

No class Friday!

Quiz #4 is Wed 23rd

Exam #1 on Frid. 25th

$$\{x \mid x \text{ contains } abb\}$$

$$(a+b)^* abb (a+b)^*$$

x contains a, b, b in that order, not necessarily consecutive

$$(a+b)^* a (a+b)^* b (a+b)^* b (a+b)^*$$

$$\{a^n \mid \begin{array}{l} n \text{ is even} \\ \text{odd} \end{array}\}$$

$$(aa)^*$$

$$\underline{a(aa)^*}$$

$$\left[\begin{array}{l} (aaa)^* \\ (a)^* \end{array} \right]$$

$$\{x \mid \begin{array}{l} \{a,b\}^* \\ |x| \text{ is even} \end{array}\}$$

$$((a+b)(a+b))^*$$

||

or $(aa+ab+ba+bb)^*$

$$\{x \mid \# \text{ of } a\text{'s is even}\}$$

$$b^*(aa)^*b^*$$

$$((a^*) + b)^*$$

$$((ab^*a)^* + b)^*$$

$$b^* + (b^*ab^*ab^*)^* \leftarrow \text{just } (aa)^*, \text{ with } b\text{'s inserted.}$$

$$(babab)^*$$

What languages can be represented by regex?

Can I do any regular lang with regex?

There is a method to convert regex $\rightarrow$ NFA.

This means: Any language expressed by regex is regular.

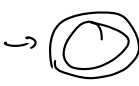
1

Convert regex to NFA

build it in blocks based on
atoms & operations.

Atomic regex: (lets use only 1 accepting state every time)

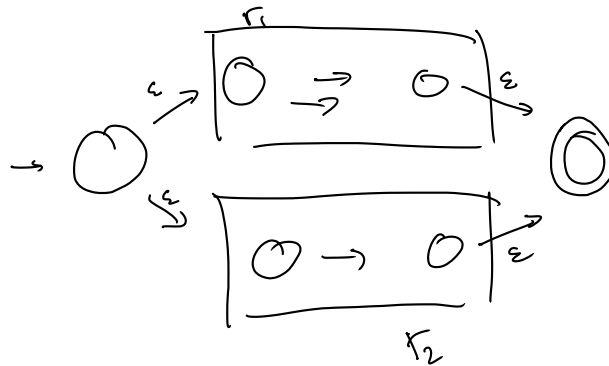
the letter a : $\rightarrow$ 

ϵ : $\rightarrow$  [or $\rightarrow$ ]

$\emptyset$: $\rightarrow$ 

Operations:

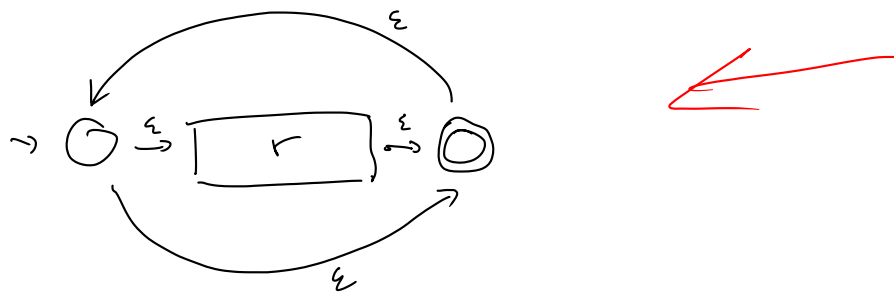
$+$: if I have NFA for r_1 & r_2 ,
 the NFA for $r_1 + r_2$ is :



Concat: if I have NFAs for r_1 & r_2 ,
the NFA for $r_1 r_2$ is:



*: if I have NFA for r ,
the NFA for r^* is

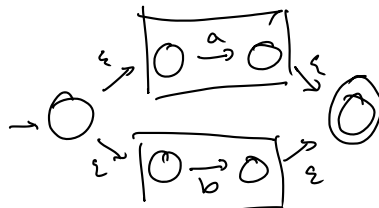


So a NFA for $L(a+b)$

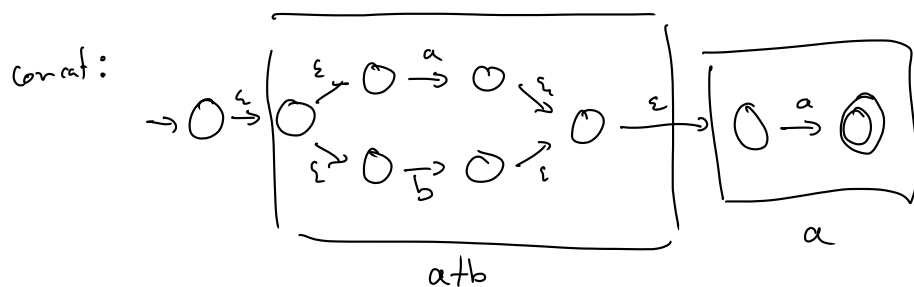
for a : $\rightarrow \text{state} \xrightarrow{a} \text{final state}$

for b : $\rightarrow \text{state} \xrightarrow{b} \text{final state}$

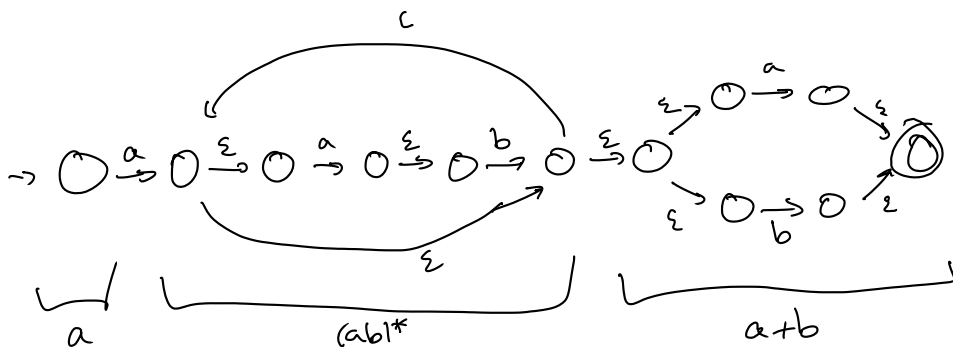
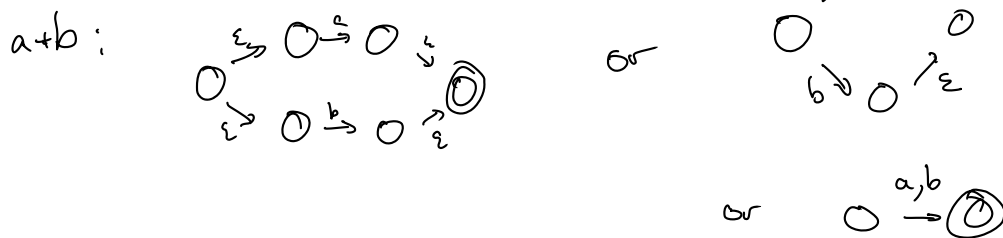
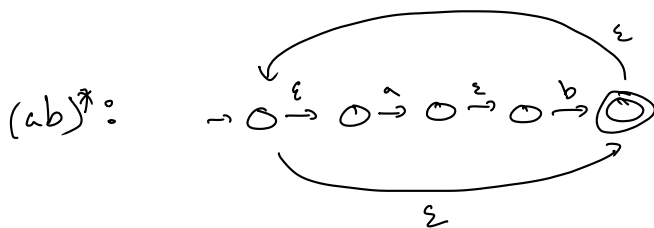
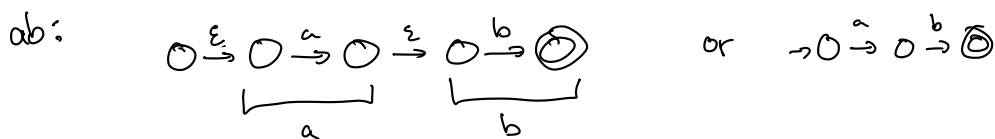
So $a+b$ is



Try $(a+b)a$



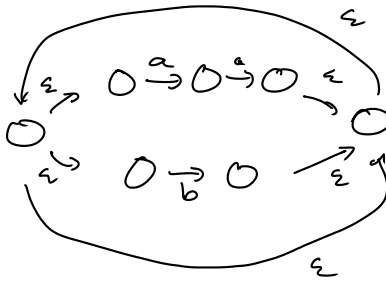
$a(ab)^*(a+b)$



Try:

$$(a^2+b)^* ba + \epsilon$$

$$(a^2+b)^*$$



$$(a^2+b)^* ba + \epsilon$$

