Homework 6

(Due at the beginning of the class on Friday, April 25)

Purpose: Strings.

(80 points) The first program is called encode.c. The simplest of all encryption method is a *straight substitution* code, where one character is directly substituted for another. This is like the cryptograms found in newspapers and puzzle books. For this assignment you are to write a pair of programs to do encoding and decoding using a code which just substitutes one letter for another. To keep things simple, all lower-case letters are converted to upper-case, and only letters are encoded; non-alphabetic characters (spaces, numbers, and punctuation marks) are left as they are.

The *substitution key* consists of the twenty-six letters which substitute for the letters A through Z in order. A sample substitution key would be the followings:

Letter:	ABCDEFGHIJKLMNOPQRSTUVWXYZ
Coded letter:	TFHXQJEMUPIDCKVBAOLRZWGNSY

Sample Encoding:	
Input line:	One if by land, two if by sea.
Encoded line:	VKQ UJ FS DTKX, RGV UJ FS LQT.

The first program encode.c will encode plain text into encoded text. The first line of input will be the substitution key, exactly 26 letters on a line by itself. The first letter in the substitution key will be the code for 'A', the second character the code for 'B', and the twenty-sixth letter the code for 'Z'. Your program should check that no character is duplicated in the coding key, and that there are exactly 26 letters on the line. Following the substitution key will come the text to be encoded. The program reads the text character by character, translating and writing each alphabetic character according to the key, and writing the non-alphabetic characters unchanged. The substitution key should be stored in one-dimensional array. The encoding is done by indexing the array using the character to be encoded.

(20 points) The second program is called decode.c which decoded encoded text into plain test. It reads the substitution key on the first line of input in exactly the same format as the first program, but then uses the key to decode txt that follows. It will be simpler to construct a decoding key in a separate one-dimensional array, rather than searching through the substitution key each time for the character.