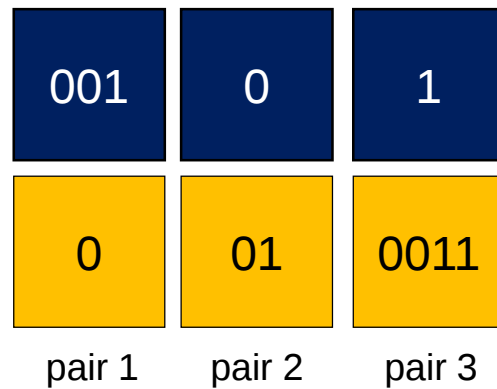


6b

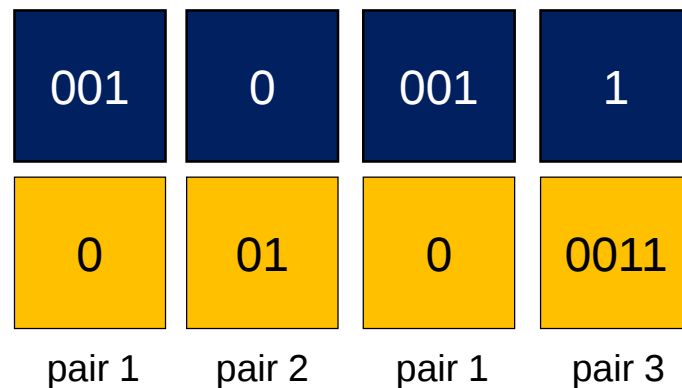
Post's Correspondence Problem

Analiza Algoritmulor

Refresher



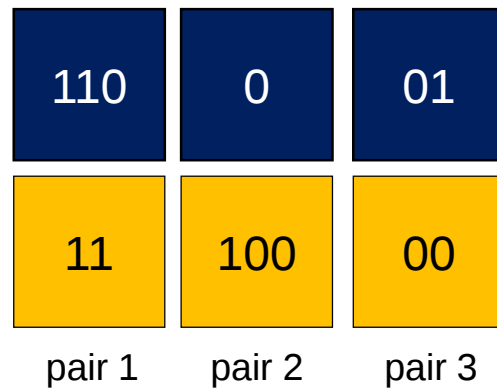
One pair = one “blue” word,
one “yellow” word



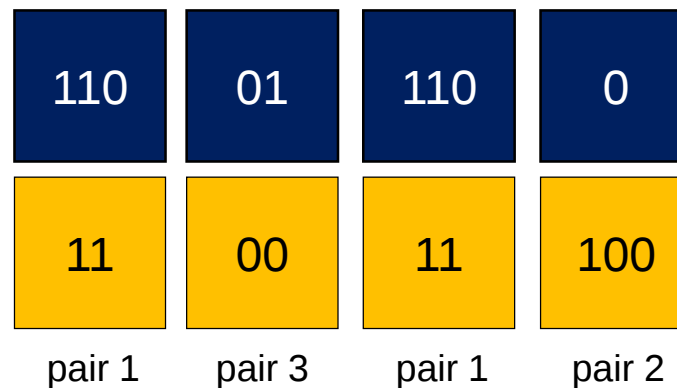
The blue word concatenation
matches the yellow concatenation

We can *reuse* **pairs**
several times

Modified Post's Correspondence Problem (MPCP)



Solutions must start with "pair 1"



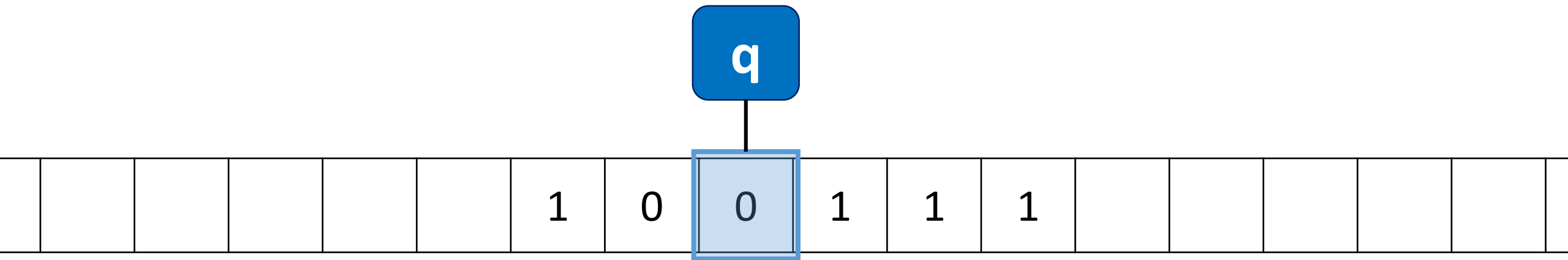
Modified Post's Correspondence Problem (MPCP) (2)

0	001	1
01	0	0011
pair 1	pair 2	pair 3

Solutions must start with "pair 1"

No solution that starts with pair 1

Configuration strings



10q0111

Computation history strings

$q110111$

$11011p1$

$1q10111$

$1101p10$

$11q0111$

$110p100$

$110q111$

$11p0000$

$1101q11$

$11H1000$

$11011q1$

$110111q \square$

Computation history strings

$q110111\#1q10111\#11q0111\#110q111\#1101q11\#11011q1\#$
 $110111q \sqcap \#11011p1\#1101p10\#110p100\#11p0000\#11H1000$

HALT $\leq_m$ MPCP idea

$M[w]$ halts

$\#C_1\#C_2\#C_3\# \dots \#C_n\#C_{n+1}\# \dots \#C_f\#$

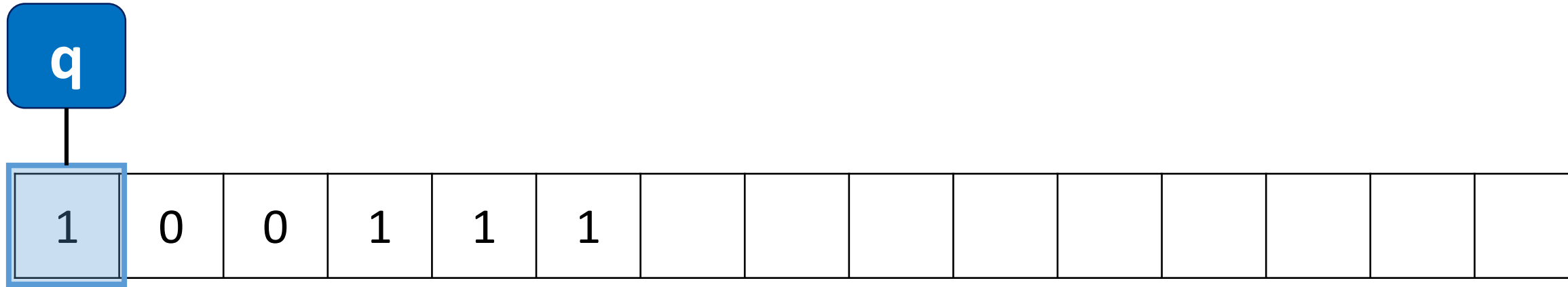
$\#C_1\#C_2\#C_3\#C_4\# \dots \#C_{n+1}\# \dots \#C_f\#$

$M[w]$ doesn't halt

$\#C_1\#C_2\#C_3\# \dots \#C_n\#C_{n+1}\# \dots \#C_i\#$

$\#C_1\#C_2\#C_3\#C_4\# \dots \#C_{n+1}\# \dots \#C_i\#C_{i+1}\#$

Restricted Turing Machines

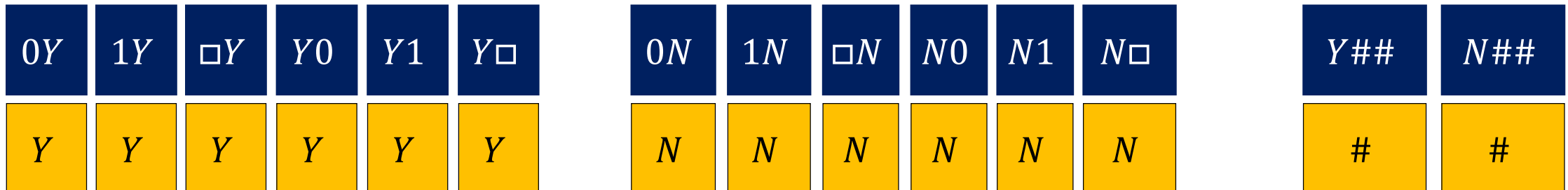
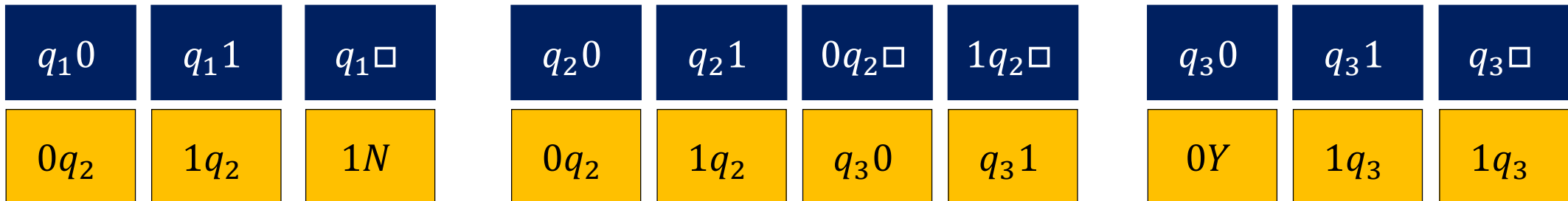
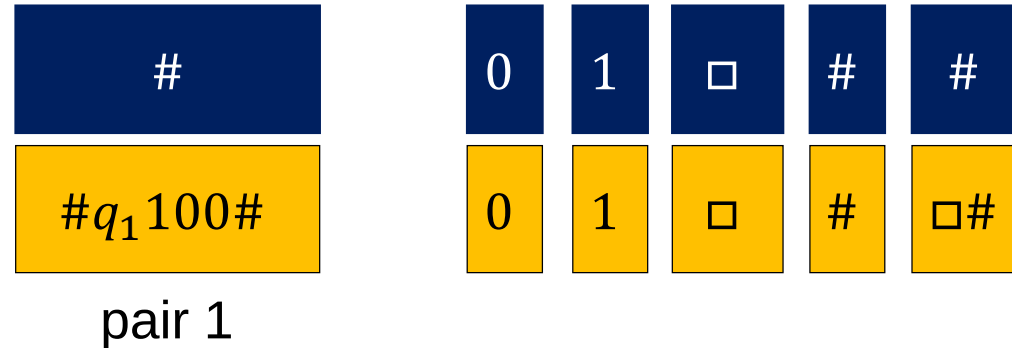


$$\delta: Q \times \Gamma \rightarrow Q' \times \Gamma \times \{\leftarrow, \rightarrow\}$$

isEven'

	0	1	$\square$
q_1	$q_2, 0, \rightarrow$	$q_2, 1, \rightarrow$	$N, 1, \rightarrow$
q_2	$q_2, 0, \rightarrow$	$q_2, 1, \rightarrow$	$q_3, \square, \leftarrow$
q_3	$Y, 0, \rightarrow$	$q_3, 1, \rightarrow$	$q_3, 1, \rightarrow$

(isEven', 100) pairs

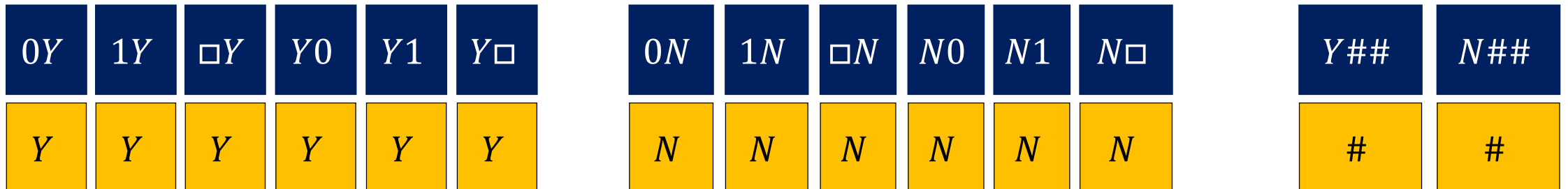
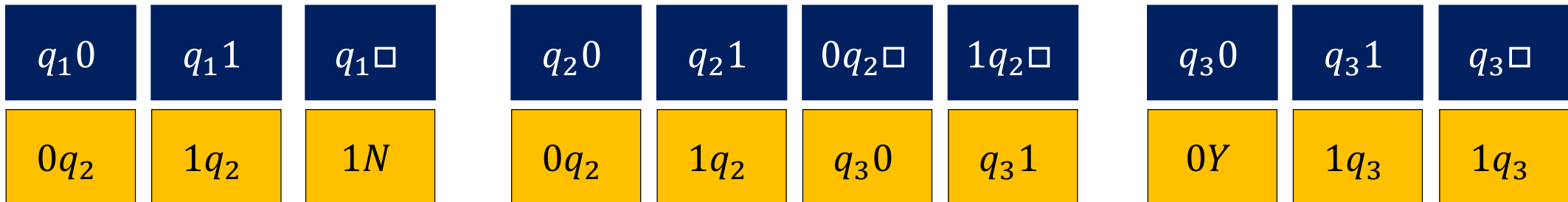
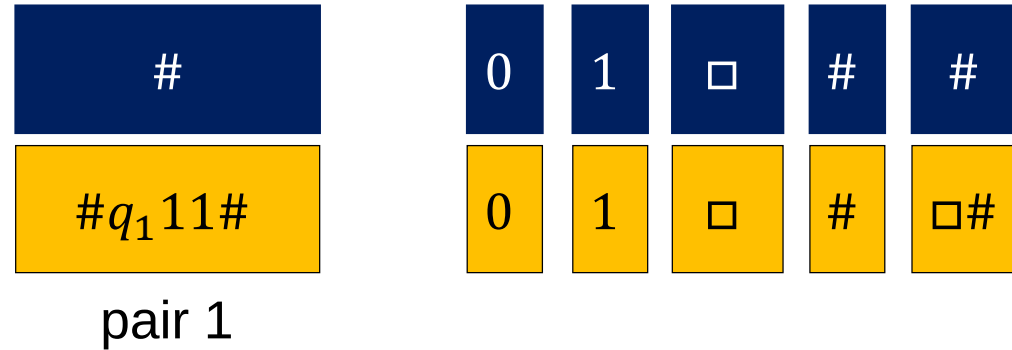


(isEven', 100) solution

#	$q_1 1$	0	0	#	1	$q_2 0$	0	#	1	0	$q_2 0$	#	1	0	$0 q_2 \square$	#
$\# q_1 100 \#$	$1 q_2$	0	0	#	1	$0 q_2$	0	#	1	0	$0 q_2$	$\square \#$	1	0	$q_3 0$	#

1	0	$q_3 0$	#	1	0	0	$Y \square$	#	1	0	$0 Y$	#	1	$0 Y$	#	$1 Y$	#	$Y \# \#$
1	0	$0 Y$	$\square \#$	1	0	0	Y	#	1	0	Y	#	1	Y	#	Y	#	#

(isEven', 11) pairs



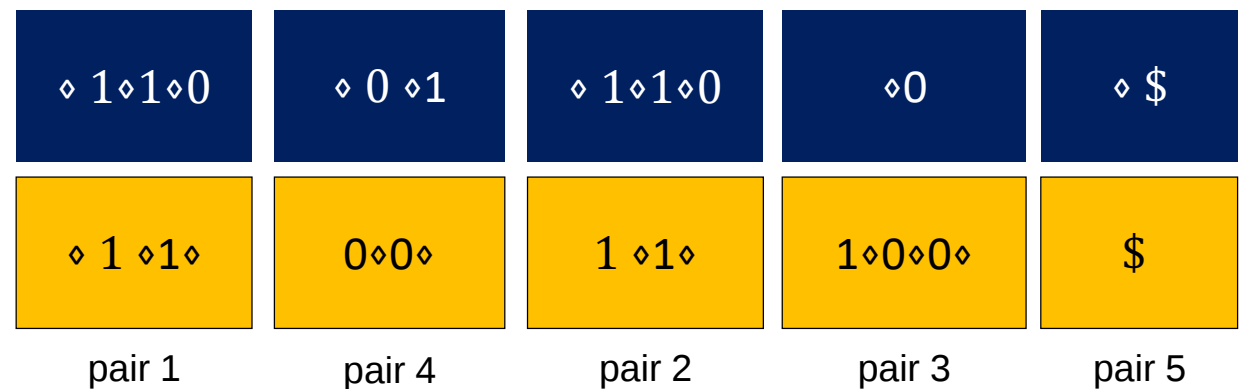
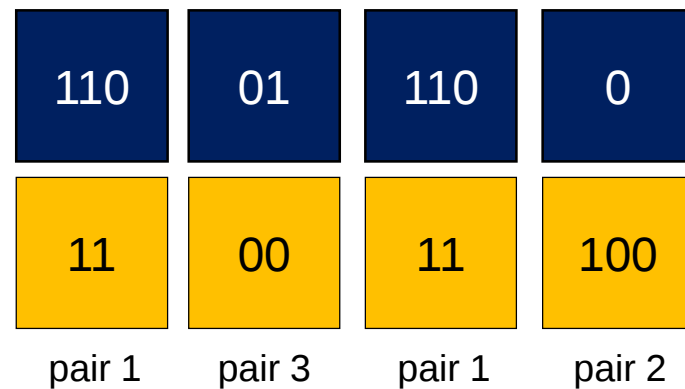
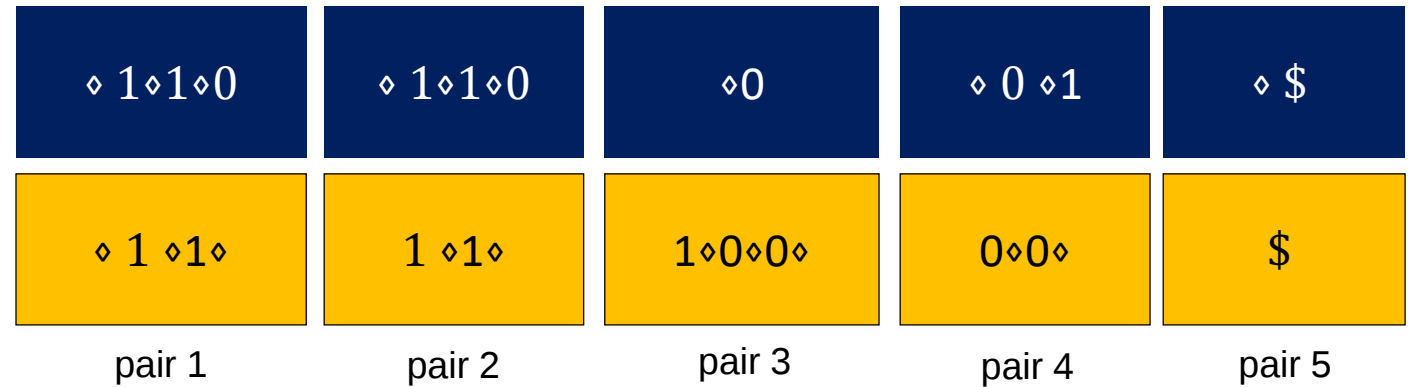
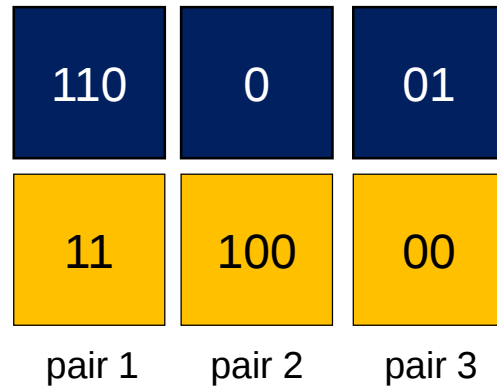
(isEven', 11) has no solution

#	$q_1 1$	1	#	1	$q_2 1$	#	1	$1 q_2 \square$	#	1	$q_3 1$	#
$\# q_1 1 1 \#$	$1 q_2$	1	#	1	$1 q_2$	$\square \#$	1	$q_3 1$	#	1	$1 q_3$	$\square \#$

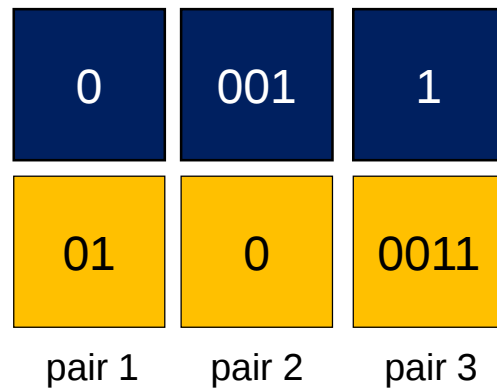
1	1	$q_3 \square$	#	1	1	1	$q_3 \square$	#
1	1	$1 q_3$	$\square \#$	1	1	1	$1 q_3$	$\square \#$

...

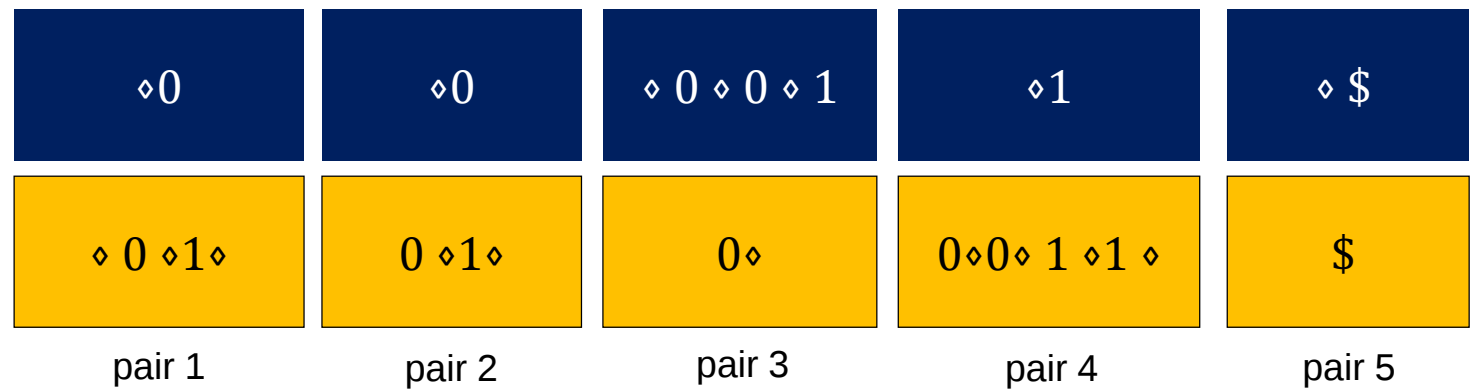
$$\text{MPCP} \leq_m \text{PCP}$$



$$\text{MPCP} \leq_m \text{PCP} (2)$$



No solution that starts with pair 1



No solution at all