Lecture 3:

- Finish regex
- MFA
- formal deft
- examples

$$
(\epsilon+0)(1+10)^{*}
$$

no 2 consecutive $0^{\prime}$ '
Language (English) $\rightarrow$ reg ex
(1) strings with 001 or 100 as substring

$$
(0+1)^{\times}(001+100)(0+1)^{\infty}
$$

(2) strings $w$ il an even $\#$ of $I^{(0, s}$

$$
\begin{gathered}
(0+11)^{\infty} \\
\left(0+\left|0^{x}\right|\right)^{x} \\
0^{x}+\left(0^{x}\left|0^{\infty}\right| 0^{x}\right)^{x}
\end{gathered}
$$

$$
0000
$$

$$
0110001100 \mathrm{~V}
$$

$$
101 \times
$$

(3) strings that do not contain

Deterministic Finite Automate, aka DFA<
Finite State Machines (FSMs)

State machine

- States
- Transitions


374 student


Recosvizing languages
Given $L$ and $w$
$\omega \in L$ ?

$$
f_{L}(w)= \begin{cases}w & \text { if } w \notin L \\ 1 & \text { if } \omega \in L\end{cases}
$$

transitions: $\rightarrow$ one per character

one pass over input string


10110
"walk" sequence of stater in a DFA following trausítiong labeled be chars in $w$
Del DFA $\frac{\text { accepts }}{\text { defined if (unique) }}$ walk e defined by w end is an accepting state.


$$
\begin{gathered}
10110 \\
q_{0} 9_{1} q_{0} 9_{1} 9_{2} q_{2} \\
6
\end{gathered} \quad \rightarrow q_{0} \quad l
$$

$9_{0} q_{3} 9_{0}$
$M$ doer not recept 10110
$M$ accept $E$
$M$ accepts $O I$


