CSCI 357 - Cryptography
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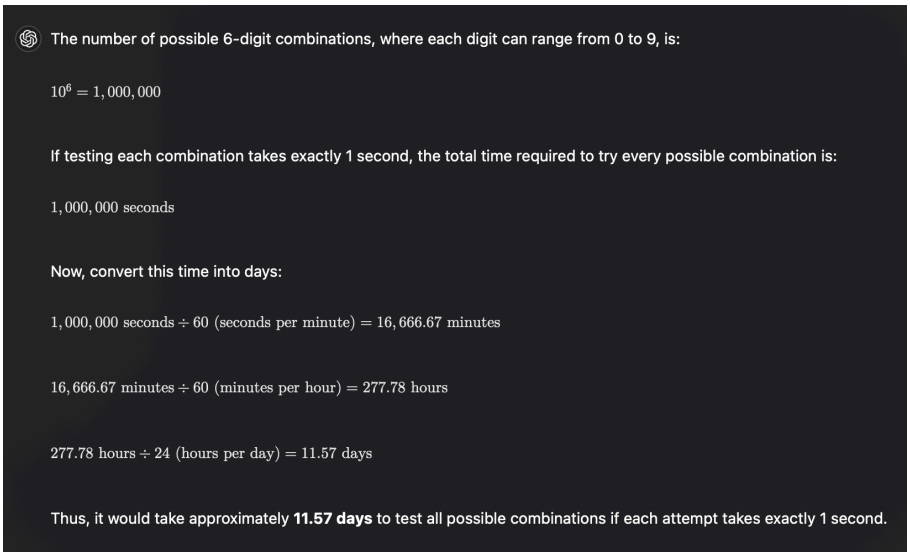
HW #1

You are trying to decipher the combination for a safety box that requires a 6-digit code. Each digit in the code can range from 0 to 9, and there are no restrictions (e.g., repeated digits are allowed). If testing each possible combination takes exactly 1 second, how long would it take (in days) in total to try every possible combination to open the box?

Since there are 6 digits in the code, and each digit has 10 possible options (0 to 9), then there are 10^6 = 1000000 possible combinations. Therefore, it would take 1000000 seconds, 1000000/60 = 16666.67 minutes, 16666.67/60 = 277.78 hours, 277.78/24 = **11.57 days.**

Here are my results when I prompted both ChatGPT and DeepSeek with the question:



The number of possible 6-digit combinations, where each digit can range from 0 to 9, is:

$10^6 = 1,000,000$

If testing each combination takes exactly 1 second, the total time required to try every possible combination is:

$1,000,000 \text{ seconds}$

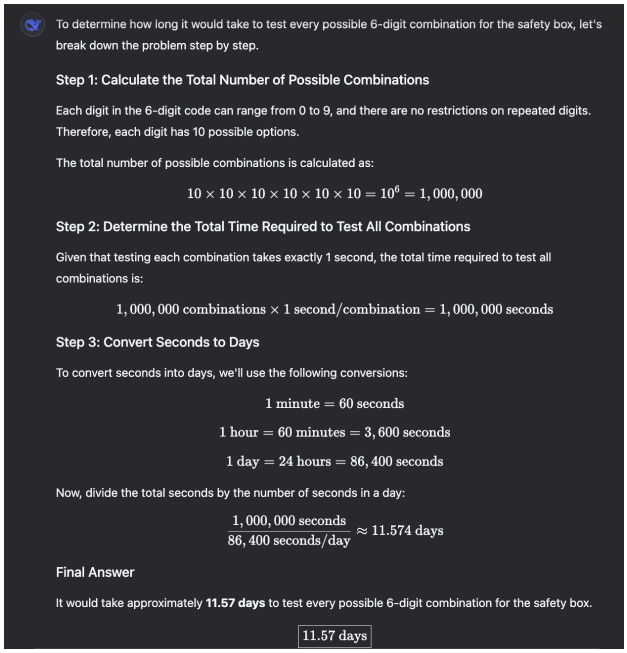
Now, convert this time into days:

$1,000,000 \text{ seconds} \div 60 \text{ (seconds per minute)} = 16,666.67 \text{ minutes}$

$16,666.67 \text{ minutes} \div 60 \text{ (minutes per hour)} = 277.78 \text{ hours}$

$277.78 \text{ hours} \div 24 \text{ (hours per day)} = 11.57 \text{ days}$

Thus, it would take approximately **11.57 days** to test all possible combinations if each attempt takes exactly 1 second.



To determine how long it would take to test every possible 6-digit combination for the safety box, let's break down the problem step by step.

Step 1: Calculate the Total Number of Possible Combinations

Each digit in the 6-digit code can range from 0 to 9, and there are no restrictions on repeated digits. Therefore, each digit has 10 possible options.

The total number of possible combinations is calculated as:

$$10 \times 10 \times 10 \times 10 \times 10 \times 10 = 10^6 = 1,000,000$$

Step 2: Determine the Total Time Required to Test All Combinations

Given that testing each combination takes exactly 1 second, the total time required to test all combinations is:

$$1,000,000 \text{ combinations} \times 1 \text{ second/combination} = 1,000,000 \text{ seconds}$$

Step 3: Convert Seconds to Days

To convert seconds into days, we'll use the following conversions:

$$1 \text{ minute} = 60 \text{ seconds}$$

$$1 \text{ hour} = 60 \text{ minutes} = 3,600 \text{ seconds}$$

$$1 \text{ day} = 24 \text{ hours} = 86,400 \text{ seconds}$$

Now, divide the total seconds by the number of seconds in a day:

$$\frac{1,000,000 \text{ seconds}}{86,400 \text{ seconds/day}} \approx 11.574 \text{ days}$$

Final Answer

It would take approximately **11.57 days** to test every possible 6-digit combination for the safety box.

$$\boxed{11.57 \text{ days}}$$

Both approaches followed similar logic to what I did. However, the small difference is that DeepSeek determined the seconds/day conversion ahead of time rather than multiplying each conversion in separate steps, which is what I and ChatGPT did.