

- Q1** What is the smallest number of people necessary to ensure with probability 50% that at least two of them have been born during the same week of the year. (Assume for this question that each year has exactly 52 weeks.)
- Q2** Suppose that a hashing function h is not collision resistant. Suppose that a rogue hacker intercepts a letter from his employer that contains the hacker's yearly salary; the letter is "signed" with the hash h — when the bank receives the letter it confirms its authenticity by verifying the hash over the phone. How can the hacker increase the salary figure and forward it to the bank while not modifying the hash?

Programming Problem Implement in Python (2.7) a rolling checksum. That is, your program should work as follows; on command:

```
rchk -s n file.txt
```

it will compute a rolling checksum of the file `file.txt` where the chunk sizes are n characters.

It is up to you to design a particular rolling checksum; it is supposed to uncover deltas, and it is supposed to be "rolling". We will define the necessary concepts in class.