

4.1 Check the password scheme on your own computer system. Are there any rules on password length, password format, or password expiry? How are passwords stored in your system?

**For my personal computer system, The minimum password length is 8 characters and the maximum length is 64 characters. My computer does not require any special characters or numbers, allowing for any format. The system my computer uses also does not have password expiry. System passwords are stored in password files on the computer.**

Exercise 4.2 Assume that you are only allowed to use the 26 letters of the alphabet to construct passwords.

- How many different passwords are possible if a password is at most  $n = 4, 6, 8$  characters long and there is no distinction between upper case and lower case characters?

**$2.171801572 \times 10^{11}$**

- How many different passwords are possible if a password is at most  $n = 4, 6, 8$  characters long and passwords are case-sensitive?

**$5.45079585 \times 10^{13}$**

Exercise 4.3 Assume that passwords have length 6 and all alphanumeric characters, upper and lower case, can be used in their construction. How long will a brute force attack take on average if....

**$62^6 = 56,800,235,584$  passwords**

**56 Million passwords.**

it takes one tenth of a second to check a password? **The worst case is over 180 years, with the average being around 70 years.**

it takes a microsecond to check a password? **The average would be around 8 hours.**  
 **$60 \times 60 \times 106 = 3,600,000,000$  is the equation of a microsecond in an hour.**

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Exercise 4.4 Assume that you are only allowed to use the 26 letters of the alphabet to construct passwords of length  $n$ . Assume further that you are using the same password in two systems where one accepts case-sensitive passwords but the other does not. Give an upper bound at the number of attempts required to guess the case-sensitive version of a password.

**$26^n$  for a password that is not case sensitive and  $52^n$  for a password that IS case sensitive.**