

lec14

September 29, 2021

```
[1]: from datascience import *
import numpy as np

%matplotlib inline
import matplotlib.pyplot as plots
plots.style.use('fivethirtyeight')
```

0.1 Monty Hall Problem

```
[2]: hidden_behind_doors = ['first goat', 'second goat', 'car']

goats = ['first goat', 'second goat']
```

```
[3]: def other_goat(goat):
    if goat == 'first goat':
        return 'second goat'
    elif goat == 'second goat':
        return 'first goat'
```

```
[4]: other_goat('first goat')
```

```
[4]: 'second goat'
```

```
[5]: other_goat('second goat')
```

```
[5]: 'first goat'
```

```
[6]: other_goat('apple')
```

```
[7]: def play_monty_hall():
    """
    Returns a list of 3 items:
    [contestant's first guess, what Monty reveals, what's behind other door]
    """
    first_guess = np.random.choice(hidden_behind_doors)

    if first_guess == 'first goat':
```

```

    return [first_guess, 'second goat', 'car']

    elif first_guess == 'second goat':
        return [first_guess, 'first goat', 'car']

    elif first_guess == 'car':
        reveal = np.random.choice(goats)
        return ['car', reveal, other_goat(reveal)]

```

```
[8]: play_monty_hall()
```

```
[8]: ['second goat', 'first goat', 'car']
```

```
[9]: results = Table(['Guess', 'Revealed', 'Remaining'])
```

```
[10]: results
```

```
[10]: Guess | Revealed | Remaining
```

```
[11]: results.append(play_monty_hall())
```

```
[11]: Guess      | Revealed  | Remaining
      second goat | first goat | car
```

```
[12]: results
```

```
[12]: Guess      | Revealed  | Remaining
      second goat | first goat | car
```

```
[13]: trials = Table(['Guess', 'Revealed', 'Remaining'])

      for i in np.arange(10000):
          trials.append(play_monty_hall())

```

```
[14]: trials
```

```
[14]: Guess      | Revealed  | Remaining
      second goat | first goat | car
      first goat  | second goat | car
      first goat  | second goat | car
      first goat  | second goat | car
      car         | second goat | first goat
      car         | second goat | first goat
      first goat  | second goat | car
      first goat  | second goat | car
      car         | second goat | first goat
      second goat | first goat | car
```

... (9990 rows omitted)

```
[15]: trials.group('Guess')
```

```
[15]: Guess      | count  
      car        | 3287  
      first goat | 3359  
      second goat | 3354
```

```
[16]: trials.group('Remaining')
```

```
[16]: Remaining   | count  
      car         | 6713  
      first goat  | 1644  
      second goat | 1643
```