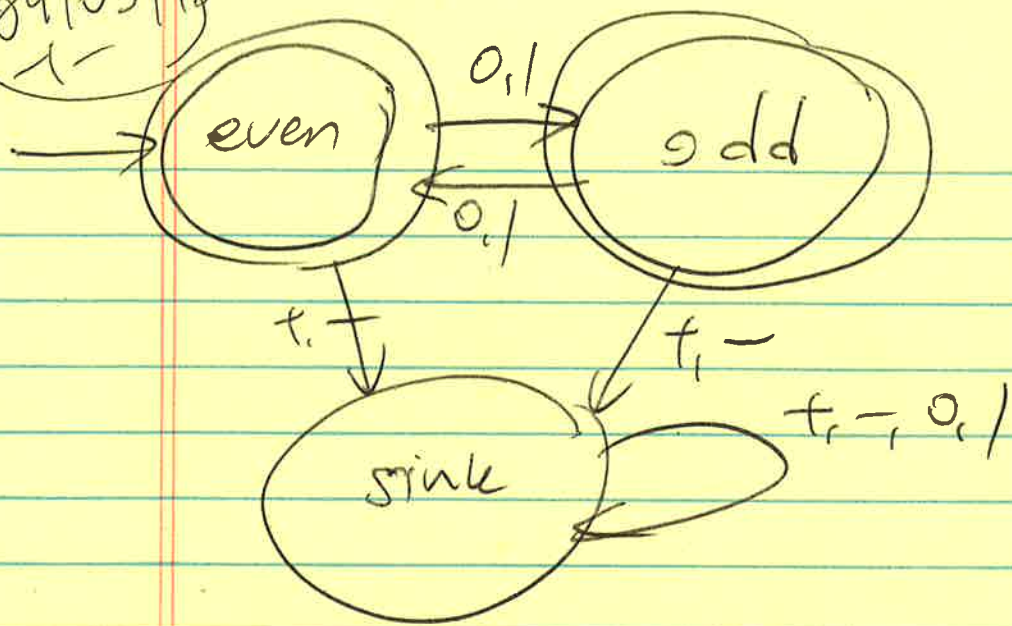


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$\delta(q, s)$

$$Q = \{ \text{even}, \text{odd}, \text{sink} \}$$

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

$$q_0 = \text{even}$$

$$F = \{ \text{even}, \text{odd} \}$$

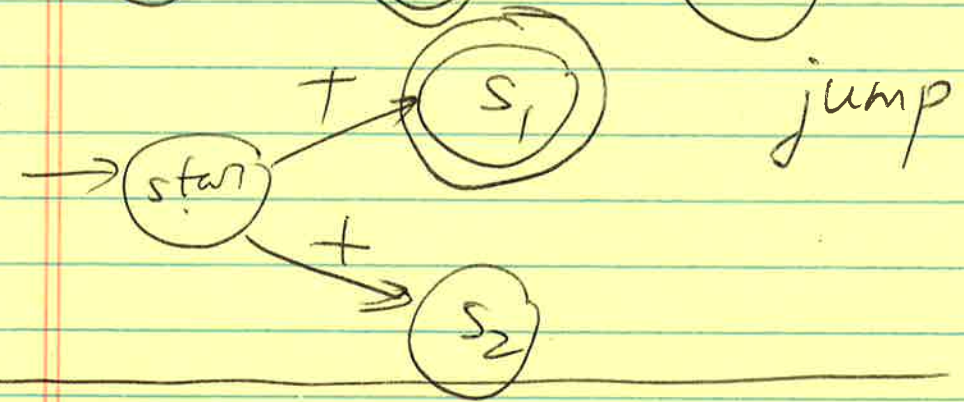
$$\delta(\text{even}, 0) = \text{odd}$$

$$\delta(\text{sink}, t) = \text{sink}$$

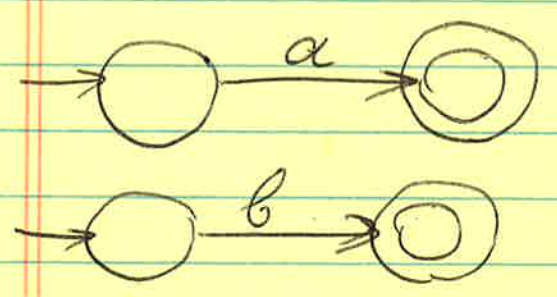
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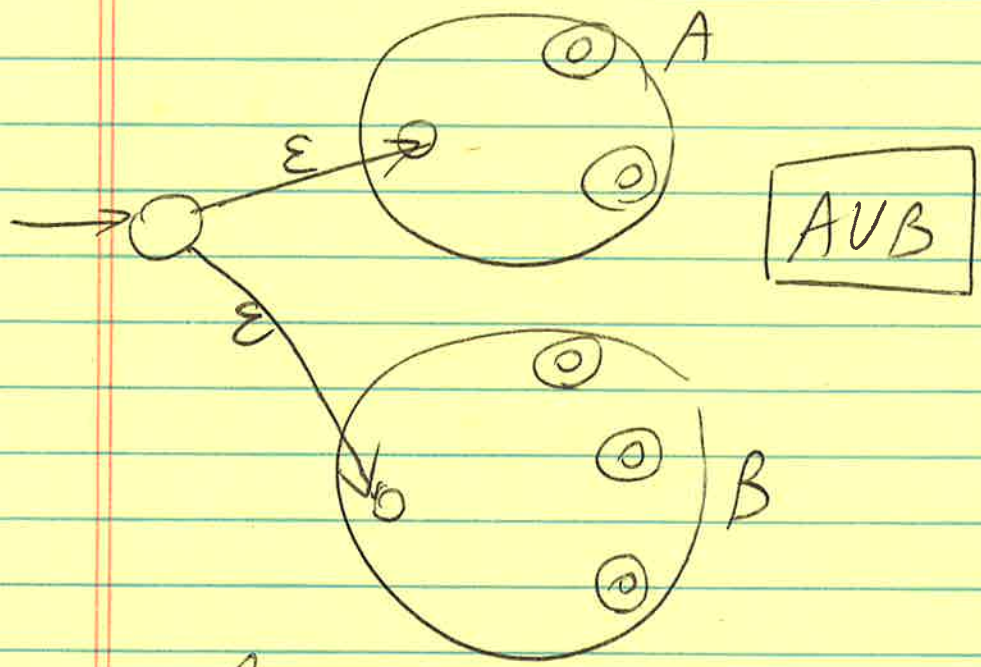
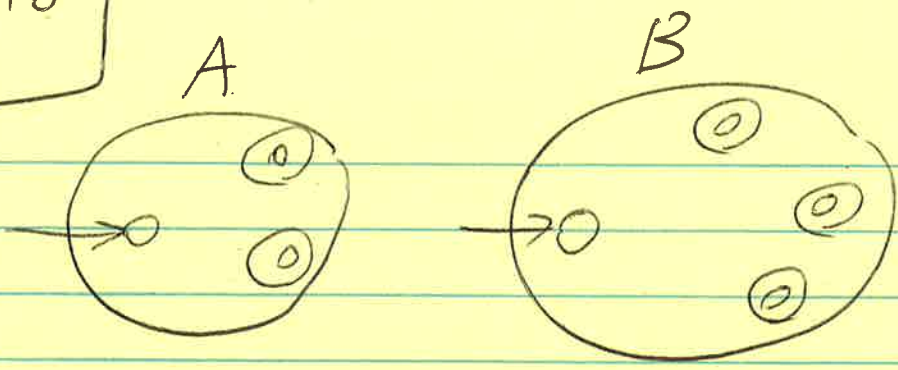
Non deterministic automaton NDA



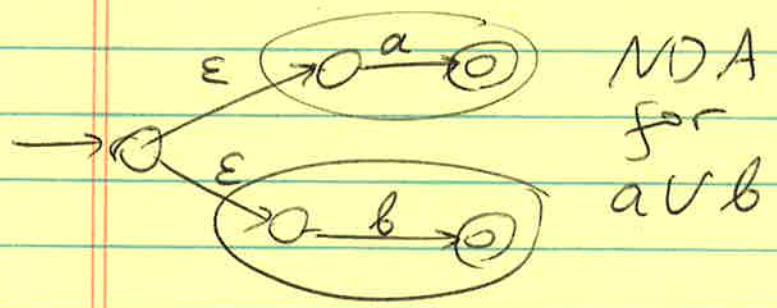
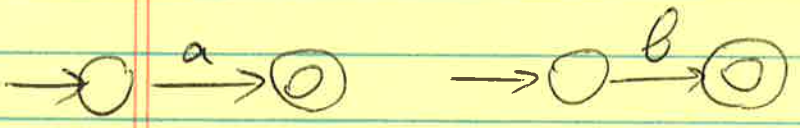
$L = \{a\}$ a



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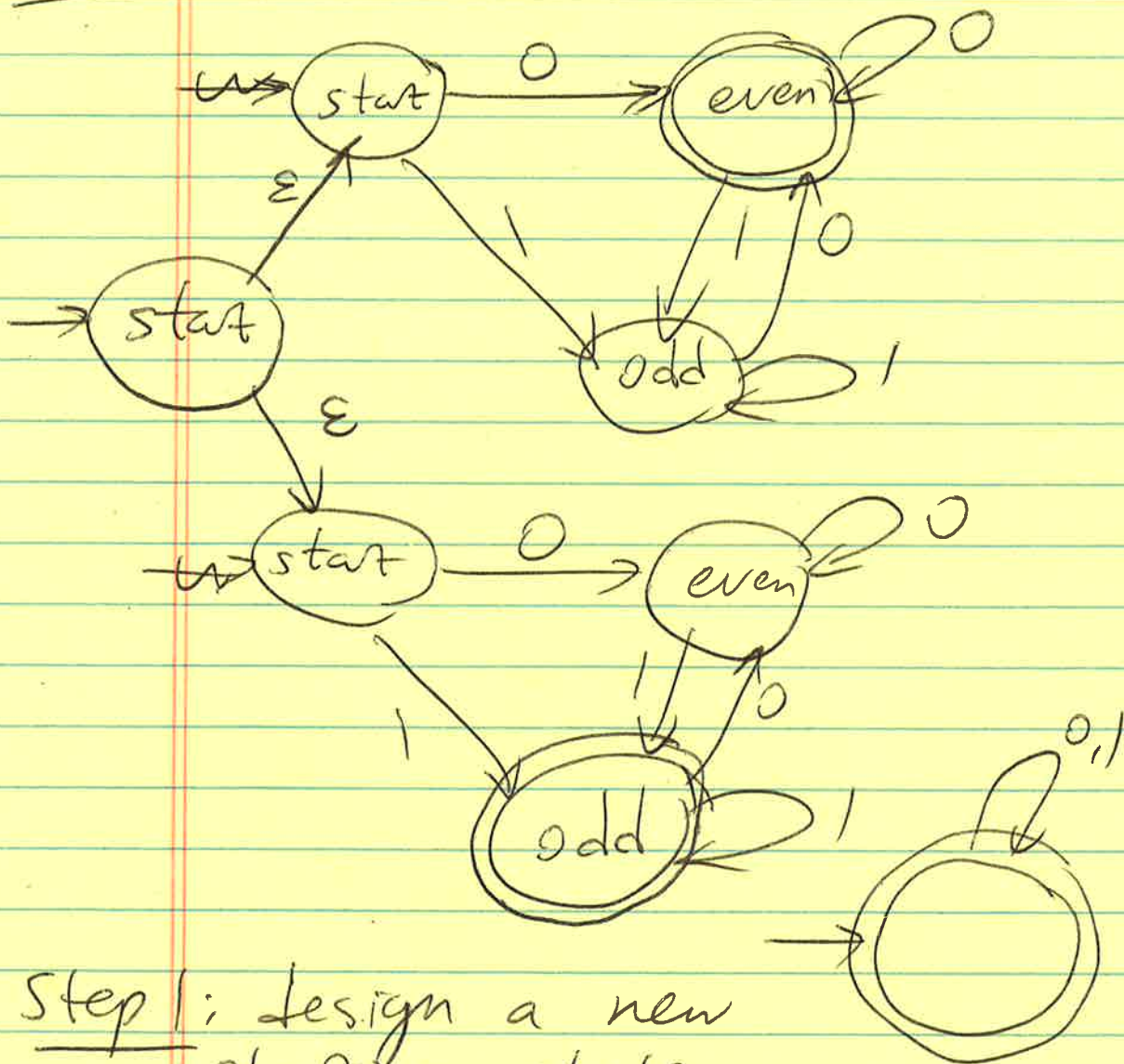


$a \cup b$



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Step 1: Design a new starting state

Step 2: add jumps from the new starting state to each of the old starting states

Concatenation

for words w in Java

$$"Vla" + "dik" = "Vladik"$$

$$AB = \{ab : a \in A, b \in B\}$$

$$A = \{\Lambda, +, -\}$$

↓
empty
word

$$B = \{0, 1, 00, 01, 10, 11, \dots\}$$

$$AB = \{0, 1, 00, 01, 10, 11, \dots, \\ +0, +1, +00, +01, \dots, \\ -0, -1, -00, -01, \dots\}$$

$$A = \{\text{red, blue}\}$$

$$B = \{\text{cat, dog}\}$$

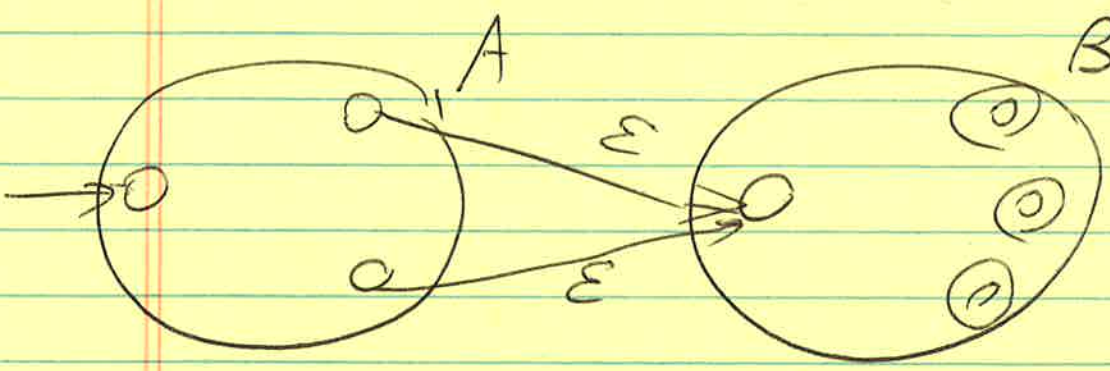
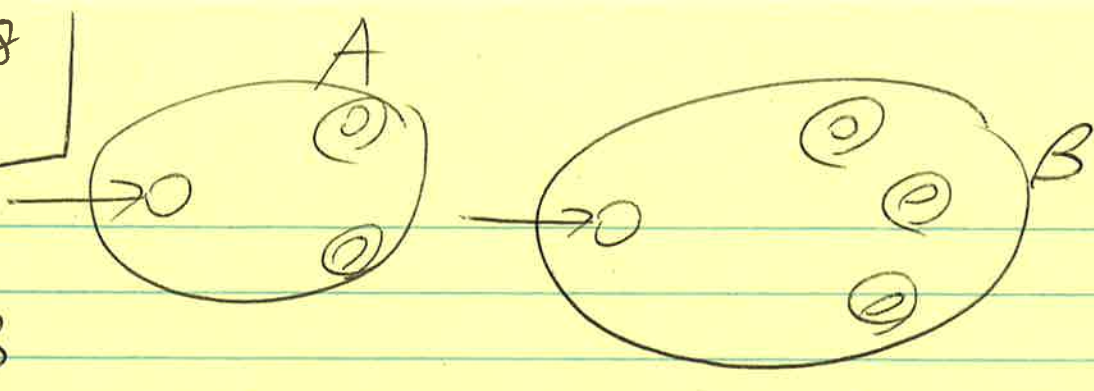
$$AB = \{\text{redcat, reddog, bluecat, \\ bluedog}\}$$

String a = "red";

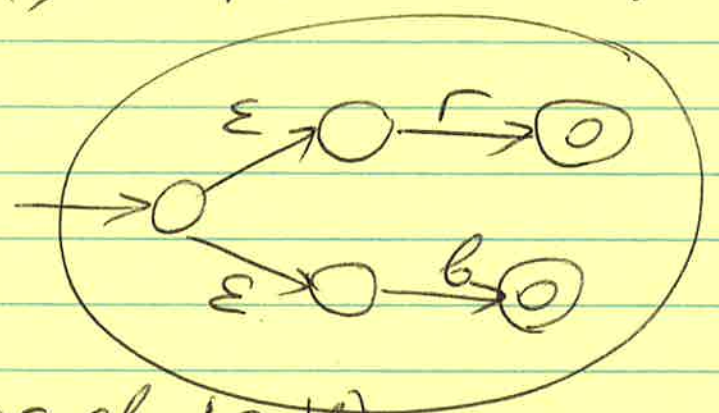
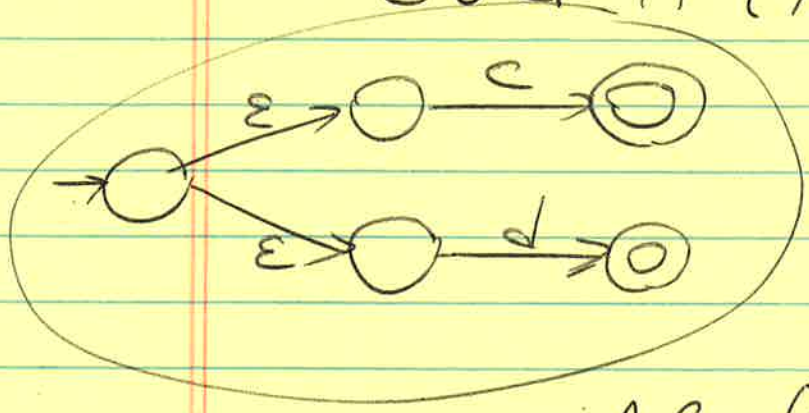
String b = "cat";

String c = a + b;

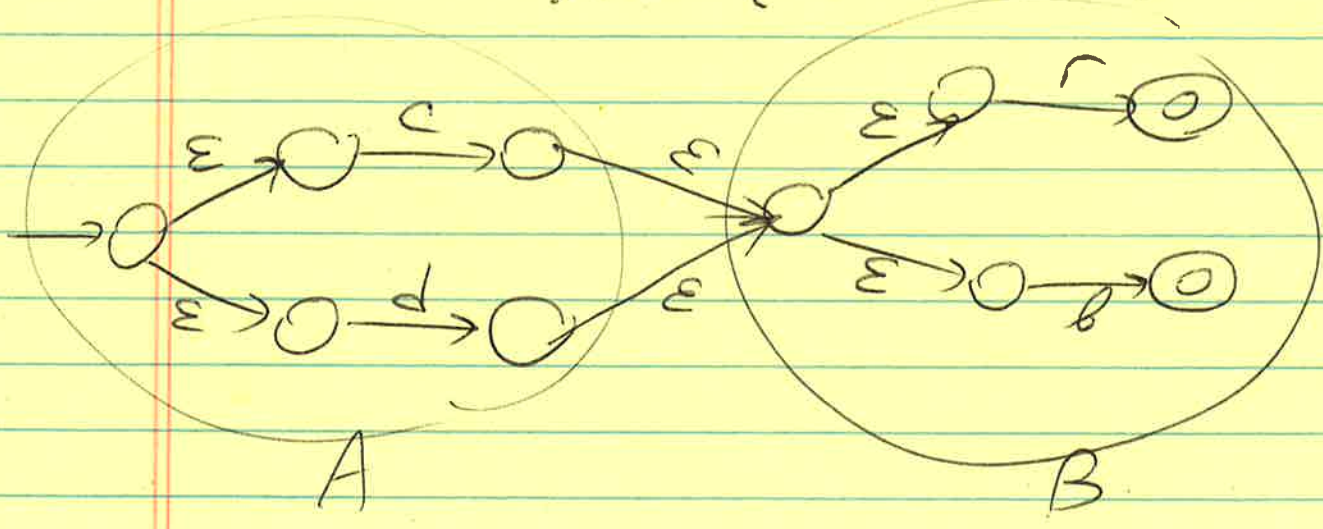
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$c \cup d$ $A = \{c, d\}$ $r \cup b$ $B = \{$



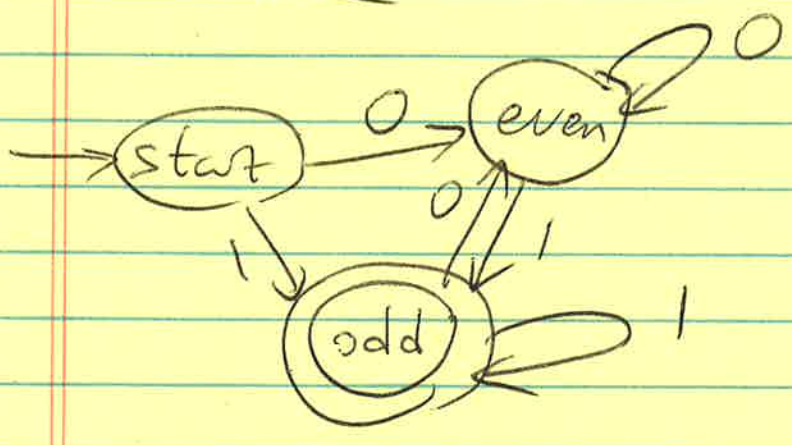
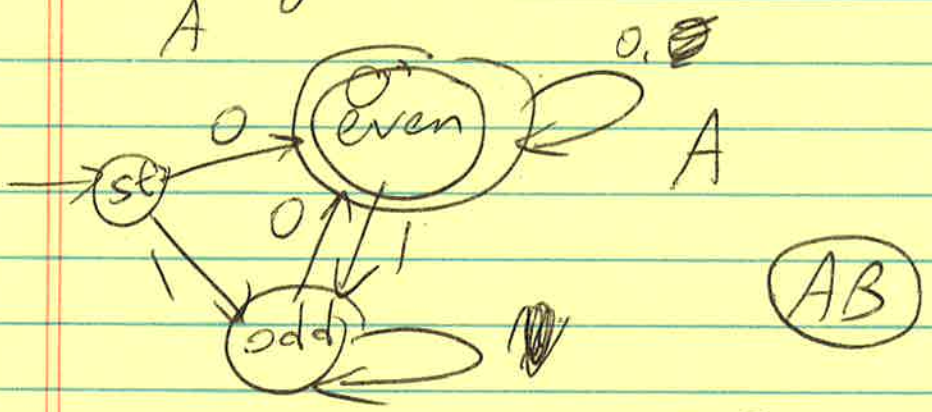
$AB = \{cr, cb, dr, db\}$



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Rules for AB:

- 1) Copy both automata, except that final states of A are no longer final
- 2) You add jumps from each previously final state of A to starting state of B



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$0V [0(1V2)]$

padding

$2 \times 3 + 4 \times 5$

$1V2$

2×3

$0(1V2)$

4×5

$0V \quad 0(1V2)$

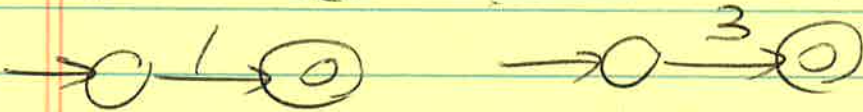
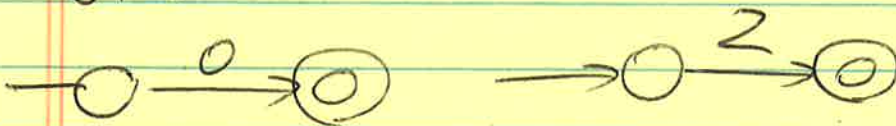
$2 \times 3 + 4 \times 5$

$01 \cup 23$

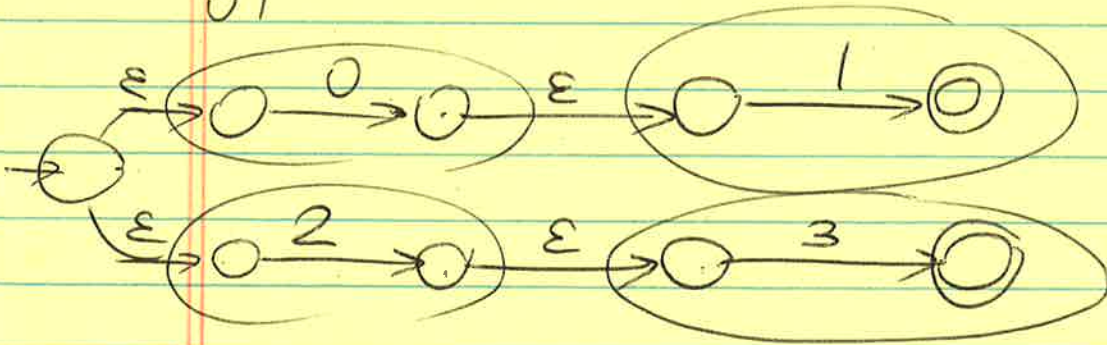
-01

-23

-01 \cup 23



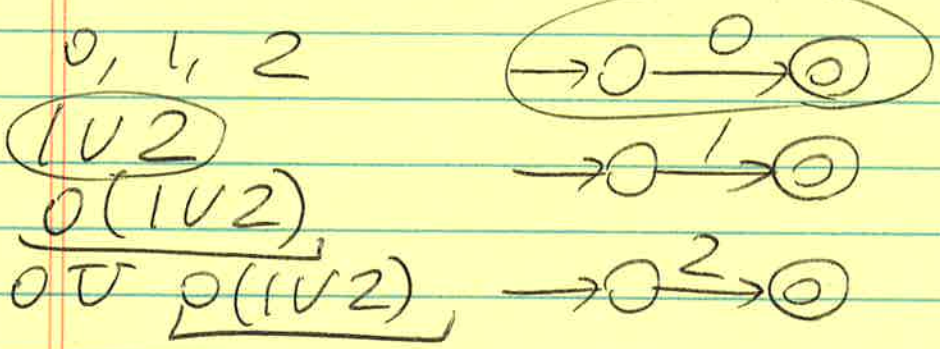
01



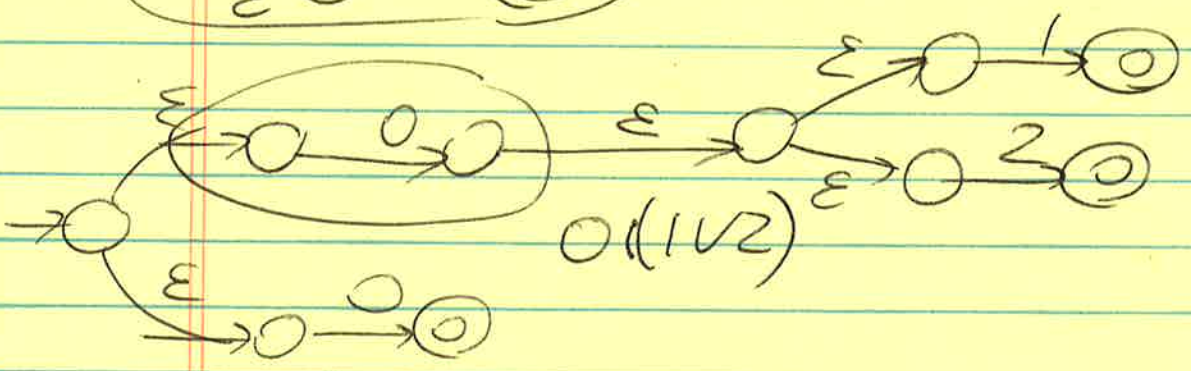
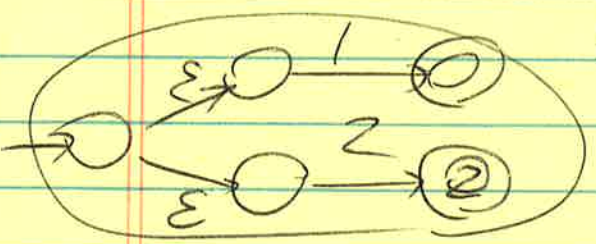
23

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$0 \cup 0(1 \cup 2)$



$1 \cup 2$



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0V10 U 23

10

0V10
23