Compilers Assignment Problem Description:-

1. We're required to build a command line tool
2. It should convert a regular expression into NFA using Thompson's algorithm
3. the input should be regular expression
4. the expression may be invalid, so we need to check it
5. We are given a table of valid regular expression syntax
6. the input literals are alphanumeric only & this is guaranteed, so we do not have to check anything else.
7. We're required to output a JSON file representing the FSM (Finite state machine)
8. this FSM represents the states & the transitions in the NFA, the format is given.
9. the JSON file should contain the following
    1. "starting state":
    2. "Each state": {
        2.1: "is terminating"
        2.2. "transition": "New_State" }
10. We should also output an image containing NFA, but we can use any graphical library in Python.

This is Part 1

Part 2:

1. Now we have NFA
2. We want to convert it to a DFA
3. then we should minimize the generated DFA
4. Our Input will be the NFA JSON file.
5. Our output should be a JSON file too, containing the Minimized DFA.
6. Also we're asked to draw the Minimized DFA

Side Note Requirements:

1. We've to use Google Colab
2. we must follow the JSON Formate
3. the last cell in the notebook should accept input text & test it, it should produce 4 outputs
   - 3.1 Part1 JSON File
   - 3.2 Part1 Graph
   - 3.3. Part2 JSON File
   - 3.4. Part2 Graph

Parsing & Validating the Input

Building NFA Algorithm:-

Building DFA from NFA Algorithm:-

DFA Minimization Algorithm: