Deterministic Finite Automata (DFAs)

Lecture 3
Tuesday, September 1, 2020

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3.1
DFA Introduction

DFAs also called Finite State Machines (FSMs)

- The "simplest" model for computers?
- State machines that are common in practice.
  - Vending machines
  - Elevators
  - Digital watches
  - Simple network protocols
- Programs with fixed memory

A simple program

Program to check if a given input string w has odd length

```
int n = 0
While input is not finished
    read next character c
    n ← n + 1
endWhile
If (n is odd) output YES
Else output NO
```

```
bit x = 0
While input is not finished
    read next character c
    x ← flip(x)
endWhile
If (x = 1) output YES
Else output NO
```
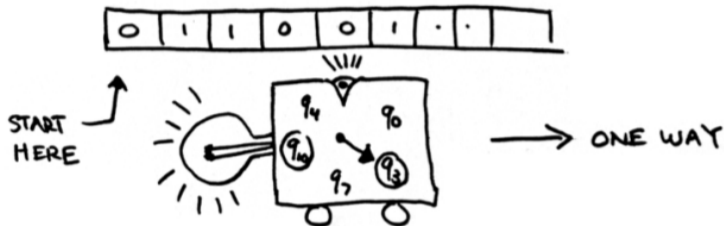
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Another view

- Machine has input written on a <u>read-only</u> tape
- Start in specified start state
- Start at left, scan symbol, change state and move right
- Circled states are <u>accepting</u>
- Machine <u>accepts</u> input string if it is in an accepting state after scanning the last symbol.

Draw me a ~~sheep~~ DFA

THE END

...

(for now)