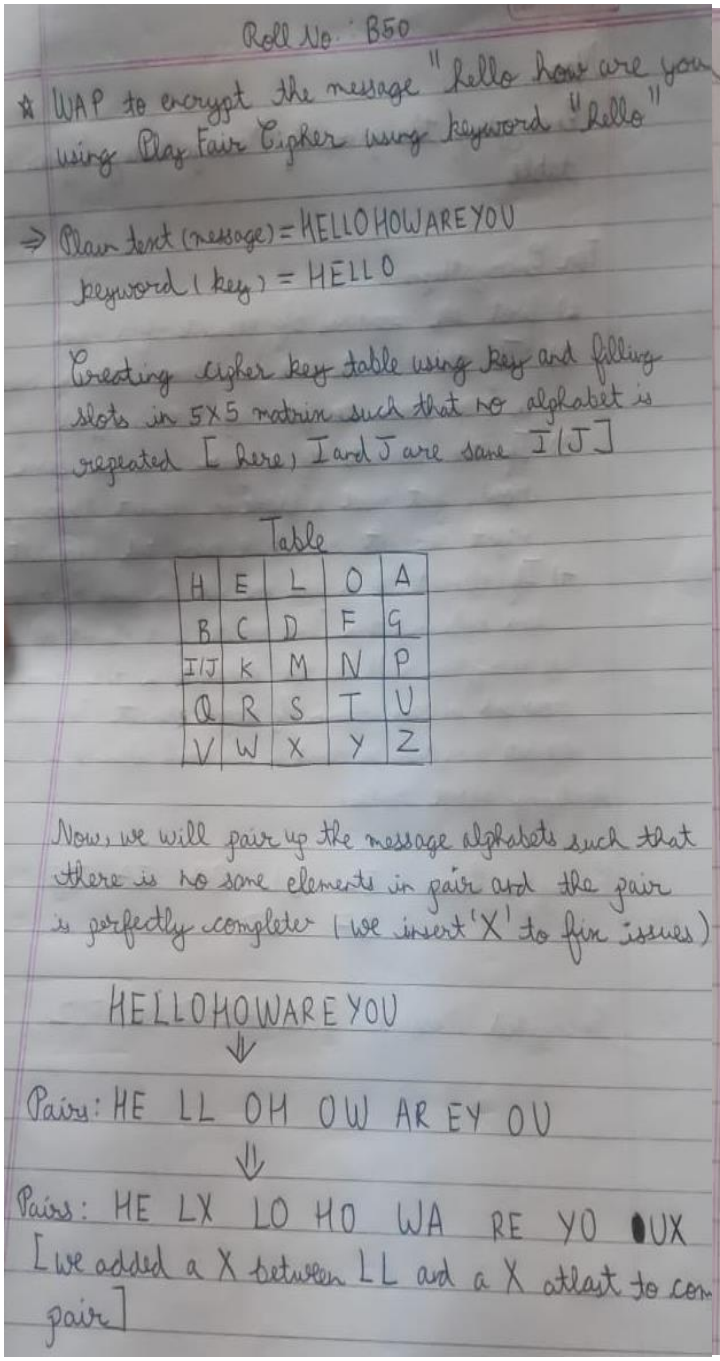
Assignment Question:

Write a program to encrypt the message “hello how are you” using Play Fair Cipher and keyword “hello”

Program:

Link to Code: https://github.com/bivkarki/PlayFairCipher/blob/master/Playfaircipher.c

Logical Solution:



Roll No: B50

☆ WAP to encrypt the message "hello how are you" using Play Fair Cipher using keyword "hello"

⇒ Plain text (message) = HELLOHOWAREYOU
keyword (key) = HELLO

Creating cipher key table using key and filling slots in 5×5 matrix such that no alphabet is repeated [here, I and J are same I/J]

Table

H	E	L	O	A
B	C	D	F	G
I/J	K	M	N	P
Q	R	S	T	U
V	W	X	Y	Z

Now, we will pair up the message alphabets such that there is no same elements in pair and the pair is perfectly complete (we insert 'X' to fix issues)

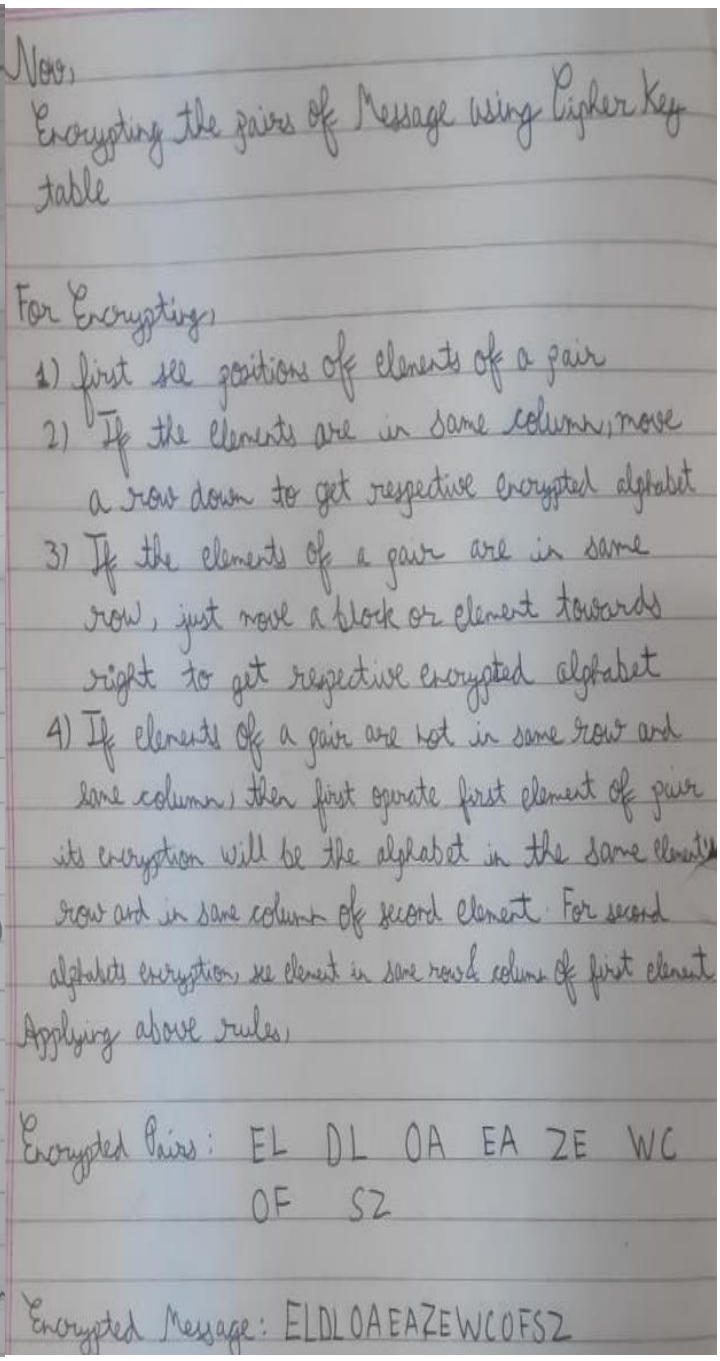
HELLOHOWAREYOU

⇓

Pairs: HE LL OH OW AR EY OU

⇓

Pairs: HE LX LO HO WA RE YO UX
[we added a X between LL and a X atleast to com pair]



Now,
Encrypting the pairs of Message using Cipher Key table

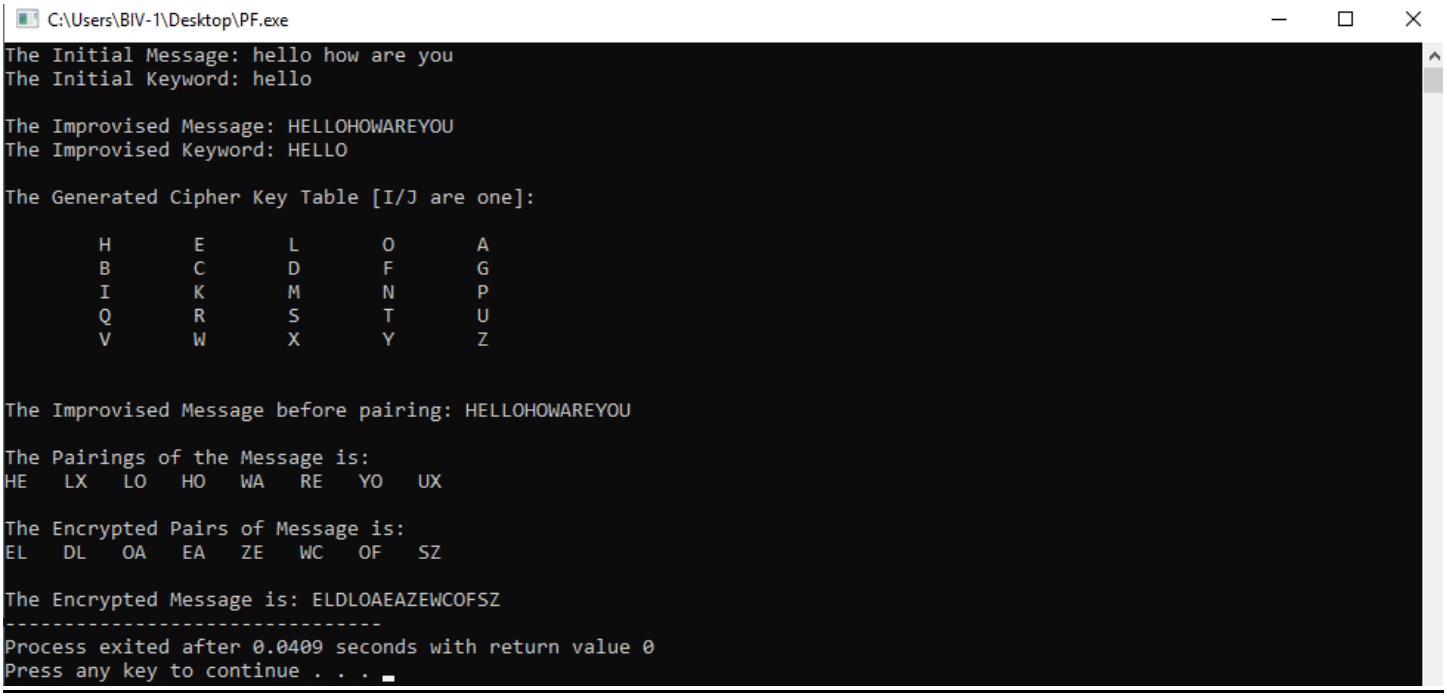
For Encrypting,
1) first see positions of elements of a pair
2) If the elements are in same column, move a row down to get respective encrypted alphabet
3) If the elements of a pair are in same row, just move a block or element towards right to get respective encrypted alphabet
4) If elements of a pair are not in same row and same column, then first operate first element of pair its encryption will be the alphabet in the same element row and in same column of second element. For second alphabets encryption, see element in same row & column of first element

Applying above rules,

Encrypted Pairs: EL DL OA EA ZE WC OF SZ

Encrypted Message: ELDLOAEAZEWCOFSZ

Output of the Program:



About the Functions used in Program:

1. **char *Improvise(char arr[]); =>** to capitalize and remove spaces from the message and key
2. **void GenerateCipherKeyTable(char arr[5][5],char key[]); =>** to generate the cipher key table based upon the key provided
3. **void RemoveDuplicates(char arr[]); =>** this functions helps to remove duplicate or repeated alphabets in the key while creating cipher key table
4. **void PairPlainText(char arr[]); =>** this function is used to make pairs from the message
5. **void PairProcessing(char arr[]); =>** this function processes pairs generated from PairPlainText function such that the pairs are rectified to be used for encryption
6. **void InsertElementat(int position,char arr[],int size); =>** this function is used when we need to insert “X” when the pairs is generated
7. **void Encryption(char encrypted_msg[],char table[][5],char arr[]); =>** this functions is used to generate the encrypted message from the provided cipher key table and message pairs by calling FindPositionInTable function to match positions and perform operation to find corresponding encryption alphabet in cipher key table
8. **void FindPositionInTable(char table[][5],char element,int *x,int *y); =>** this functions is used to find the position of elements of message pairs and us