

ab	aaabbb	aab	ba	abab	aa
ba	bb	baab	baa	ababaa	a

abab	aaabbb	aab	ba	ab	ab	aa
ababaa	bb	baab	baa	ba	ba	a

abab	aaabbb	aab	ba	ab	ab	aa
ababaa	bb	baab	baa	ba	ba	a

a
ab

baa
aab

then $f(I)$ would be the *PCP* instance

a^*
$^*a^*b$

$b^*a^*a^*$
$^*a^*a^*b$

$^*a^*$
$^*a^*b$

$\$$
$^*\$$

start	1	#
start <i>1</i>	1	#

i	
1	$i + 1$

i	
$\#$	$i + 1$

$$\begin{array}{c} i \\ i+k \end{array}$$

$$\begin{array}{c} i \\ i-k \end{array}$$

i
$i + 1$

$i \quad 1$
$i + 2$

$i \quad \#$
$i + 3$

start	1	#	2 halt	1
start 1	1	#	halt	1 2

start
start 1

1
1

#

3 halt
halt

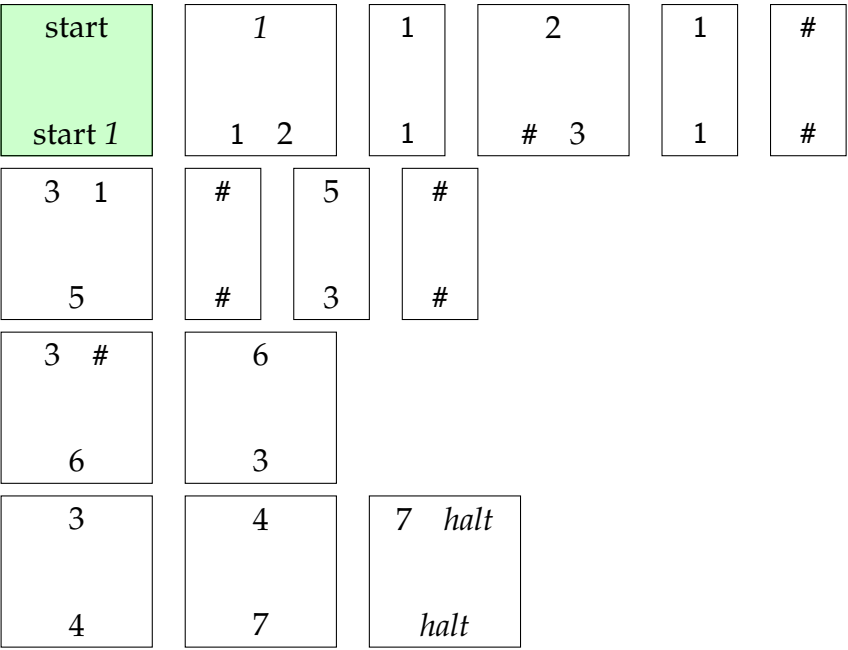
1
1 2

2
3

1##|1#⁵|1³#³|1²#⁴|1³#⁴

asdf

start	1	#	7 halt
start 1	1	#	halt
1	2		
1 2	# 3		
3	3 1	3 #	
4	5	6	
4	5	6	
7	3	3	



start 11 21# 31# 5# 3# 6 3 4 7

start

start 1

start	
start	1

1	
1	2

start	
start	1

1	
1	2

start	1	1	2
start 1	1 2	1	# 3

start	1	1	2	1	#
start 1	1 2	1	# 3	1	#

start	1	1	2	1	#	
start 1	1 2	1	# 3	1	#	
3	1	#	#	4 1	#	#
# 4	1	#	#	3	#	#
3	#	#	#			
# 4	#	#	#			
4 #	#	#	4 #	#	4 #	4 halt
4	#	#	4	#	4	halt

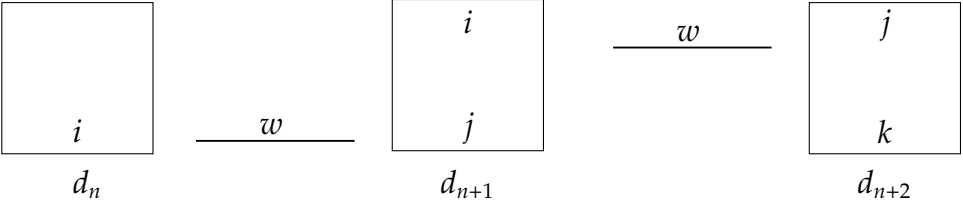
	?	k
...	k	$N + 1$

	?	k	$N + 1$ <i>halt</i>
...	k	$N + 1$	<i>halt</i>

n
$1 \ n+1$

$$\begin{array}{cc} n & 1 \\ n+2 \end{array}$$

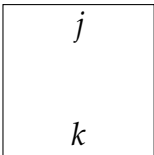
$$\begin{array}{cc} n & \# \\ n+3 \end{array}$$





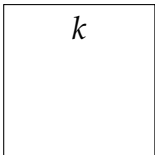
d_{n+1}

u



d_{n+2}

u

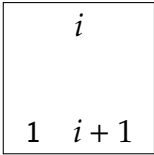


d_{n+3}



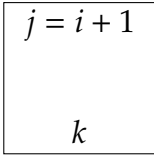
d_n

w

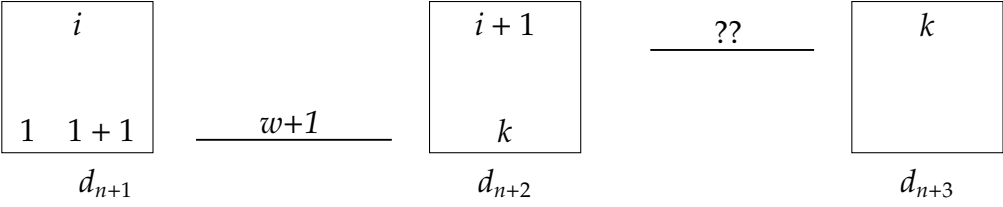


d_{n+1}

$w+1$



d_{n+2}



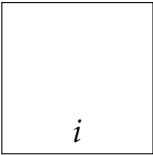
$$\begin{array}{|c|} \hline i \\ \hline 1 \quad 1+1 \\ \hline d_{n+1} \end{array}$$

$$\xrightarrow{w+1}$$

$$\begin{array}{|c|} \hline i+1 \\ \hline k \\ \hline d_{n+2} \end{array}$$

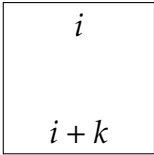
$$\xrightarrow{??}$$

$$\begin{array}{|c|} \hline k \\ \hline \\ \hline d_{n+3} \end{array}$$



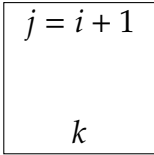
d_n

w



d_{n+1}

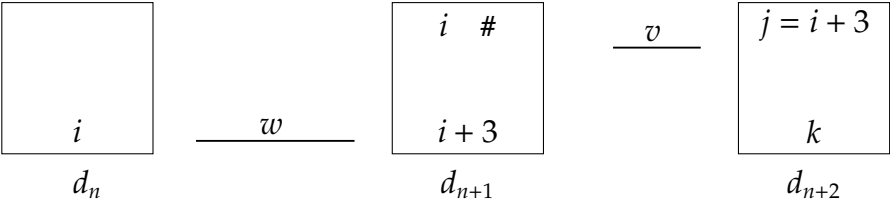
$w+1$

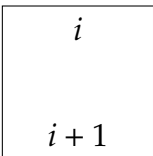


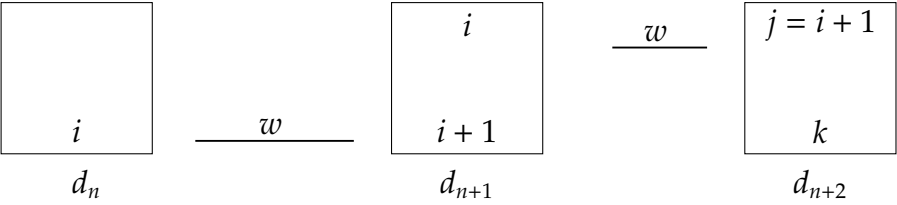
d_{n+2}

i	1
$i+2$	

i	$\#$
$i+3$	







start	1	#
start <i>1</i>	1	#

i	
1	$i + 1$

i	
$\#$	$i + 1$

$$\begin{array}{c} i \\ i+k \end{array}$$

$$\begin{array}{c} i \\ i-k \end{array}$$

$$\begin{array}{c} i \\ i+1 \end{array}$$

$$\begin{array}{c} i \quad 1 \\ i+2 \end{array}$$

$$\begin{array}{c} i \quad \# \\ i+3 \end{array}$$

start	1	1	2	1	#
start 1	1 2	1	# 3	1	#
3	1	#	#	4 1	#
# 4	1	#	#	3	#
3	#	#	#		
# 4	#	#	#		
4 #	#	#	4 #	#	4 halt
4	#	#	4	#	4 halt

n
$1 \ n+1$

n 1
next(n+2)

n #
next(n+3)

x

#
#

1
1

x
1 y

?

y
z

	#	1	x	#	1	1	y
x	#	1	1 y	#	1	1	# z

x

#
#

1
1

x
1 y

?

y #
z

x

$\#$
$\#$

1
1

x $\#$
y

?

y
1 z