Monte Carlo methods mean using computer simulation (with random choices for unknowns) to obtain an answer. Essentially, random sampling of the output, often where an exact value cannot be calculated. We saw earlier a way to estimate \( \pi \) by throwing darts at a dartboard, using the fact that the area of the board is related to \( \pi \).

### B1.1 The birthday paradox

Consider the following famous question. You have \( n \) people in a room. How large must \( n \) be so that there is at least a 50% chance that some two (or more) people have the same birthday (day and month)?

This is not hard to solve using probability. But we can do a Monte Carlo simulation. We create a function `coincides` that generates \( n \) birthdays at random, and then tests whether there is a match or not.

We then write a driver that uses this function multiple times and calculates some statistics.

```bash
birthdayParadox.m
```