

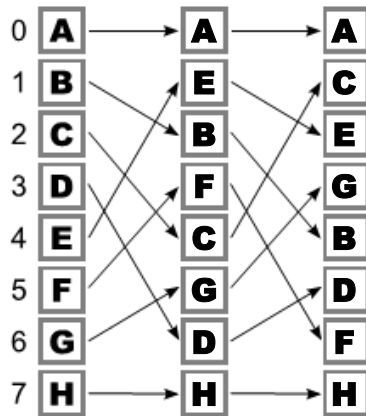
Two Perfect Shuffles: An Investigation (part 1)

What happens to the top card if you perform a series of two in (i) and out (o) shuffles?

The first one is completed for you. Use the grid and arrows to help you trace the other three.

"oo"

Two "out" shuffles in a row.

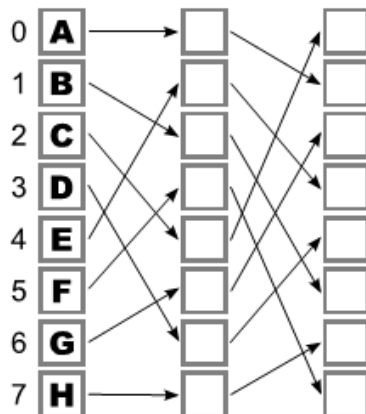


The top card ('A') moves to position **0**.

Since an "out" shuffle leaves the top card in the top position, any number of repeated "out" shuffles leaves the top card intact.

"oi"

An "out" shuffle followed by an "in" shuffle.

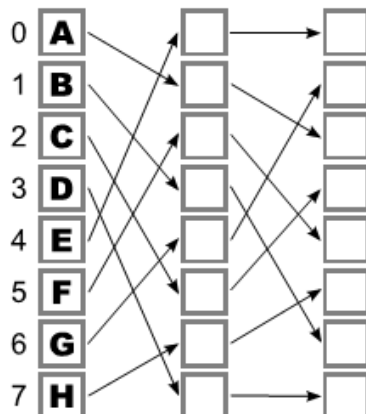


The top card ('A') moves to position _____.

The top card doesn't start moving until you do your first "in" shuffle.

"io"

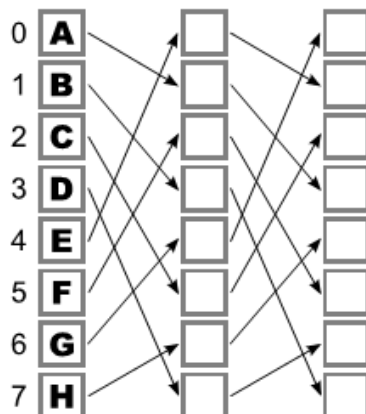
An "in" shuffle followed by an "out" shuffle.



The top card ('A') moves to position _____.

"ii"

Two "in" shuffles in a row.



The top card ('A') moves to position _____.

When you have finished turn over and try the 3 shuffle challenges!

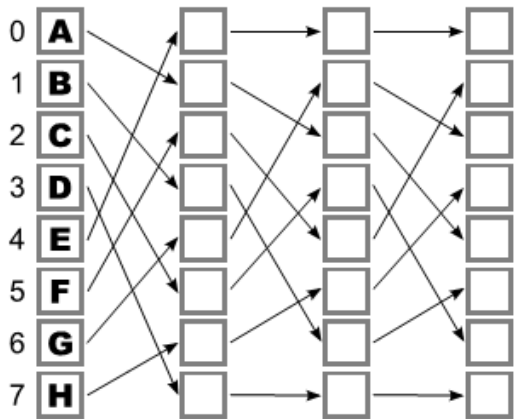
Three Perfect Shuffles: An Investigation (part 2)

What happens to the top card if you perform a series of three in (i) and out (o) shuffles?

This time the help gets less each time. Use a series of cards in your array to help you.

"ioo"

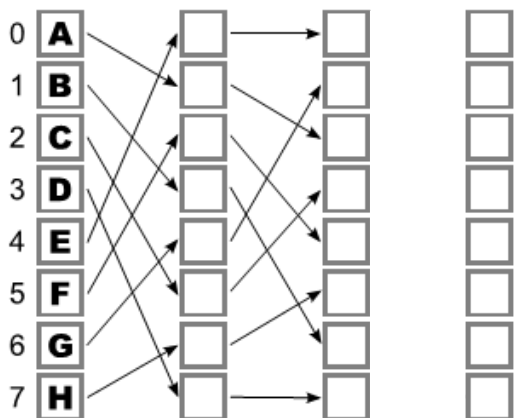
in-out-out



The top card moves to position _____.

"ioi"

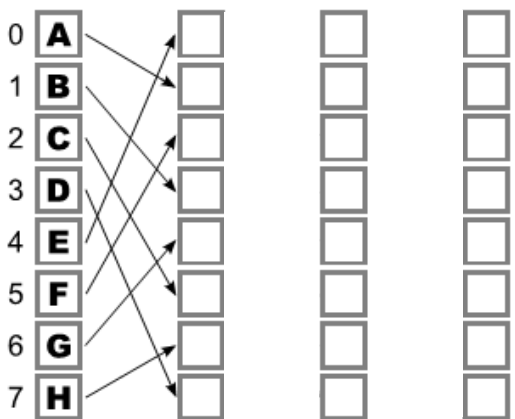
in-out-in



The top card moves to position _____.

"iio"

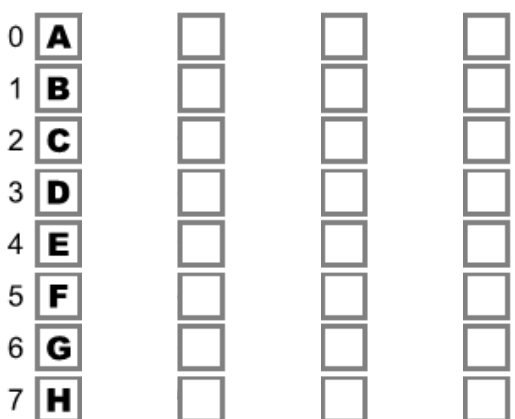
in-in-out



The top card moves to position _____.

"iii"

in-in-in



The top card moves to position _____.

Look at your answers. Can you predict the top card position for each of the following:

ooo	
ooi	
oio	
oii	