

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

*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

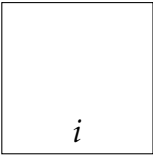
	?	$k$
...	$k$	$N + 1$

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

$n$
$1 \ n+1$

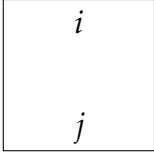
$n$	$1$
$n+2$	

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



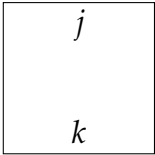
$d_n$

$w$



$d_{n+1}$

$w$

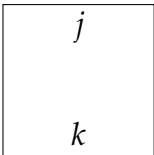


$d_{n+2}$



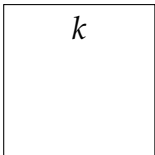
$d_{n+1}$

$u$

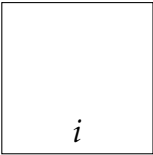


$d_{n+2}$

$u$

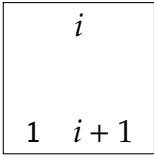


$d_{n+3}$



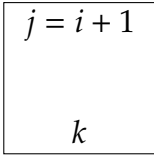
$d_n$

$w$



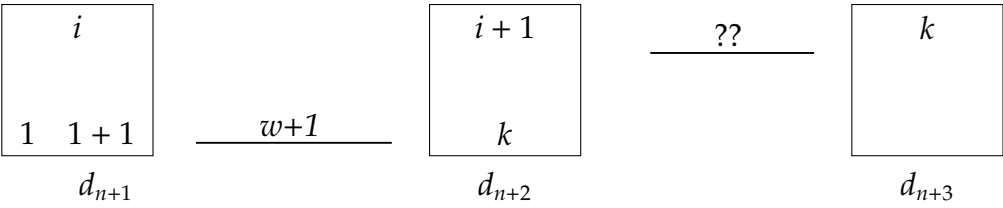
$d_{n+1}$

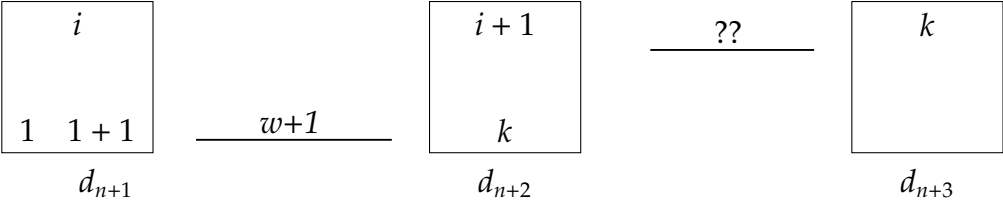
$w+1$

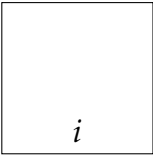


$d_{n+2}$



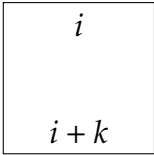






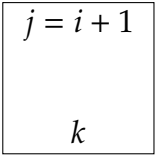
$d_n$

$w$



$d_{n+1}$

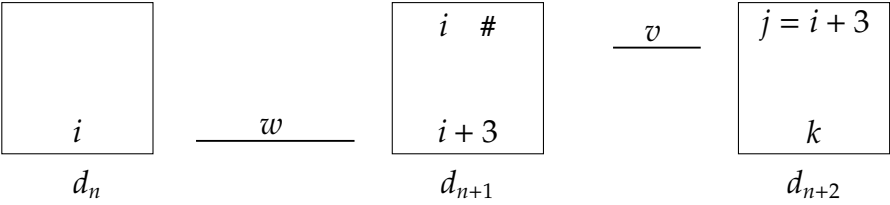
$w+1$

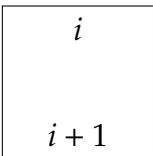


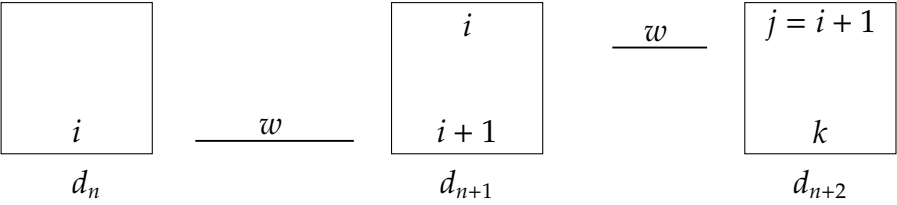
$d_{n+2}$

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

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







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 $y$

?

$y$ #
$z$

$x$

$\#$
$\#$

$1$
$1$

$x$ $\#$
$y$

?

$y$
$1$ $z$