	11.8	193.5	28.0
18	float64|none|sgd|cameralx15|simd	7.1	3.9	11.8	250.8	24.0
19	bfloat16|none|step_sgd|cameralx15|simd	9.2	3.7	11.7	284.7	27.5
20	int32|none|step_sgd|cameralx15|simd	7.4	3.0	11.6	228.7	28.0

Top scores



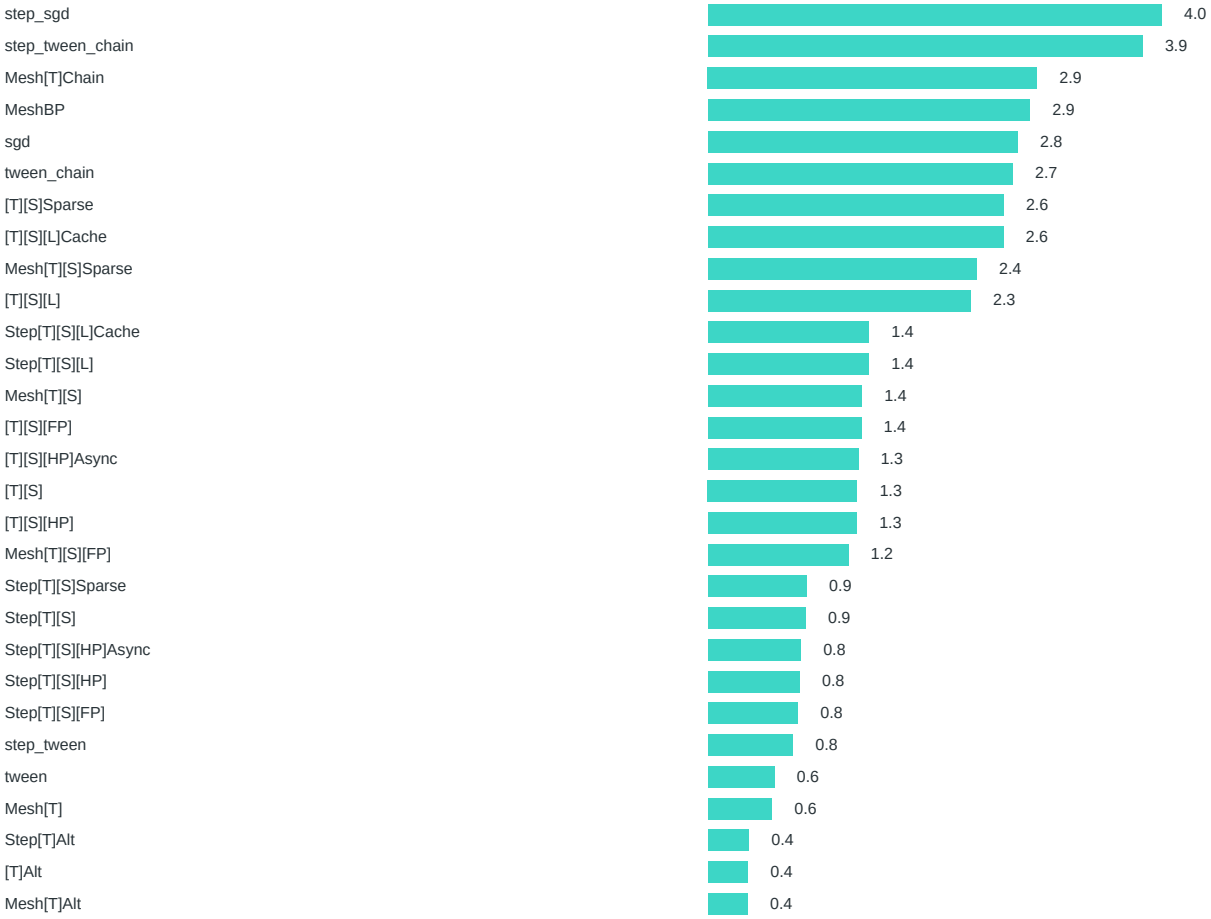
Best settings per mode



Best settings per mode



Mean Score by train mode



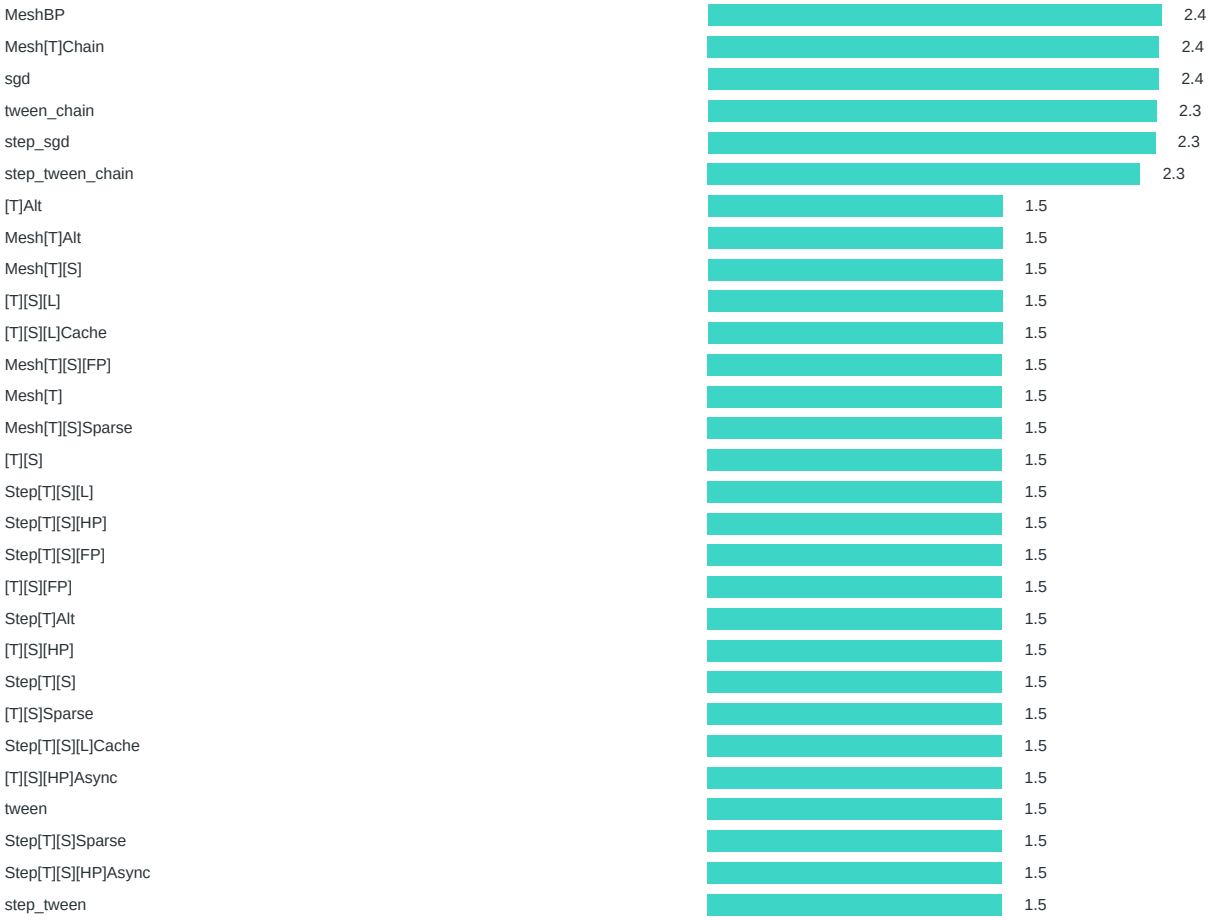
Mean hard Acc by train mode



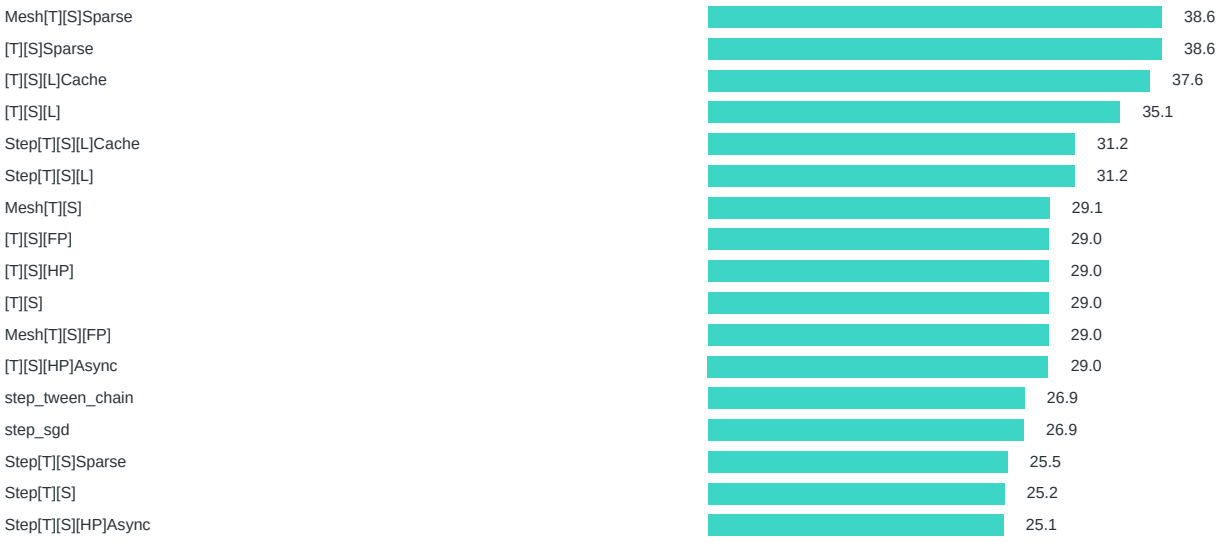
Mean hard Acc by train mode



Mean SoftAcc by train mode



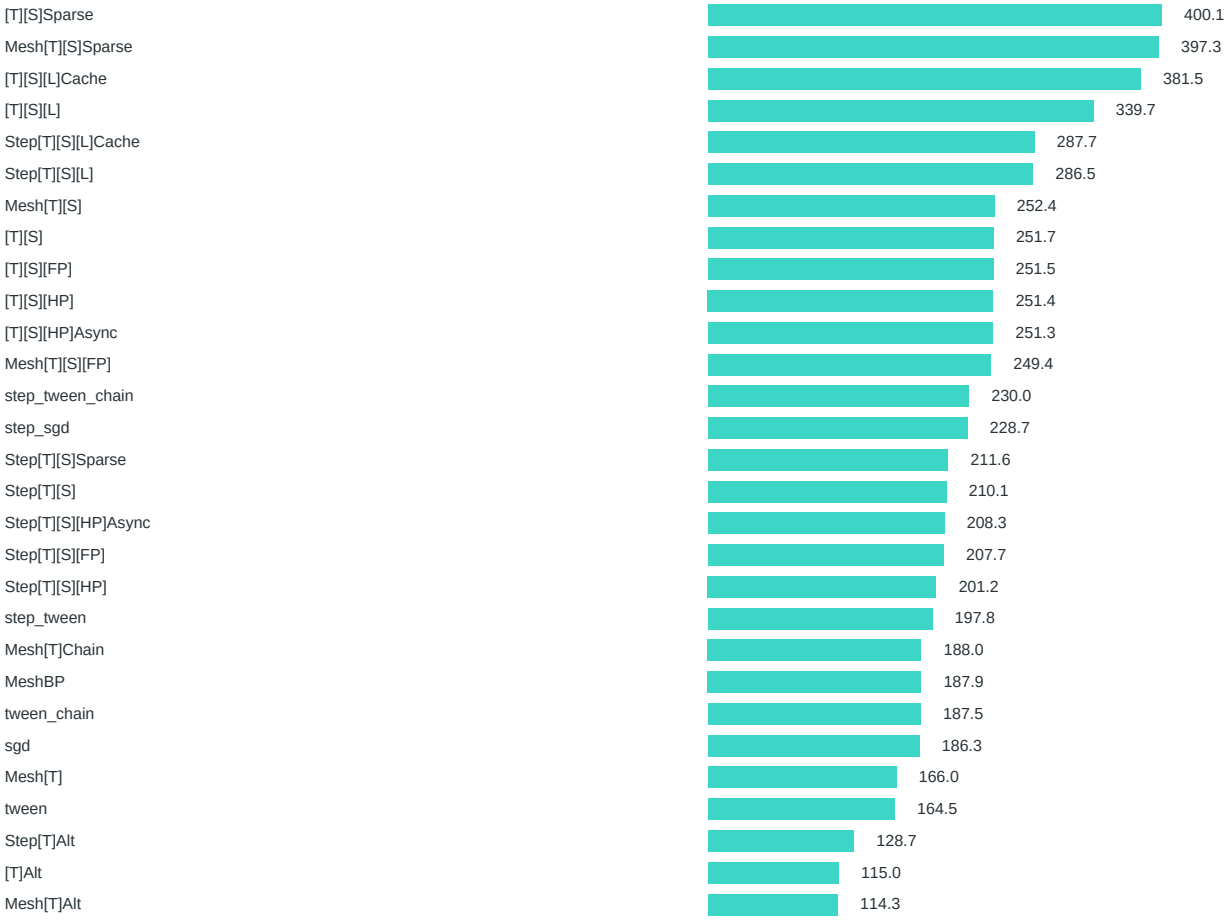
Mean Availability by train mode



Mean Availability by train mode



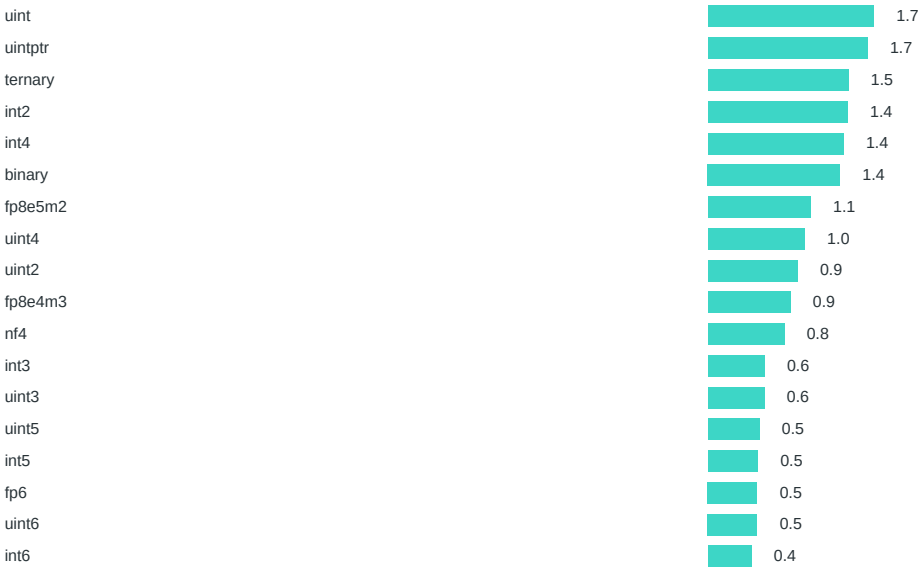
Mean Throughput by train mode



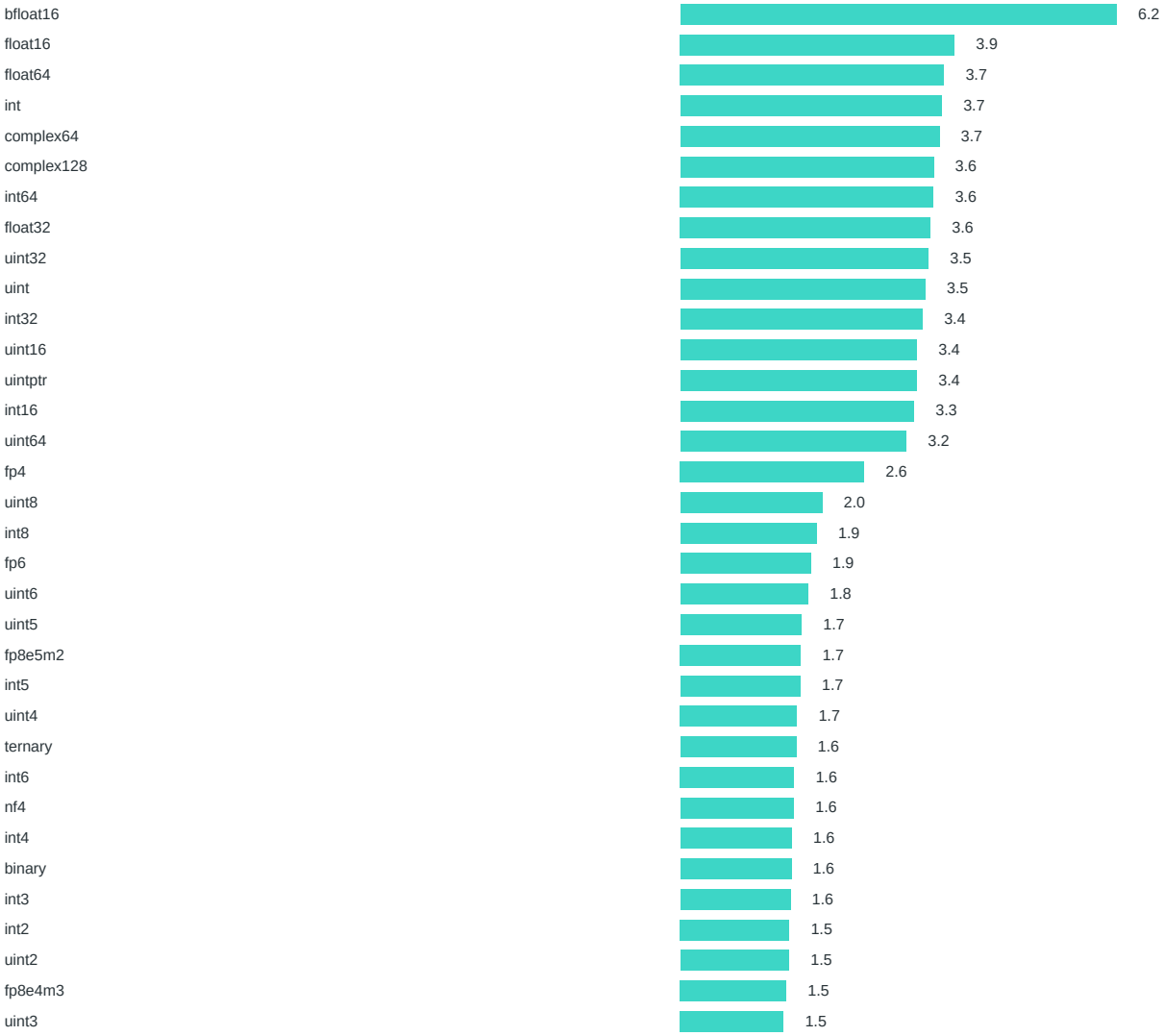
Mean Score by dtype



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

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

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

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

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

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

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

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	3	2	2	3	2	2	2	3	2	3
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	3	2	2	3	2	2	2	3	2	3
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	3	2	2	3	2	2	2	3	2	3
step_sgd	3	2	2	3	2	2	2	3	2	3
step_tween	2	2	2	2	2	2	2	2	2	2
step_tween_chain	3	2	2	3	2	2	2	2	2	3
tween	2	2	2	2	2	2	2	2	2	2
tween_chain	3	2	2	3	2	2	2	3	2	3

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	24	20	24	24	22	24	24	23	24	24	24	24
Mesh[T]	22	18	22	22	20	22	22	21	21	22	22	22
Mesh[T]Alt	16	13	17	17	15	17	17	15	16	16	16	17
Mesh[T]Chain	24	20	24	24	22	24	24	23	24	24	24	24
Mesh[T][S]	29	26	30	30	28	29	30	28	30	30	29	30
Mesh[T][S][FP]	29	26	30	30	28	29	29	28	30	30	29	30
Mesh[T][S]Sparse	39	38	39	39	39	39	39	39	38	39	39	39
Step[T]Alt	18	14	18	18	16	18	18	17	18	18	18	18
Step[T][S]	25	23	26	26	24	25	26	24	26	26	26	26
Step[T][S][FP]	25	23	26	26	24	25	25	24	26	26	25	26
Step[T][S][HP]	25	22	25	25	24	25	25	24	25	25	25	25
Step[T][S][HP]Async	25	23	26	26	24	25	25	24	26	26	26	26
Step[T][S][L]	32	31	31	32	31	32	32	30	31	31	31	32
Step[T][S][L]Cache	32	31	32	32	32	32	32	31	31	31	31	32
Step[T][S]Sparse	26	23	26	26	25	25	26	25	26	26	26	26
[T]Alt	16	13	17	17	15	16	17	15	16	16	16	17
[T][S]	29	26	30	30	27	28	30	28	30	30	29	30
[T][S][FP]	29	26	30	30	28	29	29	28	30	30	29	30
[T][S][HP]	29	26	30	30	27	29	30	28	30	30	29	30
[T][S][HP]Async	29	26	30	30	28	29	29	28	30	30	29	30
[T][S][L]	36	31	36	36	34	37	37	37	34	35	36	36
[T][S][L]Cache	38	37	38	38	38	39	39	37	37	38	37	38
[T][S]Sparse	39	38	39	39	39	39	39	39	38	39	39	39
sgd	23	20	24	24	22	24	24	22	24	24	23	24
step_sgd	28	23	28	28	25	28	28	26	27	28	28	28
step_tween	25	21	25	25	23	25	25	24	25	25	25	25
step_tween_chain	28	23	28	28	26	28	28	26	27	28	27	28
tween	21	18	22	22	20	21	22	21	21	22	22	22
tween_chain	24	20	24	24	22	24	24	23	24	24	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	20	24	24	24	23	23	20	24
Mesh[T]	22	19	21	22	19	21	21	22	21	21	18	21
Mesh[T]Alt	17	13	16	17	13	16	16	16	16	16	13	16
Mesh[T]Chain	24	21	24	24	20	24	24	24	23	24	19	24
Mesh[T][S]	30	26	30	30	26	30	30	30	28	29	26	30
Mesh[T][S][FP]	30	25	30	30	26	30	30	30	28	29	26	30
Mesh[T][S]Sparse	39	38	39	39	38	39	39	39	39	39	38	39
Step[T]Alt	18	14	18	18	14	18	18	18	17	17	13	18
Step[T][S]	26	22	26	26	23	26	26	26	24	25	23	26
Step[T][S][FP]	26	22	26	26	23	26	26	26	24	25	23	26
Step[T][S][HP]	25	22	25	25	22	25	25	25	24	25	21	25
Step[T][S][HP]Async	26	22	26	26	23	26	26	26	24	25	23	26
Step[T][S][L]	32	30	31	32	30	31	31	32	31	30	30	32
Step[T][S][L]Cache	32	30	31	32	30	31	31	32	31	30	30	31
Step[T][S]Sparse	26	23	26	26	24	26	26	26	25	26	23	26
[T]Alt	16	13	16	16	13	16	16	16	15	16	12	16
[T][S]	30	25	30	30	26	30	30	30	28	29	26	30
[T][S][FP]	30	25	30	30	26	30	30	30	28	29	26	30
[T][S][HP]	30	25	30	30	26	30	30	30	28	29	26	30
[T][S][HP]Async	30	25	30	30	26	30	30	30	28	29	26	30
[T][S][L]	37	33	35	37	31	34	34	37	35	34	30	36
[T][S][L]Cache	38	36	37	38	37	37	37	38	38	36	36	38
[T][S]Sparse	39	38	39	39	38	38	38	39	39	39	38	39
sgd	24	20	23	24	20	23	23	24	23	23	19	24
step_sgd	28	23	27	28	23	27	27	28	26	27	22	27
step_tween	25	21	25	25	21	24	24	25	24	24	20	24
step_tween_chain	28	23	27	28	23	27	27	28	27	27	22	28
tween	21	18	21	22	18	21	21	22	21	21	18	21
tween_chain	24	20	24	24	20	24	24	24	23	23	19	24

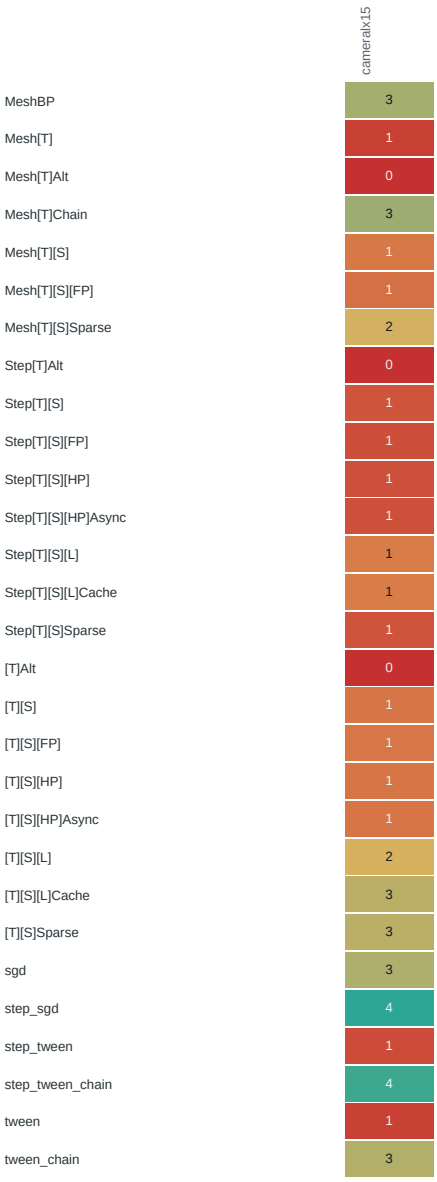
Honesty - mean Avail, every mode x dtype (cols 25-34)

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

	uint16	uint2	uint3	uint32	uint4	uint5	uint6	uint64	uint8	uintptr
MeshBP	24	24	23	24	24	23	23	24	24	24
Mesh[T]	22	21	21	22	21	21	21	22	21	22
Mesh[T]Alt	16	16	16	16	16	16	16	16	16	16
Mesh[T]Chain	24	24	24	24	24	23	24	24	24	24
Mesh[T][S]	30	29	30	30	29	30	30	30	28	30
Mesh[T][S][FP]	29	29	29	30	29	30	30	29	29	30
Mesh[T][S]Sparse	39	39	39	39	39	38	38	39	39	39
Step[T]Alt	18	18	17	18	18	18	18	18	18	18
Step[T][S]	25	25	26	26	25	26	26	26	25	26
Step[T][S][FP]	26	25	25	26	25	26	26	25	25	26
Step[T][S][HP]	25	25	25	25	25	25	25	25	25	25
Step[T][S][HP]Async	25	25	25	26	25	26	26	26	25	26
Step[T][S][L]	32	31	31	32	31	31	31	32	31	32
Step[T][S][L]Cache	32	31	31	32	31	31	31	32	31	32
Step[T][S]Sparse	26	26	26	26	26	26	26	26	25	26
[T]Alt	16	16	16	16	16	16	16	16	16	16
[T][S]	30	29	29	30	29	30	30	30	29	30
[T][S][FP]	29	29	29	30	29	30	30	30	28	30
[T][S][HP]	30	29	30	29	29	30	30	29	29	30
[T][S][HP]Async	29	29	30	30	29	30	30	29	28	30
[T][S][L]	36	35	35	36	36	34	34	36	35	36
[T][S][L]Cache	38	38	37	38	38	37	37	38	38	38
[T][S]Sparse	39	39	39	39	39	38	39	39	39	39
sgd	24	23	23	24	23	23	23	24	23	24
step_sgd	27	27	27	28	27	27	27	28	27	27
step_tween	25	24	24	25	24	24	24	24	24	24
step_tween_chain	28	27	27	28	27	27	27	28	27	27
tween	21	21	21	21	21	21	21	21	21	21
tween_chain	24	24	23	24	24	23	23	24	23	24

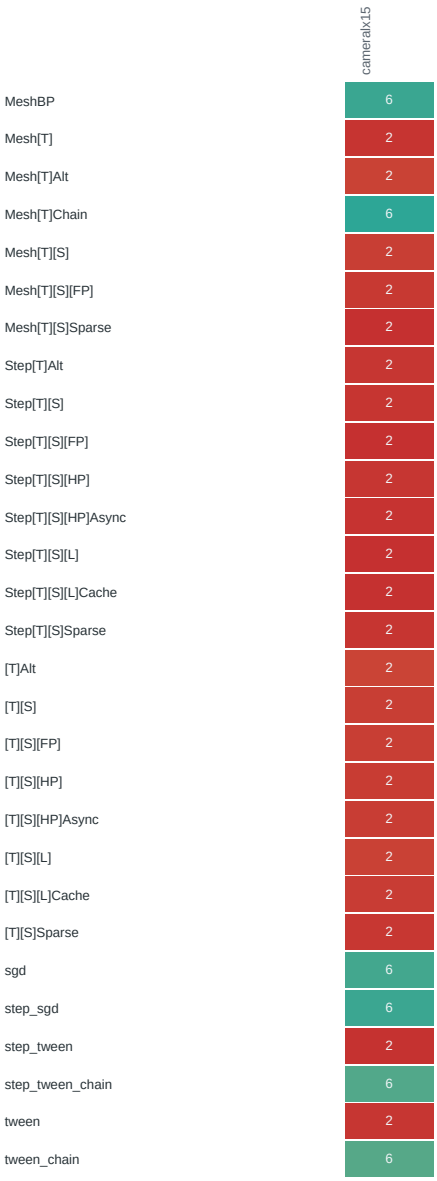
Mean Score, every mode x arch

Mean Score, every mode x arch



Mean hard Acc, every mode x arch

Mean hard Acc, every mode x arch

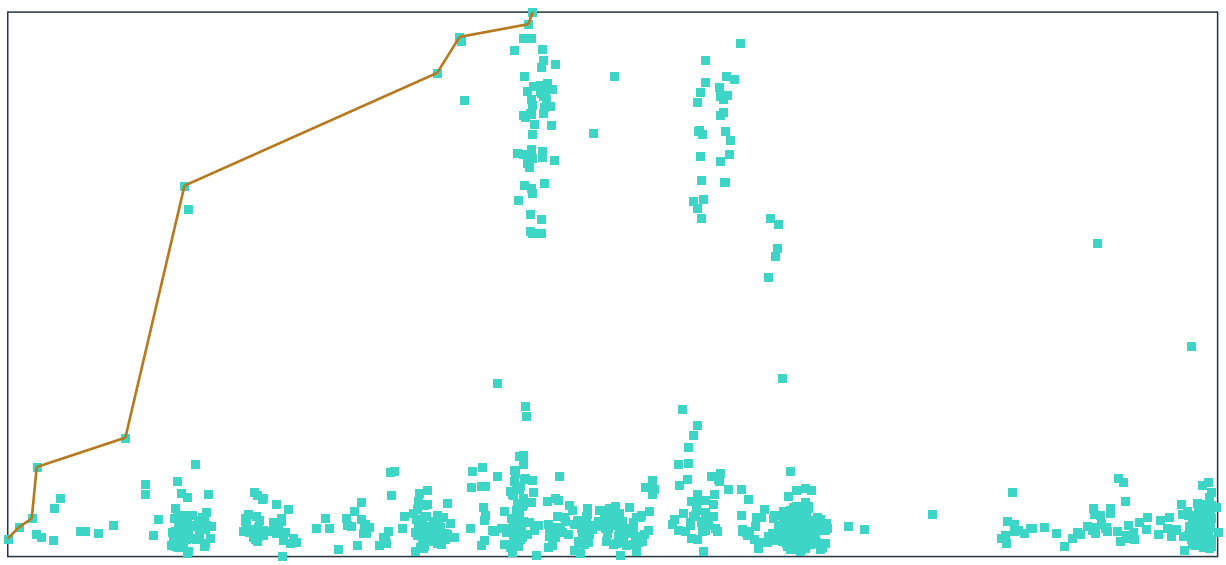


Mean Avail, every mode x arch

Mean Avail, every mode x arch

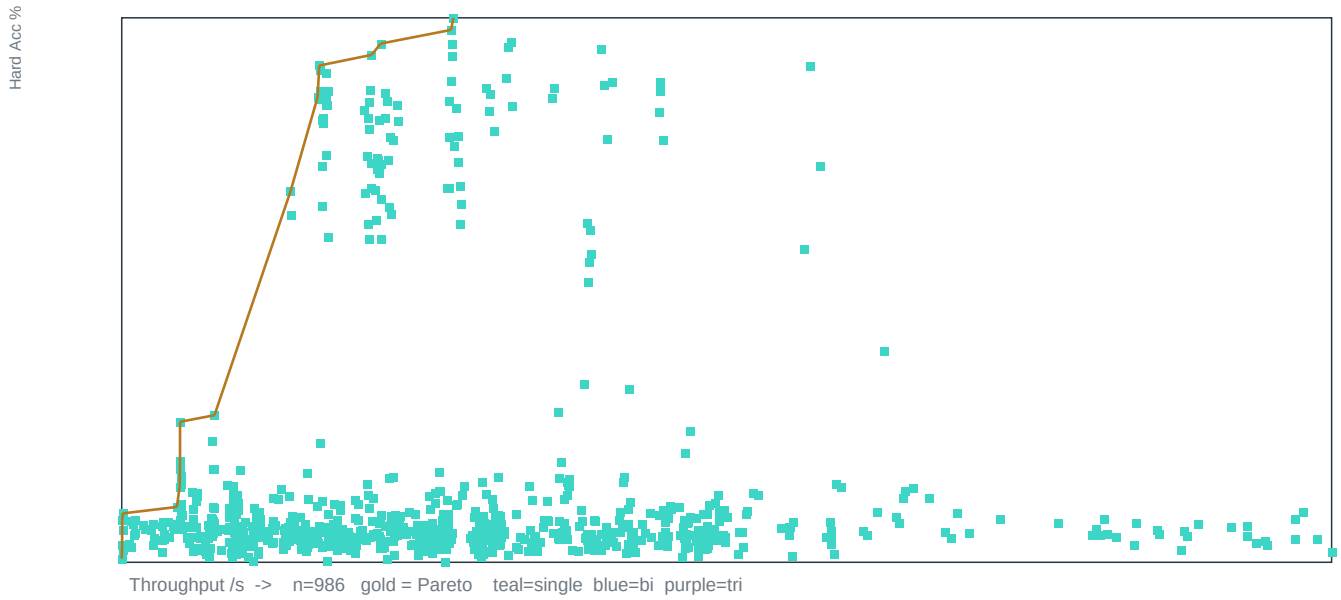
	cameralx15
MeshBP	23
Mesh[T]	21
Mesh[T]Alt	16
Mesh[T]Chain	23
Mesh[T][S]	29
Mesh[T][S][FP]	29
Mesh[T][S]Sparse	39
Step[T]Alt	17
Step[T][S]	25
Step[T][S][FP]	25
Step[T][S][HP]	25
Step[T][S][HP]Async	25
Step[T][S][L]	31
Step[T][S][L]Cache	31
Step[T][S]Sparse	25
[T]Alt	16
[T][S]	29
[T][S][FP]	29
[T][S][HP]	29
[T][S][HP]Async	29
[T][S][L]	35
[T][S][L]Cache	38
[T][S]Sparse	39
sgd	23
step_sgd	27
step_tween	24
step_tween_chain	27
tween	21
tween_chain	23

Pillars - Availability vs hard Acc

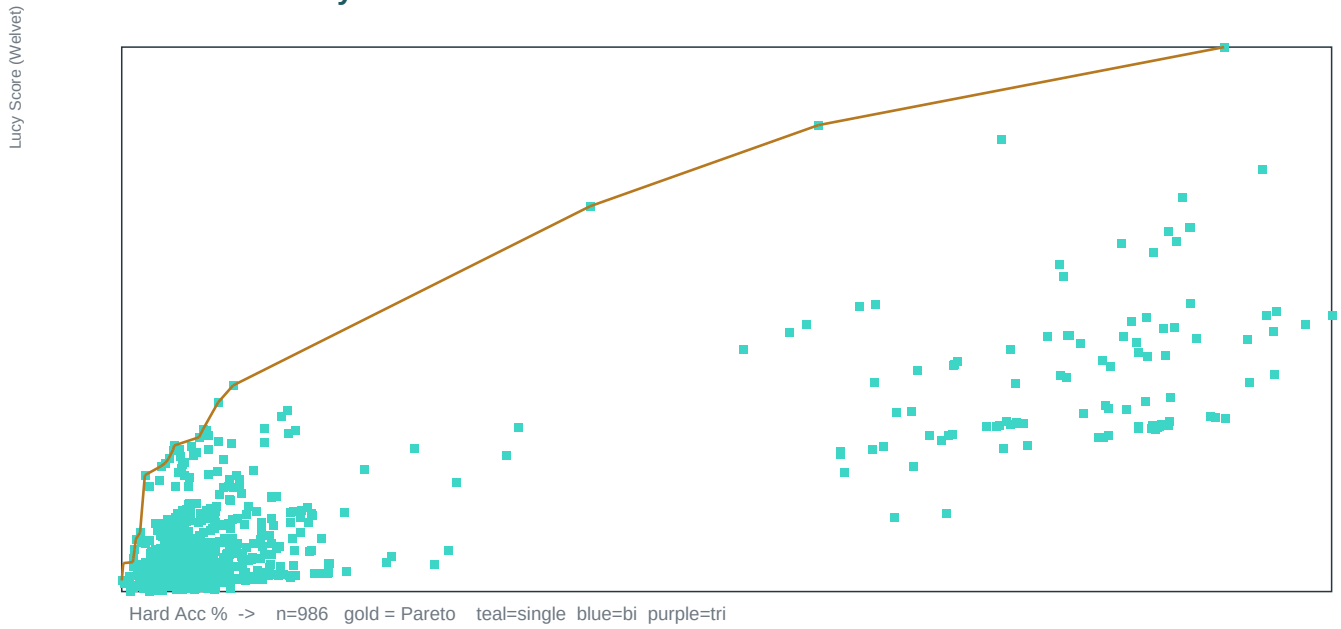



Availability % -> n=986 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

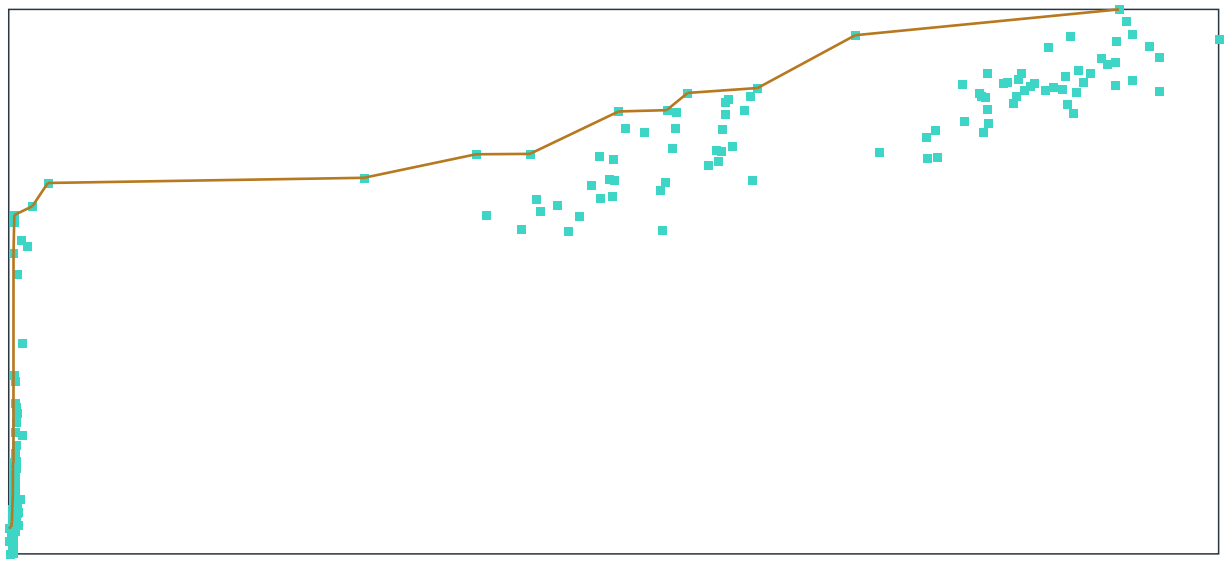
Pillars - Throughput vs hard Acc



Pareto - hard Acc vs Lucy Score

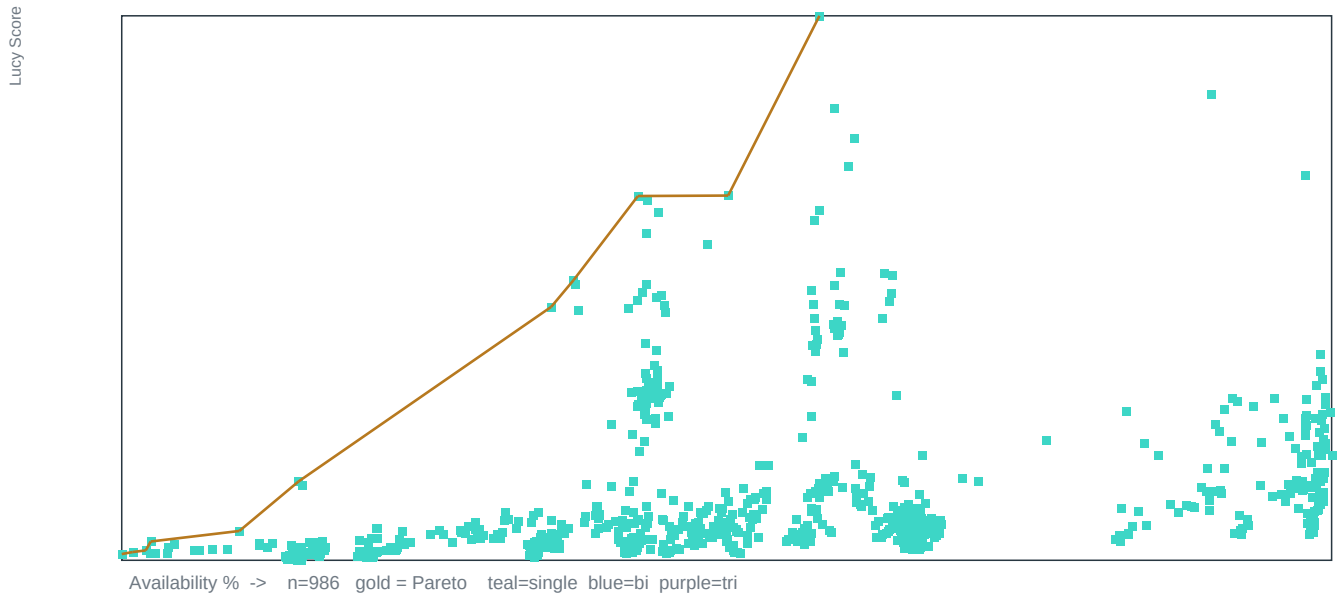


SoftAcc (serve-confidence) vs hard Acc

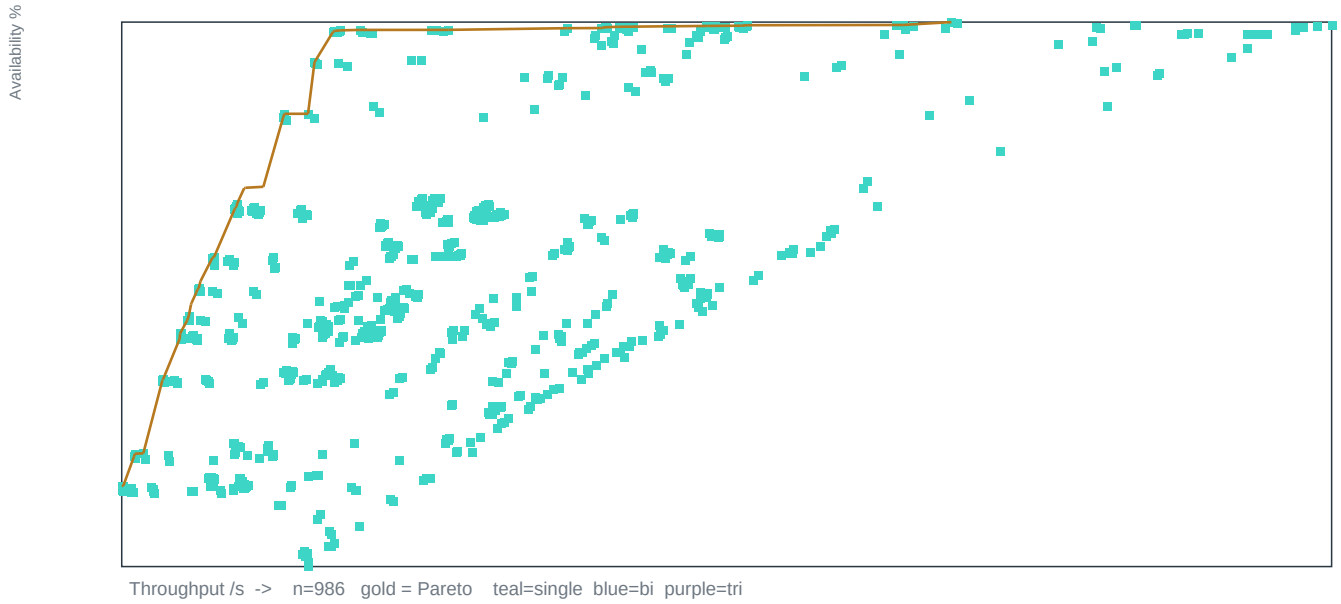



SoftAcc % -> n=986 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

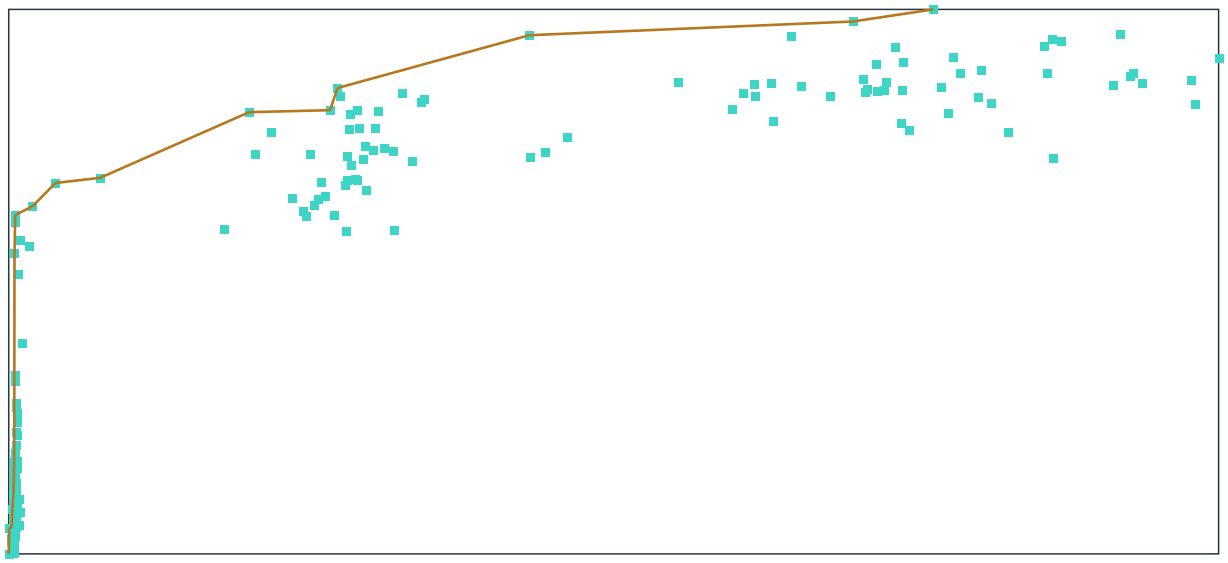
Avail vs Lucy Score (duty clock)



Pillars - Throughput vs Availability



AdaptPct vs hard Acc



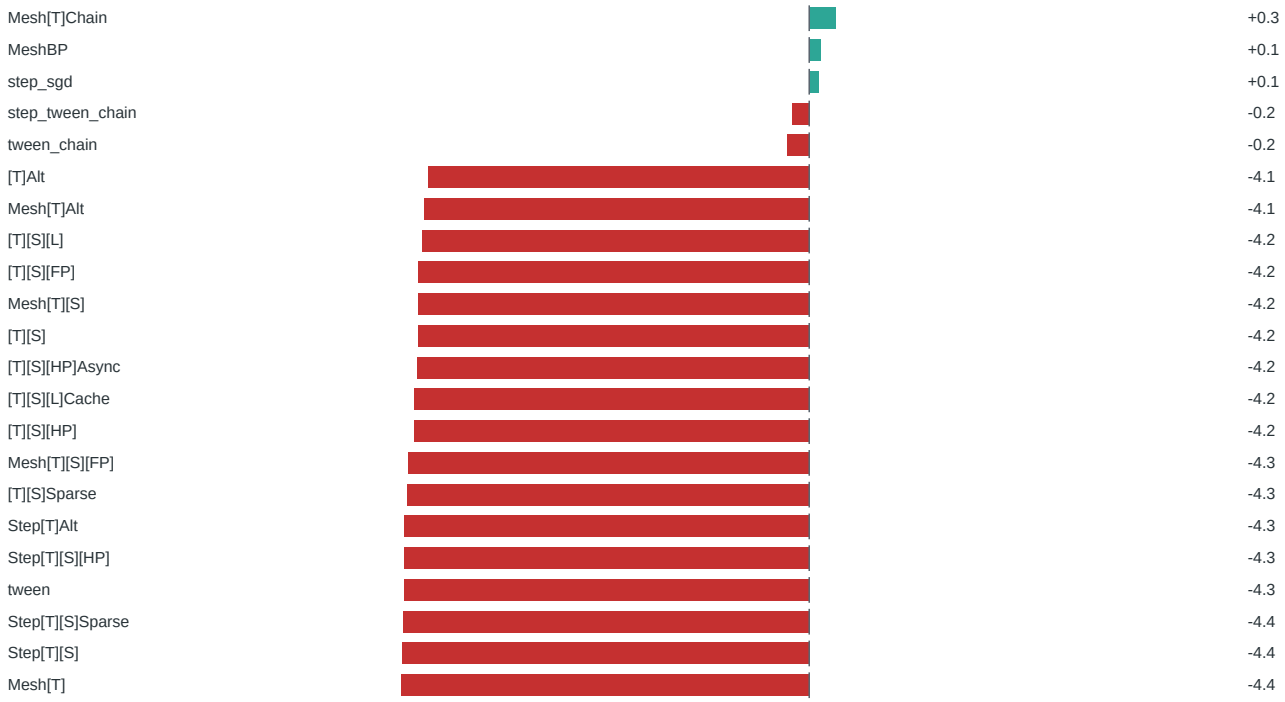

AdaptPct % -> n=986 gold = Pareto teal=single blue=bi purple=tri
Hard Acc %

vs sgd - matched dtype x format x arch

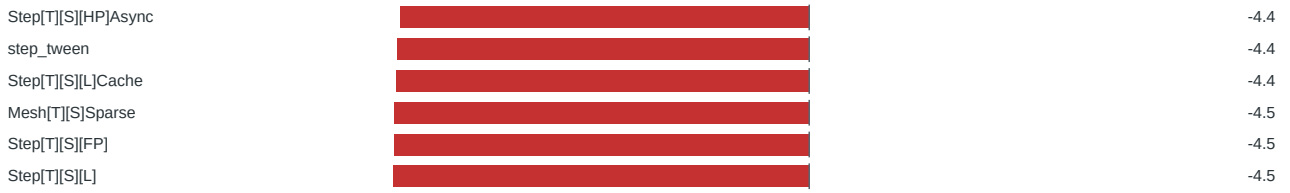
AccDelta is the honest column. ScoreDelta is usually Availability (duty clock), not a better chain rule. Acc win = AccDelta > 0.5. Score win = ScoreDelta > 1. Baseline is discovered from the board, not a frozen StepBP list.

mode	n	AccD	Acc win%	SoftD	AvailD	ThruD	ScoreD	Score win%
Mesh[T]Chain	34	+0.3	35	+0.0	+0.2	+2	+0.2	6
MeshBP	34	+0.1	29	+0.0	+0.2	+2	+0.1	9
step_sgd	34	+0.1	29	-0.0	+3.8	+42	+1.3	44
step_tween_chain	34	-0.2	12	-0.1	+3.9	+44	+1.1	47
tween_chain	34	-0.2	12	-0.0	+0.2	+1	-0.0	0
[T]Alt	34	-4.1	3	-0.8	-7.3	-71	-2.4	0
Mesh[T]Alt	34	-4.1	3	-0.8	-7.2	-72	-2.4	0
[T][S][L]	34	-4.2	0	-0.8	+12.0	+153	-0.4	24
[T][S][FP]	34	-4.2	0	-0.8	+6.0	+65	-1.4	0
Mesh[T][S]	34	-4.2	3	-0.8	+6.0	+66	-1.4	12
[T][S]	34	-4.2	0	-0.8	+5.9	+65	-1.4	0
[T][S][HP]Async	34	-4.2	3	-0.8	+5.9	+65	-1.4	3
[T][S][L]Cache	34	-4.2	0	-0.8	+14.6	+195	-0.1	35
[T][S][HP]	34	-4.2	0	-0.8	+5.9	+65	-1.4	3
Mesh[T][S][FP]	34	-4.3	3	-0.8	+5.9	+63	-1.5	3
[T][S]Sparse	34	-4.3	3	-0.8	+15.6	+214	-0.1	38
Step[T]Alt	34	-4.3	3	-0.8	-5.8	-58	-2.4	0
Step[T][S][HP]	34	-4.3	6	-0.8	+1.5	+15	-1.9	0
tween	34	-4.3	6	-0.8	-2.0	-22	-2.2	0
Step[T][S]Sparse	34	-4.4	0	-0.8	+2.5	+25	-1.9	0
Step[T][S]	34	-4.4	3	-0.8	+2.2	+24	-1.9	0
Mesh[T]	34	-4.4	3	-0.8	-1.9	-20	-2.2	0
Step[T][S][HP]Async	34	-4.4	3	-0.8	+2.1	+22	-1.9	0
step_tween	34	-4.4	3	-0.8	+1.0	+11	-2.0	0
Step[T][S][L]Cache	34	-4.4	3	-0.8	+8.2	+101	-1.3	15
Mesh[T][S]Sparse	34	-4.5	3	-0.8	+15.6	+211	-0.4	38
Step[T][S][FP]	34	-4.5	0	-0.8	+2.1	+21	-2.0	0
Step[T][S][L]	34	-4.5	0	-0.8	+8.2	+100	-1.3	21

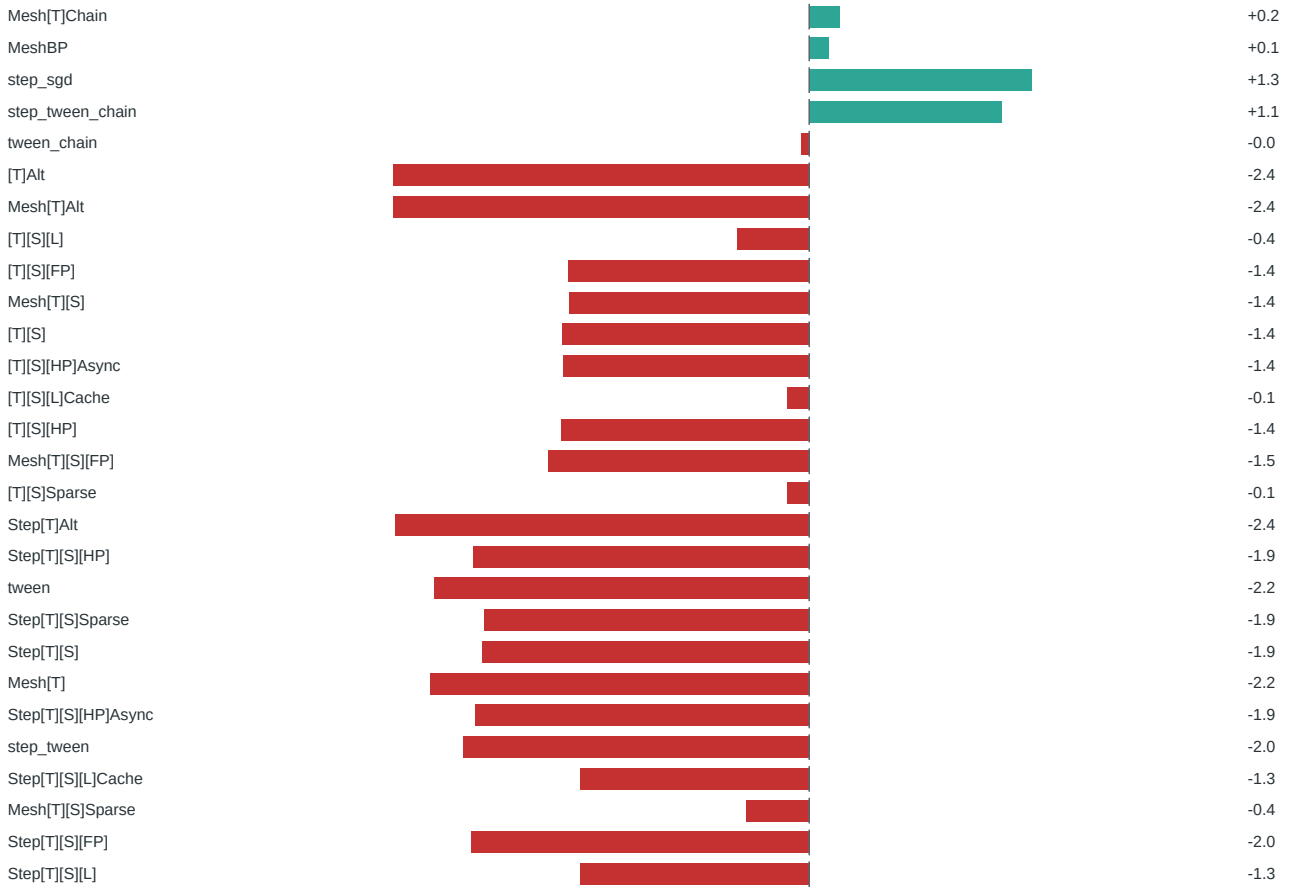
mean AccD vs sgd



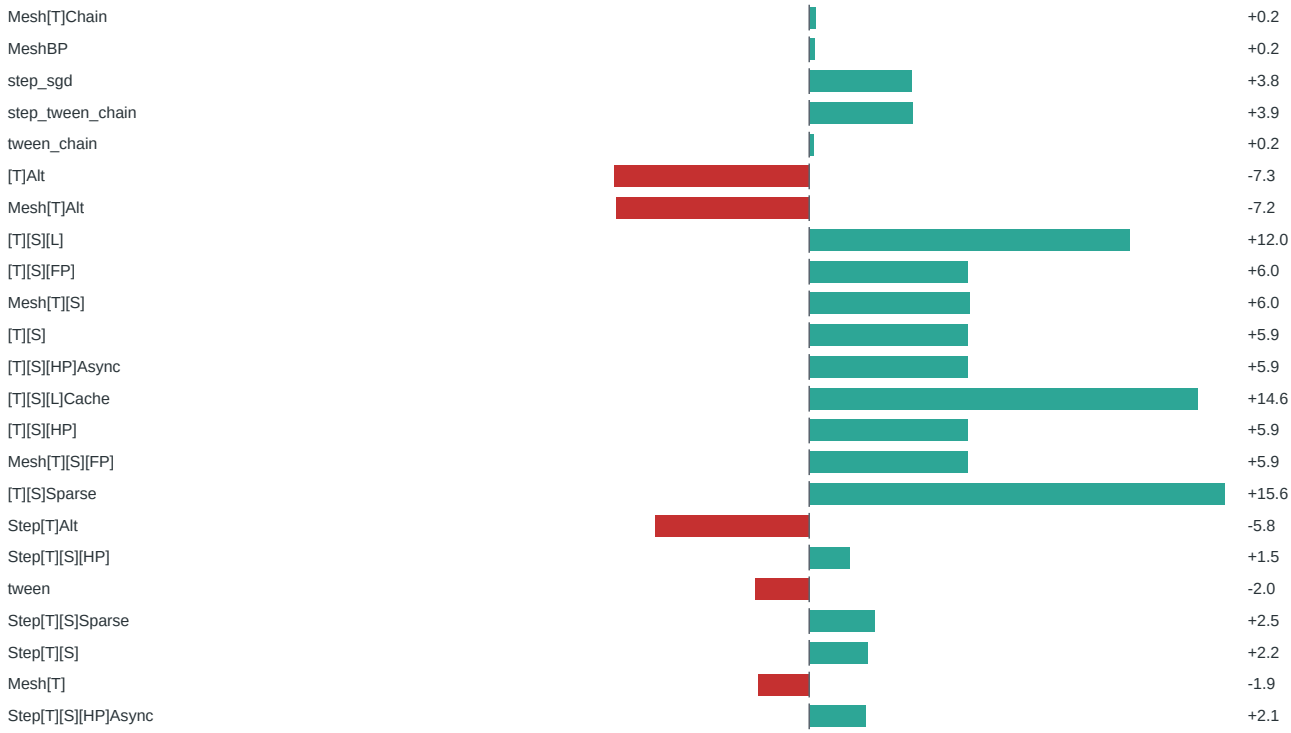
mean AccD vs sgd



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

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

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

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

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

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

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

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

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

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

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

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

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

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

	bfloat16	binary	complex128	complex64	float16	float32	float64	fp4	fp6	fp8e4m3	fp8e5m2	int
MeshBP	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0
Mesh[T]	-2	-1	-2	-2	-1	-2	-2	-2	-2	-2	-2	-2
Mesh[T]Alt	-7	-7	-8	-7	-7	-7	-7	-7	-7	-7	-7	-7
Mesh[T]Chain	+0	+0	+0	+0	+1	+0	+0	+0	+0	+0	+0	+0
Mesh[T][S]	+6	+7	+6	+6	+6	+5	+5	+5	+6	+7	+6	+6
Mesh[T][S][FP]	+6	+6	+6	+6	+6	+5	+5	+6	+6	+7	+6	+6
Mesh[T][S]Sparse	+15	+19	+15	+15	+17	+15	+15	+16	+15	+15	+15	+15
Step[T]Alt	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6
Step[T][S]	+2	+3	+2	+2	+2	+1	+2	+2	+2	+3	+2	+2
Step[T][S][FP]	+2	+3	+2	+2	+2	+1	+1	+2	+2	+2	+2	+2
Step[T][S][HP]	+1	+2	+1	+1	+2	+1	+1	+1	+2	+1	+2	+1
Step[T][S][HP]Async	+2	+3	+2	+2	+2	+1	+1	+2	+2	+2	+2	+2
Step[T][S][L]	+8	+11	+7	+8	+10	+8	+8	+8	+7	+8	+8	+8
Step[T][S][L]Cache	+8	+11	+8	+8	+10	+8	+8	+8	+7	+8	+8	+8
Step[T][S]Sparse	+2	+4	+2	+2	+3	+2	+2	+2	+3	+3	+2	+2
[T]Alt	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7
[T][S]	+6	+6	+6	+6	+6	+5	+5	+5	+6	+6	+6	+6
[T][S][FP]	+6	+6	+6	+6	+6	+5	+5	+5	+6	+6	+6	+6
[T][S][HP]	+6	+6	+6	+6	+6	+5	+6	+5	+6	+7	+6	+6
[T][S][HP]Async	+6	+6	+6	+6	+6	+5	+5	+5	+6	+7	+6	+6
[T][S][L]	+13	+11	+12	+12	+13	+14	+13	+14	+11	+11	+12	+12
[T][S][L]Cache	+15	+17	+14	+14	+16	+15	+15	+14	+13	+14	+14	+14
[T][S]Sparse	+15	+19	+15	+15	+17	+15	+15	+16	+15	+15	+15	+15
step_sgd	+4	+3	+4	+4	+3	+4	+4	+4	+4	+4	+4	+4
step_tween	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1
step_tween_chain	+4	+3	+4	+4	+4	+4	+4	+4	+4	+4	+4	+4
tween	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
tween_chain	+0	+0	+0	+0	+1	+0	+0	+0	+0	+0	+0	+0

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

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

	int16	int2	int3	int32	int4	int5	int6	int64	int8	nf4	ternary	uint
MeshBP	+0	+0	+0	+0	+0	+0	+0	+0	+1	+0	+0	+0
Mesh[T]	-2	-2	-2	-2	-1	-2	-2	-2	-2	-2	-1	-2
Mesh[T]Alt	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7
Mesh[T]Chain	+0	+0	+0	+0	+0	+0	+0	+0	+1	+0	+0	+0
Mesh[T][S]	+6	+5	+6	+6	+6	+6	+6	+6	+5	+6	+7	+6
Mesh[T][S][FP]	+6	+5	+6	+6	+7	+6	+6	+6	+5	+6	+7	+6
Mesh[T][S]Sparse	+15	+18	+15	+15	+19	+15	+15	+15	+16	+15	+19	+15
Step[T]Alt	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6
Step[T][S]	+2	+2	+2	+2	+3	+2	+2	+2	+2	+2	+4	+2
Step[T][S][FP]	+2	+2	+2	+2	+3	+2	+2	+2	+2	+2	+3	+2
Step[T][S][HP]	+1	+2	+2	+1	+2	+2	+2	+1	+1	+1	+2	+1
Step[T][S][HP]Async	+2	+2	+2	+2	+4	+2	+2	+2	+2	+2	+4	+2
Step[T][S][L]	+8	+10	+8	+8	+11	+7	+7	+8	+8	+7	+11	+8
Step[T][S][L]Cache	+8	+10	+7	+8	+11	+7	+7	+8	+9	+7	+11	+8
Step[T][S]Sparse	+2	+3	+3	+2	+4	+3	+3	+2	+2	+2	+4	+2
[T]Alt	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7
[T][S]	+6	+5	+6	+6	+6	+6	+6	+6	+5	+6	+7	+6
[T][S][FP]	+6	+5	+6	+6	+6	+6	+6	+6	+5	+6	+7	+6
[T][S][HP]	+6	+5	+6	+6	+6	+6	+6	+6	+5	+6	+7	+6
[T][S][HP]Async	+6	+5	+6	+6	+6	+6	+6	+6	+5	+6	+7	+6
[T][S][L]	+13	+13	+11	+13	+11	+11	+11	+13	+12	+11	+11	+12
[T][S][L]Cache	+14	+16	+14	+14	+17	+13	+14	+14	+15	+13	+17	+14
[T][S]Sparse	+15	+18	+15	+15	+19	+15	+15	+15	+16	+15	+19	+15
step_sgd	+4	+3	+4	+4	+3	+4	+4	+4	+4	+4	+3	+4
step_tween	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1	+1
step_tween_chain	+4	+3	+4	+4	+3	+4	+4	+4	+4	+4	+3	+4
tween	-2	-2	-2	-2	-1	-2	-2	-2	-2	-2	-1	-2
tween_chain	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0	+0

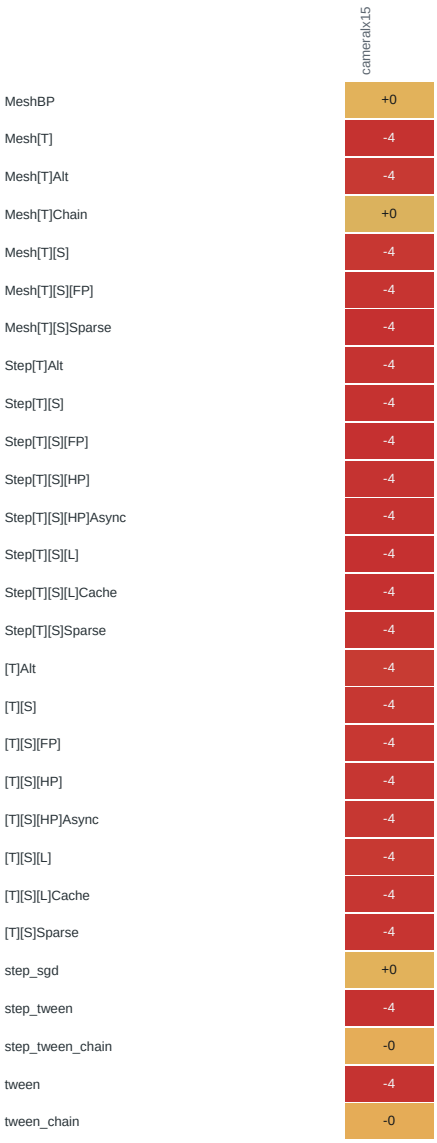
AvailD vs sgd, every mode x dtype (cols 25-34)

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

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

AccD vs sgd, every mode x arch

AccD vs sgd, every mode x arch



Family collapse - Step* vs non-Step

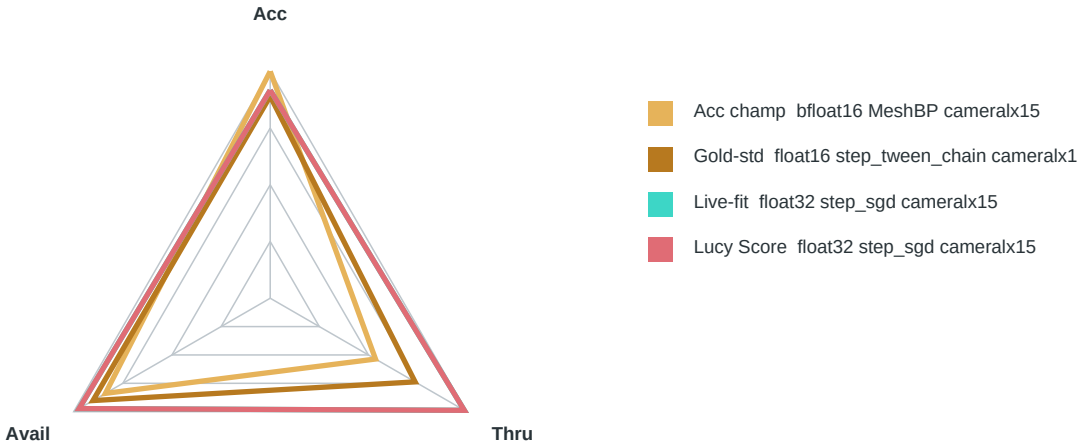
Step* is a 1D pipe (one sample enters layer 0 per tick; output is the sample that entered depth ticks ago). Non-Step of the same family is a full-chain update. AccD is a real scheduler split, not leftover warm-up forwards.

step	plain	n	mean |AccD|
Step[T]Alt	[T]Alt	34	0.60
Step[T][S]	[T][S]	34	0.51
Step[T][S][FP]	[T][S][FP]	34	0.46
Step[T][S][HP]	[T][S][HP]	34	0.42
Step[T][S][HP]Async	[T][S][HP]Async	34	0.48
Step[T][S][L]	[T][S][L]	34	0.46
Step[T][S][L]Cache	[T][S][L]Cache	34	0.36
Step[T][S]Sparse	[T][S]Sparse	34	0.34
step_sgd	sgd	34	0.71
step_tween	tween	34	0.42
step_tween_chain	tween_chain	34	0.72

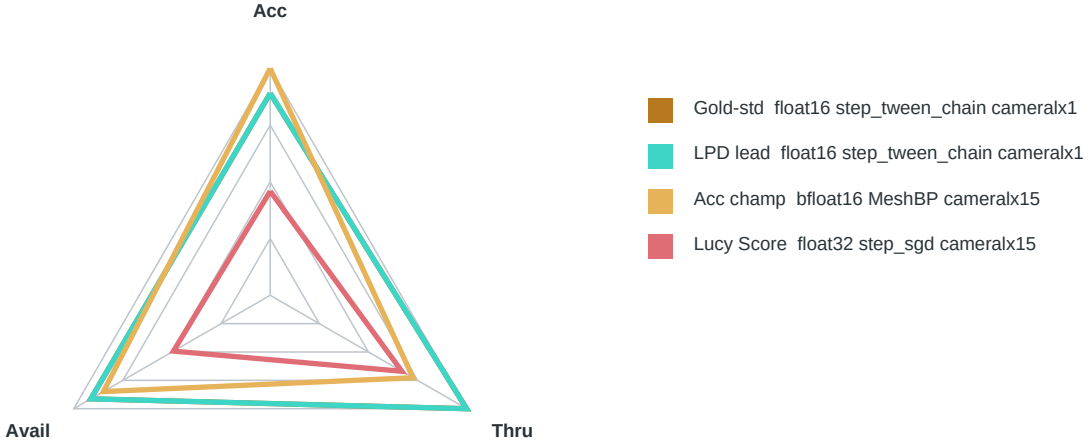
Consciousness - Acc, Throughput, Availability

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|MeshBP|cameralx15|simd Acc 13.5 Thru 231 Avail 23.8% 268.2 KiB (RAM reference)
Lucy Score champ (T x Avail x Acc) float32|none|step_sgd|cameralx15|simd Score 14.6 Acc 12.4 Soft 4 536.4 KiB
Live-fit champ (best Q) float32|none|step_sgd|cameralx15|simd Acc 12.4 Thru 426 Avail 27.7% 536.4 KiB
Gold-std (2+ pillars, Acc keep >= 80%, then smallest then fastest): float16|none|step_tween_chain|cameralx15|simd mode step_tween_chain Acc 12.1 Thru 318 268.2 KiB
Board fastest float32|none|[T][S]Sparse|cameralx15|simd Thru 710 (traps may own this) Best availability float64|none|Mesh[T][S]Sparse|cameralx15|simd 39.0%
Learner Thru peak 431 learner Avail peak 28.4%

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	9	12.8	268.2	426	bfloat16 step_sgd cameralx15 / float32 step_sgd cameralx15
sgd	9	12.7	268.2	344	bfloat16 sgd cameralx15 / float32 sgd cameralx15

Mode	n	Acc	KiB	Thru	Cell
tween_chain	7	12.9	268.2	343	bfloat16 tween_chain cameralx15 / float32 tween_chain cameralx15
MeshBP	9	13.5	268.2	343	bfloat16 MeshBP cameralx15 / float32 MeshBP cameralx15
step_tween_chain	5	12.1	268.2	318	float16 step_tween_chain cameralx15
Mesh[T]Chain	10	13.3	268.2	253	bfloat16 Mesh[T]Chain cameralx15 / float64 Mesh[T]Chain cameralx~

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	float16 step_tween_chain cameralx15	89	74	90	84	100	1.0	0.84	12.1	318	268.2
keep	bfloat16 step_tween_chain cameralx15	88	66	97	83	100	1.0	0.83	11.9	286	268.2
keep	bfloat16 step_sgd cameralx15	86	66	97	82	100	1.0	0.82	11.7	285	268.2
-	float16 step_sgd cameralx15	79	73	89	80	100	1.0	0.80	10.7	315	268.2
acc	float16 MeshBP cameralx15	96	61	78	77	100	1.0	0.77	13.0	262	268.2
acc	float16 tween_chain cameralx15	95	60	78	77	100	1.0	0.77	12.9	261	268.2
keep	bfloat16 MeshBP cameralx15	100	54	84	77	100	1.0	0.77	13.5	231	268.2
keep	uint16 step_sgd cameralx15	85	54	97	76	100	1.0	0.76	11.4	232	268.3
keep	bfloat16 Mesh[T]Chain cameralx15	98	53	84	76	100	1.0	0.76	13.3	230	268.2
keep	bfloat16 tween_chain cameralx15	95	53	83	75	100	1.0	0.75	12.9	230	268.2
acc	float16 sgd cameralx15	90	60	76	74	100	1.0	0.74	12.1	260	268.2
keep	bfloat16 sgd cameralx15	93	53	82	74	100	1.0	0.74	12.7	230	268.2
acc	float16 Mesh[T]Chain cameralx15	85	61	79	74	100	1.0	0.74	11.5	263	268.2
-	int16 step_tween_chain cameralx15	71	53	99	72	100	1.0	0.72	9.6	228	268.2
-	int16 step_sgd cameralx15	71	53	99	72	100	1.0	0.72	9.6	228	268.2
keep	int16 Mesh[T]Chain cameralx15	83	43	85	67	100	1.0	0.67	11.2	185	268.2
keep	int16 sgd cameralx15	84	42	84	67	100	1.0	0.67	11.4	182	268.2
-	uint16 MeshBP cameralx15	75	44	84	65	100	1.0	0.65	10.1	191	268.3
-	uint16 tween_chain cameralx15	76	44	83	65	100	1.0	0.65	10.2	190	268.3
-	uint16 sgd cameralx15	76	44	83	65	100	1.0	0.65	10.3	190	268.3

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

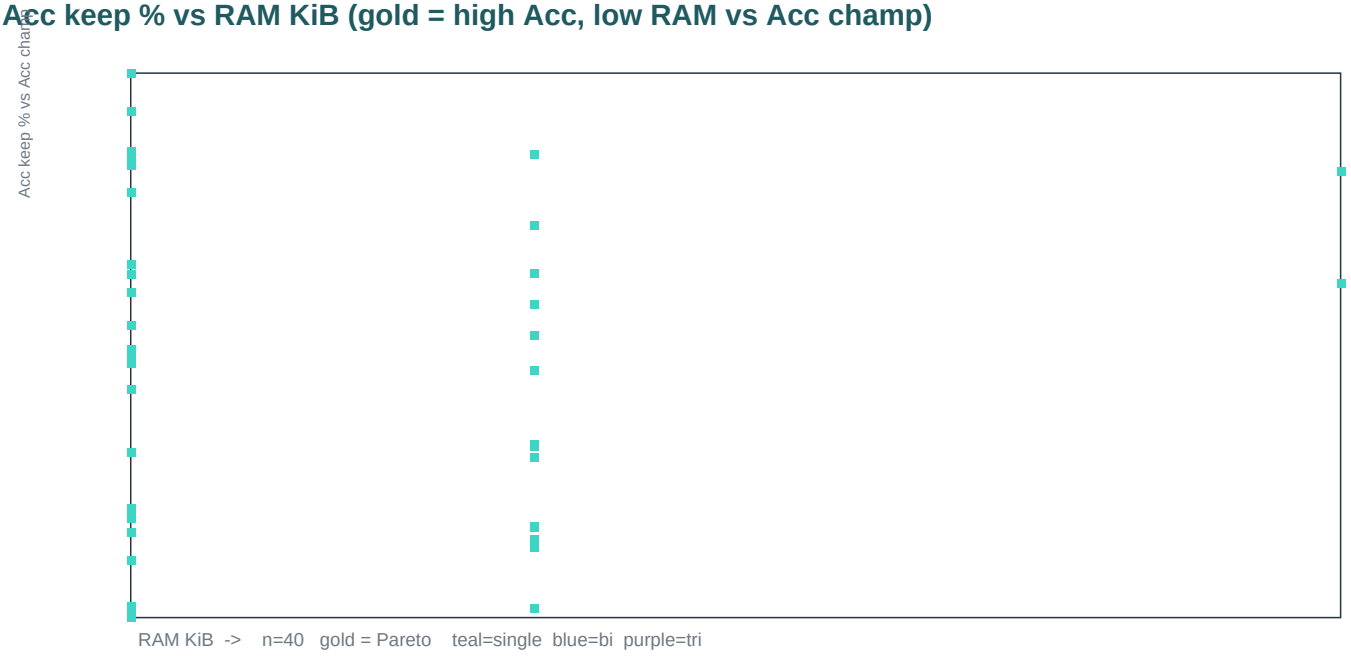
Band	Cell	Acc%	Thru%	Avail%	Q%	LPD	Thru	Avail
keep	float32 step_sgd cameralx15	92	99	97	96	0.48	426	27.7
-	float32 step_tween_chain cameralx15	75	100	98	90	0.45	431	28.0
keep	float64 step_sgd cameralx15	95	72	100	88	0.22	312	28.4
keep	float64 step_tween_chain cameralx15	89	73	99	86	0.22	313	28.3
keep	float16 step_tween_chain cameralx15	89	74	90	84	0.84	318	25.6
keep	float32 sgd cameralx15	89	80	83	84	0.42	344	23.7
keep	float32 tween_chain cameralx15	87	80	84	84	0.42	343	23.9
keep	bfloat16 step_tween_chain cameralx15	88	66	97	83	0.83	286	27.6
keep	float32 MeshBP cameralx15	84	80	85	83	0.41	343	24.1
keep	bfloat16 step_sgd cameralx15	86	66	97	82	0.82	285	27.5

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

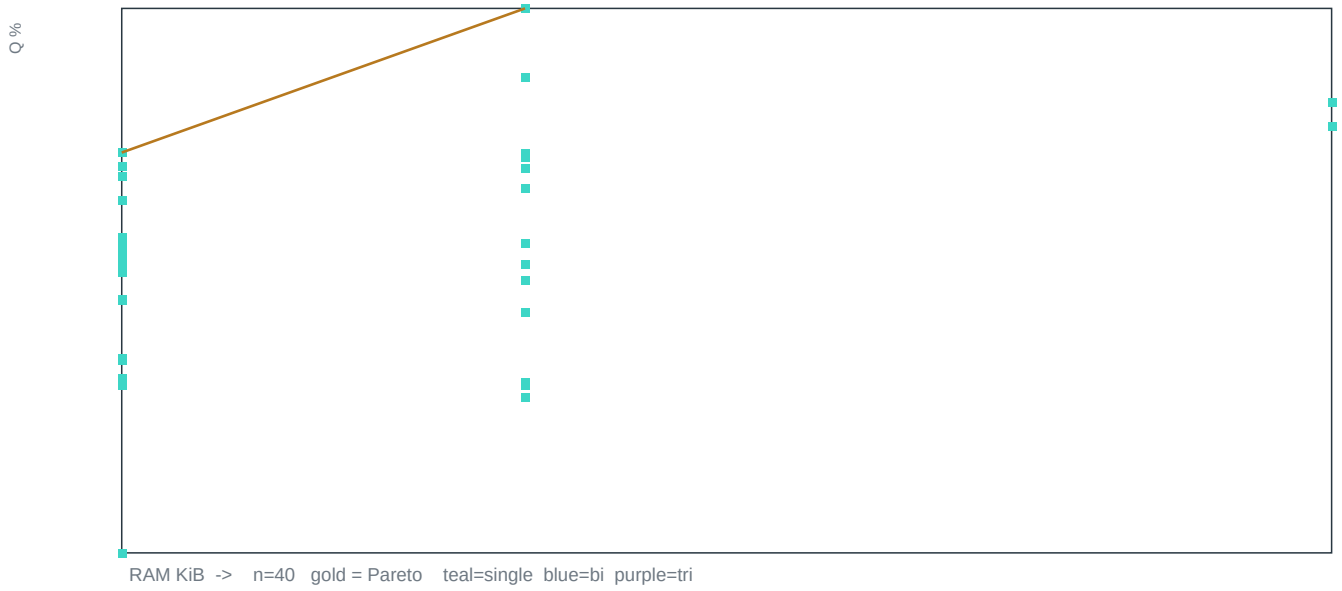
Band	Cell	Acc%	Thru%	Avail%	Q%	RAM%	xSmall	LPD	Acc	Thru	KiB
trap	binary sgd cameralx15	12	58	70	36	6	16.0	0.00	1.6	250	16.8
trap	binary step_sgd cameralx15	14	70	80	43	6	16.0	0.00	1.9	301	16.8
trap	binary tween cameralx15	7	53	64	28	6	16.0	0.00	0.9	226	16.8
trap	binary tween_chain cameralx15	11	58	71	35	6	16.0	0.00	1.5	252	16.8
trap	binary step_tween cameralx15	11	62	73	37	6	16.0	0.00	1.5	267	16.8
trap	binary step_tween_chain cameralx15	11	70	81	40	6	16.0	0.00	1.5	303	16.8
trap	binary MeshBP cameralx15	16	59	71	41	6	16.0	0.00	2.2	253	16.8
trap	binary Mesh[T] cameralx15	15	53	65	37	6	16.0	0.00	2.0	228	16.8

trap	binary Mesh[T]Chain cameralx15	15	59	70	39	6	16.0	0.00	2.0	254	16.8
trap	binary [T][S] cameralx15	9	83	92	41	6	16.0	0.00	1.3	357	16.8

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

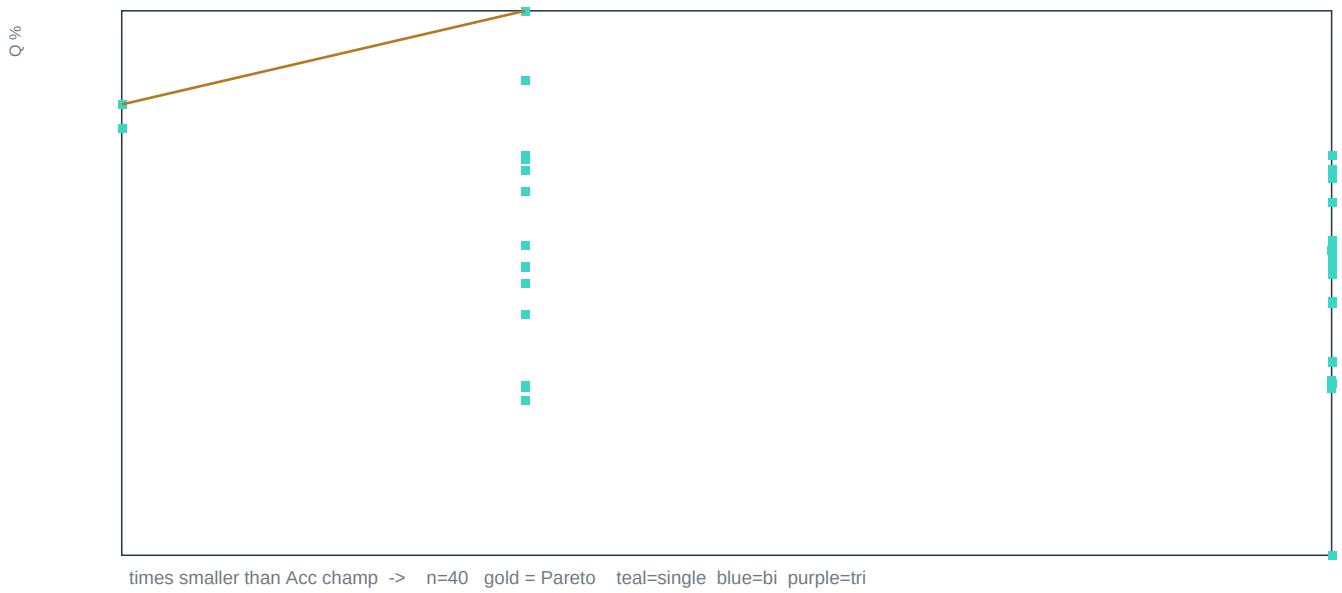


Q% vs RAM KiB (gold = high consciousness, low RAM)



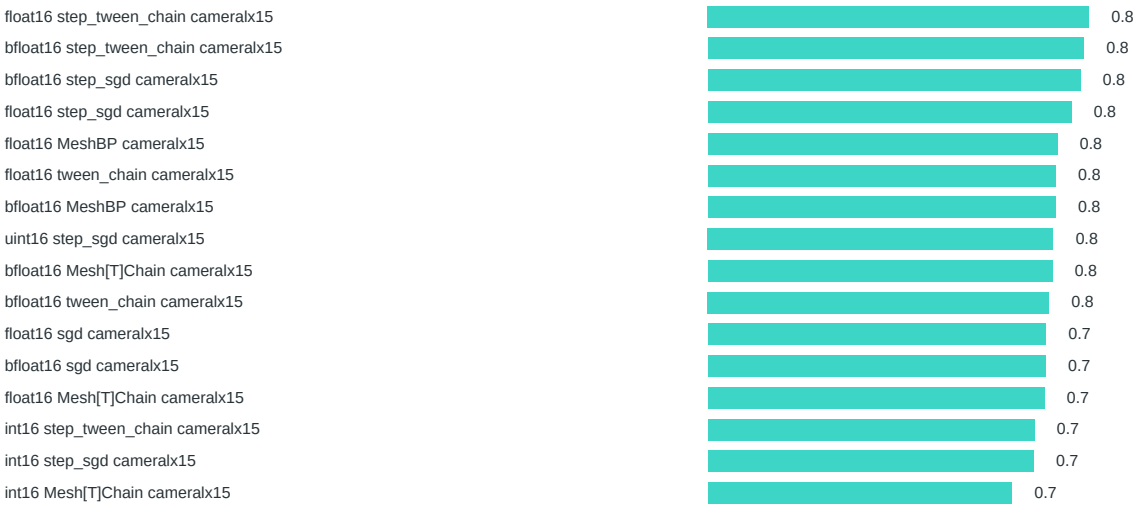
Q% vs shrink vs Acc champ (gold = upper right)

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

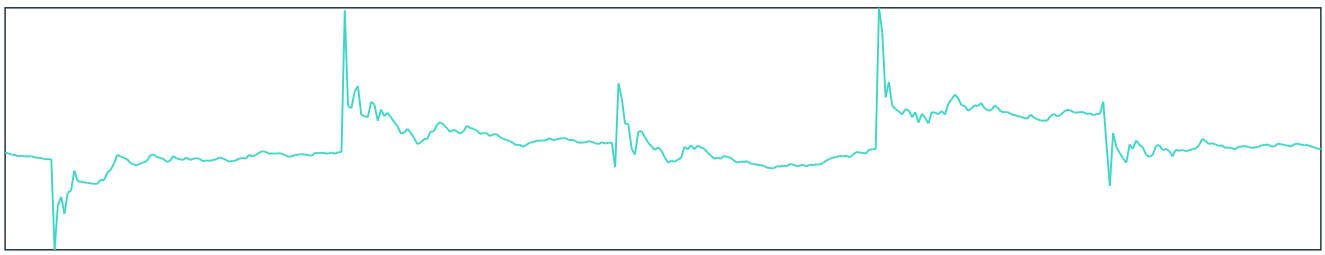


times smaller than Acc champ -> n=40 gold = Pareto teal=single blue=bi purple=tri

Top Lucy density (LPD)

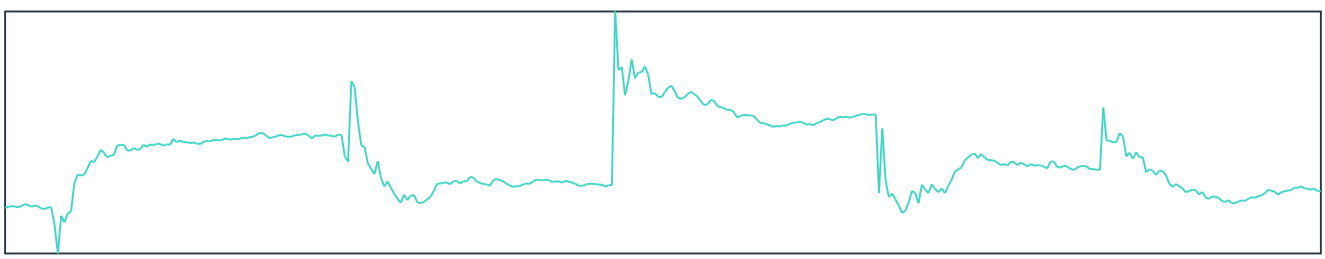


Live pulse (Score)



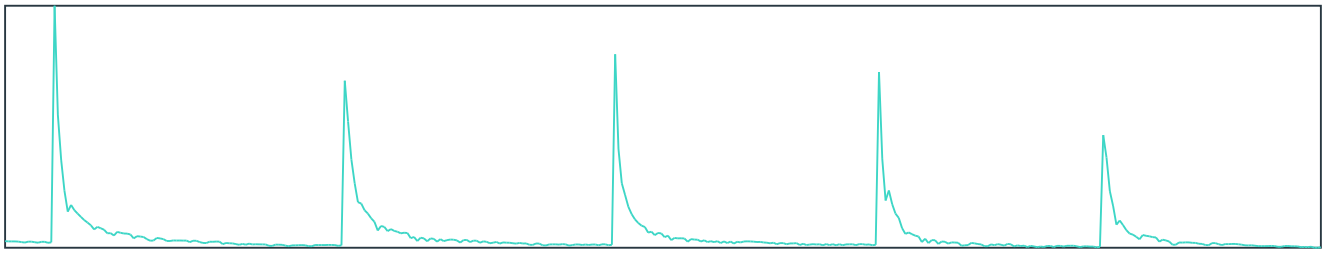
n=400 min=0.00 max=1.01

Live pulse (SoftAcc)



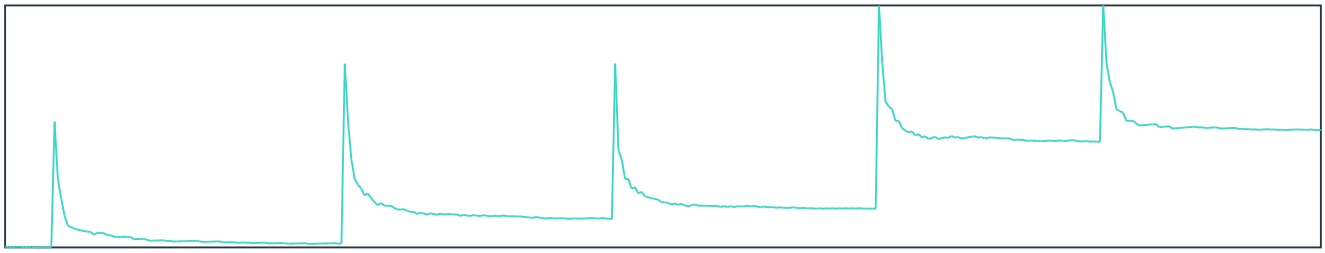
n=400 min=1.54 max=1.54

Live pulse (Availability)



n=400 min=25.97 max=36.69

Live pulse (Throughput)



n=400 min=93.08 max=159.76

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