For Part 1, the first step was to read in a text file. This was done using the `FILE` data type as well as the `fopen()` and `fclose()` methods. Then a `while` loop using the `fscanf` function was used to read in one word at a time, in a method described here:
https://stackoverflow.com/questions/3463426/in-c-how-should-i-read-a-text-file-and-print-all-strings

In order to determine which words were repeated, I used a structure similar to a hash table, which is described here:
https://www.tutorialspoint.com/data_structures_algorithms/hash_table_program_in_c.htm. This structure allowed me to store a word and its frequency in a key-value pair for easy indexing.

When looping through all the words, I would do some pre-processing by lowercasing the word, as shown here: https://stackoverflow.com/questions/2661766/how-do-i-lowercase-a-string-in-c. Then, I would first check if the end of the dictionary was reached, using a variable `num_words` to store the length of the dictionary. If so, then the new word would be appended to the end of the dictionary using the `strcpy()` method, and `num_words` would be incremented. If not, then the program would compare the word with the current dictionary entry using the `strcmp()` method, and if it matches, the program will stop searching the dictionary and increment the frequency variable.

Finally, I would use the aforementioned file I/O methods to print an output file by writing the information from each entry of the dictionary structure.

Part 1 code, executed with the sample input given in Blackboard

```
student@studentVM:~/Documents/cpp_classes/Lab1_355$ gcc lab1p4
_1.c -o lab1p4_1
student@studentVM:~/Documents/cpp_classes/Lab1_355$ ./lab1p4_1
student@studentVM:~/Documents/cpp_classes/Lab1_355$ cat out.tx
t
The word but occurred 1 time(s).
The word good occurred 2 time(s).
The word morning! occurred 1 time(s).
The word morning occurred 1 time(s).
The word to occurred 2 time(s).
The word ye occurred 1 time(s).
The word and occurred 2 time(s).
The word thou! occurred 1 time(s).
The word i'd occurred 1 time(s).
The word say occurred 1 time(s).
The word all occurred 2 time(s).
The word my occurred 1 time(s).
The word patients, occurred 1 time(s).
The word because occurred 1 time(s).
The word i occurred 2 time(s).
The word was occurred 2 time(s).
The word the occurred 5 time(s).
The word worse occurred 1 time(s).
The word of occurred 2 time(s).
The word hypocrites, occurred 3 time(s).
The word cruel occurred 1 time(s).
The word phony occurred 1 time(s).
The word very occurred 1 time(s).
The word worst. occurred 1 time(s).
```

Part 2 is exactly like Part 1, except that `strcpy()` is replaced with a custom function called `equal()`. This function checks whether two strings are equal while skipping over non-alphanumeric characters. It does so using a while loop that iterates through both strings until both of them are depleted (i.e. the '\0' character is detected). If either word has a non-alphanumeric character at a given position, the program skips that character using an `_adj` variable and uses `continue;` to go back through the loop without incrementing the indexing variable or checking for a mismatch. If a mismatch is found at any point, the function returns 0, otherwise it return 1. The `isalnum()` function determined whether a character is alphanumeric, and it can be found here: https://www.geeksforgeeks.org/isalnum-function-c-language/

Part 2 code, executed with the sample input given in Blackboard

```
student@studentVM:~/Documents/cpp_classes/Lab1_355$ gcc lab1p4
_2.c -o lab1p4_2
student@studentVM:~/Documents/cpp_classes/Lab1_355$ ./lab1p4_2
student@studentVM:~/Documents/cpp_classes/Lab1_355$ cat out_im
proved.txt
The word but occurred 1 time(s).
The word good occurred 2 time(s).
The word morning! occurred 2 time(s).
The word to occurred 2 time(s).
The word ye occurred 1 time(s).
The word and occurred 2 time(s).
The word thou! occurred 1 time(s).
The word i'd occurred 1 time(s).
The word say occurred 1 time(s).
The word all occurred 2 time(s).
The word my occurred 1 time(s).
The word patients, occurred 1 time(s).
The word because occurred 1 time(s).
The word i occurred 2 time(s).
The word was occurred 2 time(s).
The word the occurred 5 time(s).
The word worse occurred 1 time(s).
The word of occurred 2 time(s).
The word hypocrites, occurred 3 time(s).
The word cruel occurred 1 time(s).
The word phony occurred 1 time(s).
The word very occurred 1 time(s).
The word worst. occurred 1 time(s).
```