# Assignment: Text Analysis Tool in C

Problem Statement:

You are tasked with creating a text analysis tool in C that performs various operations on a given text file. The program should support the following functionalities:

1. **Word Count:** Count the total number of words in the text file. Words are defined as sequences of characters separated by spaces.
2. **Character Frequency:** Display the frequency of each character in the text file. Ignore case while counting (i.e., 'A' and 'a' should be considered the same character).
3. **Substring Search:** Allow the user to input a substring, and the program should find and display all occurrences of the substring in the text.
4. **Word Reversal:** Reverse the order of characters in each word in the text. Maintain the order of words.
5. **Palindromic Words:** Identify and display all palindromic words in the text. A palindromic word is the same when read backward (e.g., "level" or "radar").

Requirements:

1. The program should take the name of the text file as a command-line argument.
2. Ensure proper error handling, such as checking if the file exists and can be opened.
3. Implement functions for each operation to promote modularity and readability.
4. Include comments and documentation in your code to explain the logic and purpose of each function.
5. Test your program with different text files to ensure its correctness and efficiency.

Submission:

Submit a well-documented C source code file along with a Makefile. Include sample input files and the expected output to demonstrate the functionality of your text analysis tool. Include a "code diary" that you should submit with your completed code. Please include the date and time that you worked on various bits of code, which resources you used to work out how to write the code, etc. You should also document the dates and times you worked on the functions in the comments of the source code itself.