

RLBWT to LZ77

in time $O(n \lg(r))$ and space $O(r \lg(n))$

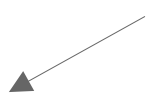
[Policriti & Prezza, Algorithmica 80, 2018]

(slides by Patrick Dinklage, released under [CC0](#))

$T = \#banana\#$

lex. largest

lex. smallest



$T = \#banana\$$

lex. largest

lex. smallest

$BWT(T^R)$

	F	L
0	# \$ a n a n a	b
1	a b # \$ a n a	n
2	a n a b # \$ a	n
3	a n a n a b #	\$
4	b # \$ a n a n a	a
5	n a b # \$ a n a	a
6	n a n a b # \$	a
7	\$ a n a n a b	#

T^R

$T = \#banana\$$

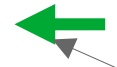
lex. largest

lex. smallest

$BWT(T^R)$

	F	L
0	# \$ a n a n a	b
1	a b # \$ a n a	n
2	a n a b # \$ a	n
3	a n a n a b #	\$
4	b # \$ a n a n a	a
5	n a b # \$ a n a	a
6	n a n a b # \$	a
7	\$ a n a n a b	#

T^R



current L position

$T = \#banana\$$

lex. largest

lex. smallest

$BWT(T^R)$

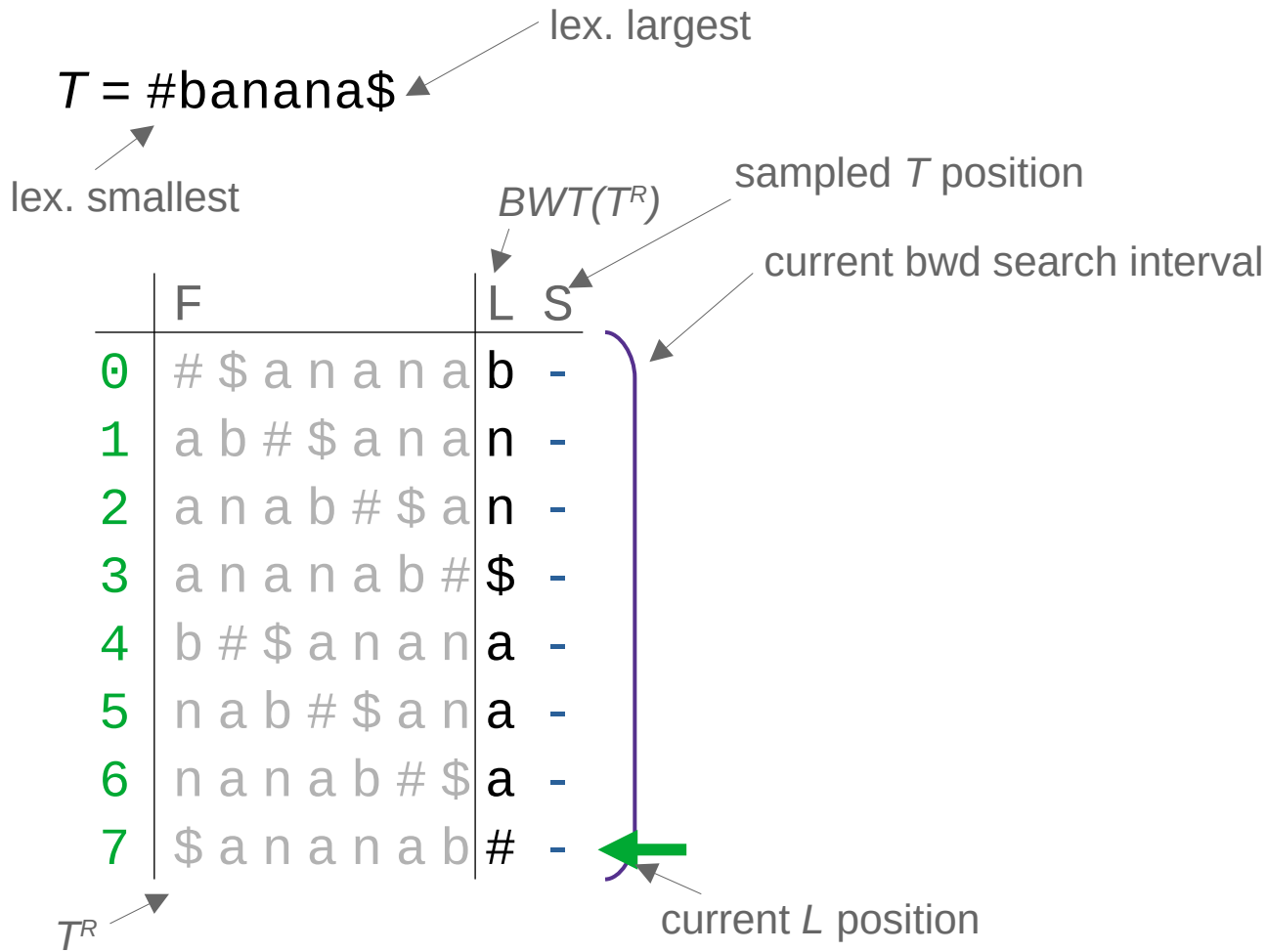
current bwd search interval

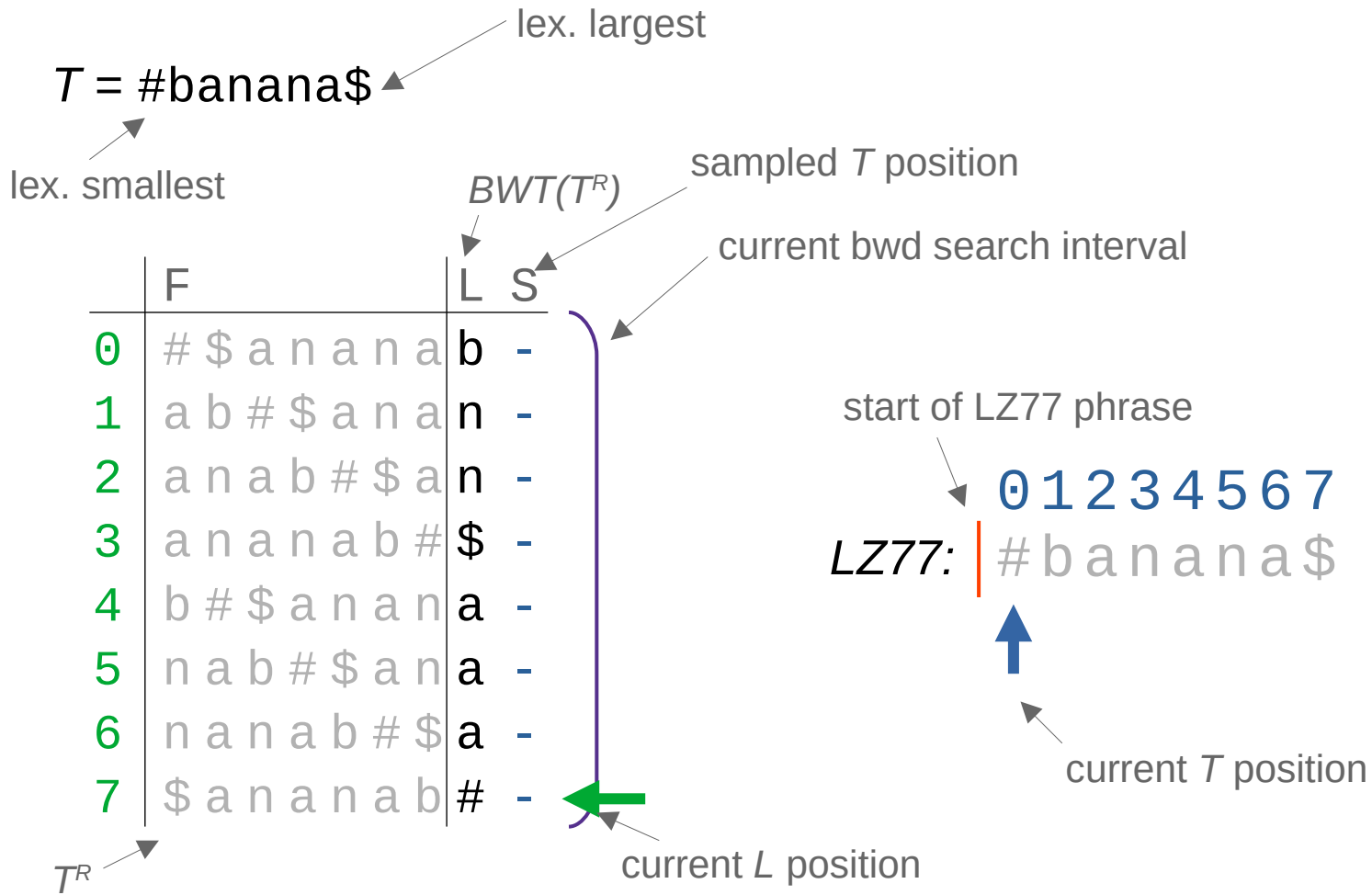
	F	L
0	# \$ a n a n a	b
1	a b # \$ a n a	n
2	a n a b # \$ a	n
3	a n a n a b #	\$
4	b # \$ a n a n a	a
5	n a b # \$ a n a	a
6	n a n a b # \$	a
7	\$ a n a n a b	#

T^R

current L position







	F	L	S
0	# \$ a n a n a	b	-
1	a b # \$ a n a	n	-
2	a n a b # \$ a	n	-
3	a n a n a b #	\$	-
4	b # \$ a n a n	a	-
5	n a b # \$ a n	a	-
6	n a n a b # \$	a	-
7	\$ a n a n a b	#	-

LZ77: | 0 1 2 3 4 5 6 7
 # b a n a n a \$

	F	L	S
0	# \$ a n a n a	b	-
1	a b # \$ a n a	n	-
2	a n a b # \$ a	n	-
3	a n a n a b #	\$	-
4	b # \$ a n a n	a	-
5	n a b # \$ a n	a	-
6	n a n a b # \$	a	-
7	\$ a n a n a b	#	0

LZ77: 0 1 2 3 4 5 6 7
 # | b a n a n a \$
 ↑

	F	L	S
0	# \$ a n a n a	b	-
1	a b # \$ a n a	n	-
2	a n a b # \$ a	n	-
3	a n a n a b #	\$	-
4	b # \$ a n a n	a	-
5	n a b # \$ a n	a	-
6	n a n a b # \$	a	-
7	\$ a n a n a b	#	0

LZ77: | # | b a n a n a \$

0 1 2 3 4 5 6 7

	F	L	S
0	# \$ a n a n a	b	1
1	a b # \$ a n a	n	-
2	a n a b # \$ a	n	-
3	a n a n a b #	\$	-
4	b # \$ a n a n	a	-
5	n a b # \$ a n	a	-
6	n a n a b # \$	a	-
7	\$ a n a n a b	#	0

LZ77: | # | b | a n a n a \$

0 1 2 3 4 5 6 7

↑

	F	L	S
0	# \$ a n a n a	b	1
1	a b # \$ a n a	n	3
2	a n a b # \$ a	n	-
3	a n a n a b #	\$	-
4	b # \$ a n a n	a	2
5	n a b # \$ a n	a	-
6	n a n a b # \$	a	-
7	\$ a n a n a b	#	0

LZ77: | # | b | a | n | a n a \$

0 1 2 3 4 5 6 7

	F	L	S
0	# \$ a n a n a	b	1
1	a b # \$ a n a	n	3
2	a n a b # \$ a	n	-
3	a n a n a b #	\$	-
4	b # \$ a n a n	a	2
5	n a b # \$ a n	a	4
6	n a n a b # \$	a	-
7	\$ a n a n a b	#	0

LZ77: | # | b | a | n | a n a \$

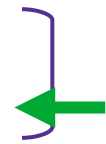
0 1 2 3 4 5 6 7

	F	L	S
0	# \$ a n a n a	b	1
1	a b # \$ a n a	n	3
2	a n a b # \$ a	n	5
3	a n a n a b #	\$	-
4	b # \$ a n a n	a	2
5	n a b # \$ a n	a	4
6	n a n a b # \$	a	-
7	\$ a n a n a b	#	0

LZ77: | # | b | a | n | a n a \$

0 1 2 3 4 5 6 7

	F	L	S
0	# \$ a n a n a	b	1
1	a b # \$ a n a	n	3
2	a n a b # \$ a	n	5
3	a n a n a b #	\$	-
4	b # \$ a n a n	a	2
5	n a b # \$ a n	a	-
6	n a n a b # \$	a	6
7	\$ a n a n a b	#	0



LZ77: | # | b | a | n | a n a \$

0 1 2 3 4 5 6 7

	F	L	S
0	# \$ a n a n a	b	1
1	a b # \$ a n a	n	3
2	a n a b # \$ a	n	5
3	a n a n a b #	\$	7
4	b # \$ a n a n	a	2
5	n a b # \$ a n	a	-
6	n a n a b # \$	a	6
7	\$ a n a n a b	#	0

LZ77: | # | b | a | n | a | n | a | \$ |