

REGEX TO DFA VISUALIZER – REPORT

Project Title

Regex to DFA Visualizer using Python

Team Members

Heba Youssef – 231000723

Nourhan Elsheikh – 231000853

Reem Ali – 231000165

Omar Magdy – 231000967

Project Description

This project provides a fully interactive tool that converts a Regular Expression (Regex) into a deterministic finite automaton (DFA) and visualizes the transition graph clearly.

The system helps users understand the behavior of automata step-by-step by allowing them to convert, visualize, and test input strings directly on the generated DFA.

The input to the system is a valid regular expression, and upon conversion, the user can view the DFA structure with states, transitions, and accepting states. Users can also enter a string to check whether it is accepted or rejected by the resulting DFA.

Input Format

User enters a valid regular expression such as: `aabb(a|b)`

Output Format

- DFA visualization drawn dynamically on screen
- Acceptance or rejection of a test input string
- Information on total states, alphabet, and accepting states

Inside Mechanism

The system performs the full theoretical process of constructing finite automata:

1. Converts a given Regex into postfix form using operator precedence.
2. Builds an NFA using Thompson's Construction algorithm.
3. Applies Subset Construction to convert the NFA to DFA.
4. Visualizes the DFA using Canvas drawings including nodes, arrows, and labels.
5. Simulates input strings through the DFA and determines acceptance.

Programming Languages, Tools & Libraries

- Python
- Tkinter
- Collections & Math Libraries
- No external visualization libraries required

Screenshots & Output Samples









