# Encode Caesar Cipher with Username and Password (Encode & Decode) Documentation

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## Purpose

This project is designed for the Advanced Python Class by Muzaffar Ali. The program allows encoding and decoding of a message using a Caesar cipher and stores the encoded message in a QR code image. The user must authenticate with a username and password, then provide a message and a PIN for encoding or decoding.

## Requirements

- pyqrcode: To create QR codes.

- QRCode: To handle QR code generation.

- PIL.Image: To handle image operations.

- pyzbar.pyzbar.decode: To decode QR codes.

- os: To handle file paths.

- string: To access printable characters.

## Environment Setup

1. Ensure Python is installed on your system.  
2. Install the required libraries using the following commands:  
```  
pip install pyqrcode  
pip install Pillow  
pip install pyzbar  
```

## Execution

1. Save the provided code in a file named `caesar\_cipher\_qr.py`.  
2. Open a terminal or command prompt.  
3. Navigate to the directory where `caesar\_cipher\_qr.py` is saved.  
4. Run the program using the command:  
```  
python caesar\_cipher\_qr.py  
```

## How It Works

1. Function `authenticate()`:  
 - Prompts the user for a username and password.  
 - Returns True if they match the stored credentials, False otherwise.  
  
2. Function `validate\_message(message)`:  
 - Checks if the message length is between 1 and 100 and contains only printable characters.  
 - Returns True if the message is valid, False otherwise.  
  
3. Function `validate\_pin(pin)`:  
 - Checks if the PIN is between 0 and 100.  
 - Returns True if the PIN is valid, False otherwise.  
  
4. Function `caesar\_cipher(text, shift, encode=True)`:  
 - Applies a Caesar cipher to the given text with the specified shift.  
 - Parameters: `text` (str): The text to be ciphered. `shift` (int): The number of positions to shift each character. `encode` (bool): Whether to encode or decode.  
 - Returns: The ciphered or deciphered text.  
  
5. Function `generate\_qr\_code(content, file\_path)`:  
 - Generates a QR code from the given content and saves it as an image file.  
 - Parameters: `content` (str): The data to encode in the QR code. `file\_path` (str): The path to save the QR code image.  
  
6. Function `read\_qr\_code(file\_path)`:  
 - Reads the QR code from the specified image file and returns the decoded content.  
 - Parameters: `file\_path` (str): The path to the image file containing the QR code.  
  
7. Main Function `main()`:  
 - Handles the workflow: authenticate, get PIN, encode or decode the message, and generate or read a QR code.  
 - Prompts the user to enter the necessary information and performs the encoding/decoding and QR code generation/reading.

## Output

The program encodes or decodes a user-provided message with a Caesar cipher using a PIN and stores or reads the encoded message in a QR code image. The QR code is saved or read from a specified file location.