

# Math 322

Do stay@home  
→ 4 exams final 11<sup>th</sup> / 13<sup>th</sup>

Now: Exams 1 to 4 ~~Final~~

Drop lowest exam

Exam 4

Open Friday 8<sup>th</sup> AM

Close Wed 13<sup>th</sup> PM

6 probs →

4 hrs

HW

Grammar:

4.1 (3, 4)

(last one)

Due Wed 13<sup>th</sup>

Exam 4

6 probs

Ch 3 (expression, State Machines)

4 probs

Ch 4 (grammar) 2 probs

# Exam 4

Ch 3 (4 probs)

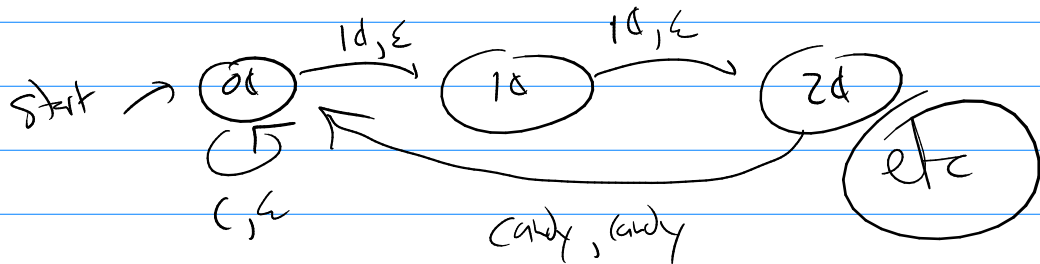
## 1 Regular Expressions (like 3.2 #2)

ex  $0^* 101 (0|1)^*$  → any number of zeros followed by 101 followed by any bit string.

ex  $000101$   
 $0101110110110$

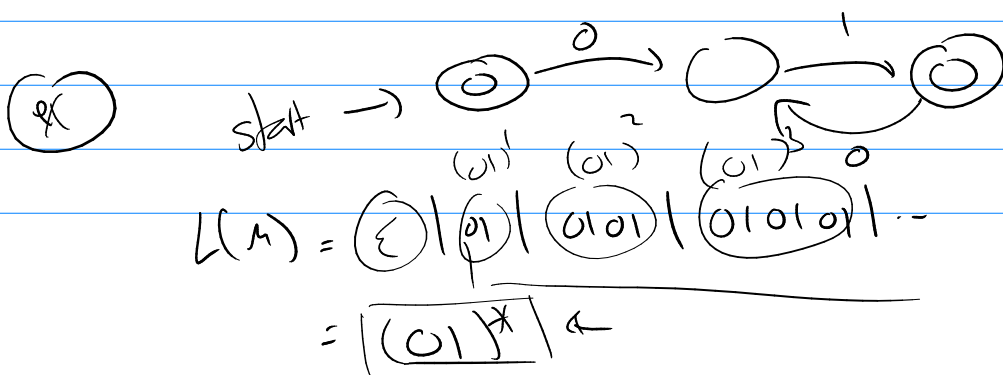
## 2 Turing Machine (lecture)

ex 2 penny machine



State Machine with output

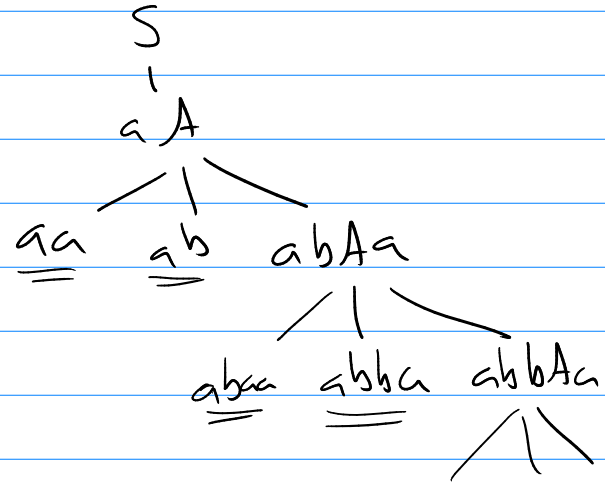
## 3 (11) FSA → Language of Machine



ch 4 grammars (2 probs)

① given productions ...  $L(G) = ?$

(ex)  $S \rightarrow aA$   
 $A \rightarrow a$   
 $A \rightarrow b$   
 $A \rightarrow bAa$



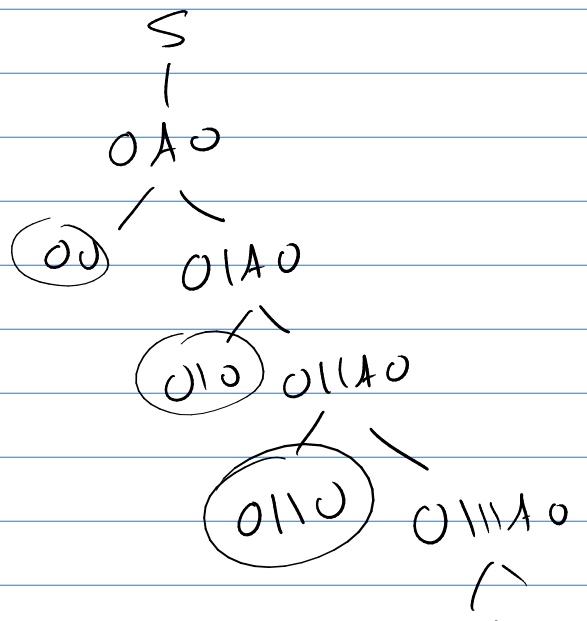
$L(G) = ?$

② given expression  $\rightarrow$  find productions?

(ex)  $L(G) = 01^*0$

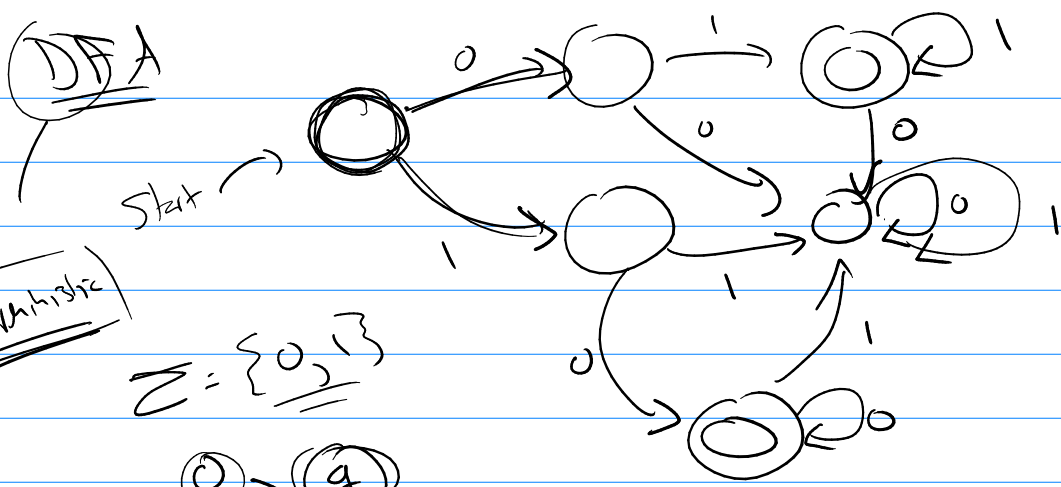
$S \rightarrow 0A0$   
 $A \rightarrow \epsilon$   
 $A \rightarrow 1A$

$G = ?$  productions?



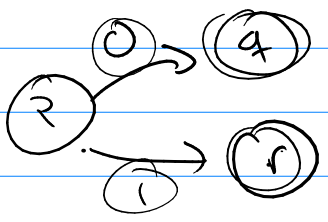
Example DFA (65) NFA

DFA



Deterministic

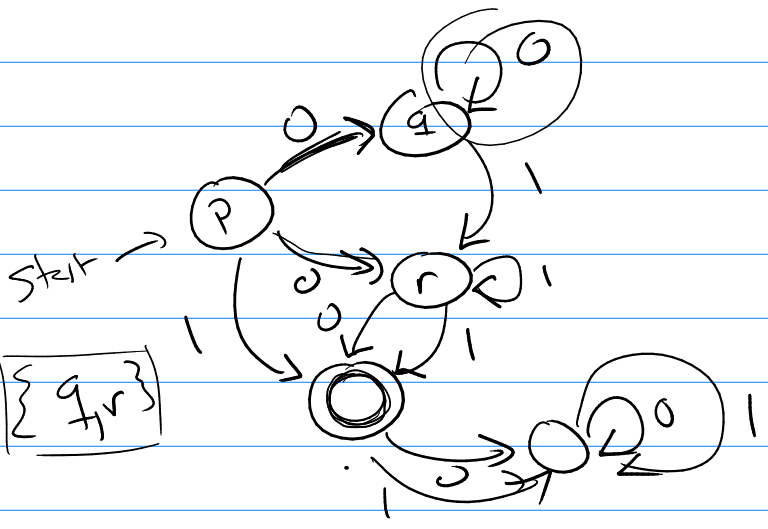
$\Sigma = \{0, 1\}$



$(p, 0) \rightarrow \underline{q}$      $(p, 1) \rightarrow \underline{r}$

NFA

Non-deterministic



Function

$(p, 0) \rightarrow \{q, r\}$

$L(M) = | 1 | 01^*(011) | 0b^*11^*011 |$