Example: How long does it take to crack a password?

HOW LONG DOES IT TAKE TO CRACK A PASSWORD?

- Password choices = 95 printable ASCII characters
- Length of the password = 10 characters in length
- Password cracker rate = 6.4 millions operations per second (6.4×10^6)
- How long will it take to test all possible passwords?
- Thus, there are $95^{10} \approx 6 \times 10^{19}$ possible passwords.
- The time required = Possible Passwords/cracker rate

$$\frac{6\times10^{19}\ \text{passwords}}{6.4\times10^{6}\ \text{passwords / second}} = 9.4\times10^{12}\ \text{seconds}$$

$$= 300{,}000\ \text{years}$$

Thus, it will take 300,000 years to crack the password.

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Solution: ① calculate seconds

$$\frac{95^{10}}{6.4\times10^{6}} \overset{\text{CASIO}}{=\!=} 9.3553\times10^{12}$$

② translate to years

$$\frac{9.3553\times10^{12}}{365\times24\times60\times60} = 296653.4968$$