

## 61A Extra Lecture 2

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# Announcements

[cs61a.org/extra.html](http://cs61a.org/extra.html)

# Quines

(Demo)

# Church Numerals

(Demo)

Dice

## Exact Chances for Rolling Dice

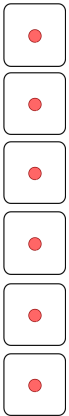
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```
roll_dice(2)
```

## Exact Chances for Rolling Dice

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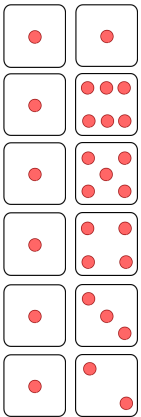
`roll_dice(2)`



## Exact Chances for Rolling Dice

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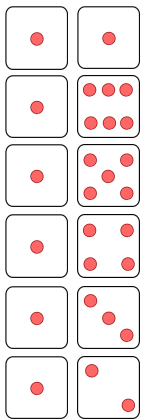




## Exact Chances for Rolling Dice

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roll\_dice(2)



1

2

3

4

5

6

7

8

9

10

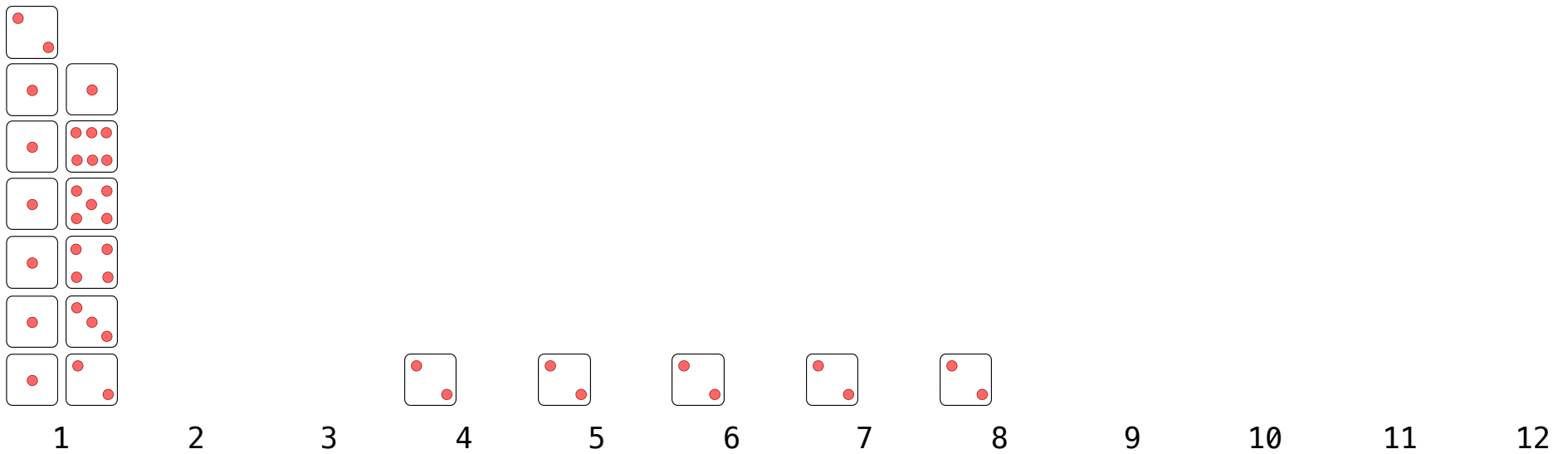
11

12

## Exact Chances for Rolling Dice

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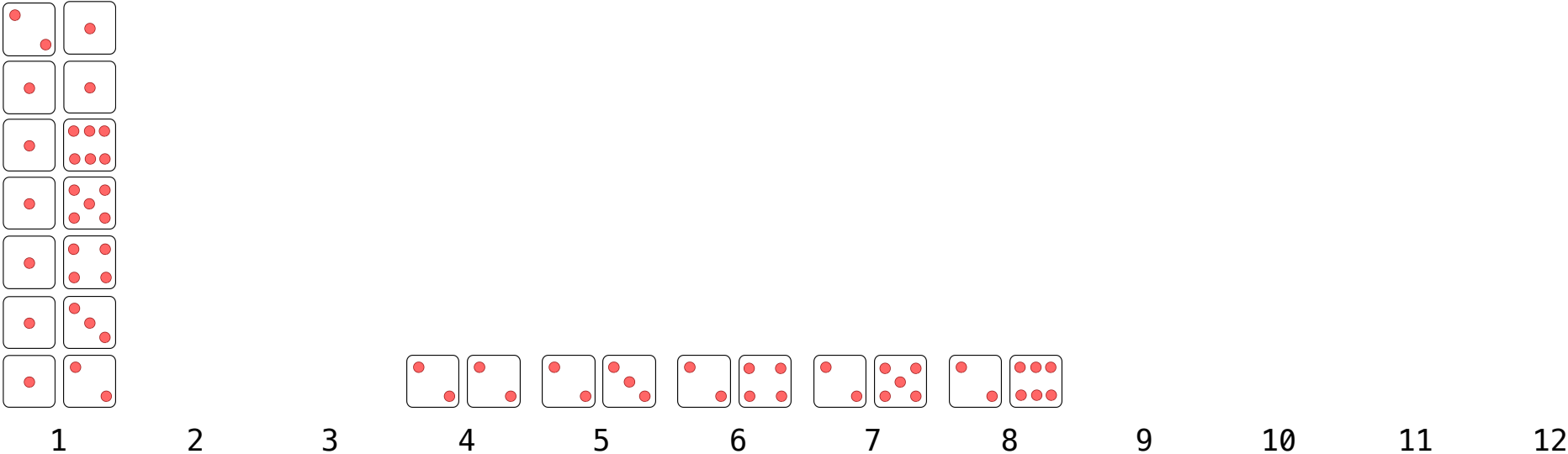
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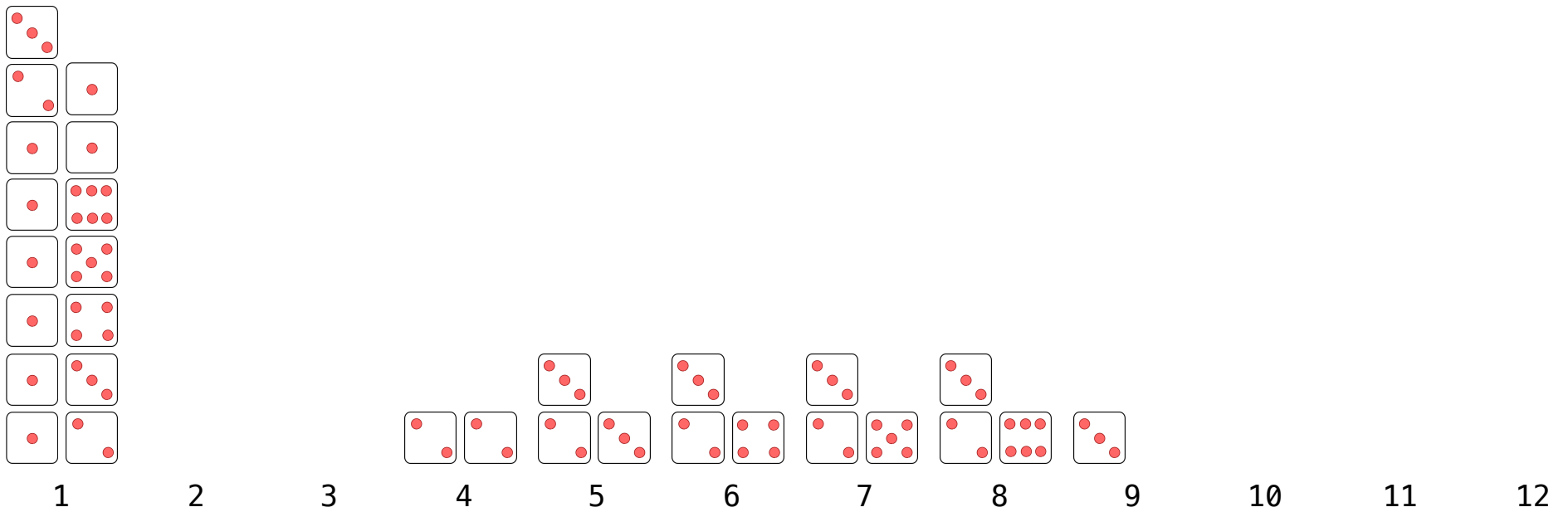
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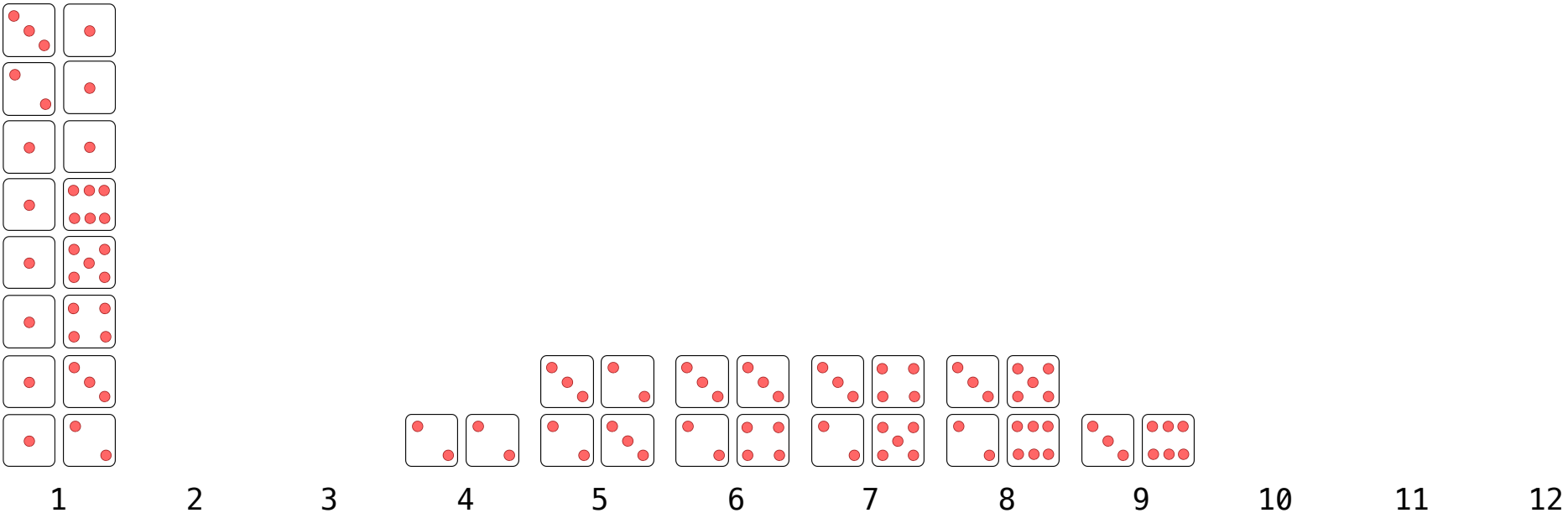
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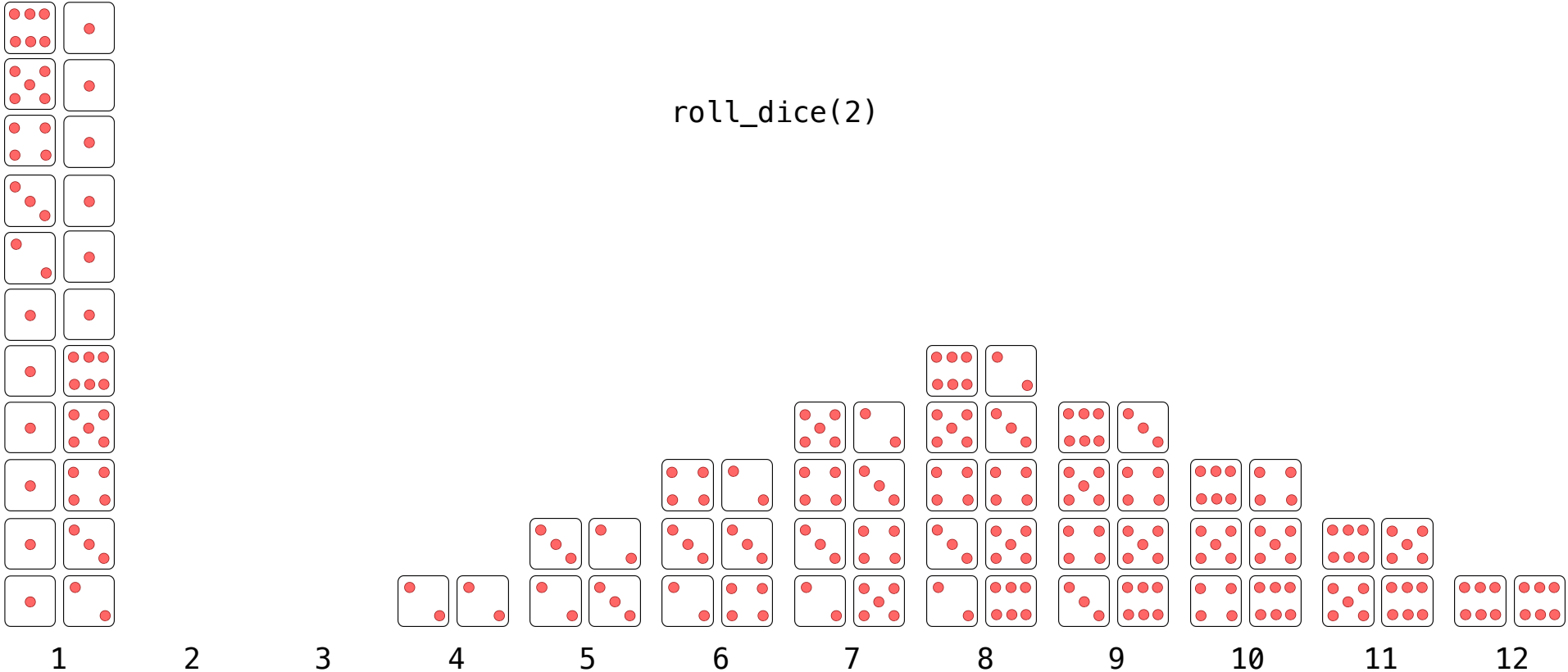
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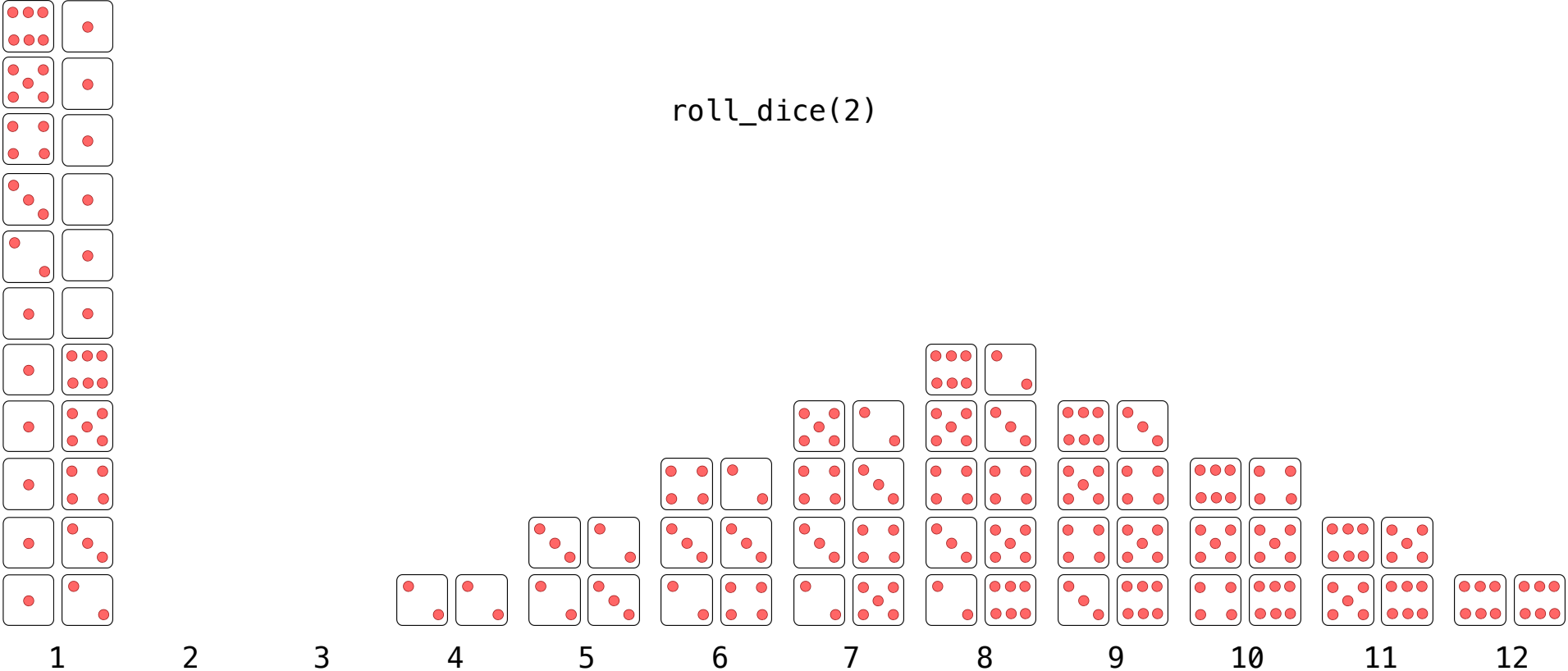
roll\_dice(2)



# Exact Chances for Rolling Dice



# Exact Chances for Rolling Dice



roll\_dice(2)

(Demo)

## Hog: The End Game

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**You:** 99  
**Them:** 99

## Hog: The End Game

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**You:** 99  
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**You:** 88  
**Them:** 99

## Hog: The End Game

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**You:** 99  
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**You:** 80  
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**You:** 99  
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What is the chance that I'll score *at least* **k** points rolling **n** six-sided dice?

## Hog: The End Game

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**You:** 99  
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**You:** 88  
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What is the chance that I'll score *at least*  $k$  points rolling  $n$  six-sided dice?

(Demo)

# Memoization

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(Demo)

## Twenty-One (Nim)



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(Demo)

## Twenty-One Rules

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**21**

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(Demo)

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(Demo)

**19**

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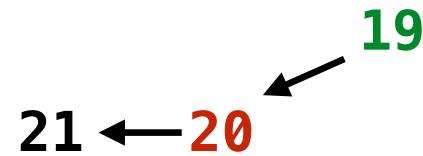
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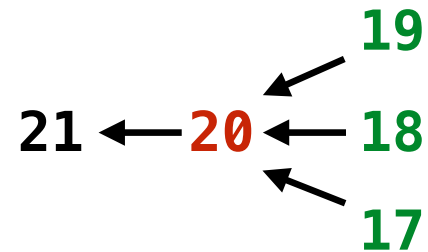
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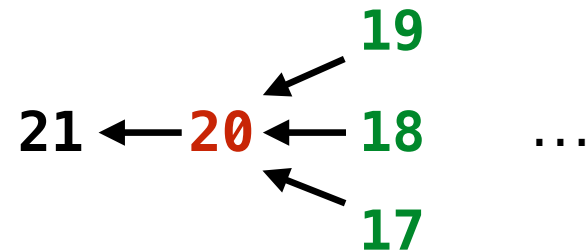
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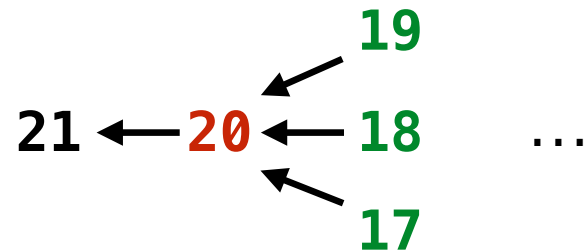
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(Demo)



(Demo)



## Hog Optimal Strategies

## Contest Challenges

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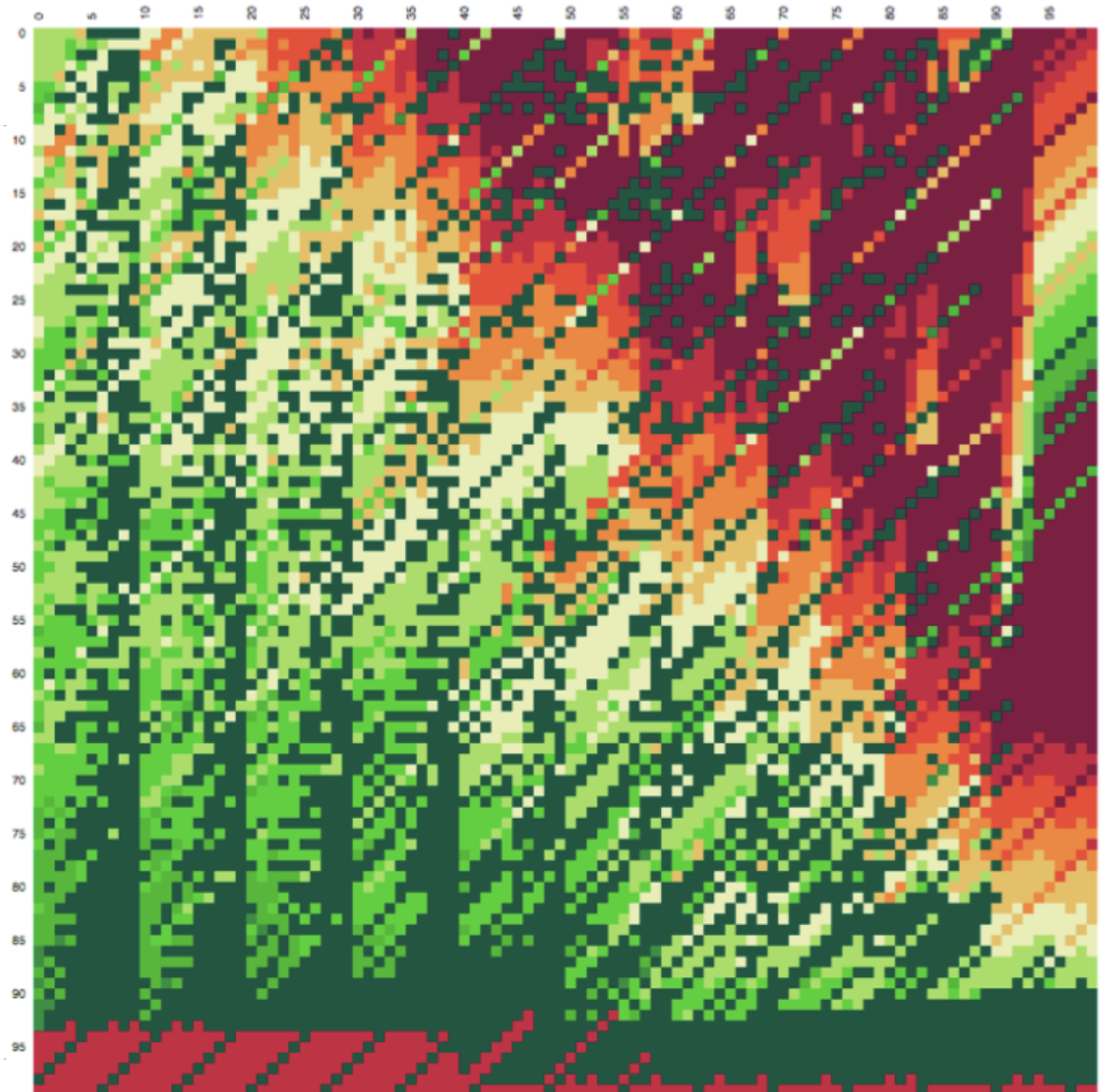
Larger state space than Nim &  
random transition function

## Contest Challenges

Larger state space than Nim &  
random transition function

Spring 2015 Optimal Strategy

- Rules: <http://inst.eecs.berkeley.edu/~cs61a/sp15/proj/hog/>
- Designed for what opponent?



## Contest Challenges

Larger state space than Nim &  
random transition function

Spring 2015 Optimal Strategy

- Rules: <http://inst.eecs.berkeley.edu/~cs61a/sp15/proj/hog/>
- Designed for what opponent?

Partial information: your  
strategy is not a function  
of the dice being used

