CS 202: Assignment 4 (20 points)

Create a subdirectory of your home directory called a4, and within it write a program titled decipher.c that satisfies the following requirements. The program should read a file that has been encrypted with a substitution cipher as a command line argument, and then perform actions in the following order:

1. Read the entire file into a single buffer (using a dynamically allocated array).
2. Decrypt the buffer in place using an alphabet that you guess.
3. Count and display the frequencies of each alphabetical character.
4. Read the words in /u1/junk/cs202/a4/words.txt into a dynamically allocated array.
5. Using these words, count the number of English words found in the decrypted message and display this count.
6. Output the decrypted message into a file called guess.txt.
7. (Bonus 4 points) Decipher the file /u1/junk/cs202/a4/secret.txt. Using the output of this program, a list of highest frequency letters in the English language, and by visually inspecting the contents of guess.txt, edit the alphabet your program uses until you believe the message has been deciphered.

In this program you should write five separate functions that will be used in the main function:

1. A function to read the file into a buffer.
2. A function to decrypt the buffer in place.
3. A function to count and print the character frequencies.
4. A function that reads the dictionary.
5. A function that searches the dictionary for a word via the binary search algorithm.

In addition, each function definition should have a comment above it that describes the purpose of the function and explains the function's parameters and return values. A simple example of this would look like:

```
/*
    Adds two numbers together.
    Params: takes two numbers to be added together
    Return: returns the sum of the two parameters
*/
int sum(int x, int y)
{
    return x + y;
}
```

Run the /u1/junk/cs202/a4/answer executable to see how to format the output of your program.