

COURSE:
AUTOMATA THEORY
COURSE ID & DAY:
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INSTRUCTOR:
SIR USMAN KHAN

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PROJECT PROPOSAL OF AUTOMATA

NFA CONSTRUCTION & NFA TO DFA CONVERSION

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Project proposal of Automata Theory

PROJECT NAME:

NFA Construction & NFA to DFA Conversion

Group Members:

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Tools:

- Microsoft Visual studio 2015
- Windows Form Application

Language:

- C#

Introduction:

We are going to develop a windows form project NFA construction then its conversion into DFA.

What Is NFA?

NFA stands for non-deterministic finite automata. The finite automata are called NFA when there exist many paths for specific input from the current state to the next state. NFA has five states same as DFA, but with different transition function, as shown follows: where,

- Q: finite set of states
- Σ : finite set of the input symbol
- q₀: initial state
- F: final state
- δ : Transition function : $\delta: Q \times \Sigma \rightarrow 2^Q$

Graphical Representation of an NFA

An NFA can be represented by digraphs called state diagram. In which:

- The state is represented by vertices.
- The arc labeled with an input character show the transitions.
- The initial state is marked with an arrow.
- The final state is denoted by the double circle.

DFA (Deterministic finite automata)

DFA refers to deterministic finite automata. Deterministic refers to the uniqueness of the computation. The finite automata are called deterministic finite automata if the machine is read an input string one symbol at a time. In DFA, there is only one path for specific input from the current state to the next state. DFA does not accept the null move, i.e., the DFA cannot change state without any input character.

DFA can contain multiple final states. It is used in Lexical Analysis in Compiler. A DFA is a collection of 5-tuples .

- Q: finite set of states

- Σ : finite set of the input symbol
- q_0 : initial state
- F : **final** state
- δ : Transition function $\delta: Q \times \Sigma \rightarrow Q$

Graphical Representation of DFA

A DFA can be represented by digraphs called state diagram. In which:

- The state is represented by vertices.
- The arc labeled with an input character show the transitions.
- The initial state is marked with an arrow.
- The final state is denoted by a double circle.

Description:

We are going to build a C# windows form program in which user will input the alphabets, states, initial state, final states and transition function. Firstly, the program will find out that it is the NFA or not, then user will give the string input to the program for checking whether it is working good or not then the program will give the output whether the given string is accepted or rejected. Then user will have the option to convert this NFA into DFA. Once user will select convert option, then program will show the alphabets, initial, final state, states and transitions of the DFA.