

Birthday Paradox Worksheet

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

$$\frac{m}{m} \times \frac{m-1}{m} \times \cdots \times \frac{m-n+1}{m}$$

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

$$n = 1 \quad n = 2$$

$$12/12 \times 11/12 = 11/12$$

$$n = 3$$

$$12/12 \times 11/12 \times 10/12 = 0.764$$

$$n = 4$$

$$12/12 \times 11/12 \times 10/12 \times 9/12 = 0.573$$

$$n = 5$$

$$12/12 \times 11/12 \times 10/12 \times 9/12 \times 8/12 = 0.382$$

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

July

July

November

September

July

3. Did your group have a collision?

Yes there was a collision