TEAM 3   김세진 (20200453), 김은솔 (20201501)

NFA ID: letter (letter | digit)*
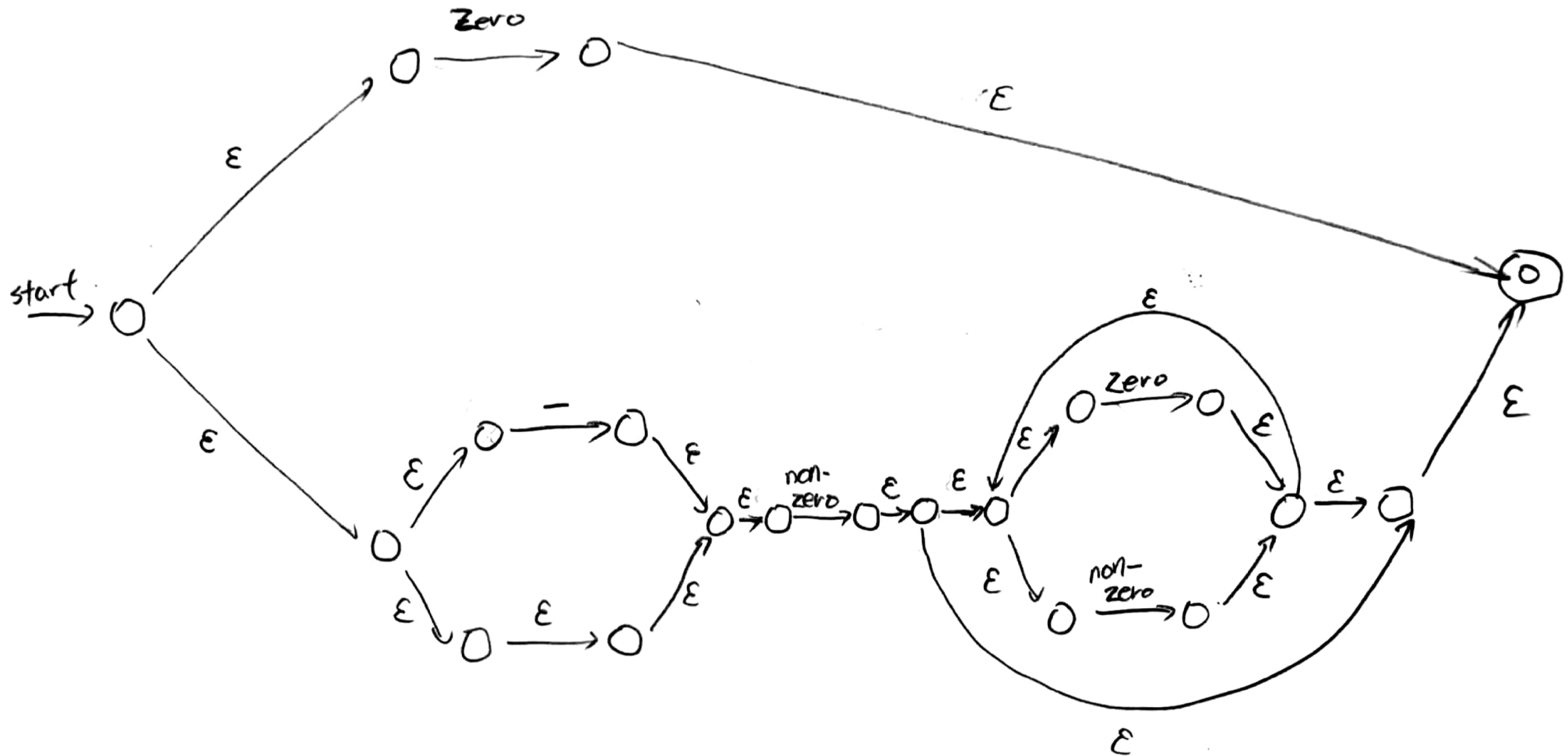
digit = 0|1|2|3|4|5|6|7|8|9
letter : a|b|c|...|z|A|B|C|...|Z
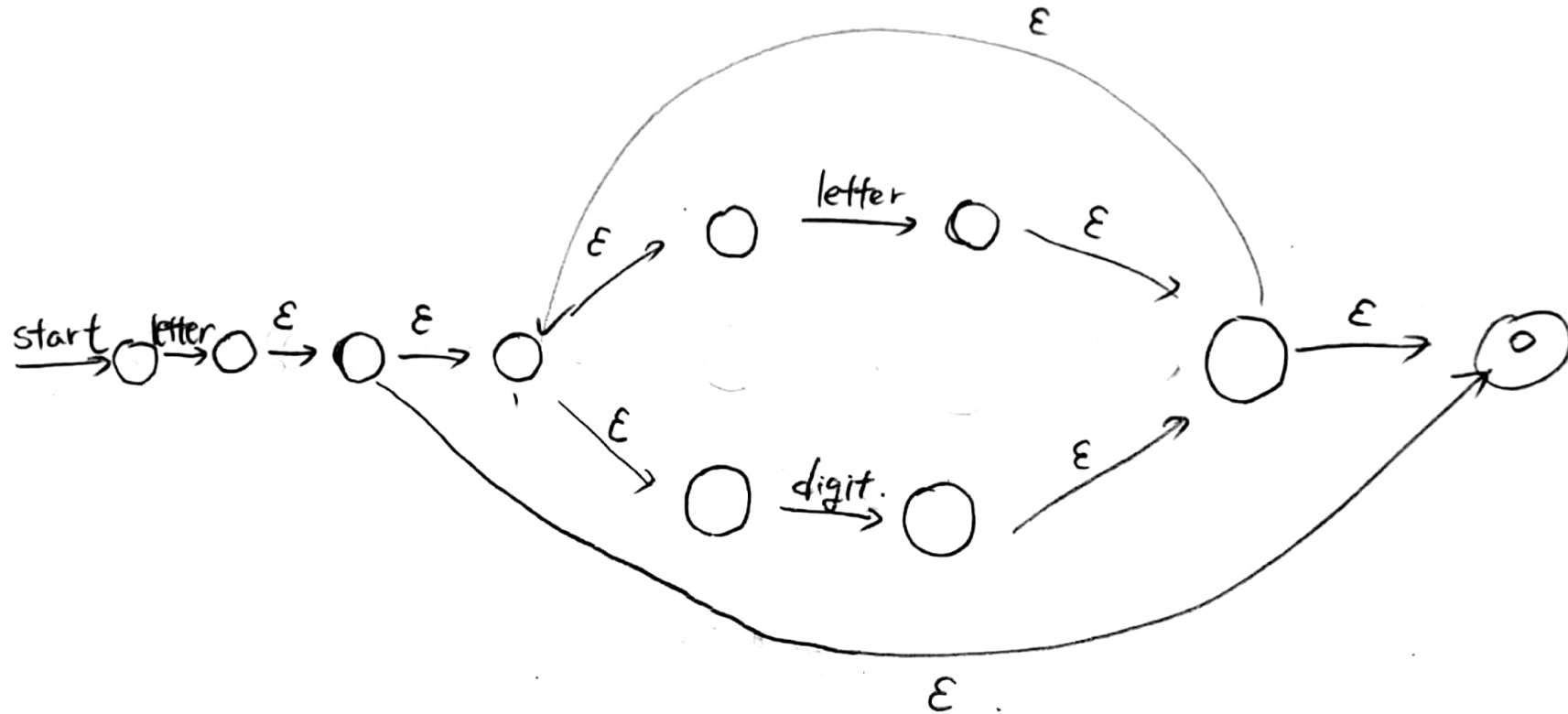
NFA   INT :   zero | ((-|ε) non-zero (zero|non-zero)*)

non-zero: 1|2|3|4|5|6|7|8|9

NFA STRING: "(letter | zero | non-zero |)*"

letter: $a|b|c| \cdots |z| A|B|C| \cdots |Z$

non-zero: $1|2|3|4|5|6|7|8|9$
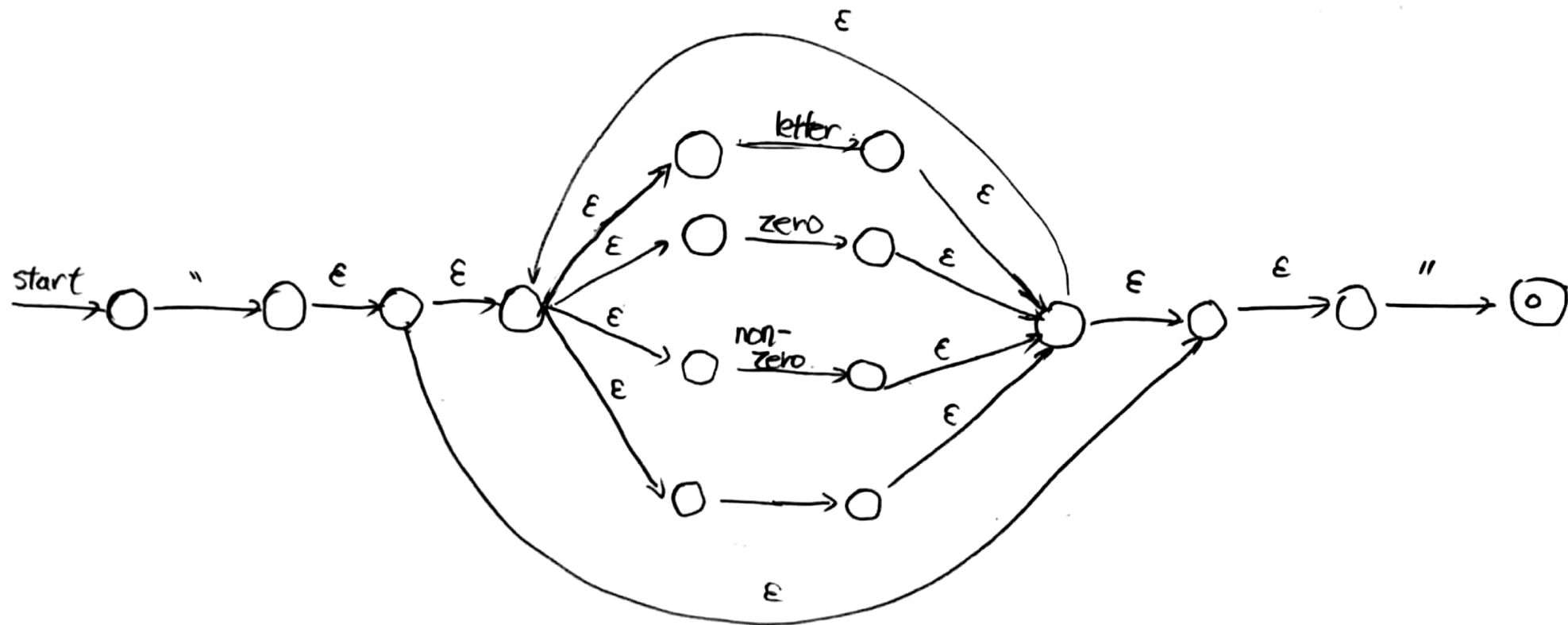
DFA ID : letter (letter | digit)*
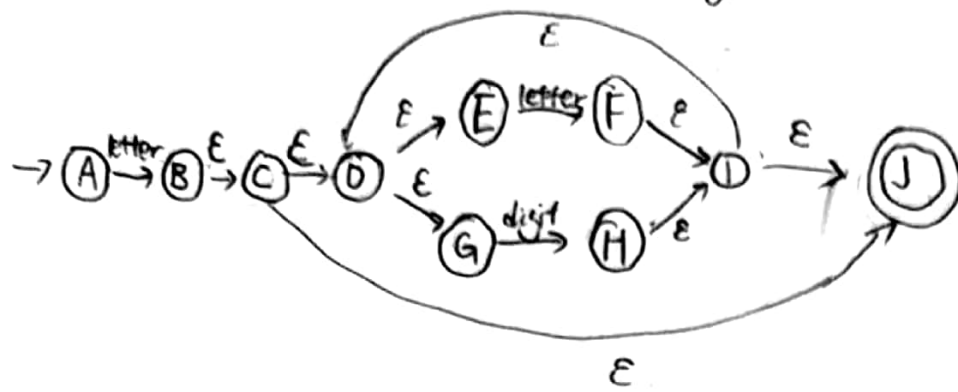
$$T_0 = \varepsilon\text{-closure}(A) = \{A\}$$

$$T_1 = \varepsilon\text{-closure}(\delta(T_0, letter)) = \{B,C,D,E,G,J\}, \quad \varepsilon\text{-closure}(\delta(T_0, digit)) = \emptyset$$

$$T_2 = \varepsilon\text{-closure}(\delta(T_1, letter)) = \{D,E,G,H,I,J\}$$

$$T_3 = \varepsilon\text{-closure}(\delta(T_1, digit)) = \{D,E,G,F,I,J\}$$

$$\varepsilon\text{-closure}(\delta(T_2, letter)) = (D,E,G,H,I,J) = T_2$$

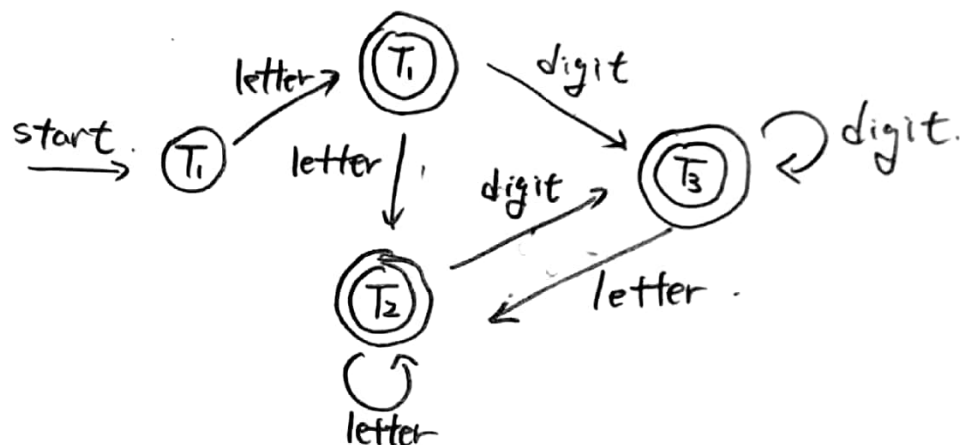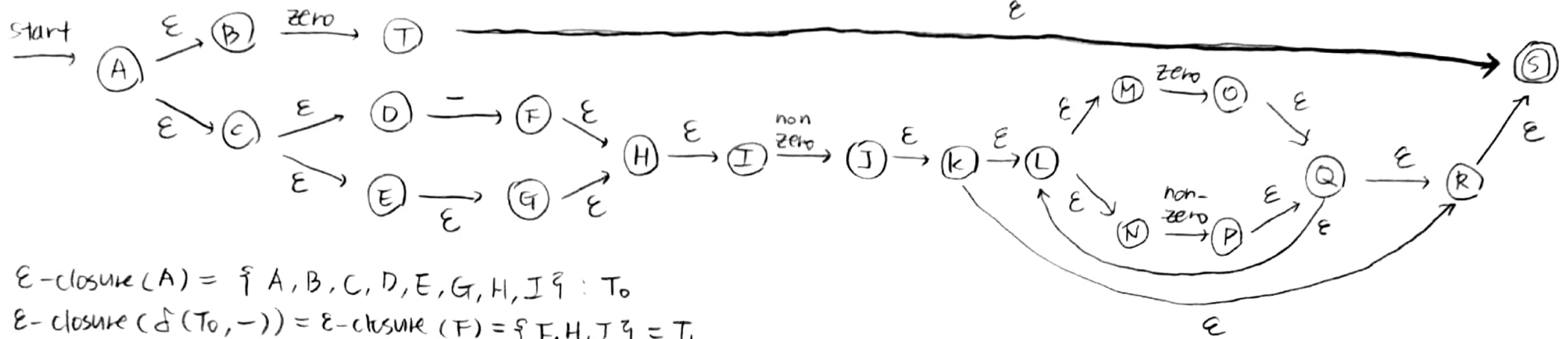$$\varepsilon\text{-closure}(\delta(T_2, digit)) = \{D,E,G,F,I,J\} = T_3$$

$$\varepsilon\text{-closure}(\delta(T_3, letter)) = \{D,E,G,H,I,J\} = T_2$$

$$\varepsilon\text{-closure}(\delta(T_3, digit)) = \{D,E,G,H,I,J\} = T_3$$

	letter	digit
T_0	T_1	$\emptyset$
T_1	T_2	T_3
T_2	T_2	T_3
T_3	T_2	T_3

DFA : INT   zero | ((- | ε) non-zero (zero | non-zero)*)   zero→z non-zero→nz

$$\varepsilon\text{-closure}(A) = \{A, B, C, D, E, G, H, I\} : T_0$$

$$\varepsilon\text{-closure}(\delta(T_0, -)) = \varepsilon\text{-closure}(F) = \{F, H, I\} = T_1$$

$$\varepsilon\text{-closure}(\delta(T_0, z)) = \varepsilon\text{-closure}(T) = \{T, S\} : T_2$$

$$\varepsilon\text{-closure}(\delta(T_0, nz)) = \varepsilon\text{-closure}(J) = \{J, k, L, M, N, R, S\} : T_3$$

$$\varepsilon\text{-closure}(\delta(T_1, -)) = \emptyset \quad \varepsilon\text{-closure}(\delta(T_1, z)) = \emptyset$$

$$\varepsilon\text{-closure}(\delta(T_1, nz)) = \varepsilon\text{-closure}(J) = T_3$$

$$\varepsilon\text{-closure}(\delta(T_2, -)) = \emptyset \quad \varepsilon\text{-closure}(\delta(T_2, z)) = \emptyset \quad \varepsilon\text{-closure}(\delta(T_2, nz)) = \emptyset$$

$$\varepsilon\text{-closure}(\delta(T_3, -)) = \emptyset$$

$$\varepsilon\text{-closure}(\delta(T_3, z)) = \varepsilon\text{-closure}(O) = \{O, Q, L, M, N, R, S\} : T_4$$

$$\varepsilon\text{-closure}(\delta(T_3, nz)) = \varepsilon\text{-closure}(P) = \{Q, L, M, N, R, S, P\} : T_5$$

$$\varepsilon\text{-closure}(\delta(T_4, -)) = \emptyset$$

$$\varepsilon\text{-closure}(\delta(T_4, z)) = \varepsilon\text{-closure}(O) = T_4$$

$$\varepsilon\text{-closure}(\delta(T_4, nz)) = \varepsilon\text{-closure}(P) = T_5$$

$$\varepsilon\text{-closure}(\delta(T_5, -)) = \emptyset$$

$$\varepsilon\text{-closure}(\delta(T_5, z)) = \varepsilon\text{-closure}(O) = T_4$$

$$\varepsilon\text{-closure}(\delta(T_5, nz)) = \varepsilon\text{-closure}(P) = T_5$$

	−	z	nz
T_0	T_1	T_2	T_3
T_1	$\emptyset$	$\emptyset$	T_3
(T_2)	$\emptyset$	$\emptyset$	$\emptyset$
(T_3)	$\emptyset$	T_4	T_5
(T_4)	$\emptyset$	T_4	T_5
(T_5)	$\emptyset$	T_4	T_5
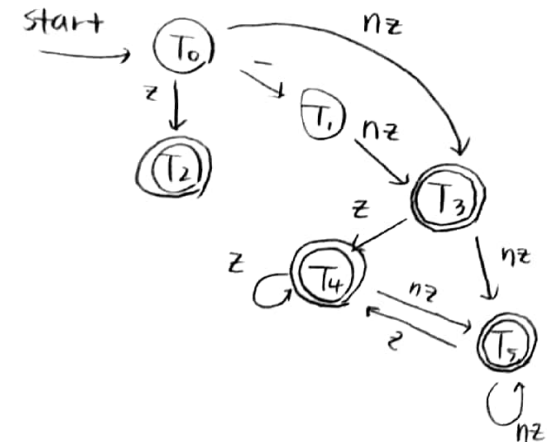
DFA STRING. "(letter | zero | non-zero)*"

letter → L, non-zero → NZ, zero → Z.

ε- closure $(A) = \{A\} = T_0$.

ε- closure $(\delta(T_0, ")) = \delta$- closure$(B) = \{B, C, D, E, F, G, H, N, O\} = T_1$.

ε- closure $(\delta(T_0, L)) = \phi$, ε- closure $(\delta(T_0, Z)) = \phi$

ε- closure $(\delta(T_0, NZ)) = \phi$, ε- closure $(\delta(T_0,)) = \phi$

ε- closure $(\delta(T_1, ")) = \varepsilon$- closure $(P) = \{P\} = T_2$

ε- closure $(\delta(T_1, L)) = \varepsilon$- closure $(I) = \{I, M, N, O, D, E, F, G, H\} = T_3$.

ε- closure $(\delta(T_1, Z)) = \varepsilon$- closure$(J) = \{J, M, N, O, D, E, F, G, H\} = T_4$

ε- closure $(\delta(T_1, NZ)) = \varepsilon$- closure $(K) = \{K, M, N, O, D, E, F, G, H\} = T_5$

ε- closure $(\delta(T_1,)) = \varepsilon$- closure$(L) = \{L, M, N, O, D, E, F, G, H\} = T_6$

ε- closure $(\delta(T_2, ")) = \phi$ ε- closure $(\delta(T_3, ")) = \varepsilon$- closure$(P) = T_2$

ε- closure $(\delta(T_2, L)) = \phi$ ε- closure $(\delta(T_3, L)) = \varepsilon$- closure$(I) = T_3$

ε- closure $(\delta(T_2, Z)) = \phi$ ε- closure $(\delta(T_3, Z)) = \varepsilon$- closure$(J) = T_4$

ε- closure $(\delta(T_2, NZ)) = \phi$ ε- closure $(\delta(T_3, NZ)) = \varepsilon$- closure$(K) = T_5$

ε- closure $(\delta(T_2,)) = \phi$ ε- closure $(\delta(T_3,)) = \varepsilon$- closure$(L) = T_6$

ε- closure $(\delta(T_4, ")) = \varepsilon$- closure$(P) = T_2$.

ε- closure $(\delta(T_4, L)) = \varepsilon$- closure$(I) = T_3$

ε- closure $(\delta(T_4, Z)) = \varepsilon$- closure $(J) = T_4$

ε- closure $(\delta(T_4, NZ)) = \varepsilon$- closure$(K) = T_5$

ε- closure $(\delta(T_4,)) = \varepsilon$- closure$(L) = T_6$

ε- closure $(\delta(T_5, ")) = \varepsilon$- closure$(P) = T_2$.

ε- closure$(\delta(T_5, L)) = \varepsilon$- closure$(I) = T_3$

ε- closure $(\delta(T_5, Z)) = \varepsilon$- closure $(J) = T_4$

ε- closure$(\delta(T_5, NZ)) = \varepsilon$- closure $(K) = T_5$.

ε- closure $(\delta(T_5,)) = \varepsilon$- closure$(L) = T_6$.

ε- closure $(\delta(T_6, ")) = \varepsilon$- closure$(P) = T_2$

ε- closure$(\delta(T_6, L)) = \varepsilon$- closure$(I) = T_3$

ε- closure $(\delta(T_6, Z)) = \varepsilon$- closure $(J) = T_4$

ε- closure $(\delta(T_6, NZ)) = \varepsilon$- closure $(K) = T_5$

ε- closure $(\delta(T_6,)) = \varepsilon$- closure $(L) = T_6$.

	"	L	Z	NZ	
T_0	T_1	∅	∅	∅	∅
T_1	T_2	T_3	T_4	T_5	T_6
(T_2)	∅	∅	∅	∅	∅
T_3	T_2	T_3	T_4	T_5	T_6
T_4	T_2	T_3	T_4	T_5	T_6
T_5	T_2	T_3	T_4	T_5	T_6
T_6	T_2	T_3	T_4	T_5	T_6

T_0 → T_1 → T_6

States: T_0, T_1, (T_2), T_3, T_4, T_5, T_6

Edge labels: ", NZ, L, Z, NZ, Z, L, NZ, L (loop at T_3), Z (loop at T_4), NZ (loop at T_5)