

# PCP Example

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April 9, 2012

The Turing Machine  $M$  recognizes strings that begin and end with a one.  
The Dominoes for MPCP  $P'$  built for  $M$  on input  $w = 101$ .

1. Start:  $\begin{bmatrix} \# \\ \#q_0101\# \end{bmatrix}$
2. Right Moves:  $\begin{bmatrix} q_01 \\ 1q_1 \end{bmatrix}$   $\begin{bmatrix} q_11 \\ 1q_1 \end{bmatrix}$   $\begin{bmatrix} q_10 \\ 0q_1 \end{bmatrix}$   $\begin{bmatrix} q_21 \\ 1q_{acc} \end{bmatrix}$
3. Left Moves:  $\begin{bmatrix} 0q_1\sqcup \\ q_20\sqcup \end{bmatrix}$   $\begin{bmatrix} 1q_1\sqcup \\ q_21\sqcup \end{bmatrix}$   $\begin{bmatrix} \sqcup q_1\sqcup \\ q_2\sqcup\sqcup \end{bmatrix}$
4. Copies:  $\begin{bmatrix} 0 \\ 0 \end{bmatrix}$   $\begin{bmatrix} 1 \\ 1 \end{bmatrix}$   $\begin{bmatrix} \sqcup \\ \sqcup \end{bmatrix}$
5. End Marks:  $\begin{bmatrix} \# \\ \# \end{bmatrix}$   $\begin{bmatrix} \# \\ \sqcup\# \end{bmatrix}$
6. Accepts:  $\begin{bmatrix} 0q_{acc} \\ q_{acc} \end{bmatrix}$   $\begin{bmatrix} 1q_{acc} \\ q_{acc} \end{bmatrix}$   $\begin{bmatrix} \sqcup q_{acc} \\ q_{acc} \end{bmatrix}$   $\begin{bmatrix} q_{acc}0 \\ q_{acc} \end{bmatrix}$   $\begin{bmatrix} q_{acc}1 \\ q_{acc} \end{bmatrix}$   $\begin{bmatrix} q_{acc}\sqcup \\ q_{acc} \end{bmatrix}$
7. End of String:  $\begin{bmatrix} q_{acc}\#\# \\ \# \end{bmatrix}$