Notes on Probability

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April 20, 2016

```
HIRE-ASSISTANT(n)
1  best = 0
2  for i = 1 to n
3        interview candidate i
4        if candidate i is better than candidate best
5              best = i
6              hire candidate i
```

```
RANDOMIZED-HIRE-ASSISTANT(n)
1  randomly permute the list of candidates
2  best = 0
3  for i = 1 to n
4        interview candidate i
5        if candidate i is better than candidate best
6              best = i
7              hire candidate i
```

PERMUTE-BY-SORTING(A)

1 $n = A.length$
2 let $P[1...n]$ be a new array
3 **for** $i = 1$ **to** n
4 $\quad\quad P[i] = \text{RANDOM}(1, n^3)$
5 sort A using P as sort keys

RANDOMIZE-IN-PLACE(A)

1 $n = A.length$
2 **for** $i = 1$ **to** n
3 $\quad\quad$ swap $A[i]$ with $A[\text{RANDOM}(i, n)]$

The birthday paradox

- How many people must be in a room before there is a 50% chance of two of them having the same birthday? Assumptions:
- $$\Pr\{b_i = r\} = 1/n \text{ for } i = 1..k \text{ and } r = 1..n$$
- $$\Pr\{b_i = r \text{ and } b_j = r\} = \Pr\{b_i = r\} \Pr\{b_j = r\}$$