


EX 1













LEXICAL ANALYZER

AIM: To implement the automata library and construct a simple program using DFA and NFA.

PROBLEM: To construct a program using DFA that accepts all strings ending with 'abb'.

 **jupyter** DFA Last Checkpoint: 01/10/2022 (autosaved)

File Edit View Insert Cell Kernel Widgets Help

        Run    Code 

```
In [1]: from automata.fa.dfa import DFA
```

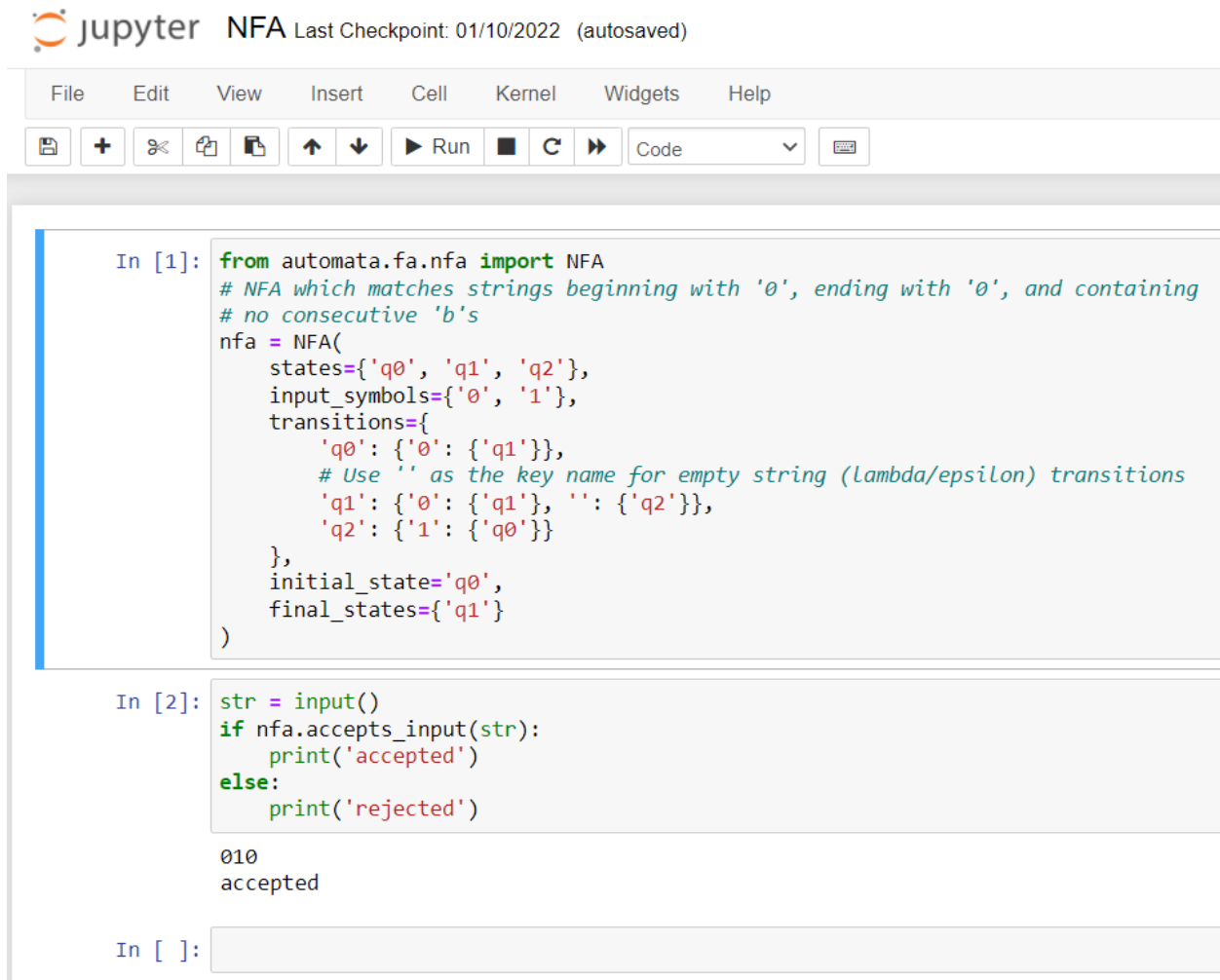
```
In [2]: dfa = DFA(
        states={'q0', 'q1', 'q2', 'q3'},
        input_symbols={'a', 'b'},
        transitions={
            'q0': {'a': 'q1', 'b': 'q3'},
            'q1': {'a': 'q1', 'b': 'q2'},
            'q2': {'a': 'q1', 'b': 'q2'},
            'q3': {'a': 'q3', 'b': 'q3'}
        },
        initial_state='q0',
        final_states={'q2'}
    )
```

```
In [3]: str = input()
        if dfa.accepts_input(str):
            print('accepted')
        else:
            print('rejected')
```

abb
accepted

```
In [ ]:
```

PROBLEM: To construct a program using NFA that accepts all strings that starts with 0 and end with 0.



The image shows a Jupyter Notebook window titled "NFA" with a last checkpoint of "01/10/2022 (autosaved)". The interface includes a menu bar (File, Edit, View, Insert, Cell, Kernel, Widgets, Help) and a toolbar with icons for saving, adding cells, undo, redo, and running code. The notebook contains three input cells. The first cell, labeled "In [1]:", contains Python code to create an NFA object using the 'automata.fa.nfa' library. The code defines states 'q0', 'q1', and 'q2', input symbols '0' and '1', and transitions: 'q0' to 'q1' on '0', 'q1' to 'q1' on '0' and 'q2' on '1', and 'q2' to 'q0' on '1'. 'q0' is the initial state and 'q1' is the final state. The second cell, labeled "In [2]:", contains code to take user input and check if it is accepted by the NFA. The output of this cell is "010" followed by "accepted" on a new line. The third cell, labeled "In []:", is currently empty.

```
In [1]: from automata.fa.nfa import NFA
# NFA which matches strings beginning with '0', ending with '0', and containing
# no consecutive 'b's
nfa = NFA(
    states={'q0', 'q1', 'q2'},
    input_symbols={'0', '1'},
    transitions={
        'q0': {'0': {'q1'}},
        # Use '' as the key name for empty string (lambda/epsilon) transitions
        'q1': {'0': {'q1'}, '' : {'q2'}},
        'q2': {'1': {'q0'}}
    },
    initial_state='q0',
    final_states={'q1'}
)

In [2]: str = input()
if nfa.accepts_input(str):
    print('accepted')
else:
    print('rejected')

010
accepted

In [ ]:
```

RESULT: Thus Deterministic Finite Automata(DFA) and Non Deterministic Finite Automata(NFA) were understood and implemented using Python Automata Library.

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