**Homework 1  
Fall 2021  
Due on Monday October 11, 2021, 11:59 p.m. via Blackboard**

If you do not have the textbook, use the following link to download it

<https://emadalsuwat.github.io/cryptography/textbook1.pdf>

Do textbook problems:

* Problem 2.10 (Page 62)
* Problem 2.11 (a only) (Page 63)
* Problem 2.11 (a and b only) (Page 98)
* Answer the following questions about S-boxes in DES:
  + Show the result of passing 110111 through S-box 3.
  + Show the result of passing 001100 through S-box 4.
  + Show the result of passing 000000 through S-box 7.
  + Show the result of passing 111111 through S-box 2.
* Show the results of the following hexadecimal data

0110 1023 4110 1023

after passing it through the initial permutation box.

* Show the results of the following hexadecimal data

AAAA BBBB CCCC DDDD

after passing it through the final permutation box.

* In DES, if the key with parity bit (64 bits) is 0123 ABCD 2562 1456, find the first-round key.