

15/10/13

To: Nicholas James

Re: Birthday paradox in Q600 (Parlar)

An easier explanation involves having the same day (M, T, etc.) for two people.
of the week

Consider the case of $n=4$ people. This problem is easier to solve if we find the prob. of not having the same birthday. (Call this $\Pr(\bar{A})$), so, A : event that two people have the same b. day

Define $p(i) = \Pr(\text{ith person's day doesn't match others})$

$$\left. \begin{array}{l} i=1 \quad p(1) = 1 = \frac{7}{7} \\ i=2 \quad p(2) = \frac{6}{7} \\ i=3 \quad p(3) = \frac{5}{7} \\ i=4 \quad p(4) = \frac{4}{7} \end{array} \right\} \Pr(\bar{A}) = \frac{7}{7} \cdot \frac{6}{7} \cdot \frac{5}{7} \cdot \frac{4}{7} \\ = \left(\frac{1}{7}\right)^4 (7 \cdot 6 \cdot 5 \cdot 4) = .35$$

$$\text{So, } \Pr(A) = 1 - .35 = .65$$

for $n=4$ people

Similar approach for 365 days. As n gets large the product term gets surprisingly small,