



Birthday Paradox Worksheet

ایرئیس کاشانی - ۹۹۴۱.۵۹

1. The probability of there being no collisions after n insertions into an m -element hash table is

$$\frac{m}{m} \times \frac{m-1}{m} \times \dots \times \frac{m-n+1}{m} \quad (1)$$

If $m = 12$ (number of months in a year), what is the smallest value of n for which the probability drops below $1/2$.

$$P_n = \frac{12}{12} \times \frac{11}{12} \times \frac{10}{12} \times \frac{9}{12} \times \frac{8}{12} \leq 0.125 \quad \checkmark \quad n = 5 \quad \checkmark$$

$$\frac{12}{12} \times \frac{11}{12} \times \frac{10}{12} \times \frac{9}{12} = 0.15 \checkmark$$

2. Form groups of 5-7 students and write down everyone's birth-month.

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3. Did your group have a collision?

☆ (بله) ☆