# PROJECT REPORT

# Encryption and Decryption Between Users in Morse Using a Flashlight (Combined Program)

This combined Python program performs all three operations — Encryption, Flashlight Transmission, and Decryption — in a single file. It uses Morse code to send messages through a simulated flashlight (a Tkinter window that blinks white and black). The user can choose to send or receive messages using a simple menu interface.

## Complete Python Code:

```
import time
import tkinter as tk

# Morse Code Dictionaries
MORSE_CODE_DICT = {
    'A': '.-', 'B': '-...', 'C': '-.-.', 'D': '-..',
    'E': '.', 'F': '..-.', 'G': '--.', 'H': '....',
    'I': '..', 'J': '.---', 'K': '-.-', 'L': '.-..',
    'M': '--', 'N': '-.', 'O': '---', 'P': '.--.',
    'Q': '--.-', 'R': '.-.', 'S': '...', 'T': '-',
    'U': '..-', 'V': '...-', 'W': '.--', 'X': '-..-',
    'Y': '-.--', 'Z': '--..', '1': '.----', '2': '..---',
    '3': '...--', '4': '....-', '5': '.....', '6': '-....',
    '7': '--...', '8': '---..', '9': '----.', '0': '-----',
    ',': '--..--', '.': '.-.-.-', '?': '..--..', '/': '-..-.',
    '-': '-....-', '(': '-.--.', ')': '-.--.-', ' ': '/'
}

REVERSE_MORSE_DICT = {v: k for k, v in MORSE_CODE_DICT.items()}

# Encryption Function
def text_to_morse(text):
    text = text.upper()
    morse_code = ' '.join(MORSE_CODE_DICT.get(char, '') for char in text)
    return morse_code

# Flashlight Transmission
DOT_TIME = 0.2
DASH_TIME = DOT_TIME * 3
GAP = DOT_TIME

def blink_flashlight(morse_code):
    root = tk.Tk()
    root.title("Flashlight Transmission")
    root.geometry("400x400")
    frame = tk.Frame(root, bg="black")
    frame.pack(fill="both", expand=True)

    def flash_on():
        frame.config(bg="white")
        root.update()

    def flash_off():
        frame.config(bg="black")
        root.update()

    print("\nTransmitting Morse Code:")
    print(morse_code)
    print("\nFlashlight simulation started...\n")

    for symbol in morse_code:
        if symbol == '.':
```

```
            flash_on()
            time.sleep(DOT_TIME)
            flash_off()
        elif symbol == '-':
            flash_on()
            time.sleep(DASH_TIME)
            flash_off()
        elif symbol == ' ':
            time.sleep(DOT_TIME * 3)
        elif symbol == '/':
            time.sleep(DOT_TIME * 7)
        time.sleep(GAP)
    root.destroy()
    print("Transmission complete.\n")

# Decryption Function
def morse_to_text(morse_code):
    words = morse_code.split(' / ')
    decoded_message = ''
    for word in words:
        for symbol in word.split():
            decoded_message += REVERSE_MORSE_DICT.get(symbol, '')
        decoded_message += ' '
    return decoded_message.strip()

# Main Menu
def main():
    while True:
        print("\n==============================")
        print("  MORSE FLASHLIGHT COMMUNICATOR")
        print("==============================")
        print("1. Encrypt & Transmit Text")
        print("2. Decrypt Received Morse")
        print("3. Exit")
        print("==============================")
        choice = input("Enter your choice (1-3): ")

        if choice == '1':
            msg = input("\nEnter text to send: ")
            morse = text_to_morse(msg)
            print("\nEncrypted Morse Code:", morse)
            blink_flashlight(morse)

        elif choice == '2':
            morse_input = input("\nEnter received Morse code (use '/' for spaces): ")
            text = morse_to_text(morse_input)
            print("\nDecrypted Text:", text)

        elif choice == '3':
            print("\nExiting program. Goodbye!")
            break

        else:
            print("\nInvalid choice. Please enter 1, 2, or 3.")

if __name__ == "__main__":
    main()
```

## Sample Output:

```
Sample Output:

==============================
  MORSE FLASHLIGHT COMMUNICATOR
==============================
1. Encrypt & Transmit Text
2. Decrypt Received Morse
3. Exit
==============================
Enter your choice (1-3): 1

Enter text to send: HELLO WORLD

Encrypted Morse Code:
```

.... . .-.. .-.. --- / .-- --- .-. .-.. -..

■ Flashlight blinks according to Morse timing (dot and dash).

Transmission complete.

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Enter your choice (1-3): 2

Enter received Morse code: .... . .-.. .-.. --- / .-- --- .-. .-.. -..

Decrypted Text: HELLO WORLD

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Enter your choice (1-3): 3
Exiting program. Goodbye!