**Programing Assignment 3**

**Problem Submission Rules:**

1. **Detection of plagiarism will result in Failing grade. Students must do this assignment by themselves.**
2. **After completion, your work must be submitted to an assignment folder in D2L by a corresponding deadline.**

**Problems:**

The aim of this assignment is to implement a Feistel cipher round function (single round) which consists of the following steps:

1. **Implementing a Feistel Cipher**

Step 1: The function takes as input 8 bits and the 4-bit key .   
Step 2: The binary is divided into two halves ( and ).   
Step 3: The function computes and , where   
Step 4: The function performs a swapping of and , then outputs .

1. **Combining with Assignment 1**

Improve your implementation for 1 by using your Text Converter, so it can handle a string from a user and output a string.

Hint: you can execute the Feistel function once for each letter, i.e., the plaintext “hello” needs five executions.

**Complier requirement:**

The code must be implemented using Python version 3.9.x or higher. Students must use Python official libraries that are accessible from the webpage (<https://docs.python.org/3/library/index.html>). All used libraries and their purpose should be described in the report.

**Submission instructions:**

Please submit your deliverables to D2L Assignments folder: PA 3. You need to submit 4 different things. ***Do not submit zip files. You will get zero if you do.***

1. Your Python code saved as yourlastname.py
2. Your Python code saved as yourlastname.txt - copy and paste your entire Python code, save
3. Your report yourlastname\_Report\_PA3.doc as a word document
4. A short video demo: (3-5 minutes)
   1. Explaining your code
   2. Use your first and last name as an input strings
      1. Show the input value at step 1 and 4 bit random key (only for first two characters)
      2. Show the output of Step 3 and 4. (only for first two characters)
      3. Show the encrypted output strings.
   3. Do b for a sentence of your choice.

Once you submit, D2L will perform a similarity check for your submission and show you the result. Your similarity score on your code as txt file must be lower than 40% unless something essential is described in the report. *Otherwise, 5 points will be deducted for every additional 5% similarity*. For example, you would get a maximum 95 if your similarity is between 41% and 45%.

**Project Report:**

The report does not have any specific format. Three things you must include:

1. What you did for the project, i.e., explain the project with your own word.
2. Explain your program/code.
3. Explain output, include screen shot.

You could add anything else you like.