CMP 313 29/01/24

Computer grammar Revision

Given E => E \* E | E + E | id

Create a parse string id + id \* id to generate all possible parse tree

=

* ID + ID \* ID

1. Final state machine/ final state automaton: is a computational model, or a mathematical model of computation. It is an abstract machine that can be in exactly one finite number of the state at a given time. FSM can move or change from one state to another in response to some external inputs, the change from one state to another is called **“Transition”.** It can be used to simulate sequential logic and some computer programs. It generates regular languages, it can also be used in mathematics and artificial intelligence, games and linguistics. Mathematically, we can define FSM as a **five tuple (Q, ∑, q0, F, ∂)**

Where Q is the finite number of state,

**∑** is a finite input alphabet,

**q**0 is the initial state,

F is the final state,

**∂** is the transition function.

Types of FSM/A

1. Deterministic FSM/A - DFSA
2. Non-Deterministic FSM/A - NDFSA

Deterministic FSA: is said to be deterministic if its input accepted only adds in one direction or if it transits with a singular input.

Non-Deterministic: is lenient and allows for bypass if the conditions have not been met.

A string is said to be accepted by DFSA if upon scanning you are able to end up at the final state.

\*the symbol for final state is **‘O’**

The state progress only recognizes 1 and not 0. If all the numbers are 0, it still stays in the initial state. I.e. 000 = 0 = 0000000000 = initial state.

Example 1: use the transition table below to

|  |  |  |
| --- | --- | --- |
| F | 0 | 1 |
| Q0 | Q0, q1 | Q1, q2 |
| Q1 | Q2 | Q3 |
| Q2 | Q3 | Q3 |
| Q3 | Q3 | Q3 |
|  |  |  |

Where FSA= 5-tuple, (A, F, **∂,** I**, S)**

1

Q3

Q2

Q1

Q0

1

2

1, 2

1, 2

Note: Your initial state can also be your final state. (loop)

The sentences that can be formed from this are:

* 1,2 – 1, 2, 1 – 1, 1 – 1, 1, 2

|  |  |  |
| --- | --- | --- |
| F | A | b |
| * A | B | C |
| * B | B | B |
| C | C | C |
|  |  |  |
|  |  |  |

|  |
| --- |
| A transition table is said to be deterministic if and only if each state can only move to another state in one way. Else the transition table is non-deterministic. |

a,b

a,b

a

b

B

C

A