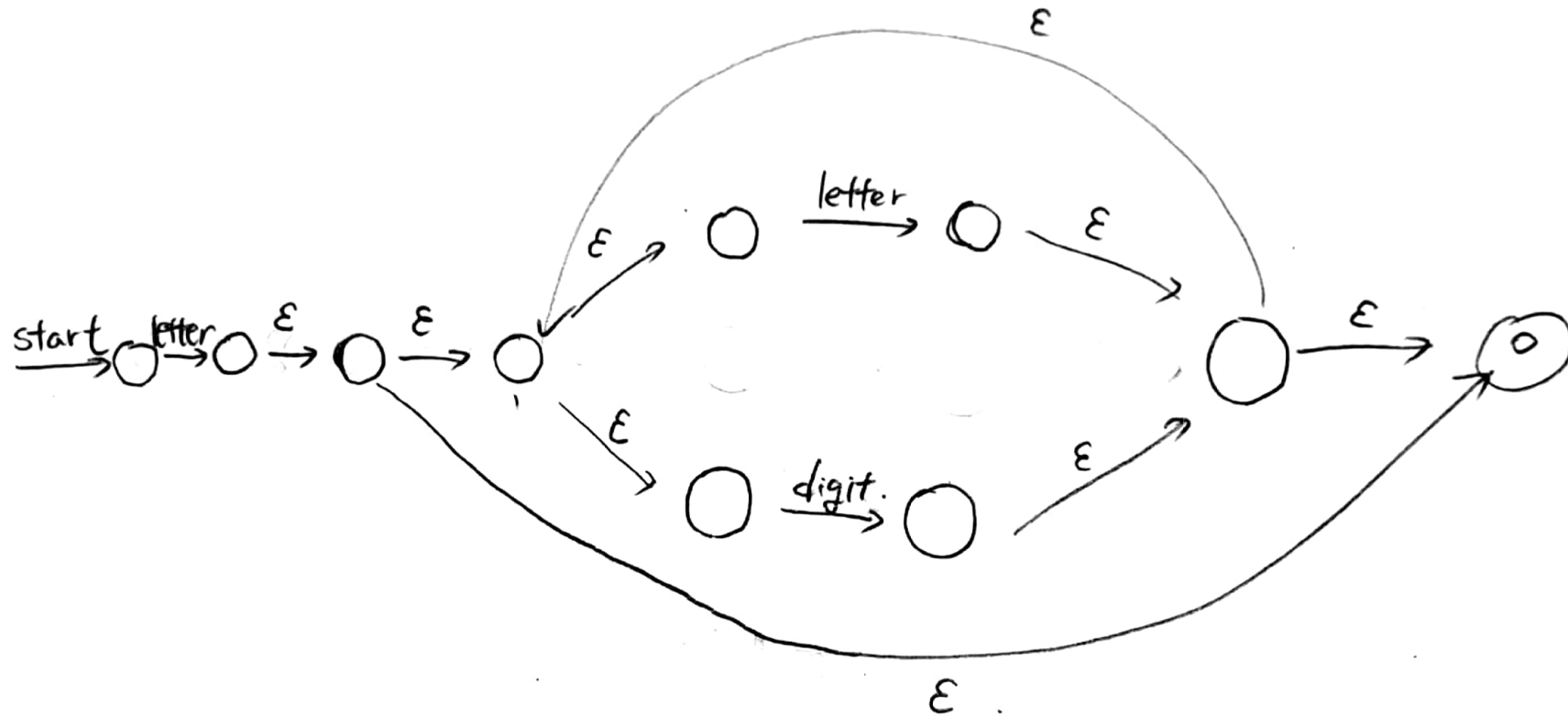


TEAM 3 김세진 (20200453), 김은솔 (20201501)

NFA ID: letter (letter | digit)\*

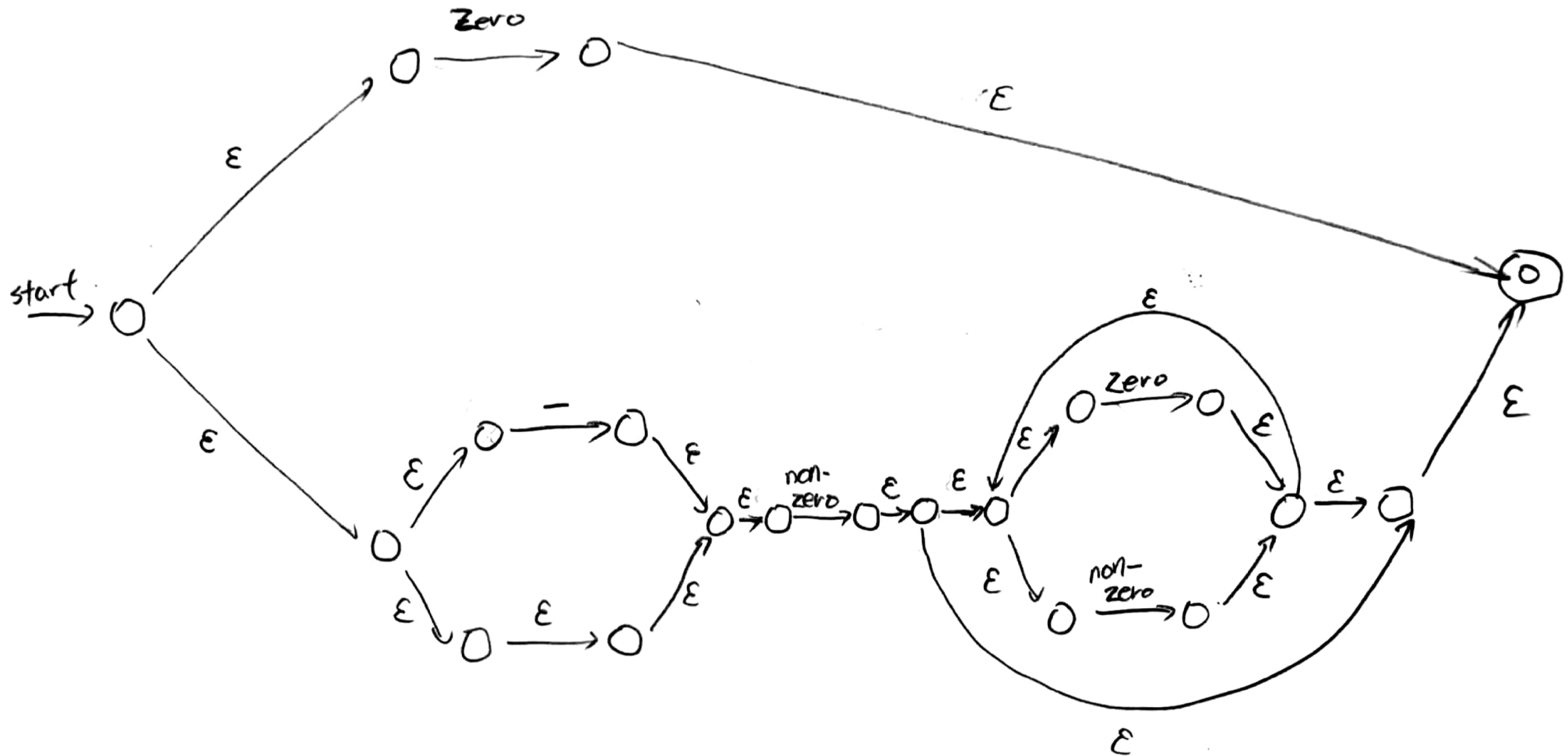
digit = 0/1/2/3/4/5/6/7/8/9

letter: a/b/c.../z/A/B/C.../Z



NFA INT :  $zero | ((- | \epsilon) non-zero (zero | non-zero)^*)$

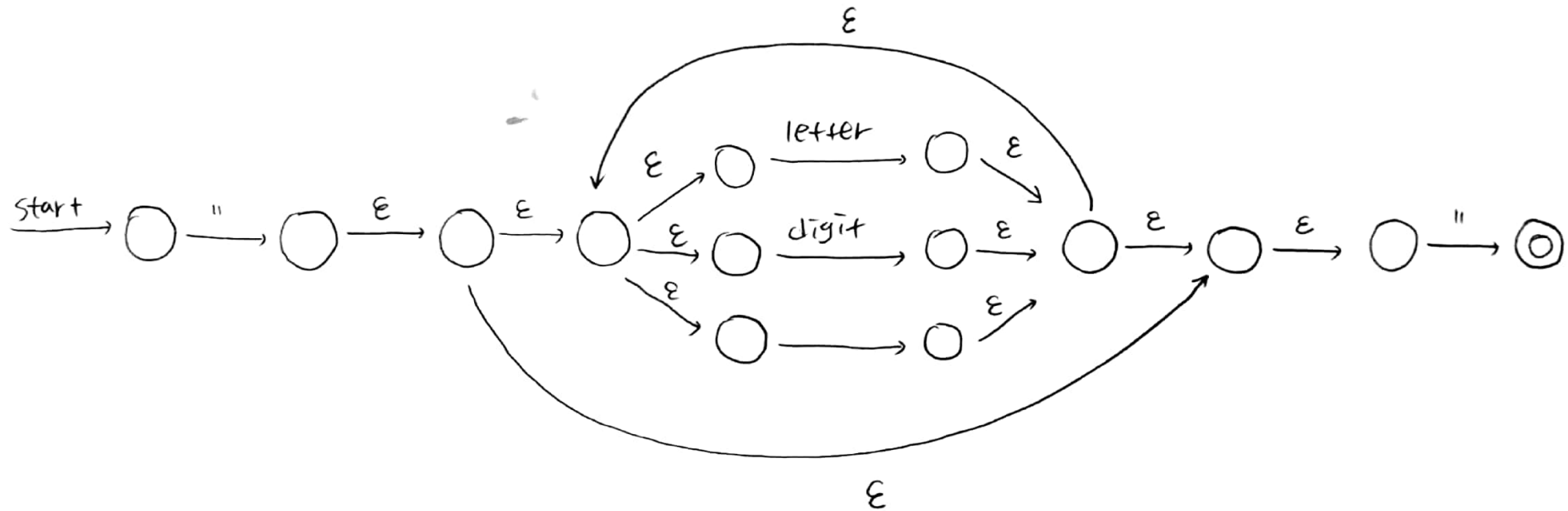
non-zero: 1|2|3|4|5|6|7|8|9



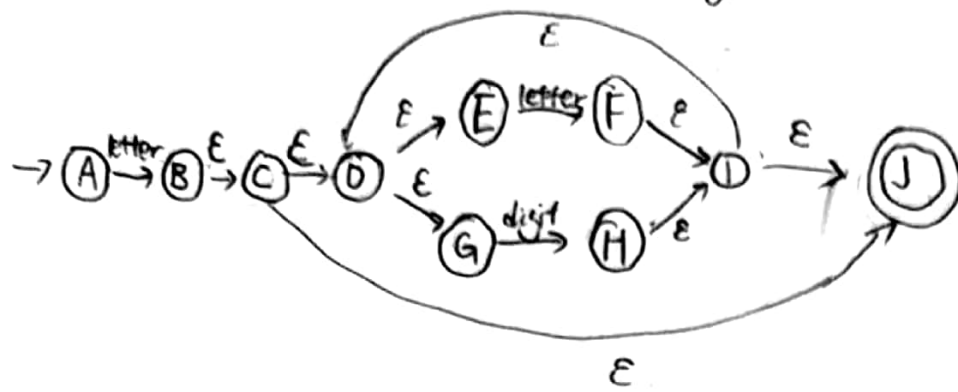
NFA STRING: "(letter|digit)\*"

letter: a|b|c|...|z|A|B|C|...|Z

digit: 0|1|2|3|4|5|6|7|8|9



DFA ID: letter (letter | digit)\*



$$T_0 = \epsilon\text{-closure}(A) = \{A\}$$

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

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

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

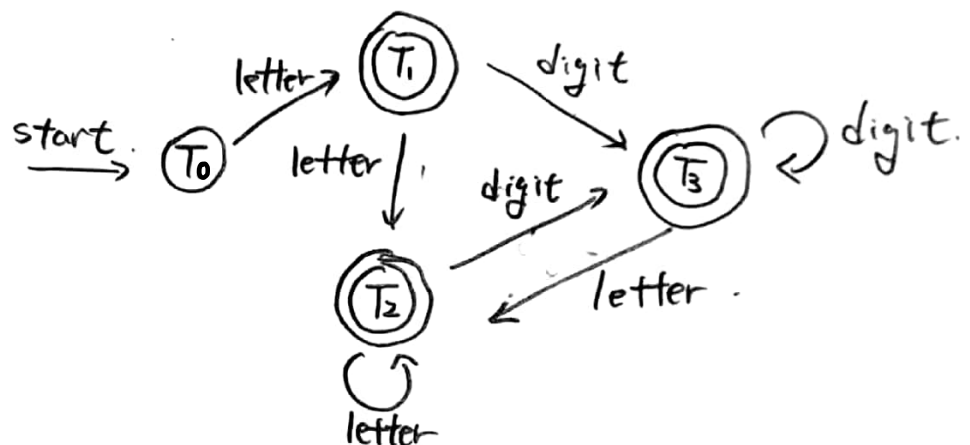
$$\epsilon\text{-closure}(\delta(T_2, \text{letter})) = \{D, E, G, H, I, J\} = T_2$$

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

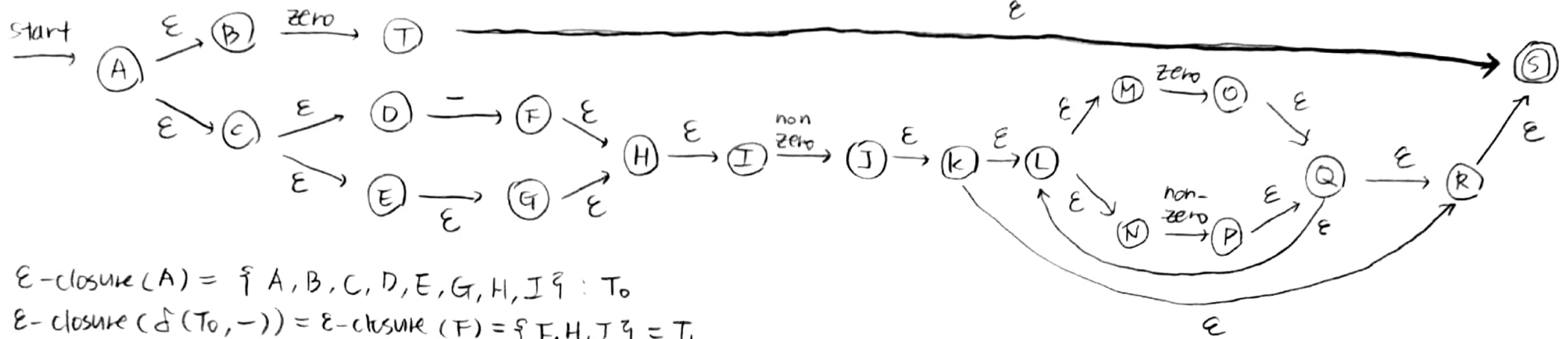
$$\epsilon\text{-closure}(\delta(T_3, \text{letter})) = \{D, E, G, H, I, J\} = T_2$$

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

	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



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

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

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

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

$\epsilon$ -closure( $\delta(T_1, -)$ ) =  $\emptyset$   $\epsilon$ -closure( $\delta(T_1, z)$ ) =  $\emptyset$

$\epsilon$ -closure( $\delta(T_1, nz)$ ) =  $\epsilon$ -closure(J) =  $T_3$

$\epsilon$ -closure( $\delta(T_2, -)$ ) =  $\emptyset$   $\epsilon$ -closure( $\delta(T_2, z)$ ) =  $\emptyset$   $\epsilon$ -closure( $\delta(T_2, nz)$ ) =  $\emptyset$

$\epsilon$ -closure( $\delta(T_3, -)$ ) =  $\emptyset$

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

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

$\epsilon$ -closure( $\delta(T_4, -)$ ) =  $\emptyset$

$\epsilon$ -closure( $\delta(T_4, z)$ ) =  $\epsilon$ -closure(O) =  $T_4$

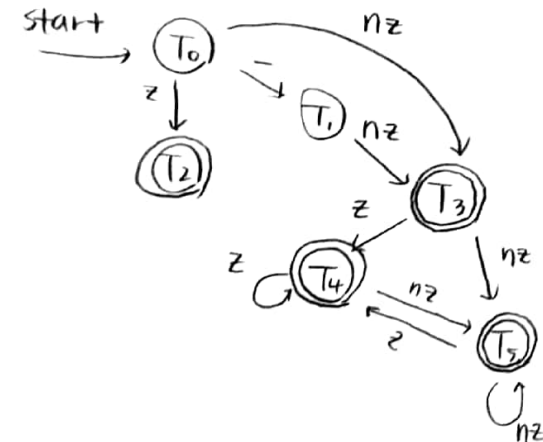
$\epsilon$ -closure( $\delta(T_4, nz)$ ) =  $\epsilon$ -closure(P) =  $T_5$

$\epsilon$ -closure( $\delta(T_5, -)$ ) =  $\emptyset$

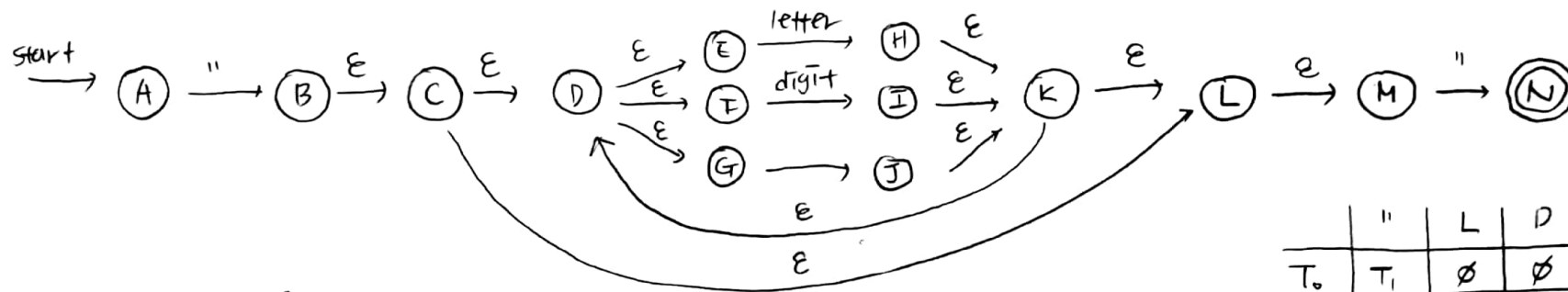
$\epsilon$ -closure( $\delta(T_5, z)$ ) =  $\epsilon$ -closure(O) =  $T_4$

$\epsilon$ -closure( $\delta(T_5, nz)$ ) =  $\epsilon$ -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|digit|)\*" letter  $\rightarrow$  L digit  $\rightarrow$  D



	"	L	D	
$T_0$	$T_1$	$\emptyset$	$\emptyset$	$\emptyset$
$T_1$	$T_2$	$T_3$	$T_4$	$T_5$
$T_2$	$\emptyset$	$\emptyset$	$\emptyset$	$\emptyset$
$T_3$	$T_2$	$T_3$	$T_4$	$T_5$
$T_4$	$T_2$	$T_3$	$T_4$	$T_5$
$T_5$	$T_2$	$T_3$	$T_4$	$T_5$

$$E\text{-closure}(A) = \{A\} : T_0$$

$$E\text{-closure}(\delta(T_0, "(")) = E\text{-closure}(B) = \{B, C, D, E, F, G, L, M\} : T_1$$

$$E\text{-closure}(\delta(T_0, L)) = \emptyset \quad E\text{-closure}(\delta(T_0, D)) = \emptyset \quad E\text{-closure}(\delta(T_0, "|")) = \emptyset$$

$$E\text{-closure}(\delta(T_1, "|")) = E\text{-closure}(N) = \{N\} : T_2$$

$$E\text{-closure}(\delta(T_1, L)) = E\text{-closure}(H) = \{H, K, D, E, F, G, L, M\} : T_3$$

$$E\text{-closure}(\delta(T_1, D)) = E\text{-closure}(I) = \{I, K, D, E, F, G, L, M\} : T_4$$

$$E\text{-closure}(\delta(T_1, "|")) = E\text{-closure}(J) = \{J, K, D, E, F, G, L, M\} : T_5$$

$$E\text{-closure}(\delta(T_2, "(")) = \emptyset \quad E\text{-closure}(\delta(T_3, "(")) = E\text{-closure}(N) : T_2$$

$$E\text{-closure}(\delta(T_2, L)) = \emptyset \quad E\text{-closure}(\delta(T_3, L)) = E\text{-closure}(H) : T_3$$

$$E\text{-closure}(\delta(T_2, D)) = \emptyset \quad E\text{-closure}(\delta(T_3, D)) = E\text{-closure}(I) : T_4$$

$$E\text{-closure}(\delta(T_2, "|")) = \emptyset \quad E\text{-closure}(\delta(T_3, "|")) = E\text{-closure}(J) : T_5$$

$$E\text{-closure}(\delta(T_4, "(")) = E\text{-closure}(N) : T_2$$

$$E\text{-closure}(\delta(T_4, L)) = E\text{-closure}(H) : T_3$$

$$E\text{-closure}(\delta(T_4, D)) = E\text{-closure}(I) : T_4$$

$$E\text{-closure}(\delta(T_4, "|")) = E\text{-closure}(J) : T_5$$

$$E\text{-closure}(\delta(T_5, "(")) = E\text{-closure}(N) : T_2$$

$$E\text{-closure}(\delta(T_5, L)) = E\text{-closure}(H) : T_3$$

$$E\text{-closure}(\delta(T_5, D)) = E\text{-closure}(I) : T_4$$

$$E\text{-closure}(\delta(T_5, "|")) = E\text{-closure}(J) : T_5$$

