

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#<sup>5</sup>|1<sup>3</sup>#<sup>3</sup>|1<sup>2</sup>#<sup>4</sup>|1<sup>3</sup>#<sup>4</sup>

asdf

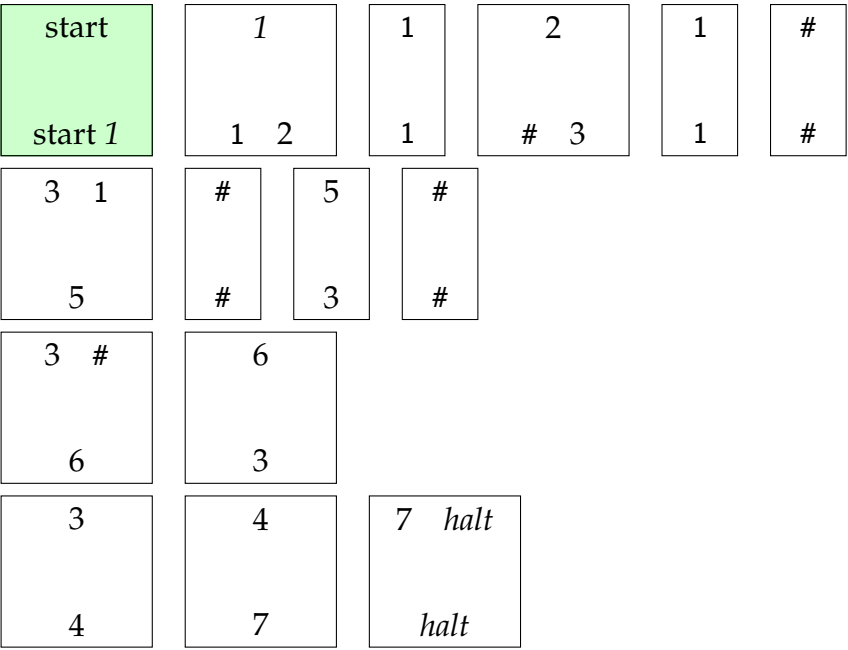
start	1	#	7 halt
start 1	1	#	halt
1	2		
1 2	# 3		
3	3 1	3 #	
4	5	6	
4	5	6	
7	3	3	











*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

	?	$k$
...	$k$	$N + 1$

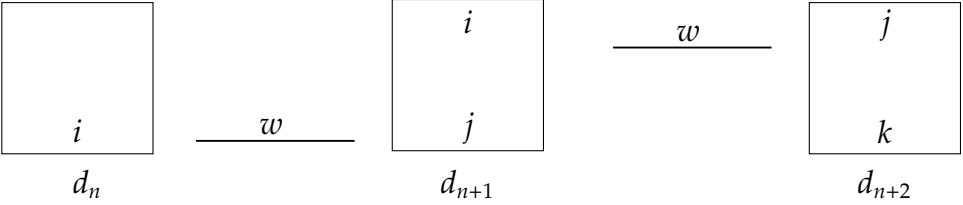
	?	$k$	$N + 1$ <i>halt</i>
...	$k$	$N + 1$	<i>halt</i>

$n$
$1 \ n+1$

$n$	$1$
$n+2$	

$n$	$\#$
$n+3$	

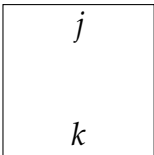






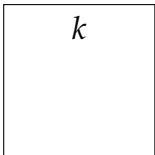
$d_{n+1}$

$u$

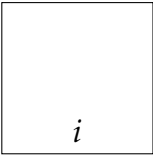


$d_{n+2}$

$u$

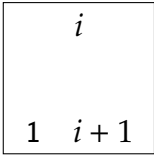


$d_{n+3}$



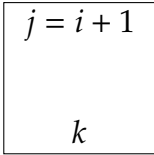
$d_n$

$w$

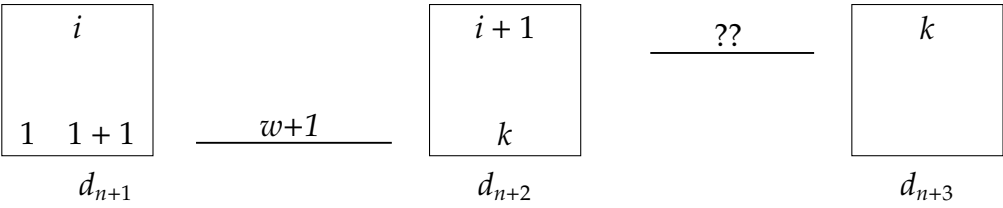


$d_{n+1}$

$w+1$



$d_{n+2}$



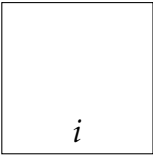
$$\begin{array}{|c|} \hline i \\ \hline 1 \quad 1+1 \\ \hline d_{n+1} \end{array}$$

$$\xrightarrow{w+1}$$

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

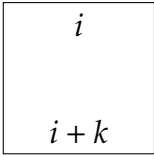
$$\xrightarrow{??}$$

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



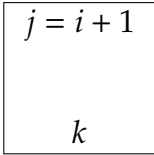
$d_n$

$w$



$d_{n+1}$

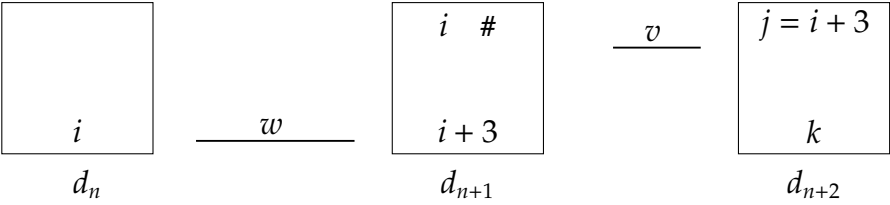
$w+1$



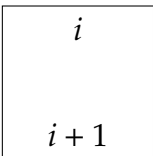
$d_{n+2}$

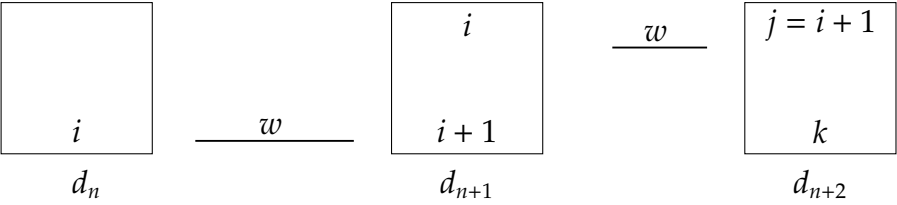
$$\begin{array}{cc} i & 1 \\ & \\ & \\ i+2 & \end{array}$$

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









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	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	# $z$

$x$

$\#$
$\#$

$1$
$1$

$x$
$1 \quad y$

?

$y \quad \#$
$z$

$x$

$\#$
$\#$

$1$
$1$

$x$ $\#$
$y$

?

$y$
$1$ $z$