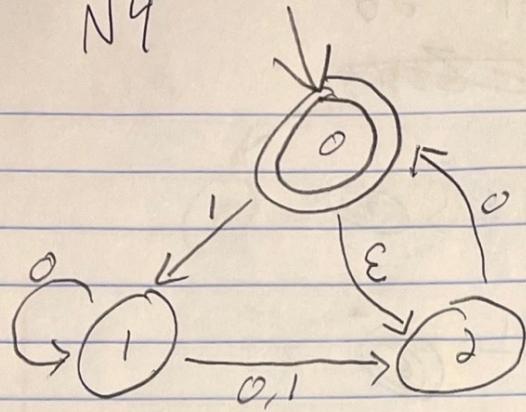


NY



$[0]10|0 \xrightarrow{\epsilon} [1]0|0 \xrightarrow{\epsilon} [1]10 \xrightarrow{\epsilon} [2]0 \xrightarrow{\epsilon} [0] \checkmark$

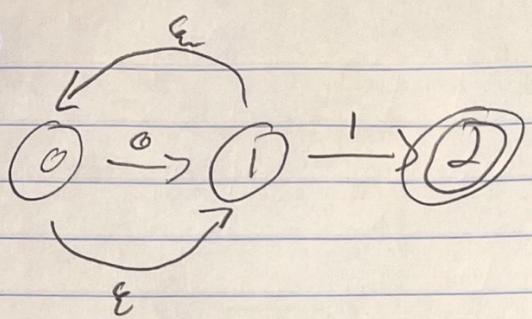
$\underline{[0]0 \xrightarrow{\epsilon} [2]0 \xrightarrow{\epsilon} [0] \checkmark}$

$[0]\epsilon \checkmark$
 $\xrightarrow{\epsilon} [2]\epsilon \times$

$[0]100 \xrightarrow{\epsilon} [1]00 \xrightarrow{\epsilon} [1]0 \xrightarrow{\epsilon} [2] \times$
 $\xrightarrow{\epsilon} [2]100 \times \xrightarrow{\epsilon} [2]0 \xrightarrow{\epsilon} [0] \checkmark$

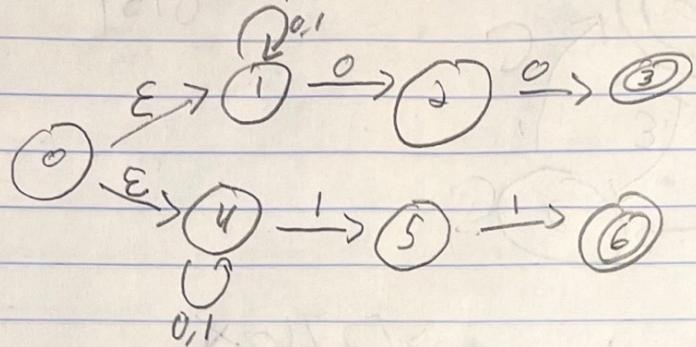
Test $\{1010\}$
 $d_1(0, 1) \rightarrow \{1\}$
 $d_2(0) \rightarrow \{2\}$
 $d_1(1, 0) \rightarrow \{1, 2\}$
 $d_2(1) \rightarrow \{2\}$
 $d_1(2, 1) \rightarrow \{2\}$
 $d_2(2) \rightarrow \{\}$

N5



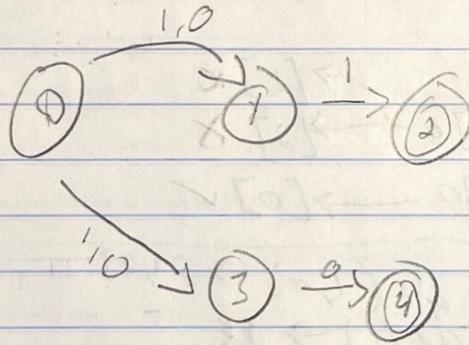
only in 11 or 00
~~Even though, ending in 000~~

N6



$[0]01011 \xrightarrow{\epsilon} [1]01011 \rightarrow [1]11111$
 $\xrightarrow{\epsilon} [4]01011 \rightarrow [4]10111 \rightarrow [4]0111 \rightarrow [4]1111$
 $\rightarrow [5]0111 \rightarrow [5]1111 \rightarrow [6]1111$

N7



$[0]00 \rightarrow [1]0 \times$
 $\rightarrow [3]0 \rightarrow [4] \checkmark$

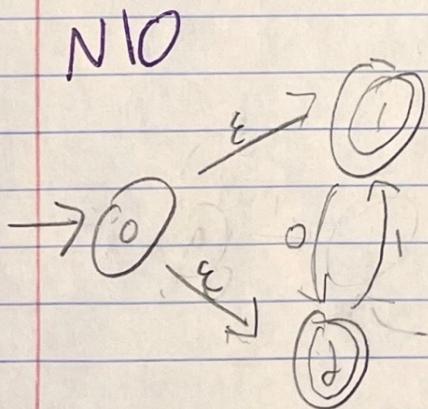
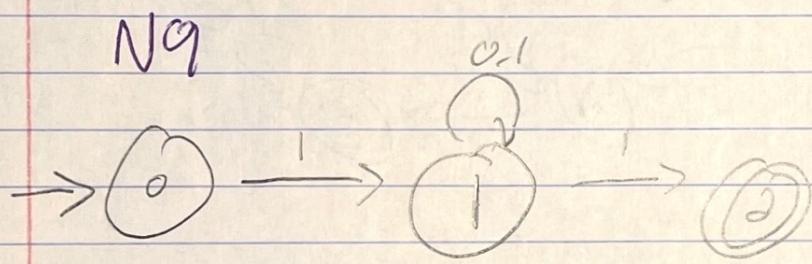
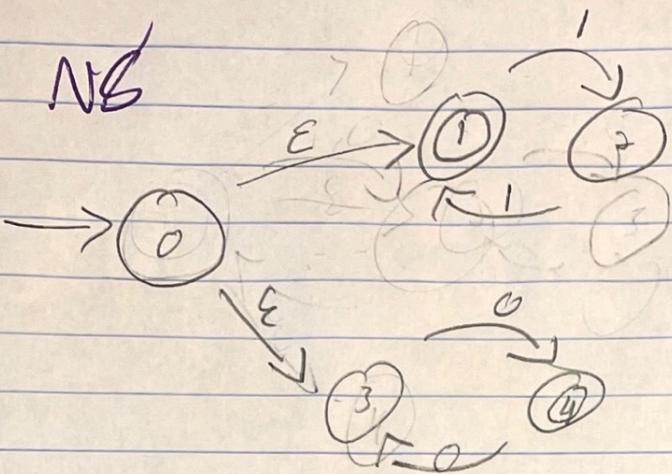
$[0]01 \rightarrow [1]1 \rightarrow [2] \checkmark$
 $\rightarrow [3]1 \times$

$[0]10 \rightarrow [1]0 \times$
 $\rightarrow [3]0 \rightarrow [4] \checkmark$

$[0]11 \rightarrow [1]1 \rightarrow [2] \checkmark$
 $\rightarrow [3]1 \times$

$[0]000 \rightarrow [1]00 \times$
 $\rightarrow [3]00 \rightarrow [4]0 \times$

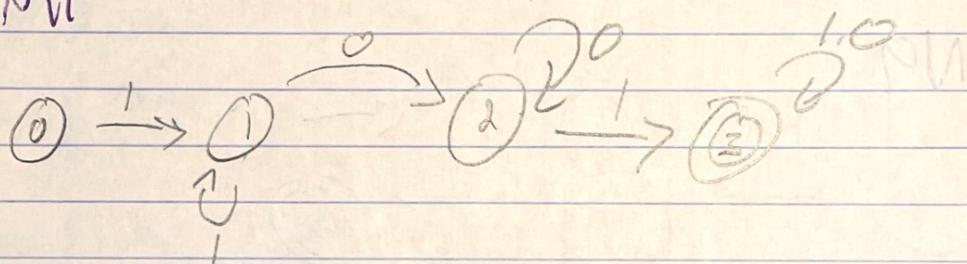
$[0]1 \rightarrow [1] \times$
 $\rightarrow [3] \times$



~~6,0-6⁴0
0-0⁴0
0-0⁴0~~

101

NV



N12

18308689

011

2468

369

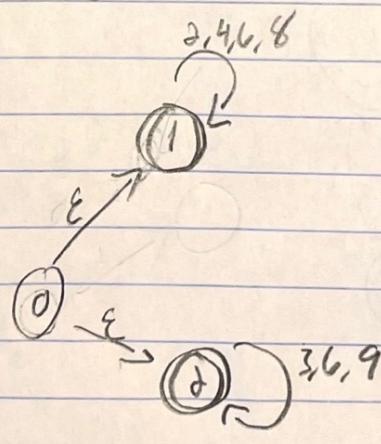
48

8

8

8

41



N1

1. str: $\{1011\}$

ACCEPTS

$[0]1011 \rightarrow [1]011 \rightarrow [2]11 \rightarrow [3]1 \rightarrow [3]$

2. $\{010110\}$

$[0]010110 \rightarrow [0]10110 \rightarrow [1]0110 \rightarrow [2]110 \rightarrow$
 $\rightarrow [3]10 \rightarrow [3]0 \rightarrow [3]$

3. $\{111\}$

$[0]111 \rightarrow [1]11 \rightarrow [2]11 \rightarrow [3]1 \rightarrow [3]$

4. $\{000101\}$

$[0]000101 \rightarrow [0]00101 \rightarrow [0]0101 \rightarrow [0]101 \rightarrow [1]01 \rightarrow$
 $\rightarrow [2]1 \rightarrow [3]$

5. $\{010110\}$

$[0]010110 \rightarrow [0]10110 \rightarrow [0]0110 \rightarrow [0]110 \rightarrow$
 $\rightarrow [1]10 \xrightarrow{\text{?}} [2]10 \rightarrow [3]0 \rightarrow [3]$

6. $\{101010\}$

$[0]101010 \rightarrow [0]01010 \rightarrow [0]1010 \rightarrow [1]010 \rightarrow$
 $\rightarrow [2]10 \rightarrow [3]0 \rightarrow [3]$

7. $\{1011\}$

$$[0]1011 \rightarrow [0]011 \rightarrow [0]11 \rightarrow [0]1 \rightarrow [1]$$

8. $\{111\}$

$$[0]111 \rightarrow [0]11 \rightarrow [0]1 \rightarrow [1]$$

9. $\{010110\}$

$$\begin{aligned} & [0]010110 \rightarrow [0]1010 \rightarrow [0]0110 \rightarrow [0]110 \rightarrow \\ \rightarrow & [0]10 \rightarrow [1]0 \rightarrow [2]0 \end{aligned}$$

10. $\{000101\}$

$$\begin{aligned} & [0]000101 \rightarrow [0]00101 \rightarrow [0]0101 \rightarrow [0]101 \rightarrow [0]01 \rightarrow \\ \rightarrow & [0]1 \rightarrow [0] \end{aligned}$$

11. $\{0110\}$

$$\begin{aligned} & [0]01010 \rightarrow [0]1010 \rightarrow [0]0110 \rightarrow [0]110 \rightarrow \\ \rightarrow & [0]10 \rightarrow [1]0 \rightarrow [2] \end{aligned}$$

12. $\{01010\}$

$$\begin{aligned} & [0]10100 \rightarrow [0]01010 \rightarrow [0]1010 \rightarrow [0]010 \rightarrow \\ \rightarrow & [0]10 \rightarrow [1]0 \rightarrow [2]0 \end{aligned}$$

N₂ - Accepts

1. $\{100\}$

2. $\{101\}$

$[0]101 \rightarrow [1]01 \rightarrow [2]1 \rightarrow [3]$

3. $\{111\}$

$[0]111 \rightarrow [1]11 \rightarrow [2]1 \rightarrow [3]$

4. $\{00000100\}$

$[0]0000100 \rightarrow [0]000100 \rightarrow [0]00100 \rightarrow [0]0100 \rightarrow$
 $\rightarrow [0]100 \rightarrow [1]00 \rightarrow [2]0 \rightarrow [3]$

5. $\{0100\}$

$[0]0100 \rightarrow [0]100 \rightarrow [1]00 \rightarrow [2]0 \rightarrow [3]$

6. $\{0110\}$

$[0]0110 \rightarrow [0]110 \rightarrow [1]10 \rightarrow [2]0 \rightarrow [3]$

(rejects)

7. $\{0111\}$

$[0]0111 \rightarrow [0]111 \rightarrow [1]1 \rightarrow [2]$

8. $\{100\}$

$[0]100 \rightarrow [0]00 \rightarrow [0]0 \rightarrow [0]$

9. $\{111\}$

$[0]111 \rightarrow [0]11 \rightarrow [1]1 \rightarrow [2]$

10. $\{101\}$

$[0]101 \rightarrow [0]01 \rightarrow [0]1 \rightarrow [1]$

11. $\{0100\}$

$[0]0100 \rightarrow [0]100 \rightarrow [0]00 \rightarrow [0]0 \rightarrow [0]$

12. $\{0110\}$

$[0]0110 \rightarrow [0]110 \rightarrow [0]10 \rightarrow [1]0 \rightarrow [2]$

N3 - Accepts

1. $[0] \text{ } 00 \rightarrow [1] \text{ } 00 \rightarrow [2] \text{ } 0 \rightarrow [1]$
2. $[0] \text{ } 000 \rightarrow [3] \text{ } 000 \rightarrow [4] \text{ } 00 \rightarrow [5] \text{ } 0 \rightarrow [3]$
3. $[0] \text{ } 0000 \rightarrow [1] \text{ } 0000 \rightarrow [1] \text{ } 00 \rightarrow [2] \text{ } 0 \rightarrow [1]$
4. $[0] \text{ } 000000 \rightarrow [3] \text{ } 000000 \rightarrow [4] \text{ } 00000 \rightarrow [5] \text{ } 0000 \rightarrow [3] \text{ } 000 \rightarrow$
 $\rightarrow [4] \text{ } 00 \rightarrow [5] \text{ } 0 \rightarrow [3]$
5. $[0] \text{ } 000000 \rightarrow [1] \text{ } 000000 \rightarrow [2] \text{ } 00000 \rightarrow [1] \text{ } 0000 \rightarrow [1] \text{ } 000 \rightarrow$
 $\rightarrow [1] \text{ } 00 \rightarrow [2] \text{ } 0 \rightarrow [1]$
6. $[0] \text{ } 0000000 \rightarrow [1] \text{ } 0000000 \rightarrow [1] \text{ } 000000 \rightarrow [1] \text{ } 00000 \rightarrow [1] \text{ } 0000 \rightarrow$
 $\rightarrow [1] \text{ } 0000 \rightarrow [2] \text{ } 000 \rightarrow [1] \text{ } 00 \rightarrow [2] \text{ } 0 \rightarrow [1]$

Rejects

7. $[0] \text{ } 00 \rightarrow [3] \text{ } 00 \rightarrow [4] \text{ } 0 \rightarrow [5]$
8. $[0] \text{ } 00 \rightarrow [1] \text{ } 000 \rightarrow [2] \text{ } 00 \rightarrow [1] \text{ } 0 \rightarrow [2]$
9. $[0] \text{ } 000 \rightarrow [3] \text{ } 0000 \rightarrow [4] \text{ } 000 \rightarrow [5] \text{ } 00 \rightarrow [3] \text{ } 0 \rightarrow [4]$
10. $[0] \text{ } 0000 \rightarrow [1] \text{ } 0000 \rightarrow [2] \text{ } 0000 \rightarrow [1] \text{ } 000 \rightarrow [2] \text{ } 00 \rightarrow [1] \text{ } 0 \rightarrow [2]$
11. $[0] \text{ } 00000 \rightarrow [3] \text{ } 00000 \rightarrow [4] \text{ } 0000 \rightarrow [5] \text{ } 000 \rightarrow [3] \text{ } 000 \rightarrow [4] \text{ } 0 \rightarrow [5]$
12. $[0] \text{ } 0 \rightarrow [1] \text{ } 0 \rightarrow [2]$

N4 - Accepts

1. $[0]1010 \rightarrow [1]010 \rightarrow [1]10 \rightarrow [2]0 \rightarrow [0]$
2. $[0]0 \rightarrow [2]0 \rightarrow [0]$
3. $[0]$
4. $[0]100 \rightarrow [1]00 \rightarrow [2]0 \rightarrow [0]$
5. $[0]110 \rightarrow [1]10 \rightarrow [2]0 \rightarrow [0]$
6. $[0]00 \rightarrow [2]00 \rightarrow [0]0 \rightarrow [2]0 \rightarrow [0]$

Rejects

7. $[0]1010 \rightarrow [2]1010$
8. $[0] \rightarrow [2]$
9. $[0]100 \rightarrow [1]00 \rightarrow [1]0 \rightarrow [2]$
10. $[0]110 \rightarrow [2]110 \rightarrow$
11. $[0]11 \rightarrow [1]1 \rightarrow [2]$
12. $[0]101 \rightarrow [1]01 \rightarrow [1]1 \rightarrow [2]$

N5 - Accepts

1. $[0]01 \rightarrow [1]1 \rightarrow [2]$
2. $[0]1 \rightarrow [1]1 \rightarrow [2]$
3. $[0]0001 \rightarrow [1]001 \rightarrow [0]001 \rightarrow [1]01 \rightarrow [0]01 \rightarrow [1]1 \rightarrow [2]$
4. $[0]001 \rightarrow [1]01 \rightarrow [0]01 \rightarrow [1]1 \rightarrow [2]$
5. $[0]00001 \rightarrow [1]0001 \rightarrow \#\$$
6. $[0]000001 \rightarrow [1]00001 \rightarrow \#\$$

Rejects

7. $[0]11 \rightarrow [1]11 \rightarrow [2]1$
8. $[0]10 \rightarrow [1]10 \rightarrow [2]01$
9. $[0]010 \rightarrow [1]10 \rightarrow [0]10 \rightarrow [1]10 \rightarrow [2]0$
10. $[0]111 \rightarrow [1]111 \rightarrow [2]11$
11. $[0]10 \rightarrow [1]10 \rightarrow [2]0$
12. $[0]0 \rightarrow [1]$

N6 - Accepts

1. $[0]11 \rightarrow [4]11 \rightarrow [5]1 \rightarrow [6]$
2. $[0]00 \rightarrow [1]00 \rightarrow [2]0 \rightarrow [3]$
3. $[0]011 \rightarrow [4]011 \rightarrow [4]11 \rightarrow [5]1 \rightarrow [6]$
4. $[0]100 \rightarrow [1]100 \rightarrow [1]00 \rightarrow [2]0 \rightarrow [3]$
5. $[0]0100 \rightarrow [1]0100 \rightarrow [1]100 \rightarrow [1]00 \rightarrow [2]0 \rightarrow [3]$
6. $[0]1011 \rightarrow [4]1011 \rightarrow [4]011 \rightarrow [4]11 \rightarrow [5]1 \rightarrow [6]$

Rejects

7. $[0]11 \rightarrow [1]11 \rightarrow [1]1 \rightarrow [1]$
8. $[0]00 \rightarrow [4]00 \rightarrow [4]0 \rightarrow [4]$
9. $[0]011 \rightarrow [4]011 \rightarrow [4]11 \rightarrow [4]1 \rightarrow [4]$
10. $[0]011 \rightarrow [4]011 \rightarrow [4]11 \rightarrow [4]1 \rightarrow [5]$
11. $[0] \rightarrow [1]$
12. $[0]1 \rightarrow [4]1 \rightarrow [5]$

N7 - Accepts

1. $[0]00 \rightarrow [3]0 \rightarrow [4]$
2. $[0]01 \rightarrow [1]1 \rightarrow [2]$
3. $[0]10 \rightarrow [3]0 \rightarrow [4]$
4. $[0]11 \rightarrow [1]1 \rightarrow [2]$

Rejects

5. $[0]0 \rightarrow [1]$
6. $[0]10 \rightarrow [3]$
7. $[0]1 \rightarrow [1]$
8. $[0]1 \rightarrow [3]$
9. $[0]$
10. $[0]000 \rightarrow [3]00 \rightarrow [4]0$
11. $[0]000 \rightarrow [1]00$
12. $[0]00 \rightarrow [1]0$

N8 - Accepts

1. $[0] \text{ II} \rightarrow [1] \text{ II} \rightarrow [2] \text{ I} \rightarrow [1]$
2. $[0] \text{ IIII} \rightarrow [1] \text{ IIII} \rightarrow [2] \text{ III} \rightarrow [1] \text{ II} \rightarrow [2] \text{ I} \rightarrow [1]$
3. $[0] \text{ O} \rightarrow [3] \text{ O} \rightarrow [4]$
4. $[0] \text{ 000} \rightarrow [3] \text{ 000} \rightarrow [4] \text{ 00} \rightarrow [3] \text{ O} \rightarrow [4]$
5. $[0] \text{ 00000} \rightarrow [3] \text{ 00000} \rightarrow [4] \text{ 00000} \rightarrow [3] \text{ 000} \rightarrow$
 $\rightarrow [4] \text{ 00} \rightarrow [3] \text{ O} \rightarrow [4]$
6. $[0] \text{ IIIIII} \rightarrow [1] \text{ OIIII} \rightarrow [2] \text{ IIIII} \rightarrow [1] \text{ IIII} \rightarrow [2] \text{ IIII} \rightarrow$
 $\rightarrow [1] \text{ II} \rightarrow [2] \text{ I} \rightarrow [1]$

rejects

7. $[0] \text{ II} \rightarrow [3] \text{ II}$
8. $[0] \text{ OO} \rightarrow [1] \text{ OO}$
9. $[0] \text{ IO} \rightarrow [1] \text{ IO} \rightarrow [2] \text{ O}$
10. $[0] \text{ O} \rightarrow [1] \text{ O}$
11. $[0] \text{ 000} \rightarrow [1] \text{ 000}$
12. $[0] \text{ IO} \rightarrow [3] \text{ IO}$

N9 - Accepts

1. $[0] \text{ III} \rightarrow [1] \text{ II} \rightarrow [1] \text{ I} \rightarrow [2]$
2. $[0] \text{ IOI} \rightarrow [1] \text{ OI} \rightarrow [1] \text{ I} \rightarrow [2]$
3. $[0] \text{ I00I} \rightarrow [1] \text{ 00I} \rightarrow [1] \text{ 0I} \rightarrow [1] \text{ I} \rightarrow [2]$
4. $[0] \text{ I000I} \rightarrow [1] \text{ 000I} \rightarrow [1] \text{ 00I} \rightarrow [1] \text{ 0I} \rightarrow [1] \text{ I} \rightarrow [2]$
5. $[0] \text{ I0II} \rightarrow [1] \text{ 0II} \rightarrow [1] \text{ II} \rightarrow [1] \text{ I} \rightarrow [2]$
6. $[0] \text{ II} \rightarrow [1] \text{ I} \rightarrow [2]$

rejects

7. $[0] \text{ II} \rightarrow [1] \text{ I} \rightarrow [1]$
8. $[0] \text{ III} \rightarrow [1] \text{ II} \rightarrow [2] \text{ I}$
9. $[0] \text{ III} \rightarrow [1] \text{ II} \rightarrow [1] \text{ I} \rightarrow [1]$
10. $[0] \text{ O}$
11. $[0]$
12. $[0] \text{ IO} \rightarrow [1] \text{ O} \rightarrow [1]$

N|O - Accepts

1. $[0] \rightarrow [1]$
2. $[0]1 \rightarrow [2]1 \rightarrow [1]$
3. $[0]0 \rightarrow [1]0 \rightarrow [2]$
4. $[0]10 \rightarrow [2]10 \rightarrow [1]0 \rightarrow [2]$
5. $[0]01 \rightarrow [1]01 \rightarrow [2]1 \rightarrow [1]$
6. $[0]101 \rightarrow [2]101 \rightarrow [1]01 \rightarrow [2]1 \rightarrow [1]$

rejects

7. $[0]1 \rightarrow [1]1$
8. $[0]0 \rightarrow [2]0$
9. $[0]10 \rightarrow [1]10$
10. $[0]01 \rightarrow [2]01$
11. $[0]11 \rightarrow [2]11 \rightarrow [1]1$
12. $[0]11 \rightarrow [1]11$

N|| - Accepts

1. $[0]101 \rightarrow [1]01 \rightarrow [2]1 \rightarrow [3]$
2. $[0]1011 \rightarrow [1]011 \rightarrow [2]11 \rightarrow [3]1 \rightarrow [3]$
3. $[0]1010 \rightarrow [1]010 \rightarrow [2]10 \rightarrow [3]0 \rightarrow [3]$
4. $[0]11011 \rightarrow [1]1011 \rightarrow [1]011 \rightarrow [2]11 \rightarrow [3]1 \rightarrow [3]$
5. $[0]110001 \rightarrow [1]10001 \rightarrow [1]0001 \rightarrow [2]001 \rightarrow [2]01 \rightarrow [2]1 \rightarrow [3]$
6. $[0]1001 \rightarrow [1]001 \rightarrow [2]01 \rightarrow [2]1 \rightarrow [3]$

rejects

7. $[0]1 \rightarrow [1]$
8. $[0]0$
9. $[0]11 \rightarrow [1]11 \rightarrow [1]1 \rightarrow [1]$
10. $[0]01 \rightarrow$
11. $[0]10 \rightarrow [1]10 \rightarrow [1]0 \rightarrow [2]$
12. $[0]100 \rightarrow [1]00 \rightarrow [2]0 \rightarrow [2]$

NFA - Accepts

1. $[0] \xrightarrow{2} [1] \xrightarrow{2} [1]$
2. $[0] \xrightarrow{24} [1] \xrightarrow{24} [1] \xrightarrow{4} [1]$
3. $[0] \xrightarrow{68} [1] \xrightarrow{68} [1] \xrightarrow{8} [1]$
4. $[0] \xrightarrow{33969} [2] \xrightarrow{33969} [2] \xrightarrow{3969} [0] \xrightarrow{969} [1] \xrightarrow{69} [2] \xrightarrow{9} [2]$
5. $[0] \xrightarrow{6} [1] \xrightarrow{6} [1]$
6. $[0] \xrightarrow{6} [0] \xrightarrow{6} [2]$

rejects

7. $[0] \xrightarrow{2} [2] \xrightarrow{1} [2]$
8. $[0] \xrightarrow{3} [1] \xrightarrow{3} [1]$
9. $[0] \xrightarrow{23} [1] \xrightarrow{23} [1] \xrightarrow{3} [1]$
10. $[0] \xrightarrow{632} [2] \xrightarrow{632} [2] \xrightarrow{32} [2] \xrightarrow{32} [2]$
11. $[0] \xrightarrow{68} [2] \xrightarrow{68} [2] \xrightarrow{8} [2]$
12. $[0] \xrightarrow{69} [1] \xrightarrow{69} [1] \xrightarrow{9} [1]$