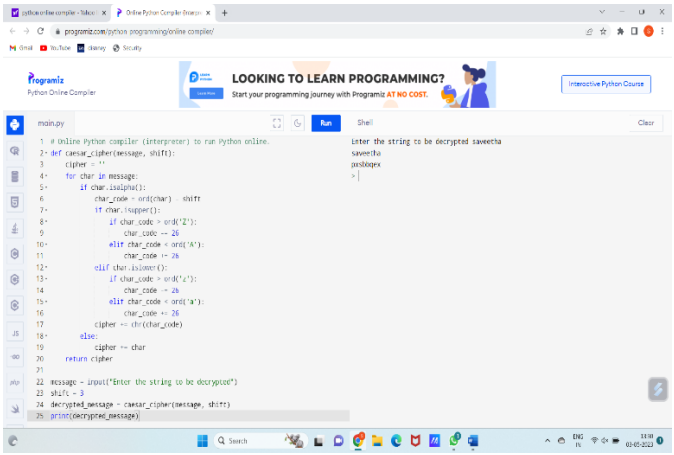
Day-1

1.write a c program for Caesar cipher involves replacing each letter of the alphabet with the letter standing k places further down the alphabet. For k in the range 1 through 25.

Program:

```
def caesar_cipher(message, shift):
    cipher = ''
    for char in message:
        if char.isalpha():
            char_code = ord(char) - shift
            if char.isupper():
                if char_code > ord('Z'):
                    char_code -= 26
                elif char_code < ord('A'):
                    char_code += 26
            elif char.islower():
                if char_code > ord('z'):
                    char_code -= 26
                elif char_code < ord('a'):
                    char_code += 26
            cipher += chr(char_code)
        else:
            cipher += char
    return cipher

message = input("Enter the string to be decrypted")
shift = 3
decrypted_message = caesar_cipher(message, shift)
print(decrypted_message)
```

output:

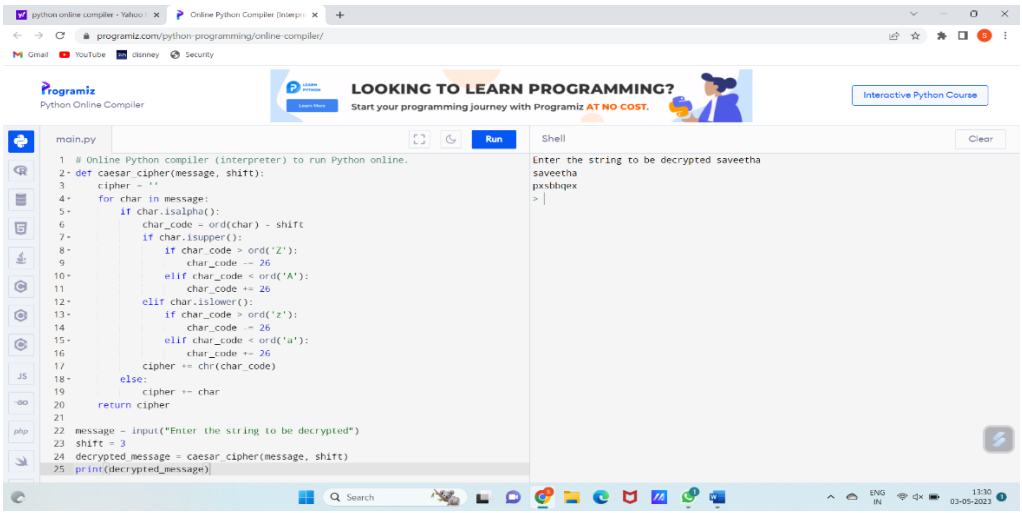


2.Write a c program for monoalphabetic substitution cipher maps a plain text alphabet to a cipher text so, that each letter of the plain text alphabets maps to a single unique letter of the cipher text alphabet.

Program:

```
import string

Cipher_ map = {'a': 'q', 'b': 'w', 'c': 'e', 'd': 'r', 'e': 't',
           'f': 'y', 'g': 'u', 'h': 'i', 'i': 'o', 'j': 'p',
           'k': 'a', 'l': 's', 'm': 'd', 'n': 'f', 'o': 'g',
           'p': 'h', 'q': 'j', 'r': 'k', 's': 'l', 't': 'z',
           'u': 'x', 'v': 'c', 'w': 'v', 'x': 'b', 'y': 'n', 'z': 'm'}

decipher_map = {v: k for k, v in cipher_map.items()}
def encrypt(message):
   """Encrypts the given message using the cipher map."""

   message = message.lower()

   encrypted_message = ''

    for char in message:
      if char in string.ascii_lowercase:
         encrypted_char = cipher_map[char]
      else:
         encrypted_char = char
      encrypted_message += encrypted_char
   return encrypted_message
message = input("Enter the text:")
encrypted_message = encrypt(message)
print(encrypted_message)
```

output:



3. Write a Python program for the Playfair algorithm is based on the use of a 5 X 5 matrix of letters constructed on a keyword. Plaintext has encrypted two letters at a time using this matrix.

Program:

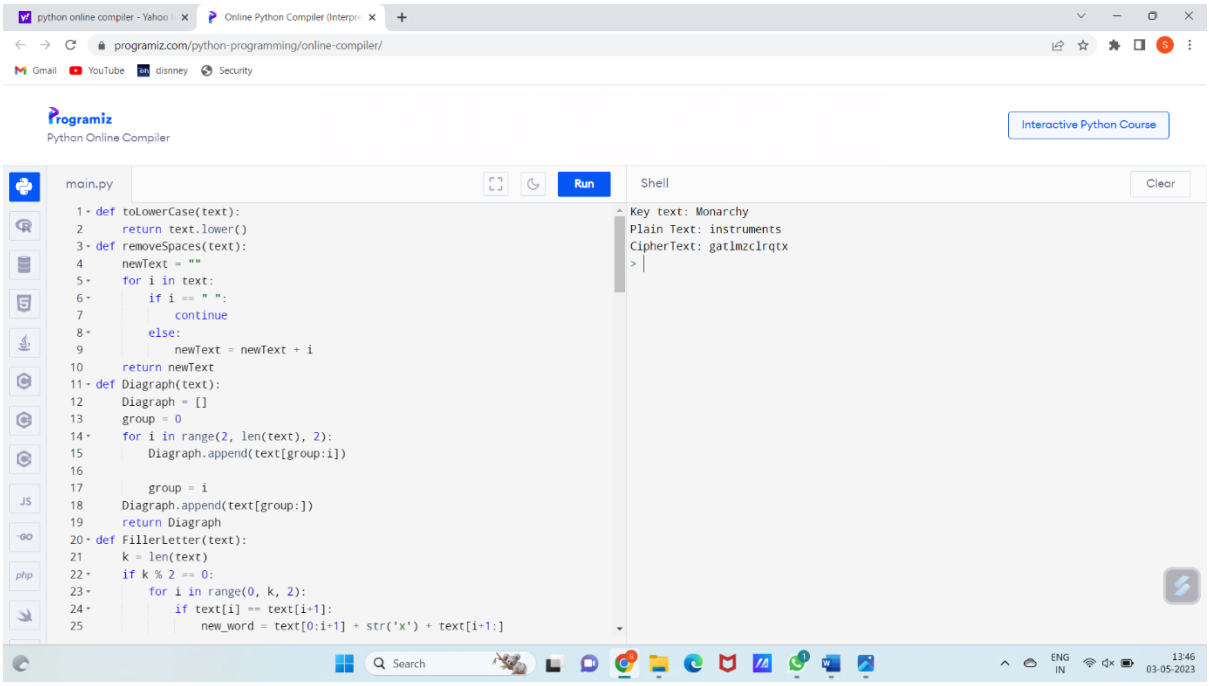
```
def toLowerCase(text):
	return text.lower()
def removeSpaces(text):
	newText = ""
	for i in text:
		if i == " ":
			continue
		else:
			newText = newText + i
	return newText
def Diagraph(text):
	Diagraph = []
	group = 0
	for i in range(2, len(text), 2):
		Diagraph.append(text[group:i])

		group = i
	Diagraph.append(text[group:])
	return Diagraph
def FillerLetter(text):
	k = len(text)
	if k % 2 == 0:
		for i in range(0, k, 2):
			if text[i] == text[i+1]:
				new_word = text[0:i+1] + str('x') + text[i+1:]
				new_word = FillerLetter(new_word)
				break
			else:
				new_word = text
	else:
		for i in range(0, k-1, 2):
			if text[i] == text[i+1]:
				new_word = text[0:i+1] + str('x') + text[i+1:]
				new_word = FillerLetter(new_word)
				break
			else:
				new_word = text
	return new_word
```

```
list1 = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'k', 'l', 'm',
                'n', 'o', 'p', 'q', 'r', 's', 't', 'u', 'v', 'w', 'x', 'y', 'z']
def generateKeyTable(word, list1):
        key_letters = []
        for i in word:
                if i not in key_letters:
                        key_letters.append(i)

        compElements = []
        for i in key_letters:
                if i not in compElements:
                        compElements.append(i)
        for i in list1:
                if i not in compElements:
                        compElements.append(i)
        matrix = []
        while compElements != []:
                matrix.append(compElements[:5])
                compElements = compElements[5:]
        return matrix
def search(mat, element):
        for i in range(5):
                for j in range(5):
                        if(mat[i][j] == element):
                                return i, j
def encrypt_RowRule(matr, e1r, e1c, e2r, e2c):
        char1 = ''
        if e1c == 4:
                char1 = matr[e1r][0]
        else:
                char1 = matr[e1r][e1c+1]
        char2 = ''
        if e2c == 4:
                char2 = matr[e2r][0]
        else:
                char2 = matr[e2r][e2c+1]
        return char1, char2
def encrypt_ColumnRule(matr, e1r, e1c, e2r, e2c):
        char1 = ''
        if e1r == 4:
                char1 = matr[0][e1c]
        else:
                char1 = matr[e1r+1][e1c]
```

```
        char2 = ''
        if e2r == 4:
                char2 = matr[0][e2c]
        else:
                char2 = matr[e2r+1][e2c]

        return char1, char2
def encrypt_RectangleRule(matr, e1r, e1c, e2r, e2c):
        char1 = ''
        char1 = matr[e1r][e2c]
        char2 = ''
        char2 = matr[e2r][e1c]
        return char1, char2
def encryptByPlayfairCipher(Matrix, plainList):
        CipherText = []
        for i in range(0, len(plainList)):
                c1 = 0
                c2 = 0
                ele1_x, ele1_y = search(Matrix, plainList[i][0])
                ele2_x, ele2_y = search(Matrix, plainList[i][1])

                if ele1_x == ele2_x:
                        c1, c2 = encrypt_RowRule(Matrix, ele1_x, ele1_y, ele2_x,
ele2_y)
                        # Get 2 letter cipherText
                elif ele1_y == ele2_y:
                        c1, c2 = encrypt_ColumnRule(Matrix, ele1_x, ele1_y, ele2_x,
ele2_y)
                else:
                        c1, c2 = encrypt_RectangleRule(
                                Matrix, ele1_x, ele1_y, ele2_x, ele2_y)
                cipher = c1 + c2
                CipherText.append(cipher)
        return CipherText
text_Plain = 'instruments'
text_Plain = removeSpaces(toLowerCase(text_Plain))
PlainTextList = Diagraph(FillerLetter(text_Plain))
if len(PlainTextList[-1]) != 2:
        PlainTextList[-1] = PlainTextList[-1]+'z'
key = "Monarchy"
print("Key text:", key)
key = toLowerCase(key)
Matrix = generateKeyTable(key, list1)
print("Plain Text:", text_Plain)
```

```
CipherList = encryptByPlayfairCipher(Matrix, PlainTextList)
CipherText = ""
for i in CipherList:
        CipherText += i
print("CipherText:", CipherText)
```

output:



4. Write a Python program for the polyalphabetic substitution cypher uses a separate monoalphabetic substitution cypher for each successive letter of plaintext, depending on a key.

Program:

```
import string

def poly_sub_cipher(plaintext, key):

    plaintext = plaintext.lower()
    key = key.lower()
    alphabet = string.ascii_lowercase
    ciphertext = ''
    for i, char in enumerate(plaintext):
        key_char = key[i % len(key)]
        shift = alphabet.index(key_char)
        shifted_alphabet = alphabet[shift:] + alphabet[:shift]
        if char in alphabet:
            ciphertext += shifted_alphabet[alphabet.index(char)]
        else:
```

```
            ciphertext += char
    return ciphertext
plaintext = 'GEEKSFORGEEKS'
key = 'AYUSH'
ciphertext = poly_sub_cipher(plaintext, key)
print(ciphertext)
```

out put: