

Example 2 : How long does it take to crack a password?

HOW LONG DOES IT TAKE TO CRACK A PASSWORD?

- ❑ Choices of passwords = **102** characters
- ❑ Length of passwords = **16** characters
- ❑ Password cracker rate = **400** million operations/second
 - ❑ = **400×10^6** operations/second
- ❑ Thus, there are **$102^{16} \approx 1.37 \times 10^{32}$** possible passwords
- ❑ The **time required** is = **Possible Passwords/cracker rate**
- ❑ Substituting the values, we have:
 - ❑ **1.37×10^{32} possible passwords / 400×10^6 operations/second**
 - ❑ **$\approx 342 \times 10^{21}$ seconds**
 - ❑ **$342 \times 10^{21} / 60 \times 60 \times 24 \times 365 \approx 108 \times 10^{14}$ years.**
- ❑ Thus, it will take **108×10^{14} years** to test all possible passwords.

DR M Y Siyal EE6102 P1-53

Solution: ① calculate seconds

$$\frac{102^{16}}{400 \times 10^6} = 3.4320 \times 10^{23}$$

② translate to years.

$$\frac{3.432 \times 10^{23}}{365 \times 24 \times 60 \times 60} = 1.0883 \times 10^{16}$$