CIS 3362 Homework #3: Playfair, Hill, ADFGVX
Due: Check WebCourses for the due date.

1) The following ciphertext was encrypted using the Playfair cipher. The first eight letters of the plaintext are "thisispr". Determine the secret key and decrypt the whole ciphertext. (Note: I may choose to reveal more of the plaintext, but I haven't made that decision yet.)

```
hodzdzokbivnuavufdkildpuphycvwdiohlvldfovnfoyckiilulpwkxeadg
tpzalinlhodzpblayzifyvokrofleaaiaobputyzycafulbladfpyrhrprit
moygztkiokrofyogwpfrlayzycafhpihhphoiayurmfydbibblinolhrtrvt
tiyzkzfadabecpgahoilfdunzddcunoecduvvpmhpypzyvzddcryrhlsdkil
advyohycpwdiasvpvbrdyvdktpyurmudlgvaphfyychmyfmrkutpwxychmhp
ip
```

2) The following was encrypted using the Hill Cipher with a 2 x 2 matrix as the key. Determine both the decryption key as well as the message itself.

```
qbnusejtppjwqbekguwqfmuocleknnzfdcvsqyeqjlewcixdjtcooenmoeivbrqaxd
```

Please solve this problem via brute force, where you try each possible decryption key.

3) Let M = $\begin{pmatrix} 11 & 18 \\ 15 & 17 \end{pmatrix}$ be the encryption key for the Hill cipher. What is the corresponding decryption key?

4) You have intercepted a tiny portion of both the plaintext and matching ciphertext of a message encrypted using the Hill cipher with a 2 x 2 matrix key. The plaintext is "FISH" and the corresponding ciphertext is "IDBH". What are the possible encryption keys based on this information only? **Please solve this problem by hand setting up four equations and not by brute force.**

5) **By hand**, using the Hill cipher, encrypt the following plaintext, "OPENSESEME", with the following encryption key: $\begin{pmatrix} 4 & 7 \\ 11 & 19 \end{pmatrix}$.

6) The following cipher text was encrypted using the ADFGVX cipher with the 6 x 6 key matrix shown below and the keyword "INSTRUCTION".

```
H O W A R 8
E Y 6 U D I
N G T 3 Z B
S 0 C F J K
L M P Q V X
1 2 4 5 7 9
```

Note: the entry in row 1 column 2 is the letter O, the entry in row 2 column 6 is the letter I, the entry in row 4 column 2 is the digit zero and the entry in row 6 column 1 is the digit one.

AADDFXDADFADFGAXDFXADFVXDAFDAAVGDGDXGVAXVDXG

By hand, determine the plaintext.