In [1]:

*# Implementation of Playfair Cipher Matrix*

In [47]:

**def** create\_matrix(key):  
 mat = []  
 letter\_added = []  
 **for** i **in** key:  
 **if** i **not** **in** letter\_added:  
 letter\_added.append(i)  
  
 **for** i **in** range(ord('A'),ord('Z')+1):  
 **if** chr(i) == 'J':  
 **continue**  
 **elif** chr(i) **in** letter\_added:  
 **continue**  
 **else**:  
 letter\_added.append(chr(i))  
  
 **for** i **in** range(0,25,5):  
 mat.append(letter\_added[i:i+5])  
 **return** mat

In [48]:

**def** generate\_pairs(message):  
 message = message.replace(' ','')  
 pairs = list(message[:])  
 i = 0  
 **while**(i < len(pairs)-1):  
 **if** pairs[i] == pairs[i+1]:  
 pairs.insert(i+1,'X')  
 i+=2  
 **if** len(pairs)%**2** !=0:  
 pairs.append('X')  
  
 final\_pairs = []  
 **for** i **in** range(len(pairs)//2):  
 final\_pairs.append([pairs[2\*i],pairs[(2\*i)+1]])  
 **return** final\_pairs

In [49]:

**def** indexof(k,mat):  
 **for** i **in** range(5):  
 **for** j **in** range(5):  
 **if** mat[i][j] == k:  
 **return** i,j

In [57]:

**def** playfair(key,msg,encrypt):  
 mat = create\_matrix(key)  
 pairs = generate\_pairs(msg)  
 *# (a,b)*  
 **if** encrypt:  
 inc = 1  
 **else**:  
 inc = -1  
  
 cipher\_text = []  
 **for** i **in** pairs:  
 k1 = i[0]  
 k2 = i[1]  
  
 r1,c1 = indexof(k1,mat)  
 r2,c2 = indexof(k2,mat)  
  
 **if** r1 == r2:  
 cipher\_text += mat[r1][(c1+inc)%**5**] + mat[r2][(c2+inc)%5]  
 **elif** c1 == c2:  
 cipher\_text += mat[(r1+inc)%**5**][c1] + mat[(r2+inc)%5][c2]  
 **else**:  
 cipher\_text += mat[r1][c2] + mat[r2][c1]   
  
  
  
 **return** "".join(cipher\_text)

In [60]:

key = 'Guptaaag'.upper()  
msg = 'HelloBhavansh'.upper()  
  
print(f'Key: **{**key**}\n**')  
print(f'Message: **{**msg**}\n**')  
  
mat = create\_matrix(key)  
pairs = generate\_pairs(msg)  
  
cipher\_text = playfair(key,msg,**True**)  
print(cipher\_text)  
decrypted\_text = playfair(key,cipher\_text,**False**)  
print(decrypted\_text)  
*# print(f'Cipher Text: {cipher\_text}\n')*

Key: GUPTAAAG  
  
Message: HELLOBHAVANSH  
  
LBKYIRHNGZGSNM  
HELXLOBHAVANSH

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