

Concept Challenge



Hash Table Collisions



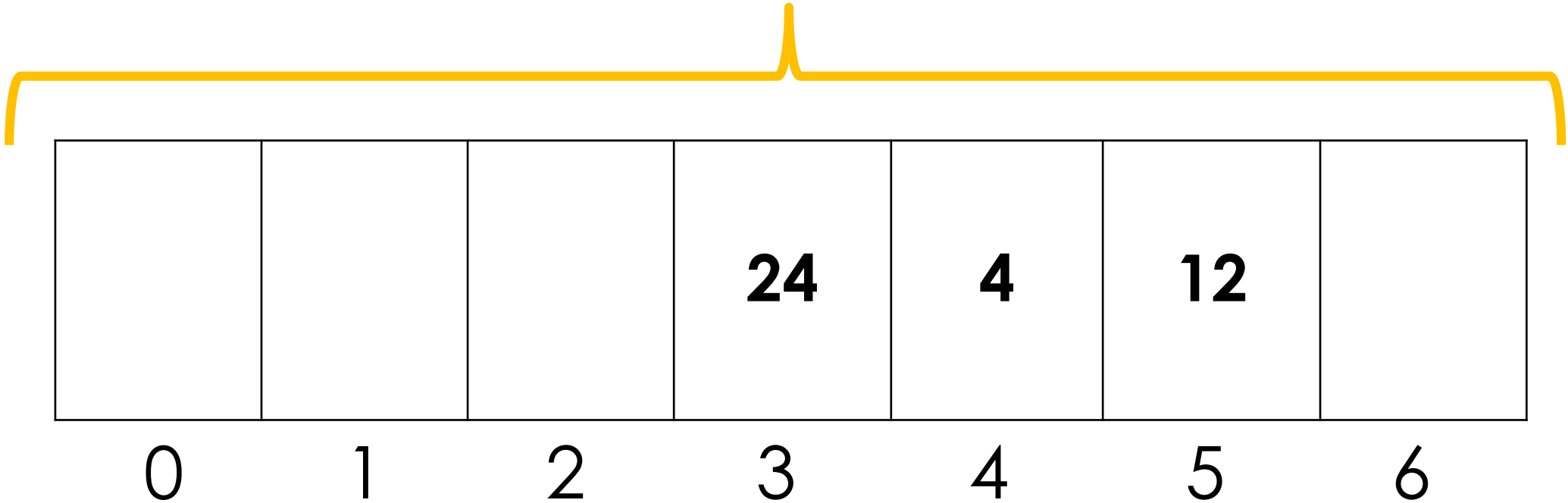
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by Christine Alvarado, Mia Minnes, and Leo Porter, 2015.

Concept Challenge

- **Pause** Try to solve the problem yourself
- **Discuss** with other learners (if you can)
- **Watch** the UCSD learners video
- **Confirm** your understanding with our explanation



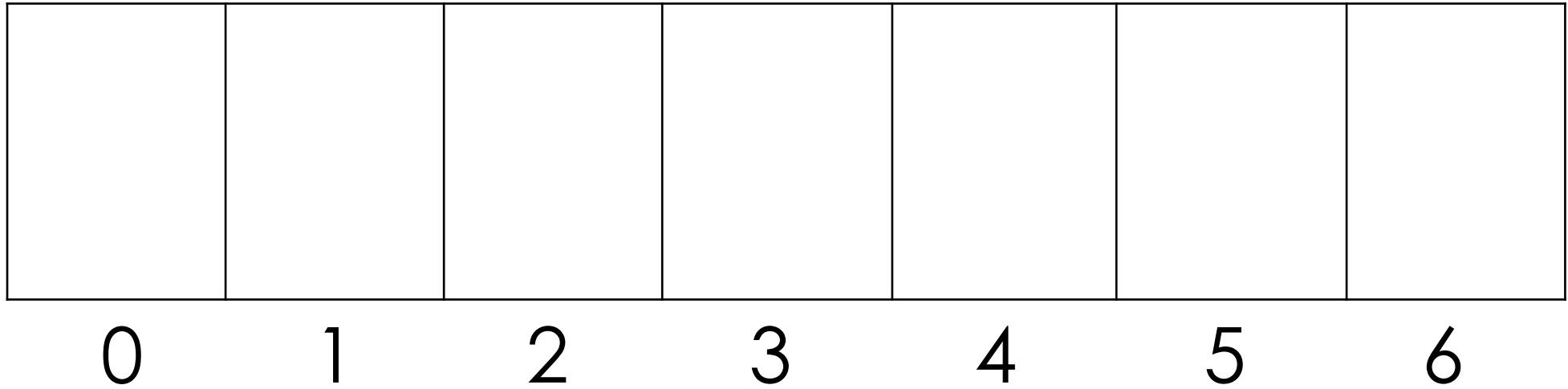
What is the probability of next key going in each slot?



$H(k) = k \bmod 7$

Linear probing

All keys equally likely



$$H(k) = k \bmod 7$$

All keys equally likely

$1/7$	$1/7$	$1/7$	$1/7$	$1/7$	$1/7$	$1/7$
0	1	2	3	4	5	6

$H(k) = k \bmod 7$

All keys equally likely

			24			
0	1	2	3	4	5	6

$$H(k) = k \bmod 7$$

All keys equally likely

			24			
0	1	2	3	4	5	6

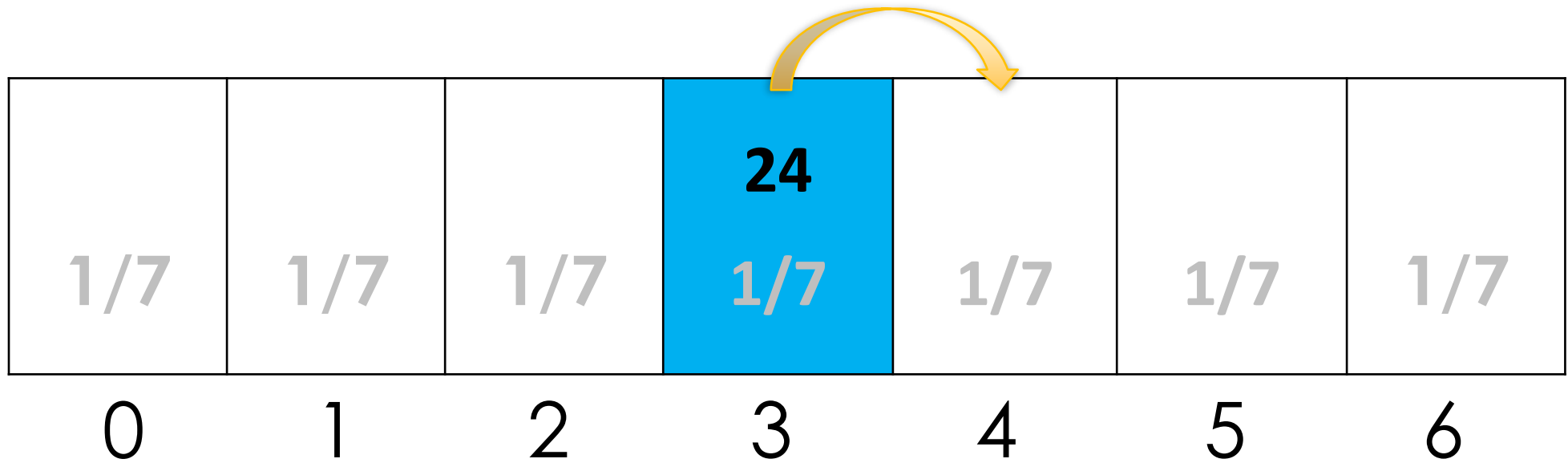
$$H(k) = k \bmod 7$$

All keys STILL equally likely

			24			
<i>1/7</i>	<i>1/7</i>	<i>1/7</i>	<i>1/7</i>	<i>1/7</i>	<i>1/7</i>	<i>1/7</i>
0	1	2	3	4	5	6

$H(k) = k \bmod 7$

All keys STILL equally likely



$H(k) = k \bmod 7$ Linear probing

All keys STILL equally likely

			24			
1/7	1/7	1/7	0	1/7+1/7	1/7	1/7
0	1	2	3	4	5	6

$H(k) = k \bmod 7$ Linear probing

All keys STILL equally likely

			24			
1/7	1/7	1/7	0	2/7	1/7	1/7
0	1	2	3	4	5	6

$H(k) = k \bmod 7$ Linear probing

All keys STILL equally likely

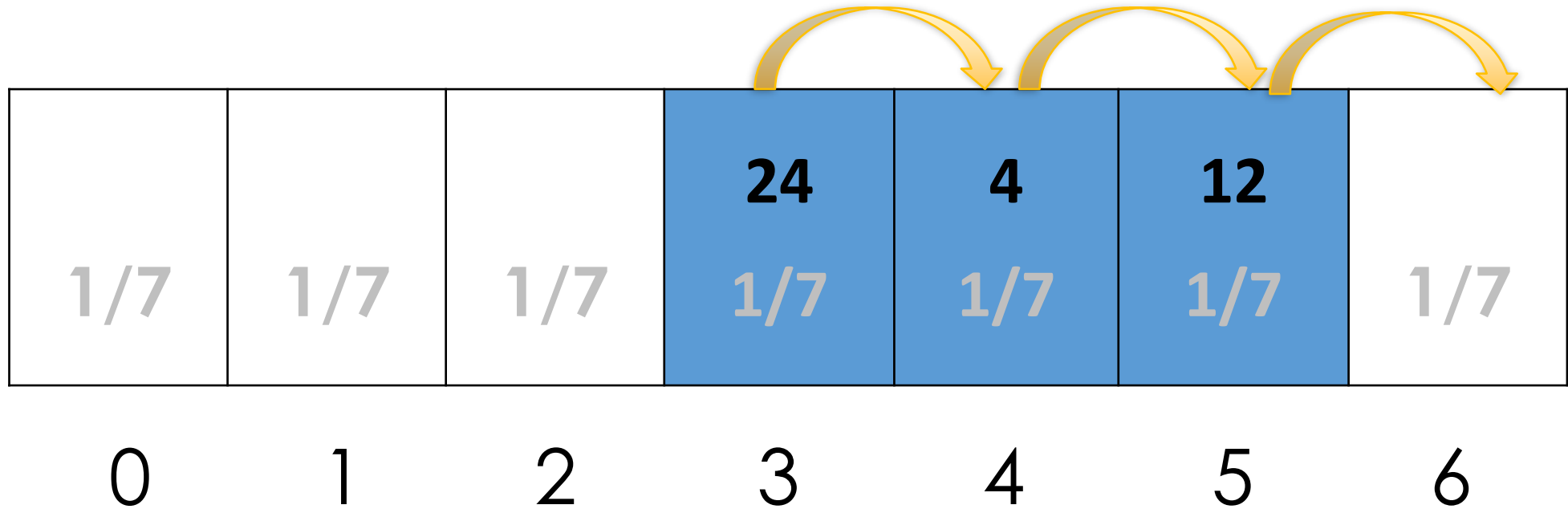
What is the probability of next key going in each slot?

			24	4	12	
1/7	1/7	1/7	1/7	1/7	1/7	1/7
0	1	2	3	4	5	6

$H(k) = k \bmod 7$

Linear probing

All keys equally likely



$H(k) = k \bmod 7$

Linear probing

All keys equally likely

$1/7$	$1/7$	$1/7$	24 0	4 0	12 0	$1/7+1/7$ $+ 1/7 +$ $1/7$
0	1	2	3	4	5	6

$H(k) = k \bmod 7$

Linear probing

All keys equally likely

			24	4	12	
1/7	1/7	1/7	0	0	0	4/7
0	1	2	3	4	5	6

$H(k) = k \bmod 7$

Linear probing

All keys equally likely