

2. Secure Passwords (16 points)

You are writing a password manager app that generates random strings of digits 0-9 to use as passcodes.

- a) (4 points) How many distinct passcodes of length 8 are possible?

*For each number in the passcode there are
10 different choices, number of distinct passcodes is:
 10^8*

- b) (4 points) Suppose your app generates all length-8 passcodes with equal probability. A hacker tries to crack a passcode from this app by brute force, starting with 00000000 and guessing passcodes in sequential order (00000001, 00000002, etc.). If the hacker can try 1 million passcodes in a second, what is the probability that a generated 8-digit passcode is guessed in one second?

*The probability is the random passcode matches
the first 10^6 trial*
$$P = \frac{10^6}{10^8} = \frac{1}{100}$$