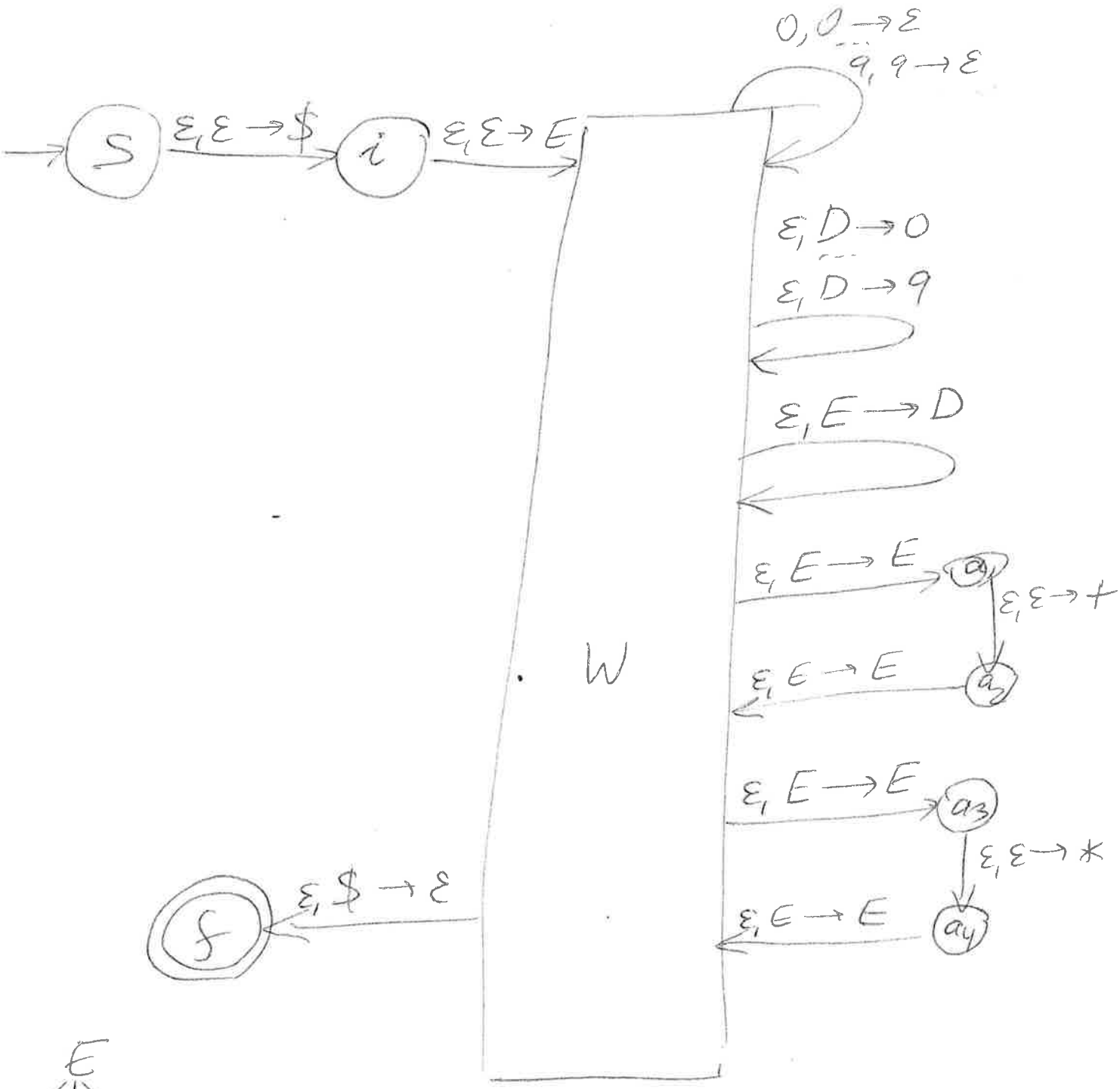
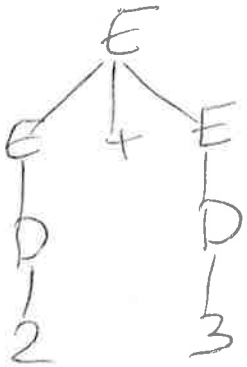
HW 9, FALL 2023, P-1

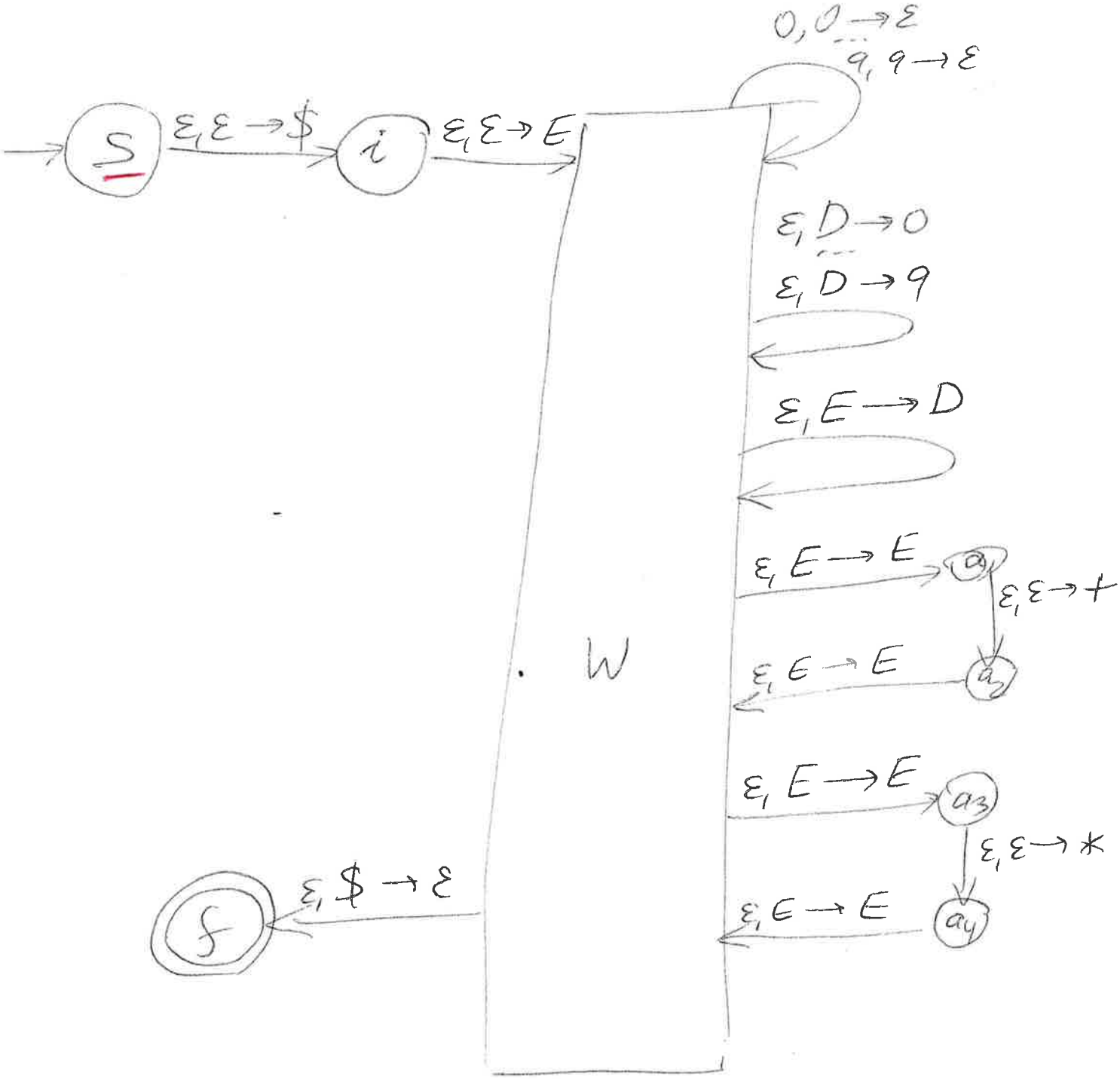




$\underline{E} \rightarrow \underline{E}+E \rightarrow \underline{D}+E \rightarrow$

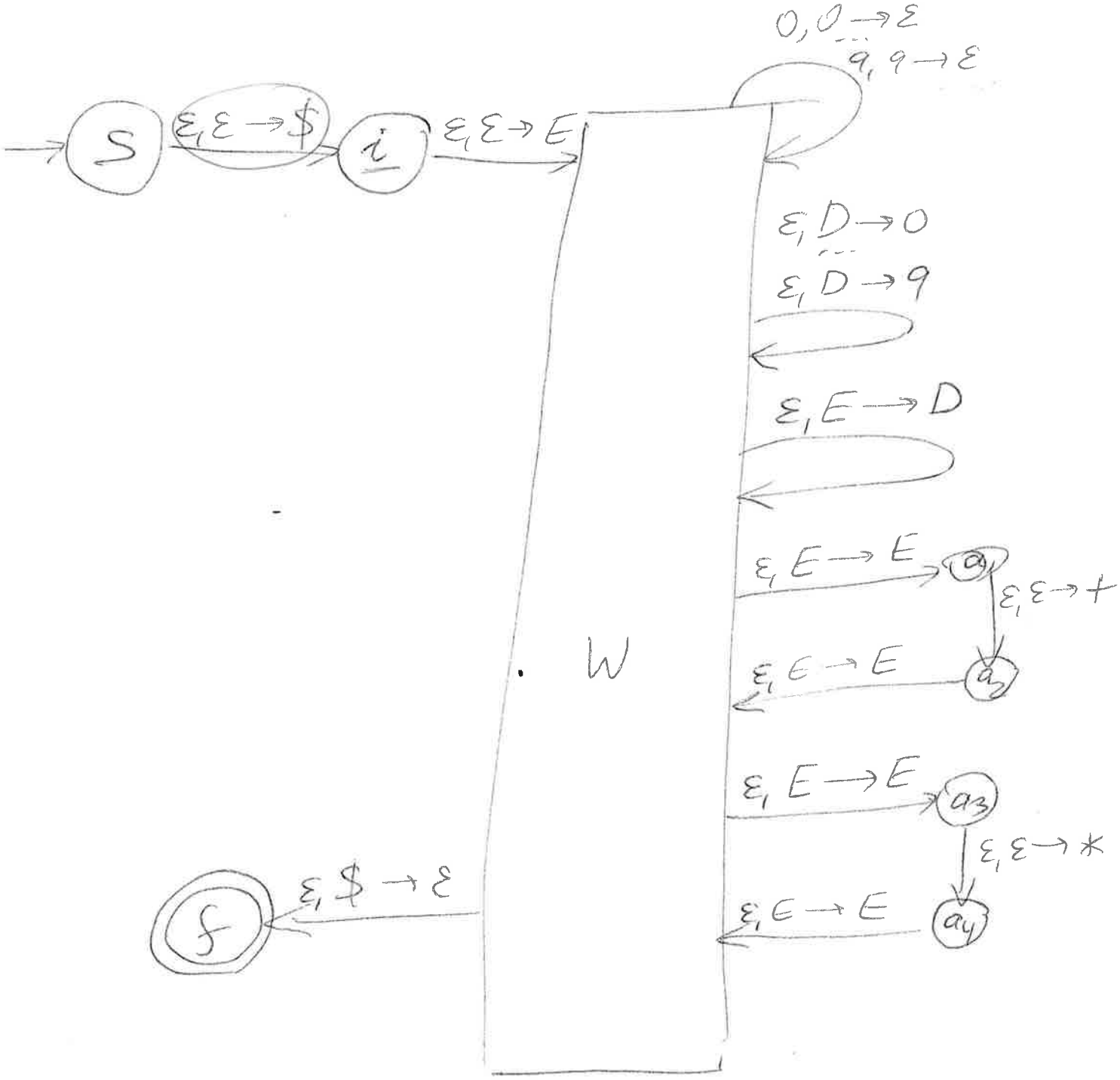
$2+\underline{E} \rightarrow 2+\underline{D} \rightarrow 2+3$

HW 9, FALL 2023, P2



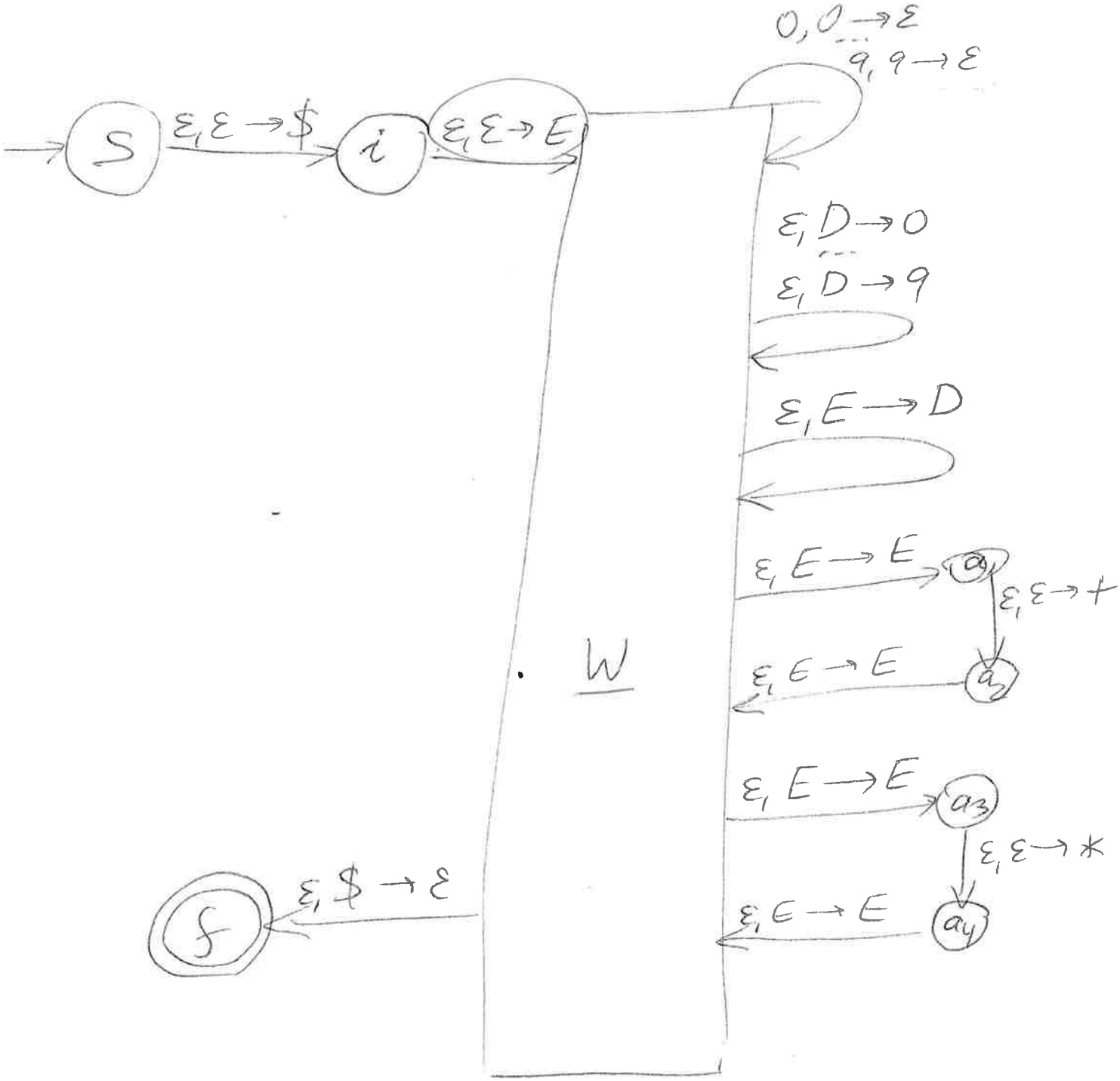
We start in the start state S

HW 9, FALL 2023, P.3



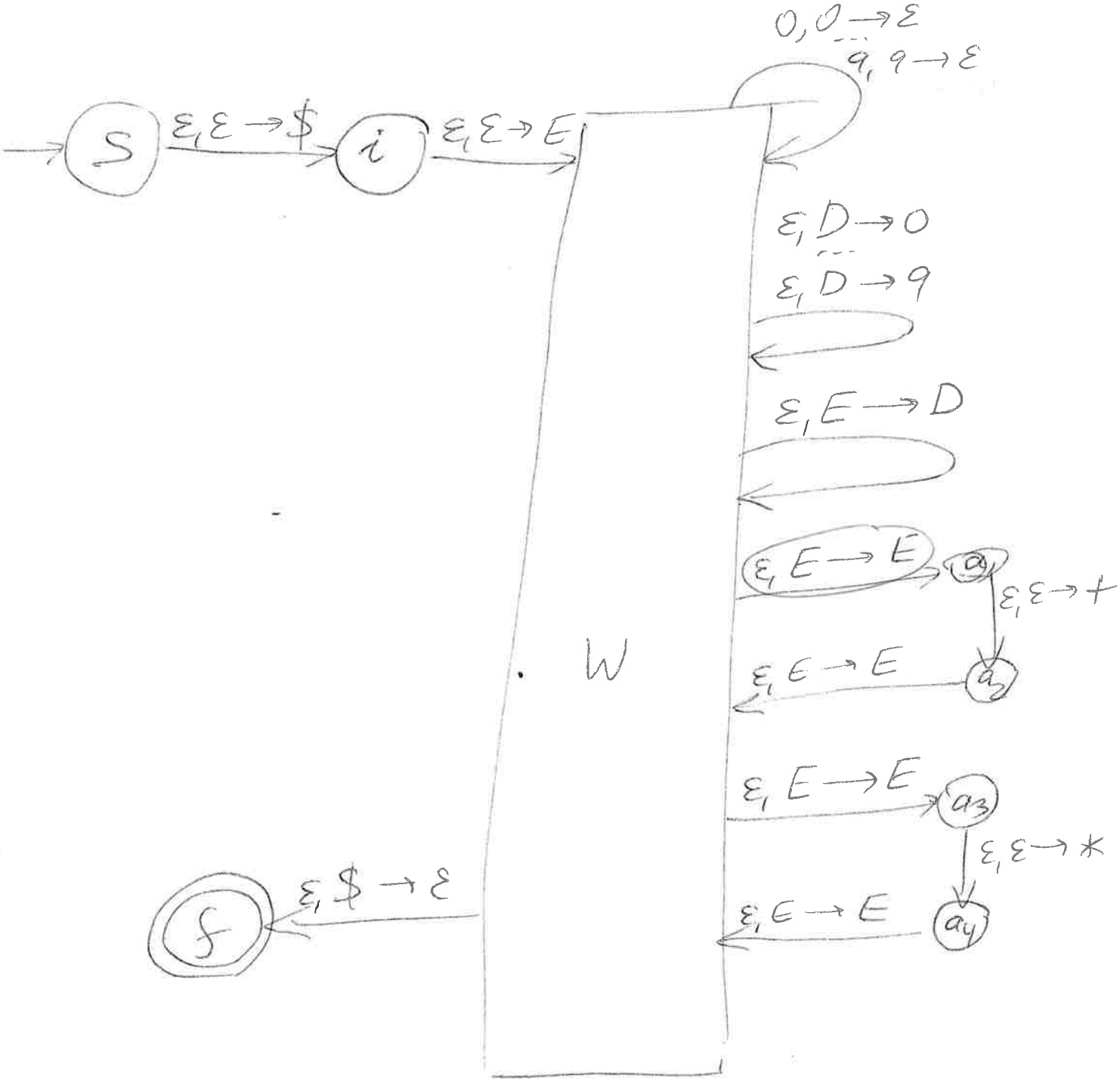
We don't have a choice: to get to f, we push \$ and go to state E

Stack ⌈\$⌋

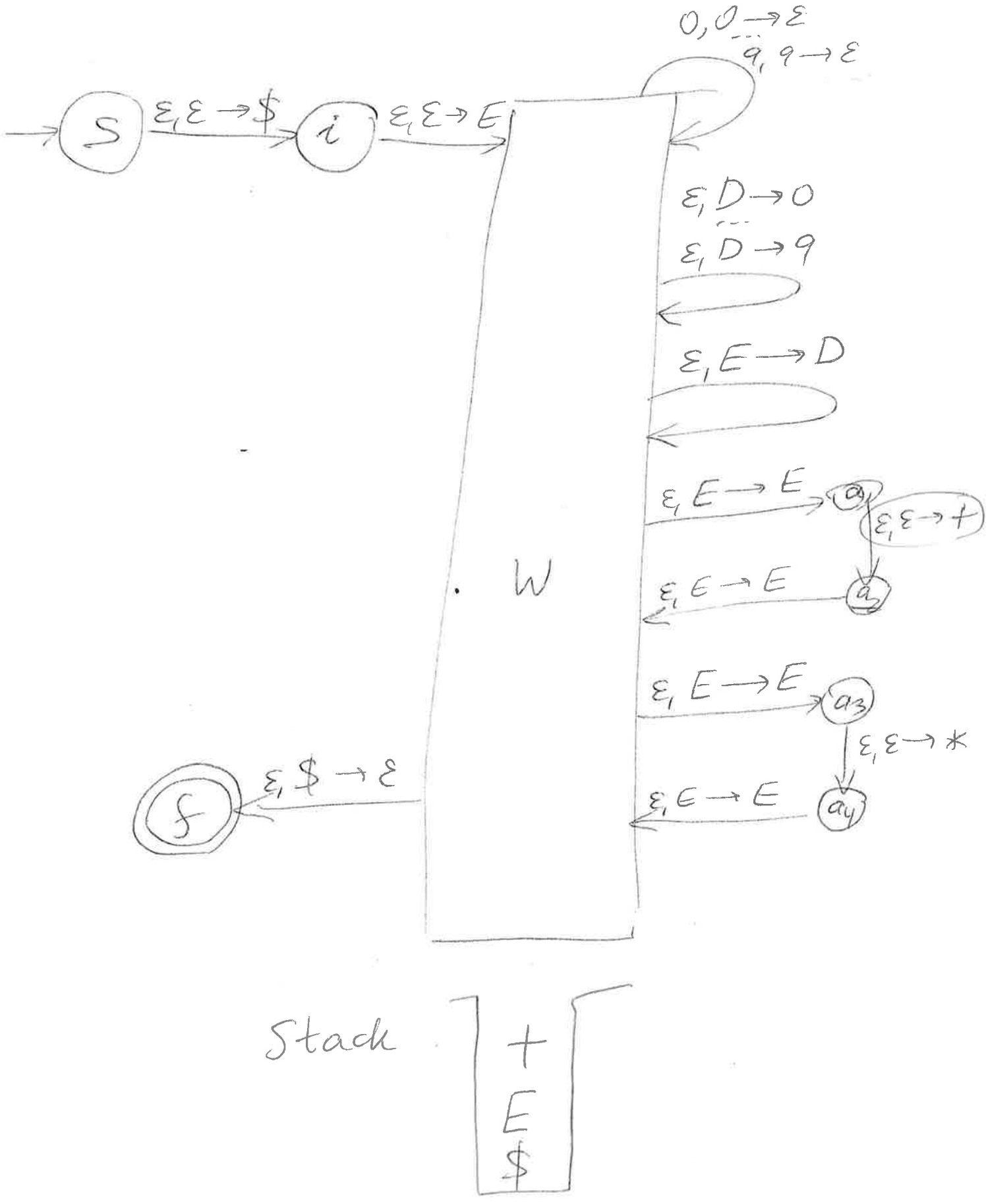


Again, no choice: we push E

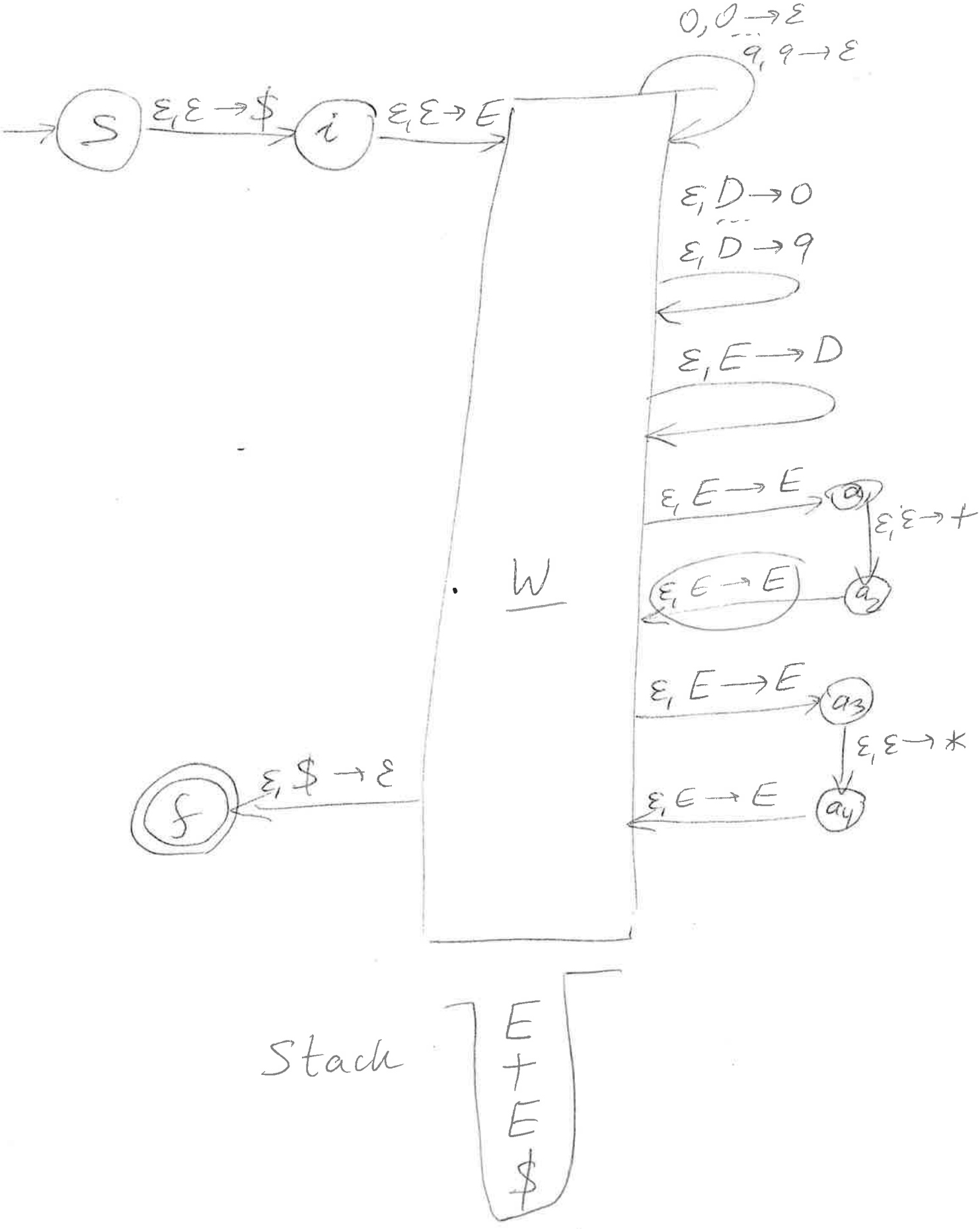
Stack $\begin{bmatrix} E \\ \$ \end{bmatrix}$



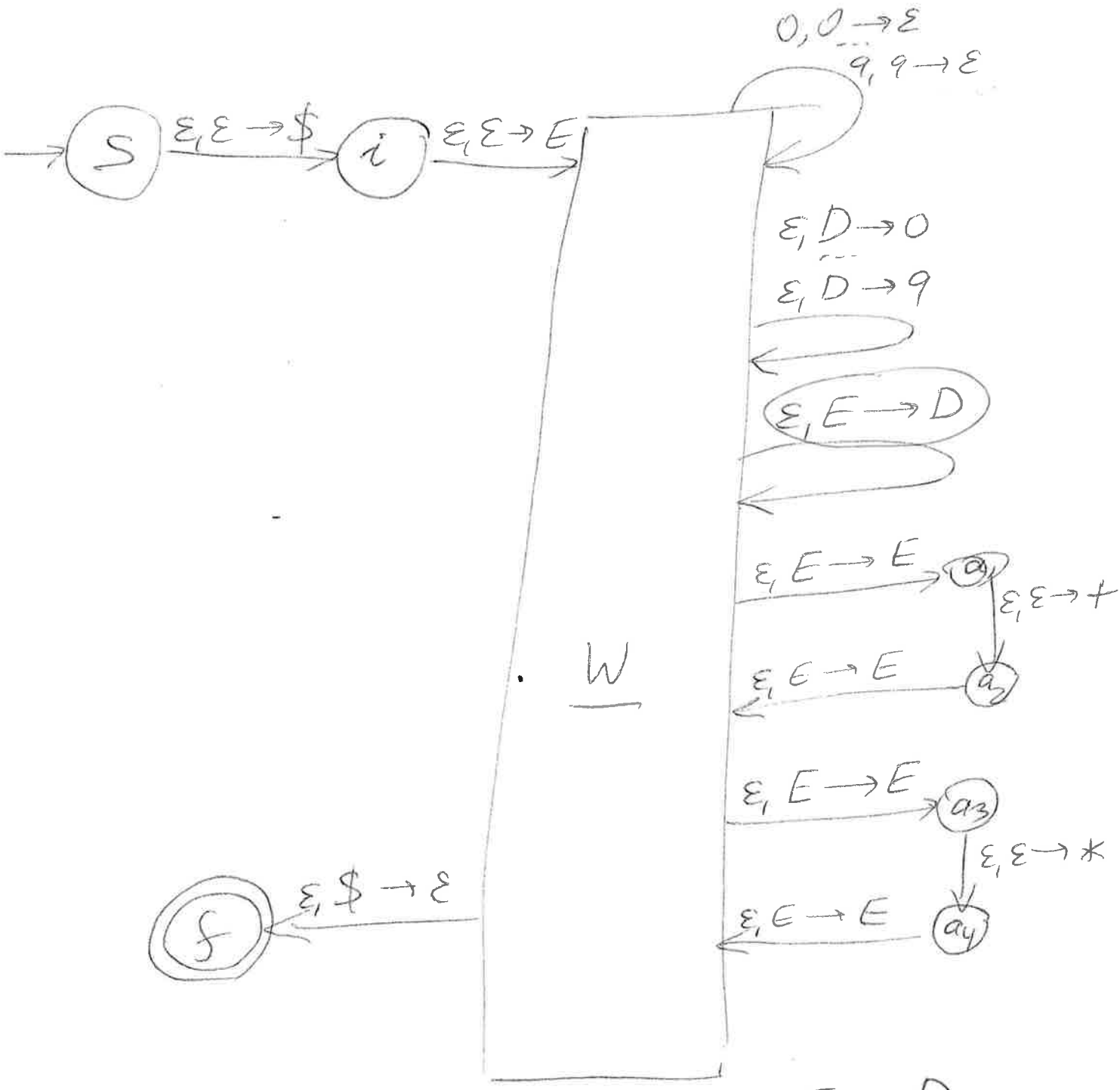
The first rule we used was $E \to E+E$, so we pop E, push E, +, and E again


0, 0 → ε
9, 9 → ε
S
ε, ε → $
i
ε, ε → E
ε, D → 0
ε, D → 9
ε, E → D
ε, E → E
a1
ε, ε → +
a2
ε, E → E
ε, E → E
a3
ε, ε → *
a4
ε, E → E
W
ε, $ → ε
f
Stack
+
E
$

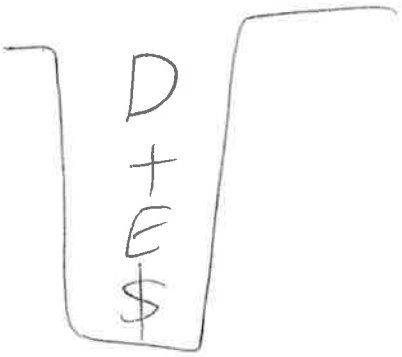
HW 9, FALL 2023, p. 7

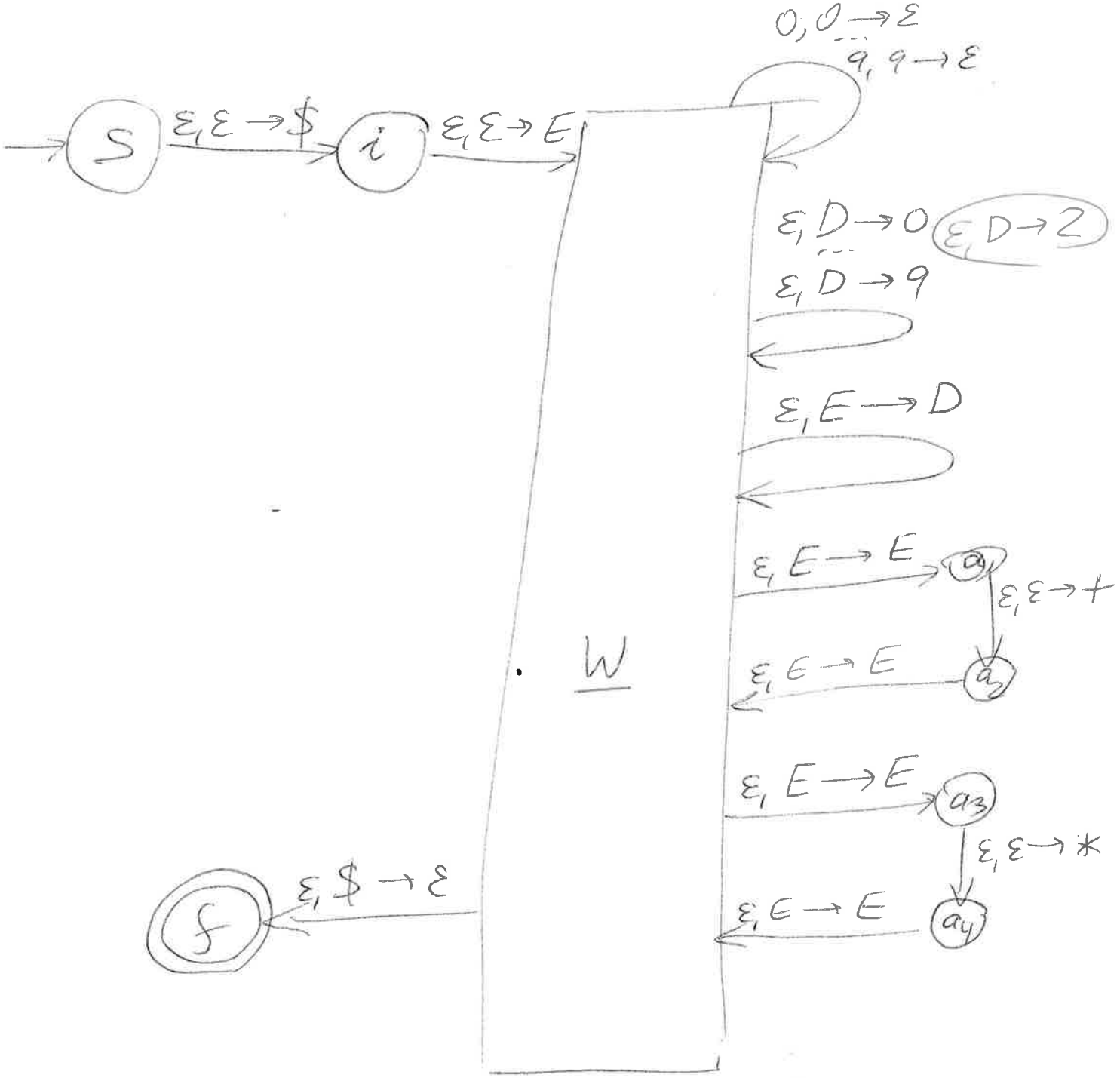


HW 9, FALL 2023, P-8

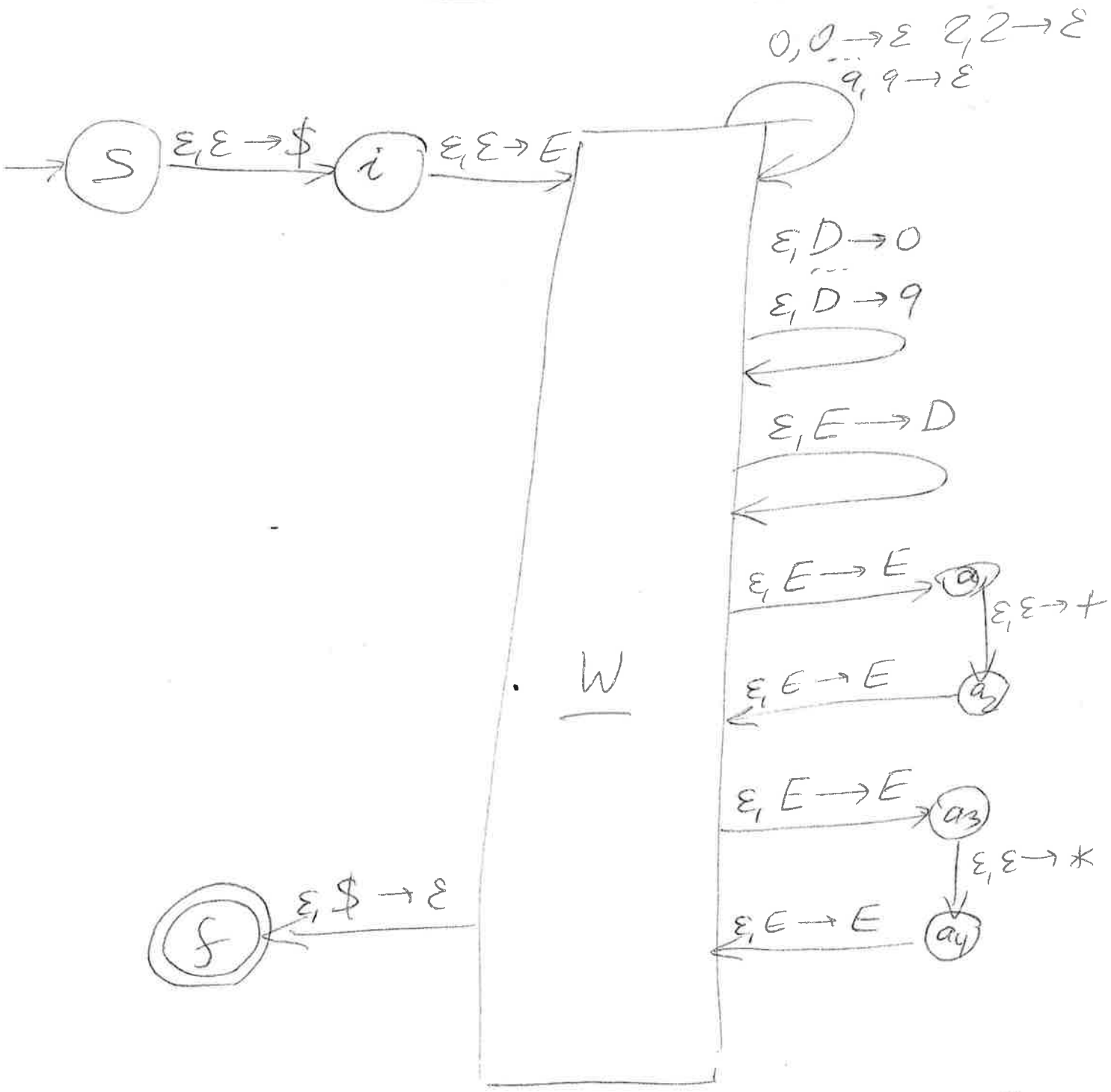


Now we use rule $E \to D$



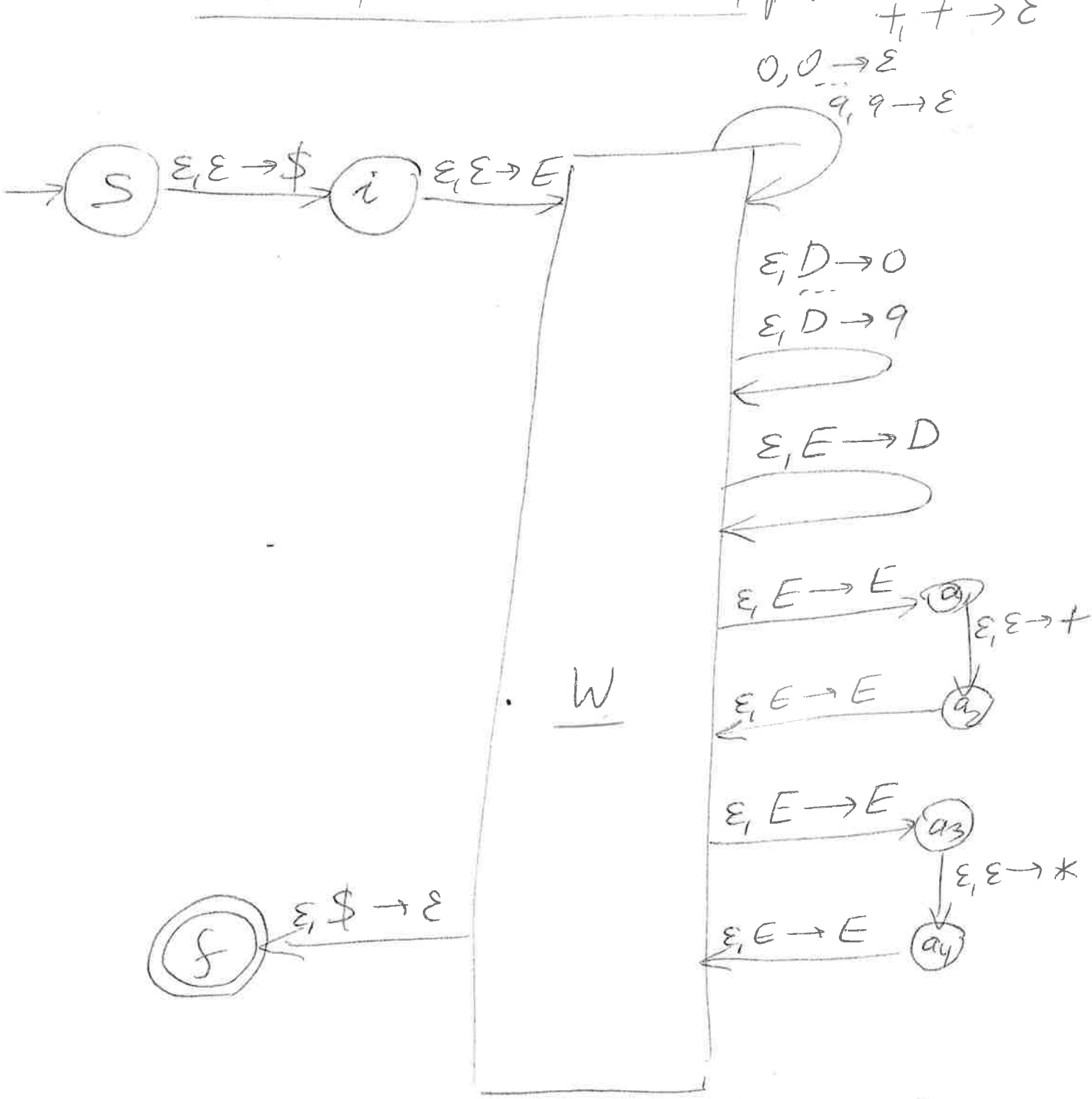


Next rule is $D \to 2$



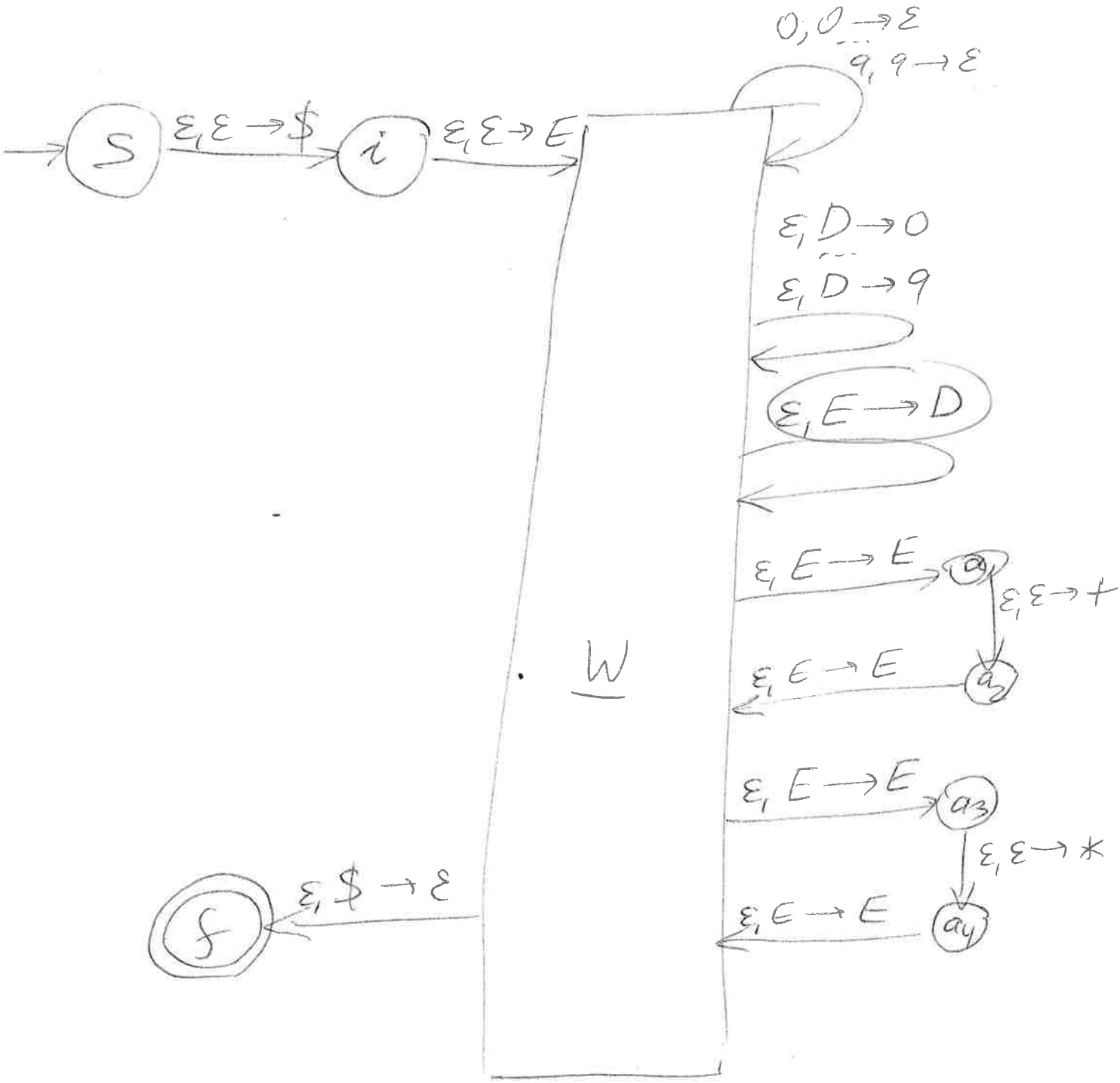
Terminal symbol is on top of stack, the only way to delete it is to use the rule $2, 2 \to \varepsilon$

HW 9, FALL 2023, p.11



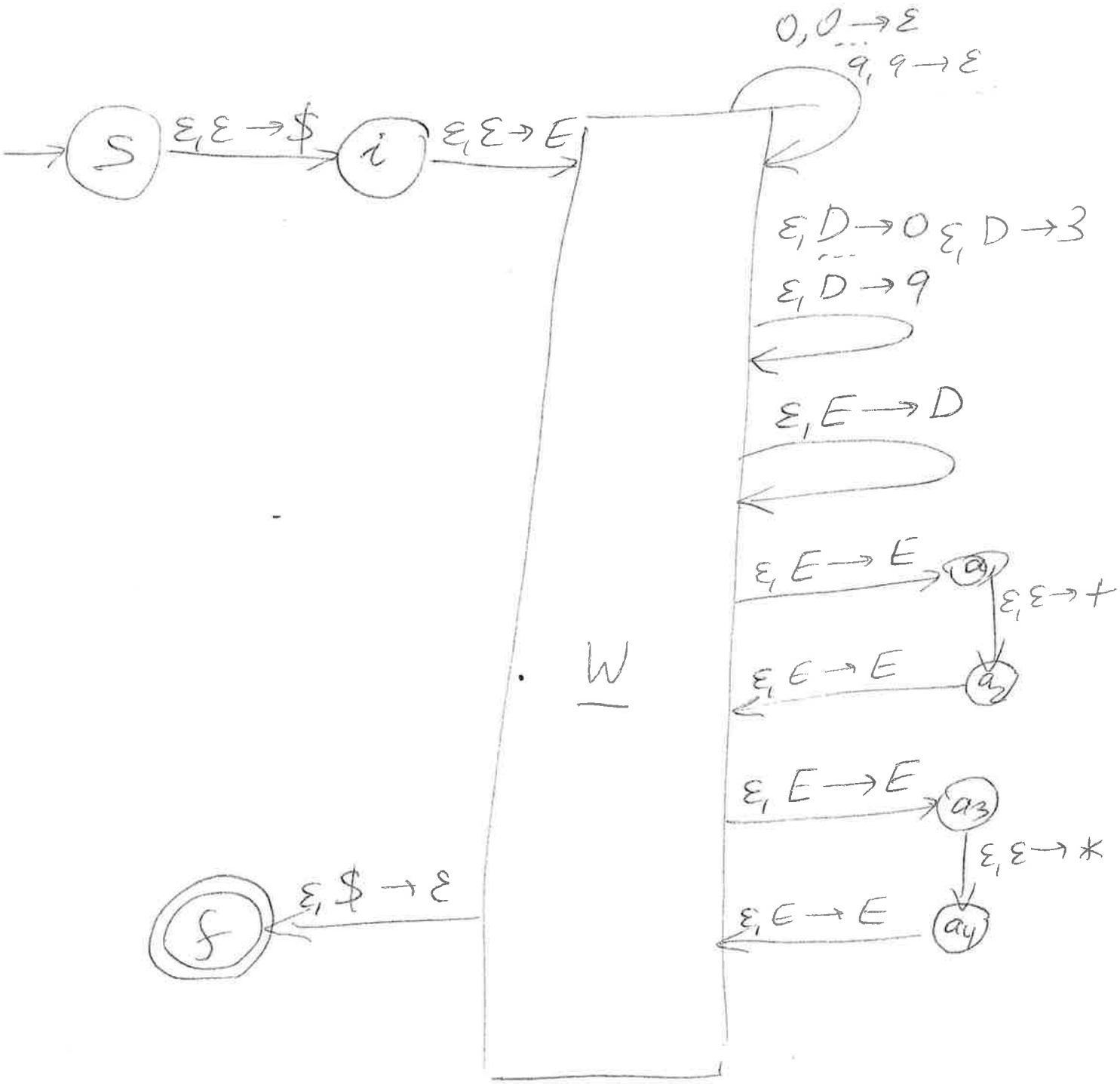
Similarly, terminal symbol on top, so we use rule +, + → ε

HW 9, FALL 2023, p12

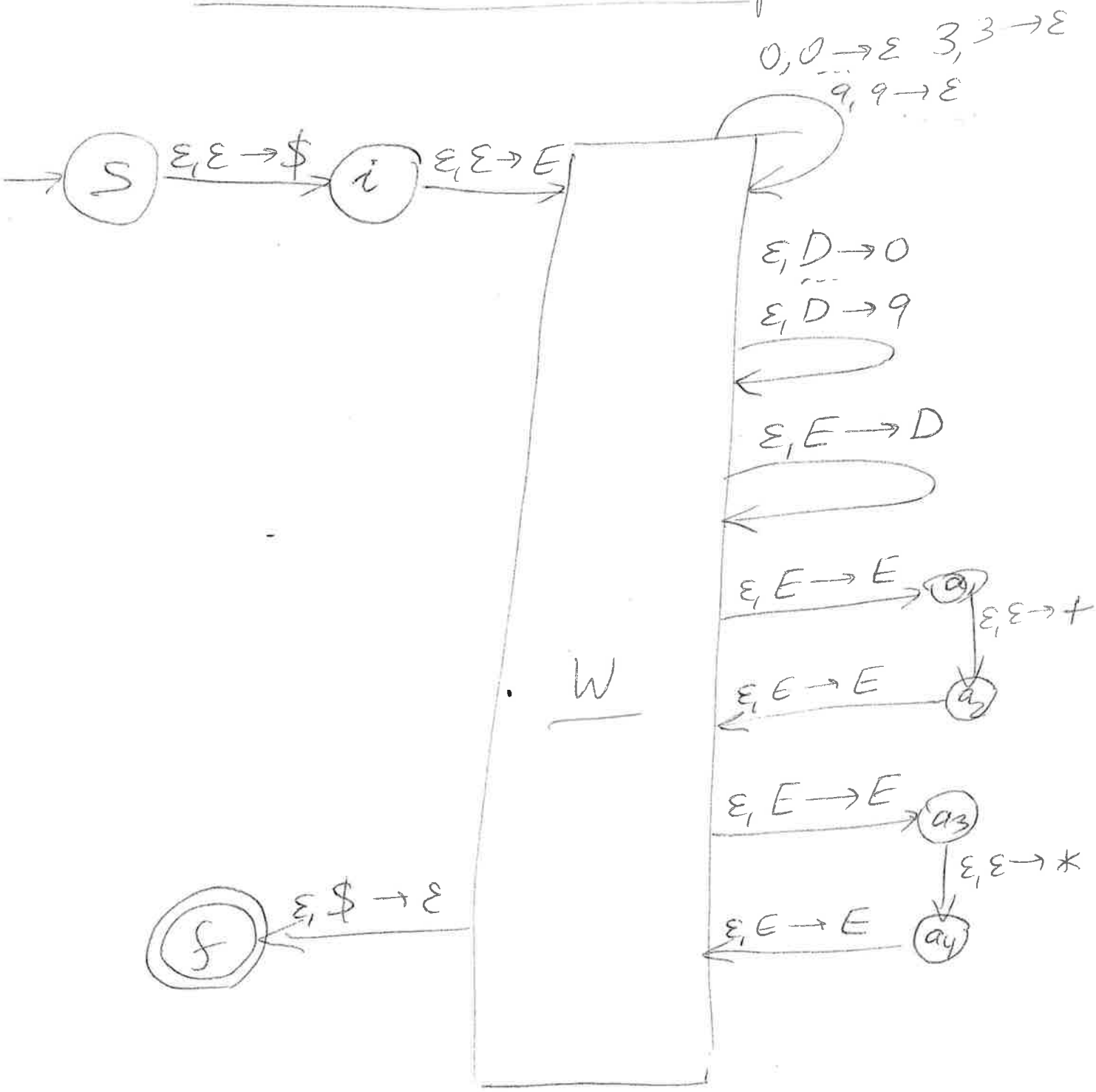


Next rule $E \to D$

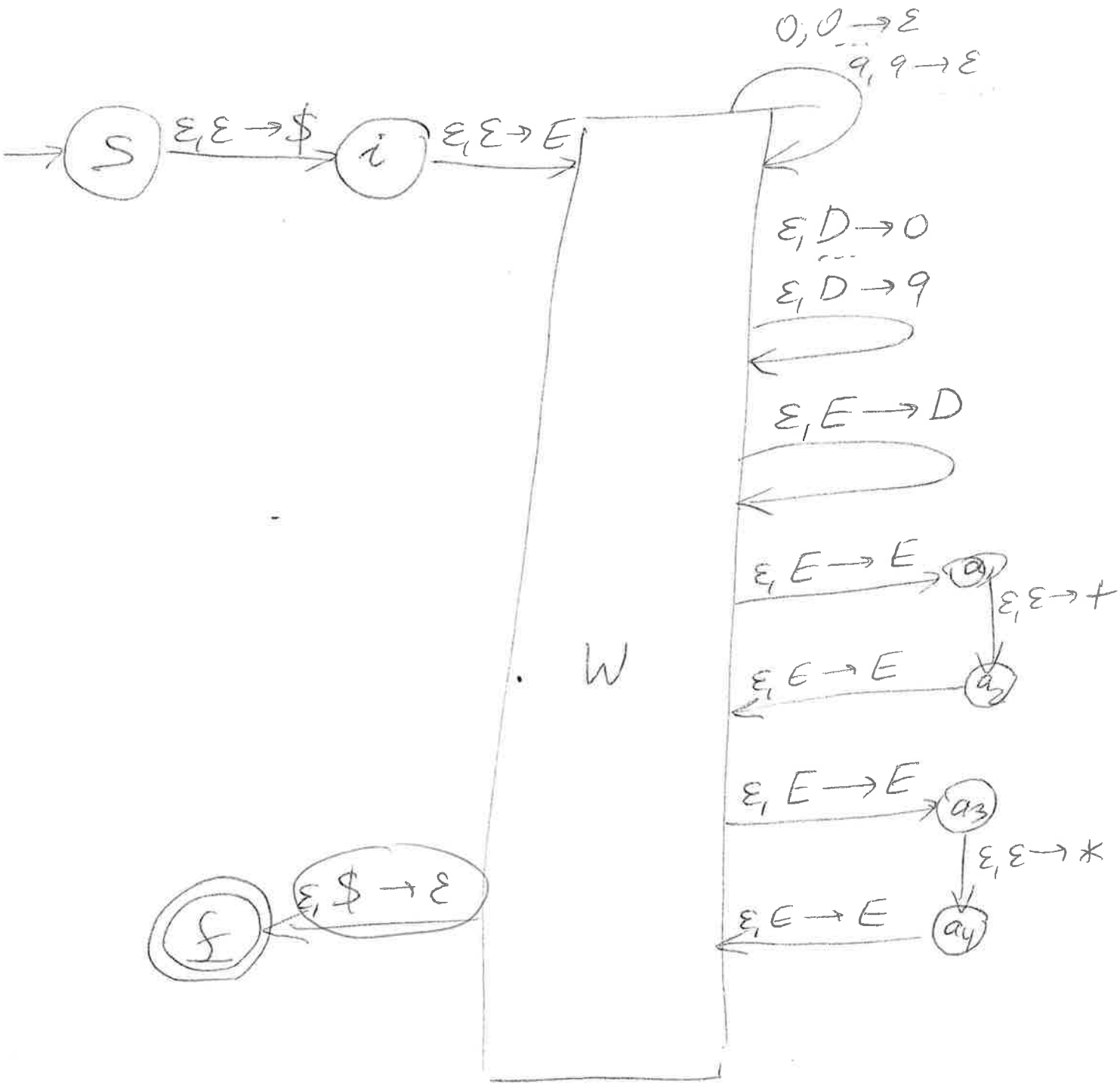
HW 9, FALL 2023, p.13



Now, D → 3



3 is terminal symbol on top of the stack, so $3, 3 \to \varepsilon$



We finished reading all symbols, so we go to f
We are in f with the empty stack, so the word is accepted

HW 9, FALL 2023, p.16

Graphical description of all transitions

read state	s	c	w	a_1	a_2	w	w	w	2	+	w	w	3	w	$
state		$	E	E	+	E	D	2	+	E	D	3	$		
			$	$	E	+	+	+	E	$	$	$			
					$	E	E	E	$						
						$	$	$							