

תרגיל בית יבש 1

1.

$CMD \rightarrow \{pop \mid push\}$

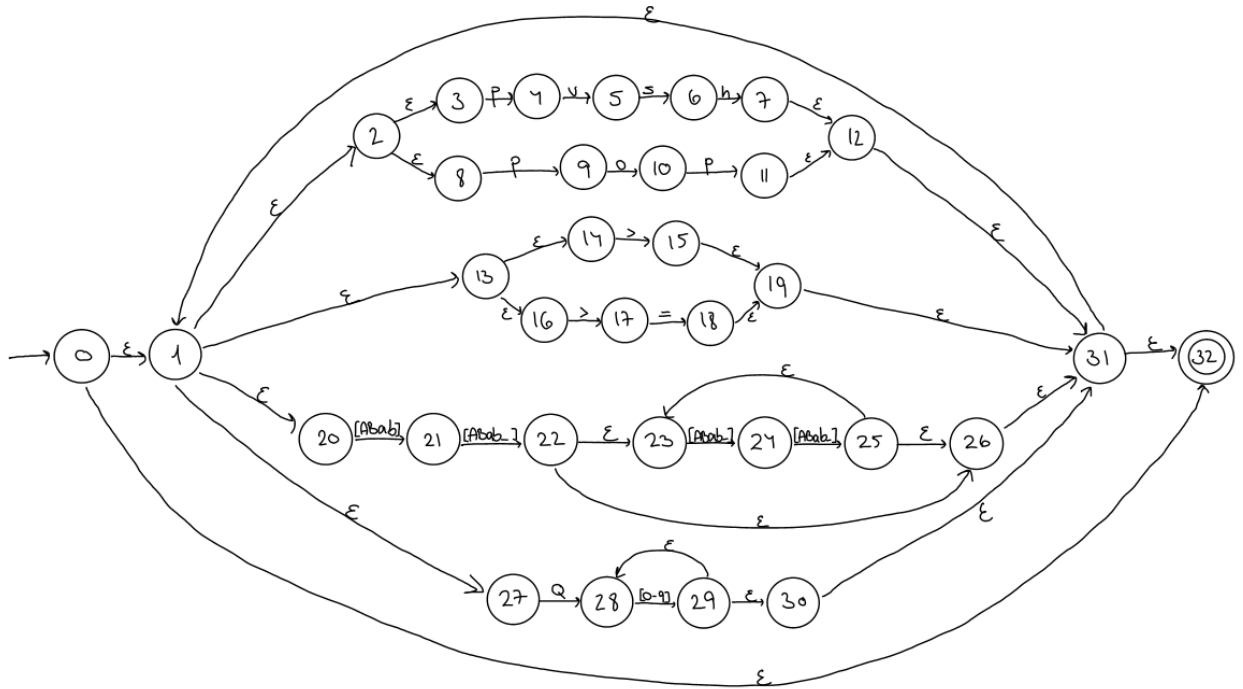
$OP \rightarrow \{> \mid >=\}$

$ID \rightarrow \{[A \mid B \mid a \mid b][A \mid B \mid a \mid b \mid _]([A \mid B \mid a \mid b \mid _][A \mid B \mid a \mid b \mid _])^*\}$

$QNUM \rightarrow \{Q[0-9]^+\}$

$L \rightarrow \{(CMD \mid OP \mid ID \mid QNUM)^*\}$

2.



3.

$$D = \{\bar{0}\}$$

$$A := \varepsilon\text{-closure}(0) = \{0, 1, 2, 3, 8, 13, 14, 16, 20, 27, 32\}$$

$$D = \{\bar{0}, \bar{A}\}$$

$$B := \varepsilon\text{-closure}(\text{move}(A, p)) = \varepsilon\text{-closure}(\{4, 9\}) = \{4, 9\}$$

$$D = \{\bar{0}, \bar{A}, B\}$$

$$C := \varepsilon\text{-closure}(\text{move}(A, >)) = \varepsilon\text{-closure}(\{15, 17\}) = \{1, 2, 3, 8, 13, 14, 15, 16, 17, 19, 20, 27, 31, 32\}$$

$$D = \{\bar{0}, \bar{A}, B, C\}$$

$$E := \varepsilon\text{-closure}(\text{move}(A, [ABab])) = \varepsilon\text{-closure}(\{21\}) = \{21\}$$

$$D = \{\bar{0}, \bar{A}, B, C, E\}$$

$$F := \varepsilon - \text{closure}(\text{move}(A, Q)) = \varepsilon - \text{closure}(\{28\}) = \{28\}$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, C, E, F\}$$

$$G := \varepsilon - \text{closure}(\text{move}(B, u)) = \varepsilon - \text{closure}(\{5\}) = \{5\}$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, C, E, F, G\}$$

$$H := \varepsilon - \text{closure}(\text{move}(B, o)) = \varepsilon - \text{closure}(\{10\}) = \{10\}$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, E, F, G, H\}$$

$$\varepsilon - \text{closure}(\text{move}(C, p)) = \varepsilon - \text{closure}(\{4, 9\}) = \{4, 9\} = B$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, E, F, G, H\}$$

$$\varepsilon - \text{closure}(\text{move}(C, >)) = \varepsilon - \text{closure}(\{15, 17\}) = \{1, 2, 3, 8, 13, 14, 15, 16, 17, 19, 20, 27, 31, 32\} = C$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, E, F, G, H\}$$

$$\varepsilon - \text{closure}(\text{move}(C, [ABab])) = \varepsilon - \text{closure}(\{21\}) = \{21\} = E$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, E, F, G, H\}$$

$$\varepsilon - \text{closure}(\text{move}(C, Q)) = \varepsilon - \text{closure}(\{28\}) = \{28\} = F$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, E, F, G, H\}$$

$$I := \varepsilon - \text{closure}(\text{move}(C, =)) = \varepsilon - \text{closure}(\{18\}) = \{1, 2, 3, 8, 13, 14, 16, 18, 19, 20, 27, 31, 32\}$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, F, G, H, I\}$$

$$J := \varepsilon - \text{closure}(\text{move}(E, [ABab_])) = \varepsilon - \text{closure}(\{22\}) = \{1, 2, 3, 8, 13, 14, 16, 20, 22, 23, 26, 27, 31, 32\}$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, G, H, I, J\}$$

$$K := \varepsilon - \text{closure}(\text{move}(F, [0-9])) = \varepsilon - \text{closure}(\{29\}) = \{1, 2, 3, 8, 13, 14, 16, 20, 27, 28, 29, 30, 31, 32\}$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, H, I, J, K\}$$

$$L := \varepsilon - \text{closure}(\text{move}(G, s)) = \varepsilon - \text{closure}(\{6\}) = \{6\}$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, J, K, L\}$$

$$M := \varepsilon - \text{closure}(\text{move}(H, p)) = \varepsilon - \text{closure}(\{11\}) = \{1, 2, 3, 8, 11, 12, 13, 14, 16, 20, 27, 31, 32\}$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, J, K, L\}$$

$$\varepsilon - \text{closure}(\text{move}(I, p)) = \varepsilon - \text{closure}(\{4, 9\}) = \{4, 9\} = B$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, J, K, L\}$$

$$\varepsilon - \text{closure}(\text{move}(I, >)) = \varepsilon - \text{closure}(\{15, 17\}) = \{1, 2, 3, 8, 13, 14, 15, 16, 17, 19, 20, 27, 31, 32\} = C$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, J, K, L\}$$

$$\varepsilon - \text{closure}(\text{move}(I, [ABab])) = \varepsilon - \text{closure}(\{21\}) = \{21\} = E$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, J, K, L\}$$

$$\varepsilon - \text{closure}(\text{move}(I, Q)) = \varepsilon - \text{closure}(\{28\}) = \{28\} = F$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, J, K, L, M\}$$

$$\varepsilon - \text{closure}(\text{move}(J, p)) = \varepsilon - \text{closure}(\{4, 9\}) = \{4, 9\} = B$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, K, L, M\}$$

$$\varepsilon - \text{closure}(\text{move}(J, >)) = \varepsilon - \text{closure}(\{15, 17\}) = \{1, 2, 3, 8, 13, 14, 15, 16, 17, 19, 20, 27, 31, 32\} = C$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, K, L, M\}$$

$$\varepsilon - \text{closure}(\text{move}(J, [ABab])) = \varepsilon - \text{closure}(\{21\}) = \{21\} = E$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, K, L, M\}$$

$$N := \varepsilon - \text{closure}(\text{move}(J, [ABab_])) = \varepsilon - \text{closure}(\{24\}) = \{24\}$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, K, L, M, N\}$$

$$\varepsilon - \text{closure}(\text{move}(J, Q)) = \varepsilon - \text{closure}(\{28\}) = \{28\} = F$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, L, M, N\}$$

$$\varepsilon - \text{closure}(\text{move}(K, p)) = \varepsilon - \text{closure}(\{4, 9\}) = \{4, 9\} = B$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, L, M, N\}$$

$$\varepsilon - \text{closure}(\text{move}(K, >)) = \varepsilon - \text{closure}(\{15, 17\}) = \{1, 2, 3, 8, 13, 14, 15, 16, 17, 19, 20, 27, 31, 32\} = C$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, L, M, N\}$$

$$\varepsilon - \text{closure}(\text{move}(K, [ABab])) = \varepsilon - \text{closure}(\{21\}) = \{21\} = E$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, L, M, N\}$$

$$\varepsilon - \text{closure}(\text{move}(K, Q)) = \varepsilon - \text{closure}(\{28\}) = \{28\} = F$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, L, M, N\}$$

$$\varepsilon - \text{closure}(\text{move}(K, [0-9])) = \varepsilon - \text{closure}(\{29\}) = \{1, 2, 3, 8, 13, 14, 16, 20, 27, 28, 29, 30, 31, 32\} = K$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, \bar{L}, M, N\}$$

$$O := \varepsilon - \text{closure}(\text{move}(L, h)) = \varepsilon - \text{closure}(\{7\}) = \{1, 2, 3, 7, 8, 12, 13, 14, 16, 20, 27, 31, 32\}$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, \bar{L}, \bar{M}, N, O\}$$

$$\varepsilon - \text{closure}(\text{move}(M, p)) = \varepsilon - \text{closure}(\{4, 9\}) = \{4, 9\} = B$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, \bar{L}, \bar{M}, N, O\}$$

$$\varepsilon - \text{closure}(\text{move}(M, >)) = \varepsilon - \text{closure}(\{15, 17\}) = \{1, 2, 3, 8, 13, 14, 15, 16, 17, 19, 20, 27, 31, 32\} = C$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, \bar{L}, \bar{M}, N, O\}$$

$$\varepsilon - \text{closure}(\text{move}(M, [ABab])) = \varepsilon - \text{closure}(\{21\}) = \{21\} = E$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, \bar{L}, \bar{M}, N, O\}$$

$$\varepsilon - \text{closure}(\text{move}(M, Q)) = \varepsilon - \text{closure}(\{28\}) = \{28\} = F$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, \bar{L}, \bar{M}, \bar{N}, O\}$$

$$P := \varepsilon - \text{closure}(\text{move}(N, [ABab_])) = \varepsilon - \text{closure}(\{25\}) = \{1, 2, 3, 8, 13, 14, 16, 20, 23, 25, 26, 27, 31, 32\}$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, \bar{L}, \bar{M}, \bar{N}, \bar{O}, P\}$$

$$\varepsilon - \text{closure}(\text{move}(O, p)) = \varepsilon - \text{closure}(\{4, 9\}) = \{4, 9\} = B$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, \bar{L}, \bar{M}, \bar{N}, \bar{O}, P\}$$

$$\varepsilon - \text{closure}(\text{move}(O, >)) = \varepsilon - \text{closure}(\{15, 17\}) = \{1, 2, 3, 8, 13, 14, 15, 16, 17, 19, 20, 27, 31, 32\} = C$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, \bar{L}, \bar{M}, \bar{N}, \bar{O}, P\}$$

$$\varepsilon - \text{closure}(\text{move}(O, [ABab])) = \varepsilon - \text{closure}(\{21\}) = \{21\} = E$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, \bar{L}, \bar{M}, \bar{N}, \bar{O}, P\}$$

$$\varepsilon - \text{closure}(\text{move}(O, Q)) = \varepsilon - \text{closure}(\{28\}) = \{28\} = F$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, \bar{L}, \bar{M}, \bar{N}, \bar{O}, \bar{P}\}$$

$$\varepsilon - \text{closure}(\text{move}(P, p)) = \varepsilon - \text{closure}(\{4, 9\}) = \{4, 9\} = B$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, \bar{L}, \bar{M}, \bar{N}, \bar{O}, \bar{P}\}$$

$$\varepsilon - \text{closure}(\text{move}(P, >)) = \varepsilon - \text{closure}(\{15, 17\}) = \{1, 2, 3, 8, 13, 14, 15, 16, 17, 19, 20, 27, 31, 32\} = C$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, \bar{L}, \bar{M}, \bar{N}, \bar{O}, \bar{P}\}$$

$$\varepsilon - \text{closure}(\text{move}(P, [ABab])) = \varepsilon - \text{closure}(\{21\}) = \{21\} = E$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, \bar{L}, \bar{M}, \bar{N}, \bar{O}, \bar{P}\}$$

$$\varepsilon - \text{closure}(\text{move}(P, [ABab_])) = \varepsilon - \text{closure}(\{24\}) = \{24\} = N$$

$$D = \{\bar{0}, \bar{A}, \bar{B}, \bar{C}, \bar{E}, \bar{F}, \bar{G}, \bar{H}, \bar{I}, \bar{J}, \bar{K}, \bar{L}, \bar{M}, \bar{N}, \bar{O}, \bar{P}\}$$

$$\varepsilon - \text{closure}(\text{move}(P, Q)) = \varepsilon - \text{closure}(\{28\}) = \{28\} = F$$

State	Input Symbol										
	p	u	s	h	o	>	=	ABab	ABab_	Q	0-9
A(q ₀)	B					C		E		F	
B		G			H						
C(F)	B					C	I	E		F	
E									J		
F											K
G			L								
H	M										
I(F)	B					C		E		F	
J(F)	B					C		E	N	F	
K(F)	B					C		E		F	K
L				O							
M(F)	B					C		E		F	
N									P		
O(F)	B					C		E		F	
P(F)	B					C		E	N	F	

$A := \{0,1,2,3,8,13,14,16,20,27,32\}$

$B := \{4,9\}$

$C := \{1,2,3,8,13,14,15,16,17,19,20,27,31,32\}$

$E := \{21\}$

$F := \{28\}$

$G := \{5\}$

$H := \{10\}$

$I := \{1,2,3,8,13,14,16,18,19,20,27,31,32\}$

$J := \{1,2,3,8,13,14,16,20,22,23,26,27,31,32\}$

$K := \{1,2,3,8,13,14,16,20,27,28,29,30,31,32\}$

$L := \{6\}$

$M := \{1,2,3,8,11,12,13,14,16,20,27,31,32\}$

$N := \{24\}$

$O := \{1,2,3,7,8,12,13,14,16,20,27,31,32\}$

$P := \{1,2,3,8,13,14,16,20,23,25,26,27,31,32\}$