

Python, základní kameny až skály III

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live coding sessions in Tic-Tac-Toe game

admin slide, dnes ...

- účastníci ACM CTU Open, pošlete mi prosím názvy vašich týmů
- Týmy si založí skupinu v BRUTE úloze
- logické funkce
- generátory
- set, frozen set

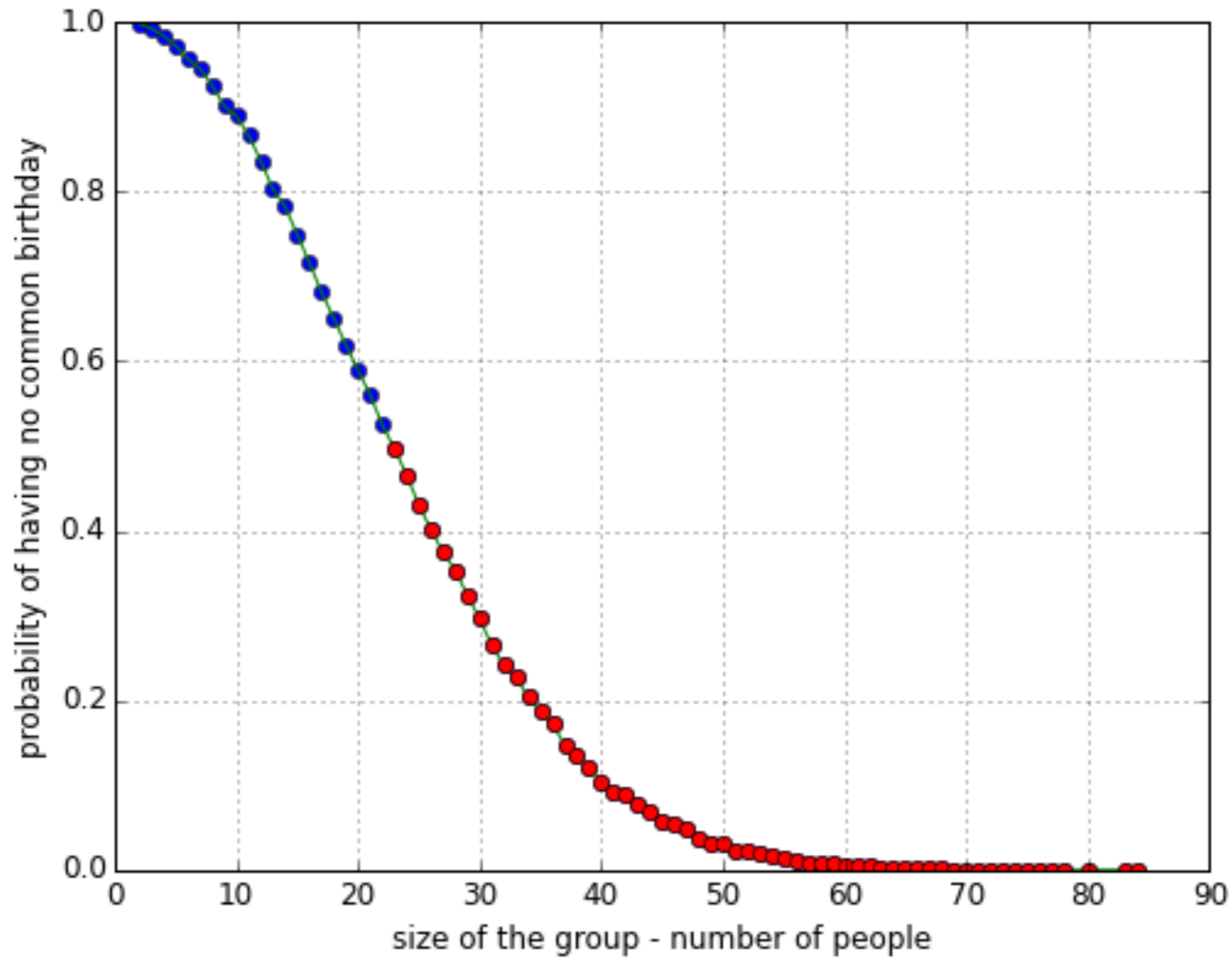
slovníky key: value

```
1 pm = {'c', 'c'): (4, 4), ('d', 'd'): (2, 2)}  
2  
3 for key in pm:  
4     print(key, pm[key])  
5  
6 for key, value in pm.items():  
7     print(key, value)
```

birthday problem



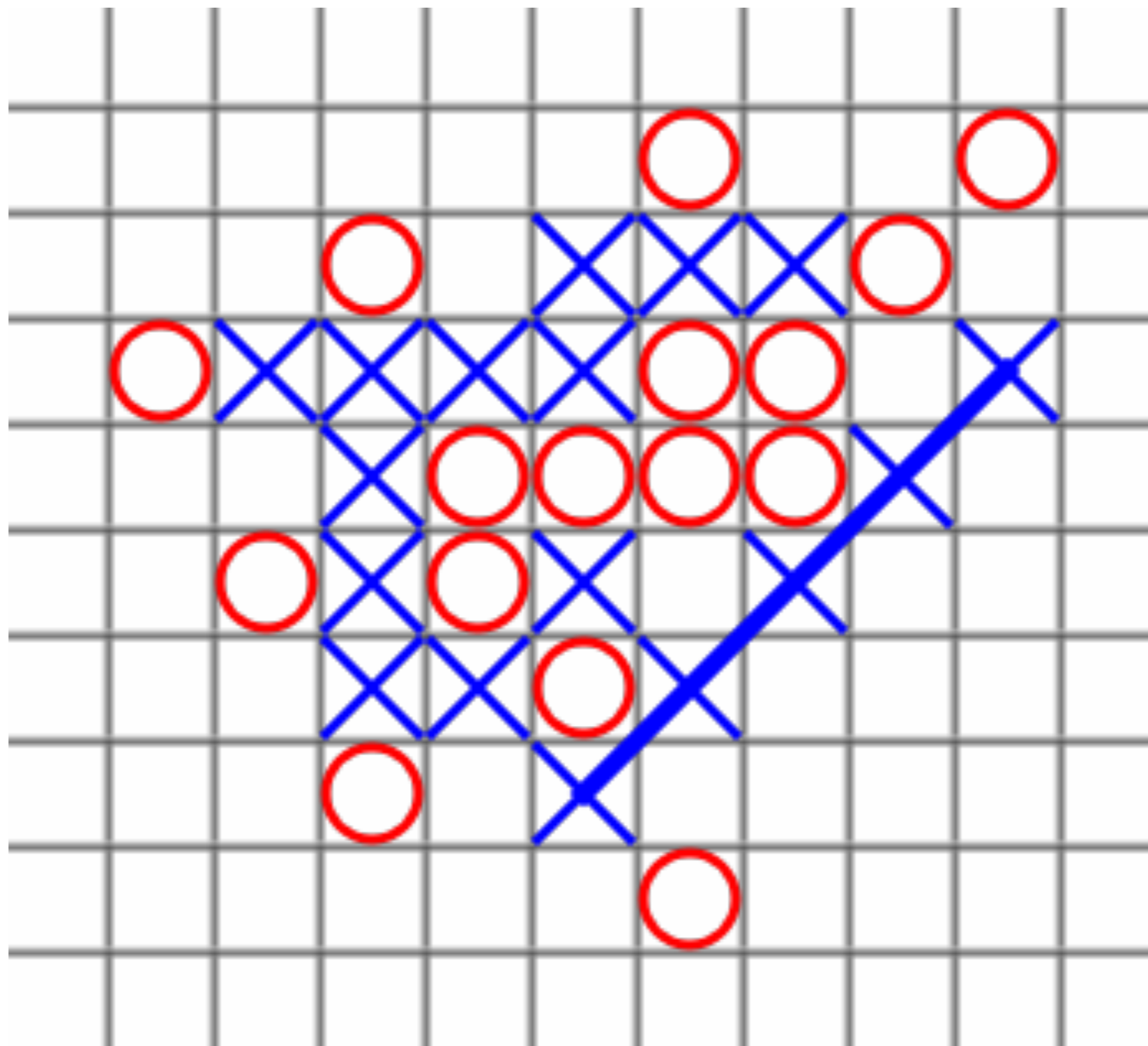
matplotlib.pyplot



generátorová notace

```
lp = {key:value for key,value in nc.items() if value < 0.5}
```

zpátky k piškvorkám



Logické funkce

- `is_inside`
- `is_winning`
- `is_empty`
- `is_full`

- Vracejí `True` nebo `False`


- Zpřehledňují hlavní ideu algoritmu

pro všechny neprázdné pozice

```
1 def is_winning_too_generous(self):  
2     for r,c in self.non_empty_pos():  
3         for direction in self.directions[0:4]:  
4             if self.is_dir_winning(r,c,direction):  
5                 return True  
6     return False
```

yield místico return

```
1 def non_empty_pos(self):
2     """generate all non-empty positions"""
3     for r,c in self.all_pos():
4         if not(self.is_empty(r, c)):
5             yield r,c
6
7 def all_pos(self):
8     """
9     generator for all field positions
10    :param self:
11    :yield: r,c
12    """
13    for r in range(len(self.field)):
14        for c in range(len(self.field[0])):
15            yield r,c
```



set, frozenset

```
1 >>> a = set([1, 2, 3, 4, 5, 4])
2 >>> b = set([1, 2, 3, 6])
3 >>> a | b
4 {1, 2, 3, 4, 5, 6}
5 >>> a & b
6 {1, 2, 3}
```

set - mutable

frozenset - immutable

sekvence pozic v jednom směru

```
1 def get_seq(self, start_pos, direction, sym):
2     r,c = start_pos
3     positions = [(r,c)]
4     r,c = r+direction['r'], c+direction['c']
5     while self.is_inside(r,c) and sym==self.field[r][c]:
6         positions.append((r, c))
7         r,c = r+direction['r'], c+direction['c']
8     return frozenset(positions)
```

kompletní sekvence

```
1 def get_all_sequences(self, pos, sym):
2     """
3     :param pos: r,c tuple
4     :param sym: symbol of the player that moves
5     :return: sequence:lenght dictionary
6     """
7     forward_sequences = []
8     sequences = {}
9     for direction in self.directions[0:4]: # forward
10         seq = self.get_seq(pos, direction, sym)
11         forward_sequences.append(seq)
12     for i in range(4): # backward directions
13         seq = self.get_seq(pos, self.directions[i + 4], sym)
14         complete_sequence = forward_sequences[i] | seq
15         sequences[complete_sequence] = len(complete_sequence)
16     return sequences
17
```

sjednocení sekvence vpřed a vzad