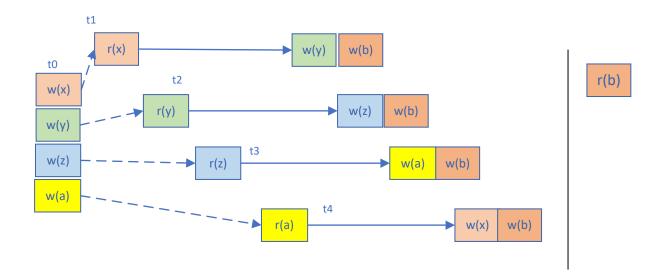
c→commit a→abort+理由になったtx bd→boundary r→read flag対象のtx w→write flag対象のtx

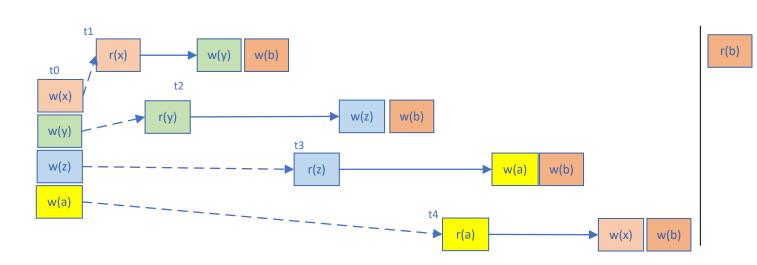


write_crown

cascading_4tx_cycled

	oc	с4	ဝငငဒ်	3ltx1	0002 00		000°	lltx1 c2	ltx1d	осс3	occ2	2ltx2	occ1		ltx1oc	c2ltx1
t1	occ	С	occ	a:t4	occ	С	occ	С	LTX	c bd1	occ	a:t4	occ	a:t4	LTX	c bd1
t2	occ	a:t1	осс	С	осс	a:t1	LTX	c bd2	occ	a:t1	occ	С	LTX	c bd2	осс	a:t1
t3	occ	С	осс	С	LTX	c bd3	occ	a:t2	occ	С	LTX	c bd3	осс	a:t2	осс	С
t4	occ	a:t3	LTX	c bd4	occ	a:t3	occ	С	occ	a:t3	LTX	c bd3 r:t3	LTX	c bd4	LTX	c bd4
read b	t	3	t	3	t	1	t	4	t	3	t.	2	t2 o	or t4	t:	3
	occ oc		ltx1d		ltx2d	осс2	occ	Iltx3	ltx1oc	c1ltx2	ltx2oc	c1ltx1	ltx3d	 occ1	ltx	×4
t1	occ	С	LTX	c bd1	LTX	c bd1	occ	a:t4	LTX	c bd1	LTX	c bd1	LTX	c bd1	LTX	c bd1
t2	LTX	c bd2	occ	a:t1	LTX	c bd1 r:t1	LTX	c bd2	occ	a:t1	LTX	c bd1 r:t1	LTX	c bd1 r:t1	LTX	c bd1 r:t1
t3	LTX	c bd2 r:t2	LTX	c bd3	occ	a:t2	LTX	c bd2 r:t2	LTX	c bd3	occ	a:t2	LTX	c bd1 r:t2	LTX	c bd1 r:t2
t4	occ	a:t3	occ	a:t3	occ	С	LTX	c bd2 r:t3	LTX	c bd3 r:t3	LTX	c bd4	occ	a:t3	LTX	a bd1 r:t2 w:t1
read b				or t3		4	t			or t3	t1 o		t		t t	

ex write_crown.cascading_4tx_cycled.occ2ltx1occ1



cascading_3tx_cycled

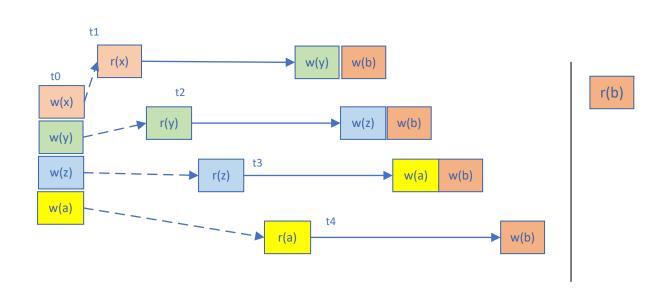
	oc	с4	occi	Bltx1	0002 00		occ1 oc		ltx1c	эсс3	occ2	2ltx2	occ1		ltx1oc	c2ltx1
t1	occ	С	occ	a:t4	occ	С	occ	С	LTX	c bd1	occ	a:t4	occ	a:t4	LTX	c bd1
t2	occ	a:t1	occ	С	occ	a:t1	LTX	c bd2	occ	a:t1	occ	C	LTX	c bd2	occ	a:t1
t3	occ	С	occ	a:t2	LTX	c bd3	occ	a:t2	occ	С	LTX	c bd3	occ	a:t2	occ	С
t4	occ	a:t3	LTX	c bd4	occ	a:t3	occ	С	occ	a:t3	LTX	c bd3 r:t3	LTX	c bd4	LTX	c bd4
read b	t	3	t	2	t	1	t	4	t	3	t	2	t,	4	ť	3
	000°		ltx1c		ltx2d	occ2	occ1	lltx3	ltx1oc	c1ltx2	ltx2oc	c1ltx1	ltx3d	occ1	lt>	< 4
t1	occ	С	LTX	c bd1	LTX	c bd1	occ	a:t4	LTX	c bd1	LTX	c bd1	LTX	c bd1	LTX	c bd1
t2	LTX	c bd2	occ	a:t1	LTX	c bd1 r:t1	LTX	c bd2	occ	a:t1	LTX	c bd1 r:t1	LTX	c bd1 r:t1	LTX	c bd1 r:t1
t3	LTX	c bd2 r:t2	LTX	c bd3	occ	a:t2	LTX	c bd2 r:t2	LTX	c bd3	occ	a:t2	LTX	c bd1 r:t2	LTX	c bd1 r:t2
t4	occ	a:t3	occ	a:t3	occ	С	LTX	c bd2 r:t3	LTX	c bd3 r:t3	LTX	c bd4	occ	a:t3	LTX	a bd1 r:t2 w:t1
															2	ľ

write_crown

cascading_3tx_1epoch_per_1ope_cycled

	ос	c4	occi	3ltx1	0002 00		000		ltx10	эсс3	occi	2ltx2	occ ⁻		ltx1oc	c2ltx1
t1	occ	С	occ	С	occ	С	occ	С	LTX	c bd1	occ	С	occ	С	LTX	c bd1
t2	occ	a:t1	occ	a:t1	occ	a:t1	LTX	c bd2	occ	a:t1	occ	a:t1	LTX	c bd2	осс	a:t1
t3	occ	С	occ	С	LTX	c bd3	occ	a:t2	occ	С	LTX	c bd3	occ	a:t2	occ	С
t4	occ	a:t3	LTX	c bd:4	occ	a:t3	occ	С	occ	a:t3	LTX	c bd3 r:t3	LTX	c bd4	LTX	c bd4
read b	t	3	t	3	t	3	t	4	t	3	t	3	t	4	t	3
	occ oc		ltx1d		ltx2d	occ2	occ.	Iltx3	ltx1oc	c1ltx2	ltx2oc	c1ltx1	ltx3d	occ1	lt:	×4
t1	occ	С	LTX	c bd1	LTX	c bd1	occ	С	LTX	c bd1	LTX	c bd1	LTX	c bd1	LTX	c bd1
t2	LTX	c bd2	осс	a:t1	LTX	c bd1 r:t1	LTX	c bd2	occ	a:t1	LTX	c bd1 r:t1	LTX	c bd1 r:t1	LTX	c bd1 r:t1
t3	LTX	c bd2 r:t2	LTX	c bd3	occ	a:t2	LTX	c bd2 r:t2	LTX	c bd3	occ	a:t2	LTX	c bd1 r:t2	LTX	c bd1 r:t2
t4	осс	a:t3	осс	a:t3	occ	С	LTX	a bd2 r:t3	LTX	c bd3 r:t3	LTX	c bd4	occ	a:t3	LTX	a bd1 r:t2
								w:t1								w:t1

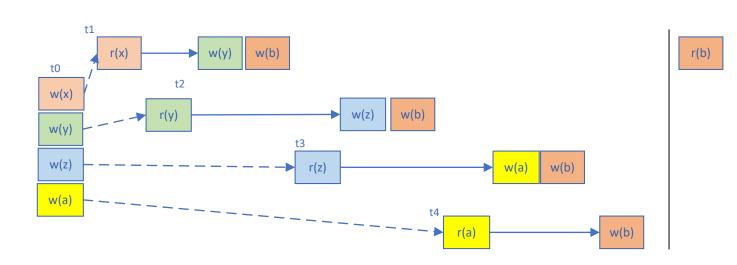
ex write_crown.cascading_3tx_1epoch_per_1ope.occ2ltx1occ1



cascading_4tx_uncylced

	ос	c4	occ3	Bltx1	occ2 oc		0CC ⁻		ltx1d	эсс3	occ2	2ltx2	occ		ltx1oc	c2ltx1
t1	occ	С	occ	С	occ	С	occ	С	LTX	c bd1	occ	С	осс	С	LTX	c bd1
t2	occ	a:t1	occ	a:t1	occ	a:t1	LTX	c bd2	occ	a:t1	occ	a:t1	LTX	c bd2	occ	a:t1
t3	occ	С	occ	С	LTX	c bd3	occ	a:t2	occ	С	LTX	c bd3	осс	a:t2	occ	С
t4	occ	a:t3	LTX	c bd4	occ	a:t3	occ	С	occ	a:t3	LTX	c bd3 r:t3	LTX	c bd4	LTX	c bd4
read b	t	4	t3		t	1	t	4	t	3	t	1	t	1	t	3
											1				1	
	000 00		ltx1d ltx1d		ltx2d	осс2	occ ⁻	Iltx3	ltx1oc	c1ltx2	ltx2oc	c1ltx1	ltx3	occ1	lt	×4
t1			l		ltx2c	c bd1	occ occ	lltx3	ltx1oc	c1ltx2	ltx2oc	c1ltx1 c bd1	ltx36	c bd1	lt:	c bd1
t1 t2	ос	c1	ltx1d	осс1 с		С				С		С		С		С
	OCC	c c	ltx1c	c bd1	LTX	c bd1 c bd1	occ	c	LTX	c bd1	LTX	c bd1 c bd1	LTX	c bd1 c bd1	LTX	c bd1 c bd1
t2	OCC LTX	c c bd2	LTX OCC	c bd1	LTX	c bd1 c bd1 r:t1	OCC	c c bd2	LTX	c bd1	LTX	c bd1 c bd1 r:t1	LTX	c bd1 c bd1 r:t1	LTX	c bd1 c bd1 r:t1

ex write_crown.cascading_4tx_uncycled.occ2ltx1occ1



cascading_3tx_uncycled

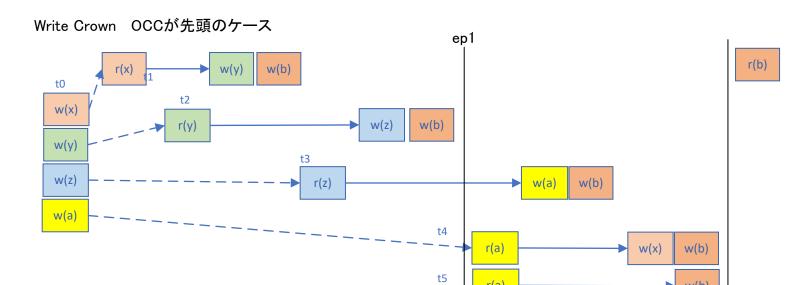
	ос	с4	occ3	Bltx1	occ2 oc		occ1		ltx1c	эсс3	occ2	2ltx2	occ1		ltx1oc	c2ltx1
t1	occ	С	occ	С	occ	С	occ	С	LTX	c bd1	occ	С	occ	С	LTX	c bd1
t2	occ	a:t1	occ	С	occ	a:t1	LTX	c bd2	occ	a:t1	occ	a:t1	LTX	c bd2	occ	a:t1
t3	occ	С	occ	a:t2	LTX	c bd3	occ	a:t2	occ	С	LTX	c bd3	occ	a:t2	occ	С
t4	occ	a:t3	LTX	c bd4	occ	a:t3	occ	С	occ	a:t3	LTX	c bd3 r:t3	LTX	c bd4	LTX	c bd4
read b	t	4	t	2	t	1	t	4	t	3	t	1	t	1	t	3
	occ1		ltx1c		ltx2d	occ2	occ1	ltx3	ltx1oc	c1ltx2	ltx2oc	c1ltx1	ltx3d	occ1	ltx	« 4
t1	occ	С	LTX	c bd1	LTX	c bd1	occ	С	LTX	c bd1	LTX	c bd1	LTX	c bd1	LTX	c bd1
t2	LTX	c bd2	occ	a:t1	LTX	c bd1 r:t1	LTX	c bd2	occ	a:t1	LTX	c bd1 r:t1	LTX	c bd1 r:t1	LTX	c bd1 r:t1
t3	LTX	c bd2 r:t2	LTX	c bd3	occ	a:t2	LTX	c bd2 r:t2	LTX	c bd3	occ	a:t2	LTX	c bd1 r:t2	LTX	c bd1 r:t2
t4	occ	a:t3	occ	a:t3	occ	С	LTX	c bd2 r:t3	LTX	c bd3 r:t3	LTX	c bd4	occ	a:t3	LTX	c bd1 r:t3
read b	t	1	t1 o	rt3	t [,]	4	t	1	t1 o	or t3	t1 o	r t4	t	1	ť	1

write_crown

cascading_3tx_1epoch_per_1ope_uncycled

	oc	с4	ဝငင်	Bltx1	0002 00		occ ⁻		ltx10	осс3	occi	2ltx2	000°		ltx1oc	c2ltx1
t1	occ	С	occ	С	occ	С	occ	С	LTX	c bd1	occ	С	occ	С	LTX	c bd1
t2	occ	a:t1	occ	a:t1	occ	a:t1	LTX	c bd2	occ	a:t1	occ	a:t1	LTX	c bd2	occ	a:t1
t3	occ	С	occ	С	LTX	c bd3	occ	a:t2	occ	С	LTX	c bd3	occ	a:t2	occ	С
t4	occ	a:t3	LTX	c bd4	occ	a:t3	occ	С	occ	a:t3	LTX	c bd3 r:t3	LTX	c bd4	LTX	c bd4
read b	t	3	t	3	t	3	t	4	t	3	t	3	t.	4	t	3
	000°	lltx2 c1	ltx1d ltx1d		ltx2d	occ2	occ [*]	lltx3	ltx1oc	c1ltx2	ltx2oc	c1ltx1	ltx3d	occ1	lt	< 4
t1					ltx2c	c bd1	occ.	c	ltx1oc	c1ltx2 c bd1	ltx2oc	c1ltx1 c bd1	ltx3d	c bd1	lt:	c bd1
t1 t2	oc	c1	ltx1d	c c		С				С		С		С		С
	OCC	c1 c	ltx1c	c bd1	LTX	c bd1 c bd1	occ	C	LTX	c bd1	LTX	c bd1 c bd1	LTX	c bd1 c bd1	LTX	c bd1 c bd1
t2	OCC LTX	c c c bd2 c bd2	LTX OCC	c bd1	LTX	c bd1 c bd1 r:t1	OCC	c c bd2	LTX	c bd1 a:t1	LTX	c bd1 c bd1 r:t1	LTX	c bd1 c bd1 r:t1	LTX	c bd1 c bd1 r:t1

ex write_crown.cascading_all_3tx_1epoch_per_1ope.occ2ltx1occ1

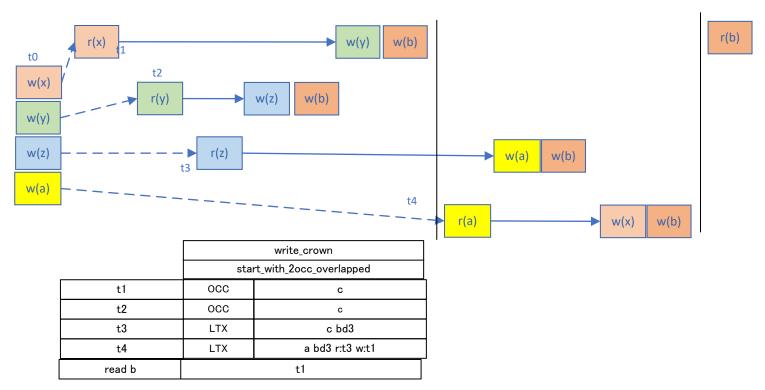


r(a)

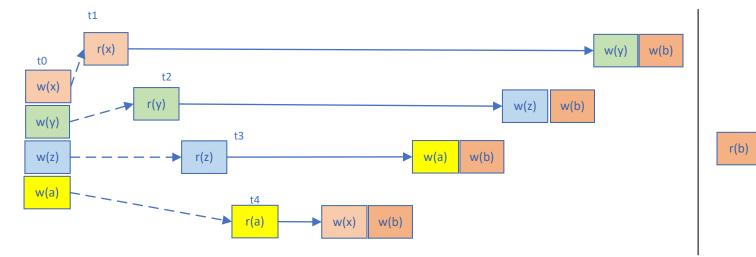
w(b)

		write_crown
	st	tart_with_occ_cascading
t1	occ	С
t2	LTX	c bd:2
t3	LTX	c bd2 r:t2
t4	LTX	a bd2 r:t3 w:t1
t5	LTX	c bd2 r:t3
read b		t1

Write Crown OCCが先頭のケースでオーバーラップする



Write Crown overlapped_all_4tx_cycled



write_crown

overlapped_4tx_cycled

	oc	с4	ဝငင	3ltx1	0002 00		occ1		ltx10	осс3	occź	2ltx2	000°		ltx1oc	c2ltx1
t1	occ	a:t4	occ	a:t4	occ	С	occ	a:t4	LTX	c bd1	occ	a:t4	occ	a:t4	LTX	c bd1
t2	occ	С	осс	С	occ	С	LTX	c bd2	occ	a:t1	occ	С	LTX	c bd2	осс	a:t1
t3	occ	C	occ	С	LTX	c bd3	occ	a:t2	occ	С	LTX	c bd3	occ	a:t2	осс	С
t4	occ	С	LTX	c bd4	occ	a:t3	occ	С	occ	С	LTX	c bd3 r:t3	LTX	c bd4	LTX	c bd4
read b	t	2	t	2	t	1	t	4	t	3	t	2	t	4	t:	3
	occ oc		ltx1d		ltx2d	occ2	occi	lltx3	ltx1oc	:c1ltx2	ltx2oc	c1ltx1	ltx3d	occ1	ltx	×4
t1	occ	С	LTX	c bd1	LTX	c bd1	occ	a:t4	LTX	c bd1	LTX	c bd1	LTX	c bd1	LTX	c bd1
t2	LTX	c bd2	occ	a:t1	LTX	c bd1 r:t1	LTX	c bd2	occ	a:t1	LTX	c bd1 r:t1	LTX	c bd1 r:t1	LTX	c bd1 r:t1
t3	LTX	c bd2 r:t2	LTX	c bd3	occ	a:t2	LTX	c bd2 r:t2	LTX	c bd3	occ	a:t2	LTX	c bd1 r:t2	LTX	c bd1 r:t2
t4	occ	a:t3	occ	a:t3	occ	С	LTX	c bd2 r:t3	LTX	c bd3 r:t3	LTX	c bd4	осс	a:t3	LTX	a bd1 r:t2
														L		w:t1

overlapped_4tx_with_epoch_cycled

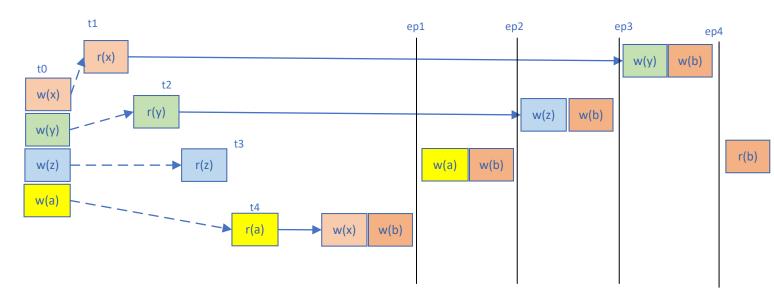
occ2ltx1 occ1ltx1 occ1ltx1 occ3ltx1 occ2ltx2 occ4 ltx1occ3 ltx1occ2ltx1 occ1ltx1 occ1 occ2 С occ t1 occ a:t4 occ a:t4 occ occ LTX a:t4 occ a:t4 LTX С a:t4 bd1 bd1 t2 OCC occ LTX occ a:t1 occ LTX OCC С occ С a:t1 С bd2 bd2 occ occ LTX LTX occ t3 С С OCC a:t2 OCC С a:t2 OCC С bd3 bd3 occ LTX occ t4 С occ a:t3 occ С С LTX bd3 LTX LTX read b t2 t1 t4 t3 t2 t4 t3 go:t2/t3 go:t2/t3 go:t1/t2/t3go:t2 go:t1/t3 go:t2/t3 go:t2 go:t1/t3 w:NA w:NA w:NA w:NA w:t4 w:NA w:NA ep1 /w:NA /w:NA /w:NA /w:NA /w:NA /w:t3 /w:NA /w:NA go:t1/t2 go:t2 go:t2 go:t2 go:t1 go:t2 go:t2 go:t1 w:NA w:NA w:NA w:NA w:NA w:NA w:NA w:NA ep2 /w:NA /w:NA /w:NA /w:NA /w:NA /w:NA /w:NA /w:NA go:NA go:NA go:NA go:t1 go:t1 go:NA go:NA go:t1 w:NA ер3 w:NA w:NA w:NA w:NA w:NA w:NA w:NA /w:NA /w:NA /w:NA /w:NA /w:NA /w:NA /w:NA /w:NA

	occ1		ltx1c		ltx2c	осс2	occ1	ltx3	ltx1oc	c1ltx2	ltx2oc	c1ltx1	ltx3c	occ1	ltx	4
t1	occ	a:t4	LTX	c bd1	LTX	c bd1	occ	a:t4	LTX	c bd1	LTX	c bd1	LTX	c bd1	LTX	c bd1
t2	LTX	c bd2	occ	a:t1	LTX	c bd1 r:t1	LTX	c bd2	occ	a:t1	LTX	c bd1 r:t1	LTX	c bd1 r:t1	LTX	c bd1 r:t1
t3	LTX	c bd2 r:t2	LTX	c bd3	occ	a:t2	LTX	c bd2 r:t2	LTX	c bd3	occ	a:t2	LTX	c bd1 r:t2	LTX	c bd1 r:t2
t4	occ	a:t3	occ	a:t3	occ	С	LTX	c bd2 r:t3	LTX	c bd3 r:t3	LTX	c bd4	occ	a:t3	LTX	a bd1 r:t2 w:t1
read b	t	2	t	3	t	4	t	2	t	3	t	4	t	1	t	1
	go:t	2/t3	go:t	1/t3	go:t	1/t2	go:t	2/t3	go:t	1/t3	go:t	1/t2	go:t1/	′t2/t3	go:t1/	′t2/t3
ep1		NA		NA	.	NA		:t4	ļ	:t4	.	NA	w:l		w:	
	ł 	:NA :t2		:NA ::t1		:NA 1/t2		r:t3 :t2	ļ	r:t3 :t1	 	:NA 1/t2	/w: go:t		/w go:t	
ep2	I——	:t3	<u> </u>	NA		NA		3/t4		NA		NA	go:t w:		go:t w:t3	
552	l 	/:t2		:NA	<u> </u>	:NA		3/t2	<u> </u>	:NA	!	:NA	/w		/w:t	
	go	:NA	go	:t1	go	:t1	go:	NA	go	:t1	go	:t1	go	:t1	go	:t1
ер3	w:	NA	w:	NA	w:	t2	w:	NA	w:	NA	w	:t2	w:t2	2/t3	w:t2/	t3/t4
	/w	:NA	/w	:NA	/w	r:t1	/w	:NA	/w	:NA	/w	/:t1	/w:t	1/t2	/w:t1/	/t2/t3

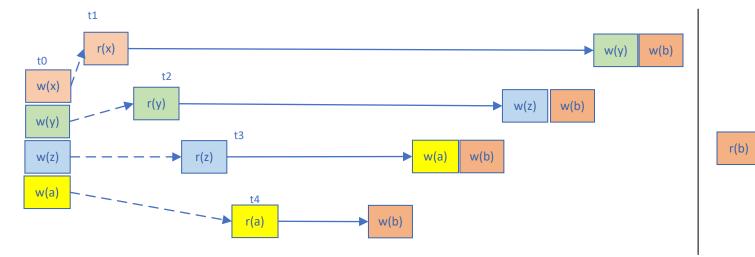
on going tx =go waiting tx = w waited tx = /w

OCCはできるだけ early abortさせている

Write Crown overlapped_all_4tx_with_epoch_cycled



Write Crown overlapped_all_4tx



write_crown

overlapped_4tx_uncycled

	ос	c4	occi	3ltx1	0002 00		000	lltx1 c2	ltx1c	эсс3	occ2	2ltx2	occ		ltx1oc	c2ltx1
t1	occ	С	occ	С	occ	С	occ	С	LTX	c bd1	occ	С	occ	a:t4	LTX	c bd1
t2	осс	С	осс	С	occ	С	LTX	c bd2	occ	a:t1	occ	С	LTX	c bd2	occ	a:t1
t3	occ	С	occ	С	LTX	c bd3	occ	a:t2	occ	С	LTX	c bd3	occ	a:t2	occ	С
t4	occ	С	LTX	c bd4	occ	a:t3	occ	С	occ	С	LTX	c bd3 r:t3	LTX	c bd4	LTX	c bd4
read b	t	1	t	1	t	1	t	1	t	3	t	1	t	4	t	3
					-						•		-		•	
	000		ltx10		ltx2d	occ2	occ ·	1ltx3	ltx1oc	c1ltx2	ltx2oc	c1ltx1	ltx3d	occ1	lt	k 4
t1	1		I		ltx2d	c bd1	occ OCC	1ltx3	ltx1oc	c1ltx2 c bd1	ltx2oc	c1ltx1 c bd1	ltx3d	c bd1	lt:	c bd1
t1 t2	oc	c1	ltx1d	c c		С				С		С		С		С
	OCC	c1 c	ltx10	c bd1	LTX	c bd1 c bd1	occ	С	LTX	c bd1	LTX	c bd1 c bd1	LTX	c bd1 c bd1	LTX	c bd1 c bd1
t2	OCC LTX	c c c bd2 c bd2	LTX OCC	c bd1	LTX	c bd1 c bd1 r:t1	OCC	c c bd2	LTX	c bd1 a:t1	LTX	c bd1 c bd1 r:t1	LTX	c bd1 c bd1 r:t1	LTX	c bd1 c bd1 r:t1

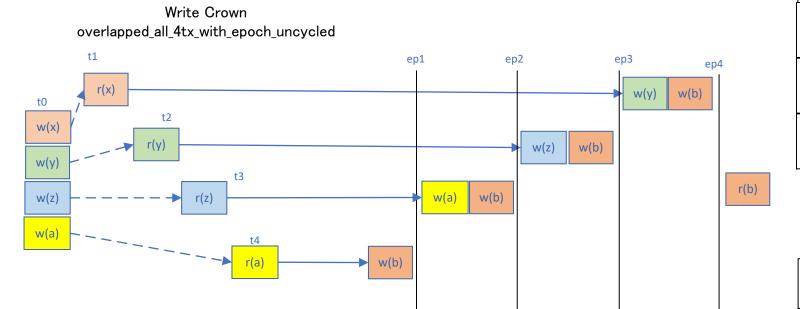
write_crown
overlapped_4tx_with_epoch_uncycled

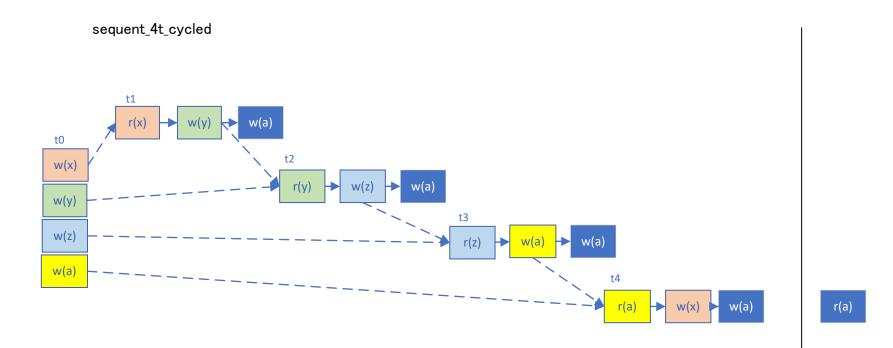
	ос	с4	occ3	Bltx1	occ2		occ1 oc		ltx1d	осс3	occ2	ltx2	occ1		ltx1oc	c2ltx1
t1	осс	С	осс	С	осс	С	осс	С	LTX	c bd1	осс	С	осс	С	LTX	c bd1
t2	осс	С	occ	С	осс	С	LTX	c bd2	осс	a:t1	occ	С	LTX	c bd2	occ	a:t1
t3	осс	С	осс	С	LTX	c bd3	осс	a:t2	осс	С	LTX	c bd3	осс	a:t2	осс	С
t4	occ	С	LTX	c bd4	occ	a:t3	occ	С	occ	С	LTX	c bd3 r:t3	LTX	c bd4	LTX	c bd4
read b	t	1	t	1	ť	1	t	1	t	3	t	1	ť	1	t	3
	go:t1/	/t2/t3	go:t1/	/t2/t3	go:t1/	′t2/t3	go:t	1/t2	go:t	1/t3	go:t1/	′t2/t3	go:t	1/t2	go:t1	1/t3
ep1	w:l	NA	w:	NA	w:l	NΑ	l:w	NA	w:l	NA	w:	t4	w: l	۱A	w: 1	۱A
	/w	:NA	/w	:NA	/w:	NA	/w:	NA	/w:	NA	/w	:t3	/w:	NA	/w:	NA
	go:t	1/t 2	go:t	1/t2	go:t	1/t2	go:t	1/t2	go	:t1	go:t	1/t2	go:t	1/t2	go:	:t1
ep2	w:l	NA	w:	NA	w: 1	NΑ	l:w	NΑ	l:w	NΑ	w:l	NΑ	w: 1	NΑ	w:1	۸A
	/w	:NA	/w	:NA	/w:	NA	/w:	NA	/w:	NA	/w:	NA	/w:	NA	/w:	NA
	go	:t1	go	:t1	go	:t1	go	:t1	go	:t1	go	:t1	go	:t1	go:	:t1
ep3	w:l	NA	w:	NA	w:N	NΑ	l:w	NA	w:l	NA	w:l	AV	w:N	AV	w:N	NΑ
	/w	:NA	/w	:NA	/w:	NA	/w:	NA	/w:	NA	/w:	NA	/w:	NA	/w:	NA

	occ1		ltx1c		ltx2c	сс2	occ1	ltx3	ltx1oc	c1ltx2	ltx2oc	c1ltx1	ltx3c	occ1	ltx	4
t1	occ	С	LTX	c bd1	LTX	c bd1	occ	С	LTX	c bd1	LTX	c bd1	LTX	c bd1	LTX	c bd1
t2	LTX	c bd2	occ	a:t1	LTX	c bd1 r:t1	LTX	c bd2	occ	a:t1	LTX	c bd1 r:t1	LTX	c bd1 r:t1	LTX	c bd1 r:t1
t3	LTX	c bd2 r:t2	LTX	c bd3	occ	a:t2	LTX	c bd2 r:t2	LTX	c bd3	occ	a:t2	LTX	c bd1 r:t2	LTX	c bd1 r:t2
t4	occ	a:t3	occ	a:t3	occ	С	LTX	c bd2 r:t3	LTX	c bd3 r:t3	LTX	c bd4	occ	a:t3	LTX	c bd1 r:t2
read b	t	1	t	3	t	4	t	1	t	3	t	4	t	1	t	1
	go:t1/	/t2/t3	go:t	1/t3	go:t	1/t2	go:t1/	/t2/t3	go:t	1/t3	go:t	1/t2	go:t1/	′t2/t3	go:t1/	′t2/t3
ep1	w:	NA	w:	NA	w:l	NA	w:	t4	w:	:t4	w:l	NA	w:1	NΑ	w:	t4
	/w	:NA	/w	:NA	/w:	:NA	/w	r:t3	/w	r:t3	/w	:NA	/w:	NA	/w	:t3
	go:t	1/t2	go	:t1	go:t	1/t2	go:t	1/t 2	go	:t1	go:t	1/t2	go:t	1/t2	go:t	1/t 2
ep2	w:	:t3	w:	NA	w:l	NA	w:t3	3/t4	w:l	NA	w:	NA	w:	t3	w:t3	3/t4
	!	/:t2	/w	:NA	/w:	:NA	/w:t	2/t3	/w:	:NA	/w:	:NA	/w	:t2	/w:t	2/t3
	l——	:t1		:t1	go		go		go		go		go		go	
ep3	l	NA		NA		t2	-	NA		NA		t2	w:t2	-	w:t2/	-
	/w	:NA	/w	:NA	/w	::t1	/w	:NA	/w:	:NA	/w	v:t1	/w:t	1/t2	/w:t1/	′t2/t3

on going tx =go waiting tx = w waited tx = /w

OCCはできるだけ early abortさせている



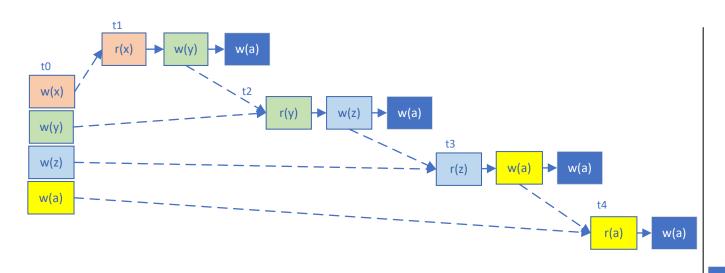


sequent_4tx_cycled

	oc	c4	occi	Bltx1	occ2 oc		occ1		ltx1d	осс3	occ2	2ltx2	occ1		ltx1oc	c2ltx1
t1	occ	С	occ	a:t4	occ	С	occ	С	LTX	c bd1	occ	a:t4	occ	a:t4	LTX	c bd1
t2	occ	С	occ	С	occ	C	LTX	c bd2	occ	O	occ	С	LTX	c bd2	occ	C
t3	occ	С	occ	С	LTX	c bd3	occ	С	occ	O	LTX	c bd3	occ	O	occ	С
t4	occ	С	LTX	c bd4	occ	O	occ	С	occ	O	LTX	c bd3 r:t3	LTX	c bd4	LTX	c bd4
read b	t [,]	4	t	3	t	4	t	4	t	4	t	2	t	3	t	3

	000	lltx2 c1	ltx1d		ltx2d	осс2	occ ⁻	Iltx3	ltx1oc	c1ltx2	ltx2oc	c1ltx1	ltx3d	occ1	ltx	×4
t1	occ	С	LTX	c bd1	LTX	c bd1	occ	a:t4	LTX	c bd1	LTX	c bd1	LTX	c bd1	LTX	c bd1
t2	LTX	c bd2	occ	С	LTX	c bd1 r:t1	LTX	c bd2	occ	O	LTX	c bd1 r:t1	LTX	c bd1 r:t1	LTX	c bd1 r:t1
t3	LTX	c bd2 r:t2	LTX	c bd3	occ	O	LTX	c bd2 r:t2	LTX	c bd3	occ	O	LTX	c bd1 r:t2	LTX	c bd1 r:t2
t4	occ	С	occ	С	occ	С	LTX	c bd2 r:t3	LTX	c bd3 r:t3	LTX	c bd4	occ	С	LTX	a bd1 r:t3 w:t1
read b	t	4	t	4	t	4	t	2	t	2	t	3	t	4	t	1

${\sf sequent_4tx_uncycled}$



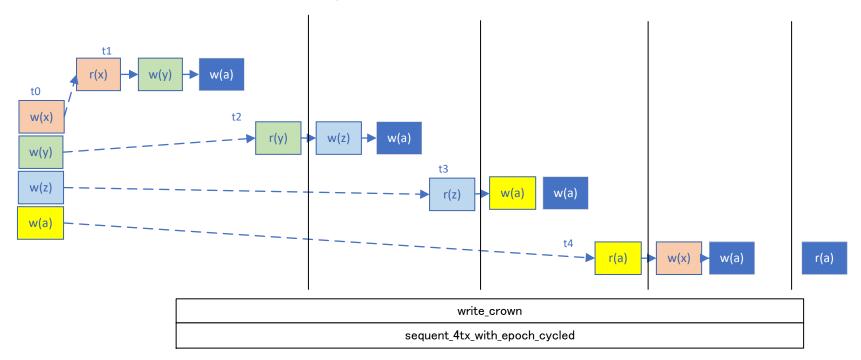
r/2)

sequent_4tx_uncycled

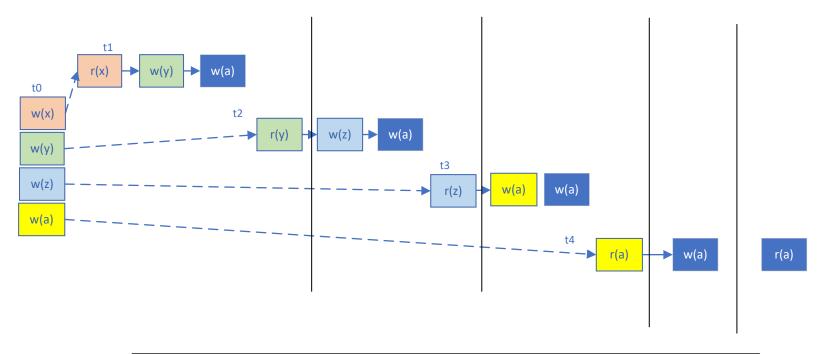
	oc	c4	occi	Bltx1	occ2 oc		occ1		ltx1d	осс3	occ2	2ltx2	occ1		ltx1oc	c2ltx1
t1	occ	С	occ	С	occ	С	occ	С	LTX	c bd1	осс	С	occ	С	LTX	c bd1
t2	occ	С	occ	С	occ	С	LTX	c bd2	occ	O	occ	С	LTX	c bd2	occ	C
t3	occ	С	occ	С	LTX	c bd3	occ	O	occ	O	LTX	c bd3	occ	O	occ	С
t4	occ	С	LTX	c bd4	occ	O	occ	С	occ	O	LTX	c bd3 r:t3	LTX	c bd4	LTX	c bd4
read b	t,	4	t	3	t	4	t	4	t	4	t	2	t	3	t	3

	0CC 0C	lltx2 c1	ltx1d		ltx2d	осс2	occ1	lltx3	ltx1oc	c1ltx2	ltx2oc	c1ltx1	ltx3	occ1	ltx	×4
t1	occ	С	LTX	c bd1	LTX	c bd1	occ	С	LTX	c bd1	LTX	c bd1	LTX	c bd1	LTX	c bd1
t2	LTX	c bd2	occ	С	LTX	c bd1 r:t1	LTX	c bd2	occ	O	LTX	c bd1 r:t1	LTX	c bd1 r:t1	LTX	c bd1 r:t1
t3	LTX	c bd2 r:t2	LTX	c bd3	occ	O	LTX	c bd2 r:t2	LTX	c bd3	occ	O	LTX	c bd1 r:t2	LTX	c bd1 r:t2
t4	occ	С	occ	С	occ	С	LTX	c bd2 r:t3	LTX	c bd3 r:t3	LTX	c bd4	occ	С	LTX	c bd1 r:t3
read b	t	4	t	4	t	4	t	1	t	2	t	3	t	4	t	1

sequent_4tx_with_epoch



	oc lt:		ltx4		
t1	occ	С	LTX	c bd:1	
t2	LTX	c bd:2	LTX	c bd:1 r:t1	
t3	LTX	c bd:2 r:t2	LTX	c bd:1 r:t2	
t4	LTX	a bd:2 r:t3 w:t1	LTX	a bd:1 r:t3 w:t1	
read b	t	:1	t1		



write_crown
sequent_4tx_with_epoch_uncycled

	oc lt:	c1 k3	ltx4		
t1	occ	С	LTX	c bd:1	
t2	LTX	c bd:2	LTX	c bd:1 r:t1	
t3	LTX	c bd:2 r:t2	LTX	c bd:1 r:t2	
t4	LTX	c bd:2 r:t3	LTX	c bd:1 r:t3	
read b	t	1	t	1	