

9. Write a PYTHON program for PT-109 American patrol boat, under the command of Lieutenant John F. Kennedy, was sunk by a Japanese destroyer, a message was received at an Australian wireless station in

Playfair code:

KXJEY UREBE ZWEHE WRYTU HEYFS

KREHE GOYFI WTTTU OLKSY CAJPO

BOTEI ZONTX BYBNT GONEY CUZWR

GDSON SXBOU YWRHE BAAHY USEDQ

Code:

```
def generate_matrix(keyword):

    keyword = keyword.lower().replace("j", "i")

    matrix = []
    used = set()

    for ch in keyword:

        if ch not in used and ch.isalpha():

            used.add(ch)
            matrix.append(ch)

    for ch in "abcdefghijklmnopqrstuvwxyz": # j removed

        if ch not in used:

            used.add(ch)
            matrix.append(ch)

    return [matrix[i:i+5] for i in range(0, 25, 5)]

def find_position(matrix, ch):

    for i in range(5):

        for j in range(5):

            if matrix[i][j] == ch:

                return i, j

    return None
```

```

def playfair_encrypt(plaintext, keyword):

    matrix = generate_matrix(keyword)

    plaintext = plaintext.lower().replace("j", "i")

    new_text = ""

    # Prepare digraphs

    i = 0

    while i < len(plaintext):

        a = plaintext[i]

        b = plaintext[i+1] if i+1 < len(plaintext) else 'x'

        if a == b:

            b = 'x'

            i += 1

        else:

            i += 2

        new_text += a + b

    cipher = ""

    for i in range(0, len(new_text), 2):

        a, b = new_text[i], new_text[i+1]

        r1, c1 = find_position(matrix, a)

        r2, c2 = find_position(matrix, b)

        if r1 == r2: # same row

            cipher += matrix[r1][(c1 + 1) % 5]

            cipher += matrix[r2][(c2 + 1) % 5]

        elif c1 == c2: # same column

            cipher += matrix[(r1 + 1) % 5][c1]

            cipher += matrix[(r2 + 1) % 5][c2]

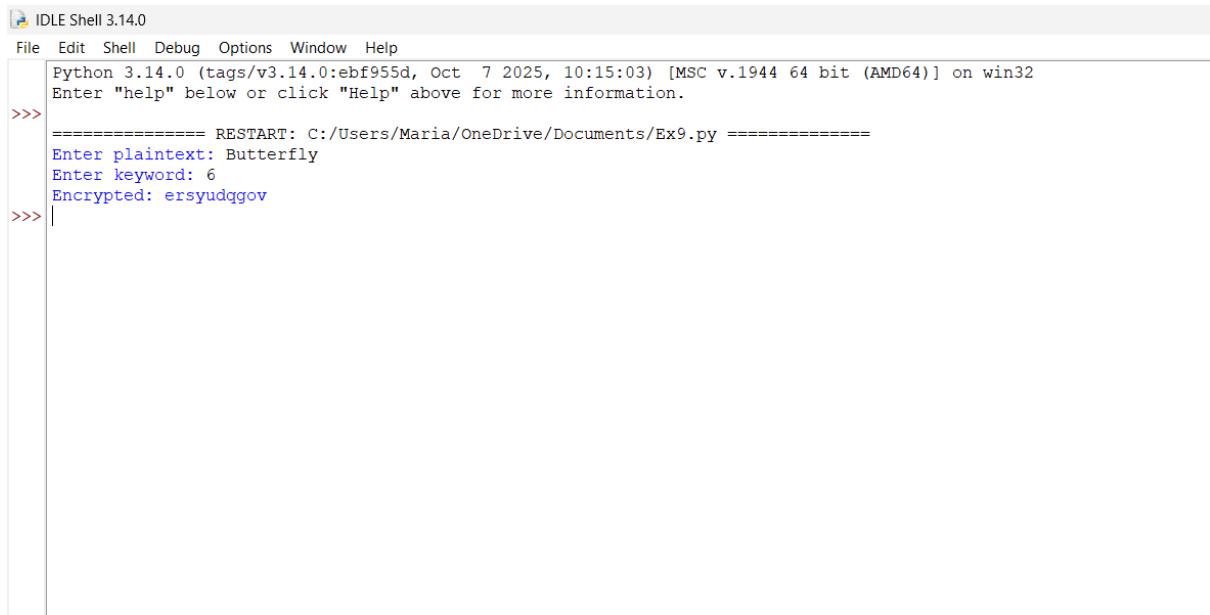
```

```
else: # rectangle
    cipher += matrix[r1][c2]
    cipher += matrix[r2][c1]

return cipher

# ---- MAIN ----

plaintext = input("Enter plaintext: ")
keyword = input("Enter keyword: ")
cipher = playfair_encrypt(plaintext, keyword)
print("Encrypted:", cipher)
```



The screenshot shows the Python IDLE Shell interface. The title bar reads "IDLE Shell 3.14.0". The menu bar includes File, Edit, Shell, Debug, Options, Window, and Help. A status bar at the bottom indicates "Python 3.14.0 (tags/v3.14.0:ebf955d, Oct 7 2025, 10:15:03) [MSC v.1944 64 bit (AMD64)] on win32". The main window displays the following interaction:

```
>>> ===== RESTART: C:/Users/Maria/OneDrive/Documents/Ex9.py =====
Enter plaintext: Butterfly
Enter keyword: 6
Encrypted: ersyudqgov
>>> |
```