Lab Assignment 1: Regular Expressions and Finite Automata

Objective: The objective of this lab assignment is to practice working with regular expressions and constructing finite automata.

Instructions:

- Create a new file and name it "regex_fa.c".
- Implement the following functions:
    - **`int matchRegex(char regex[], char input[])`**: This function should take a regular expression and an input string as parameters and return 1 if the input string matches the regular expression, or 0 otherwise. You can use any approach you prefer to implement this function, such as constructing a non-deterministic finite automaton (NFA) from the regular expression and simulating its execution on the input string.
    - **`void convertToDFA(char regex[])`**: This function should take a regular expression as input and convert it to an equivalent deterministic finite automaton (DFA). You can use any method you prefer for the conversion, such as the powerset construction algorithm.
- In the **`main()`** function, provide a menu-driven program to interact with the regular expression matching and DFA conversion functions. The menu should provide the following options:
    - Match a regular expression with an input string
    - Convert a regular expression to a DFA
    - Exit the program
- Test your program with various regular expressions and input strings to validate the correctness of the matching and conversion operations.
- Document your code and include appropriate comments to explain the purpose of each function and significant sections of code.
- Submit your code along with a brief report summarizing your implementation, any challenges faced, and how you addressed them.