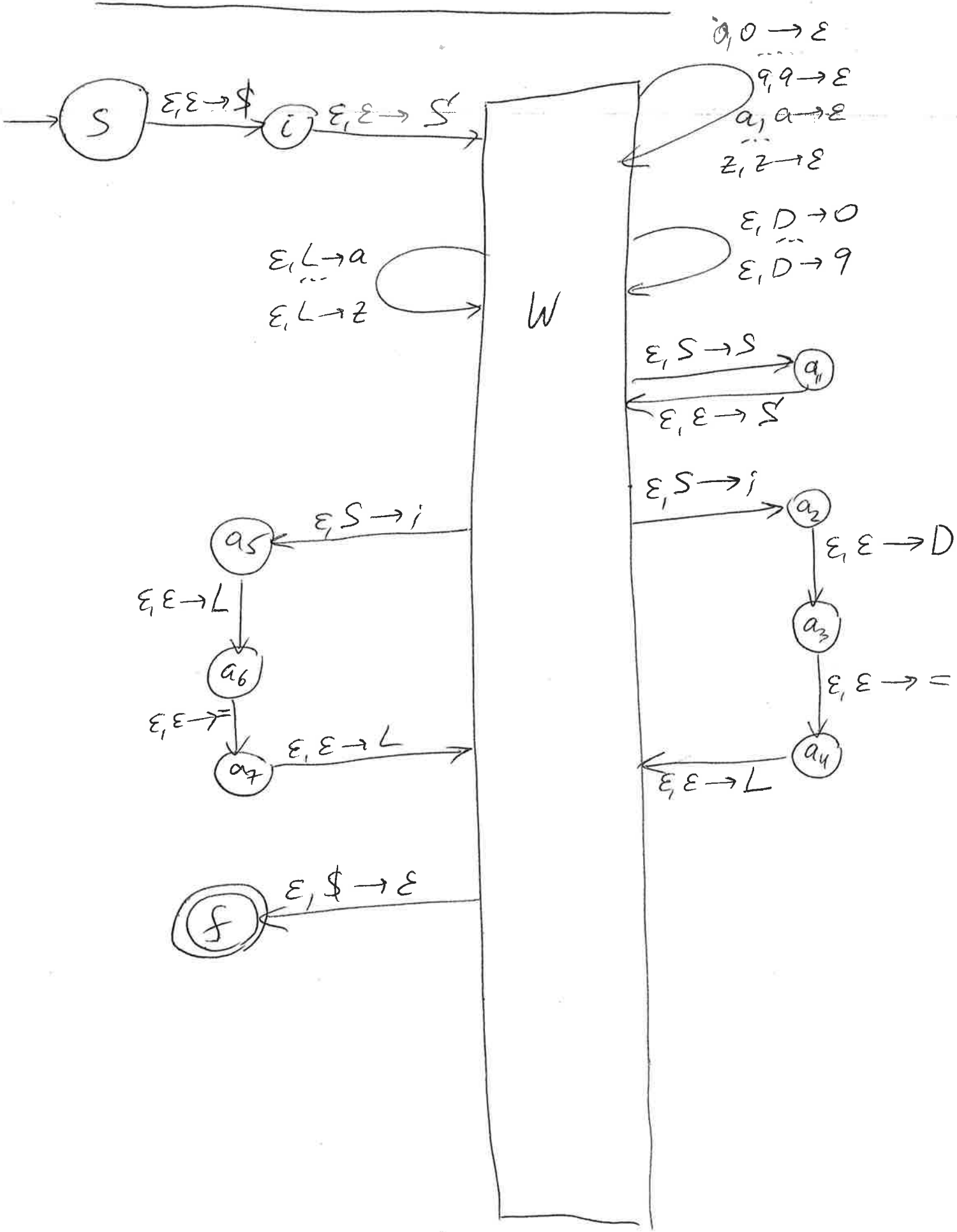
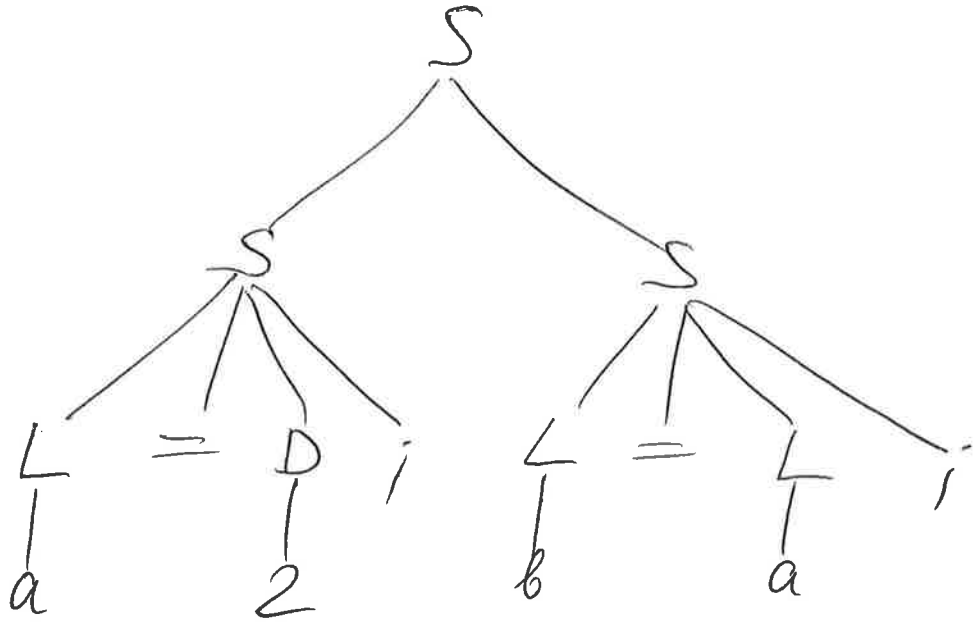
HW9, SPRING 2024, P. 1



HW 9 SPRING 2024, P.2

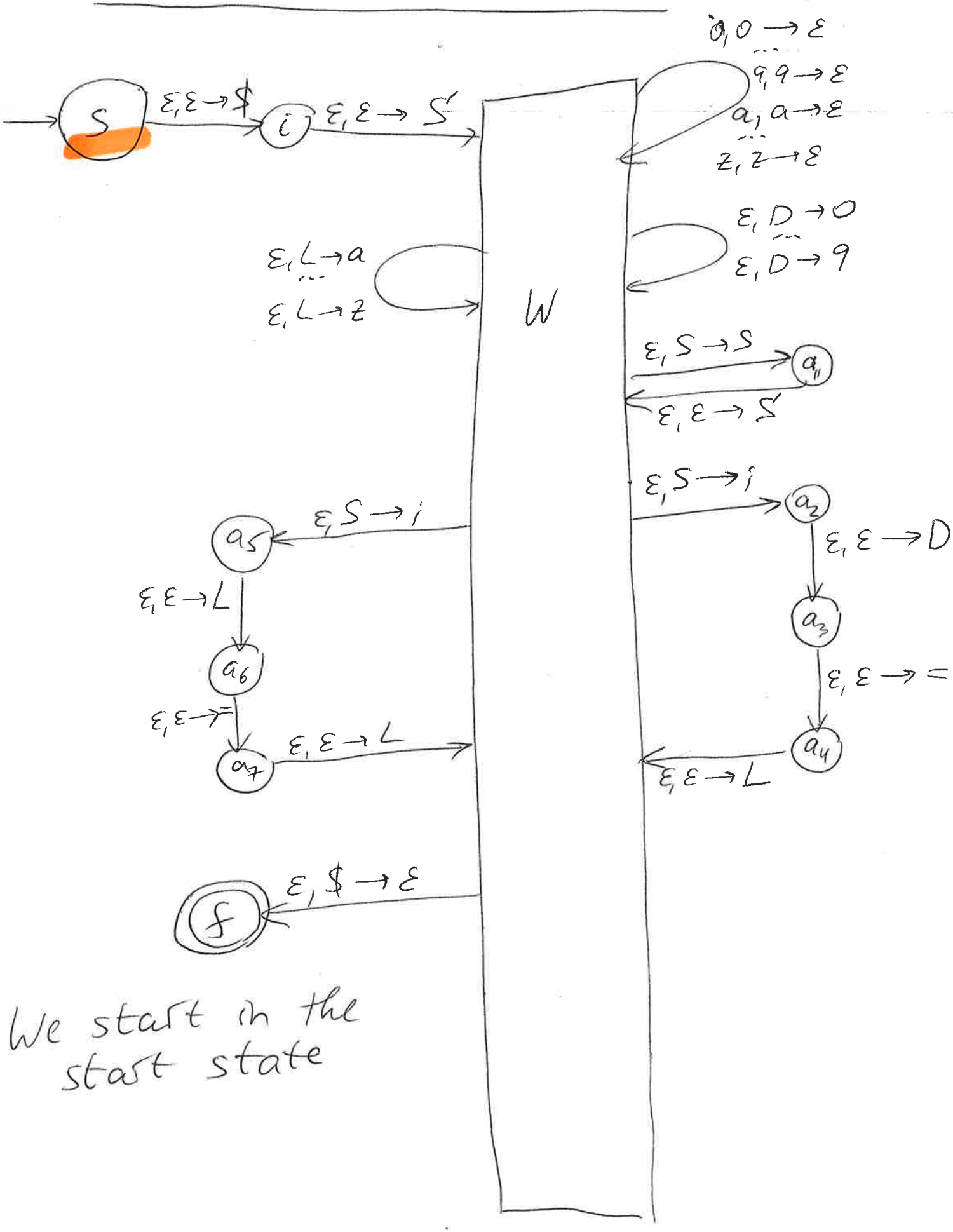


$\underline{S} \rightarrow \underline{S}S \rightarrow \underline{L}=D;S \rightarrow a=\underline{D};S \rightarrow$

$a=2;\underline{S} \rightarrow a=2;\underline{L}=L; \rightarrow a=2;b=\underline{L}; \rightarrow$

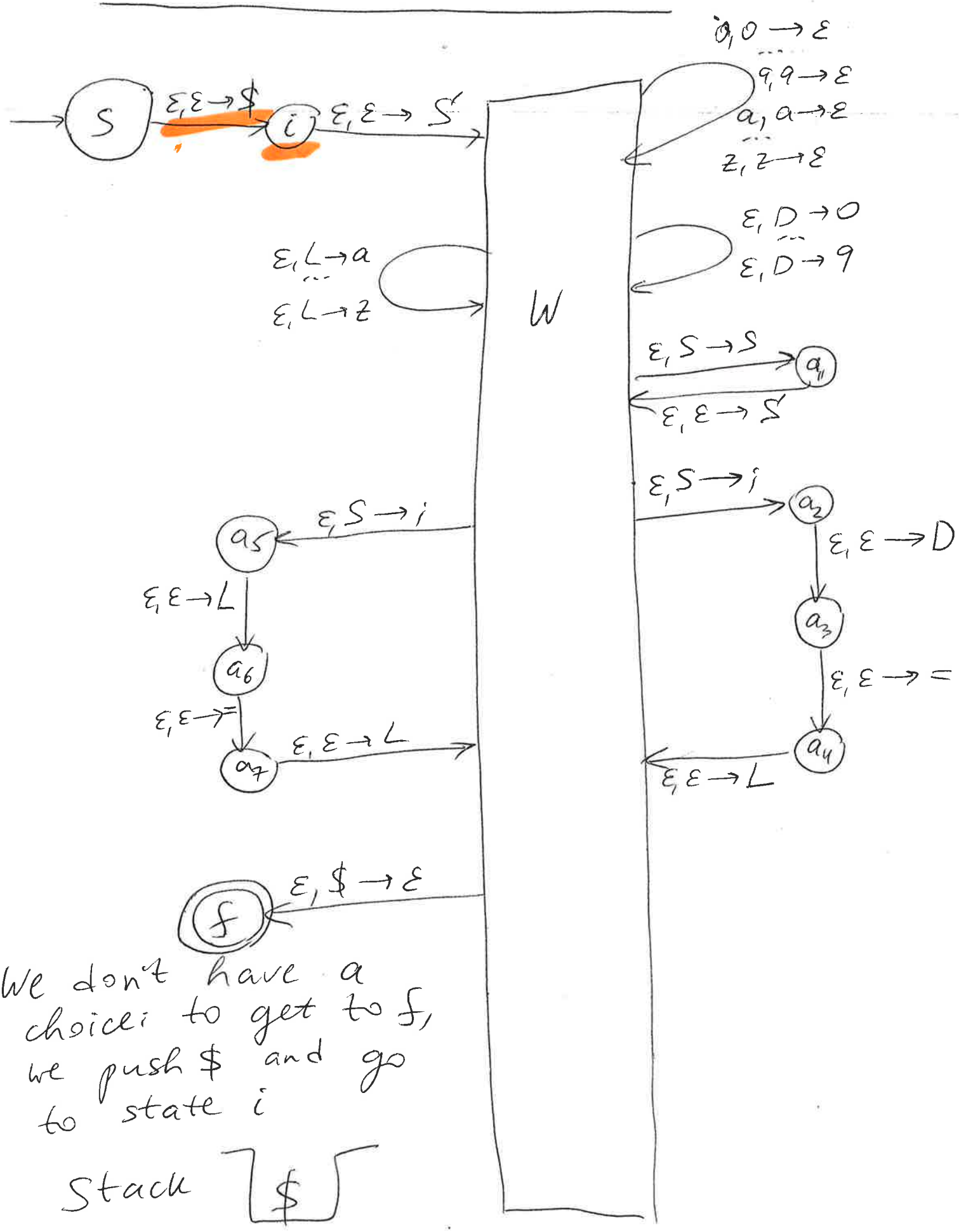
$a=2;b=a;$

HW9, SPRING 2024, P. 3



We start in the start state

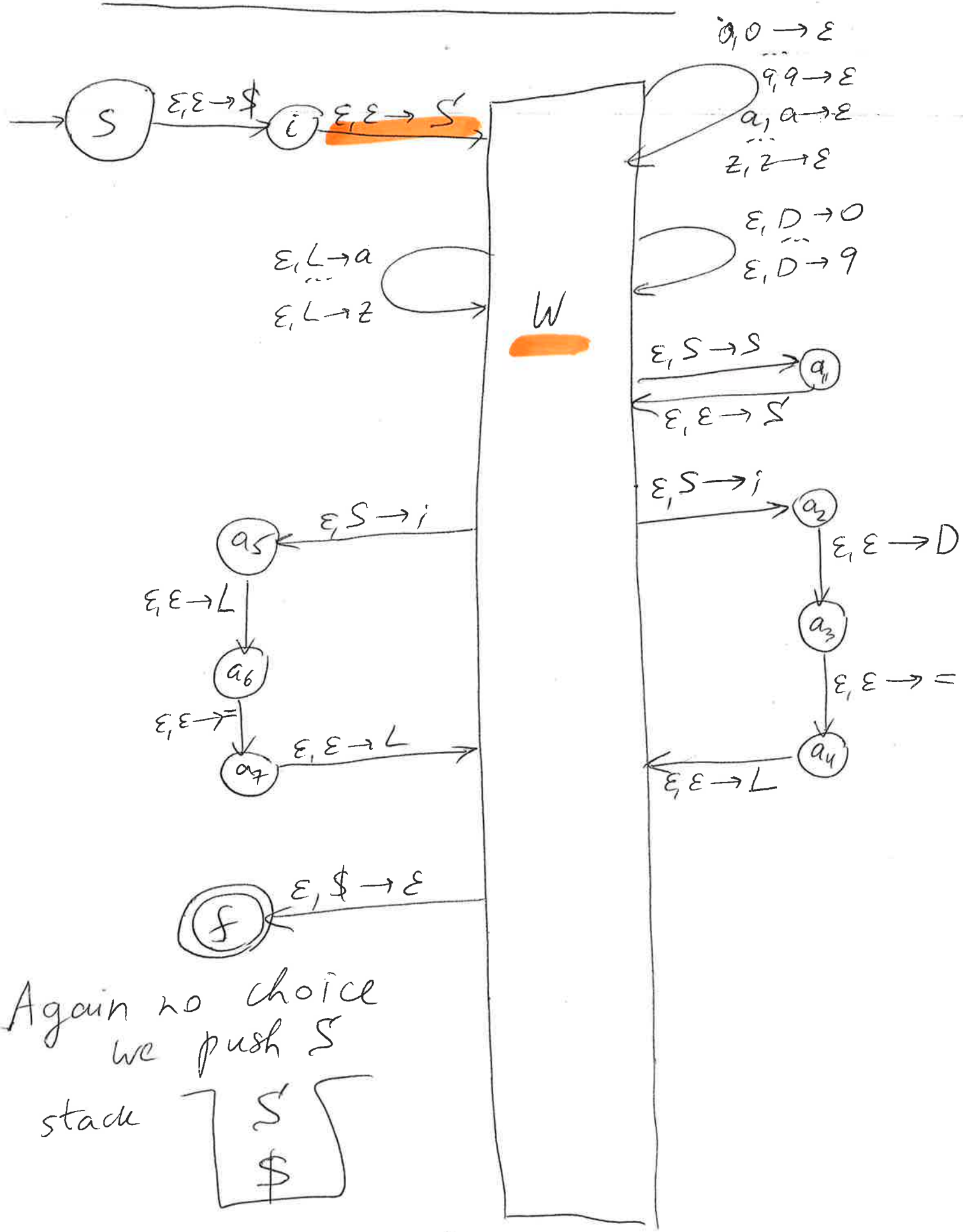
HW9, SPRING 2024, P. 4



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

Stack $

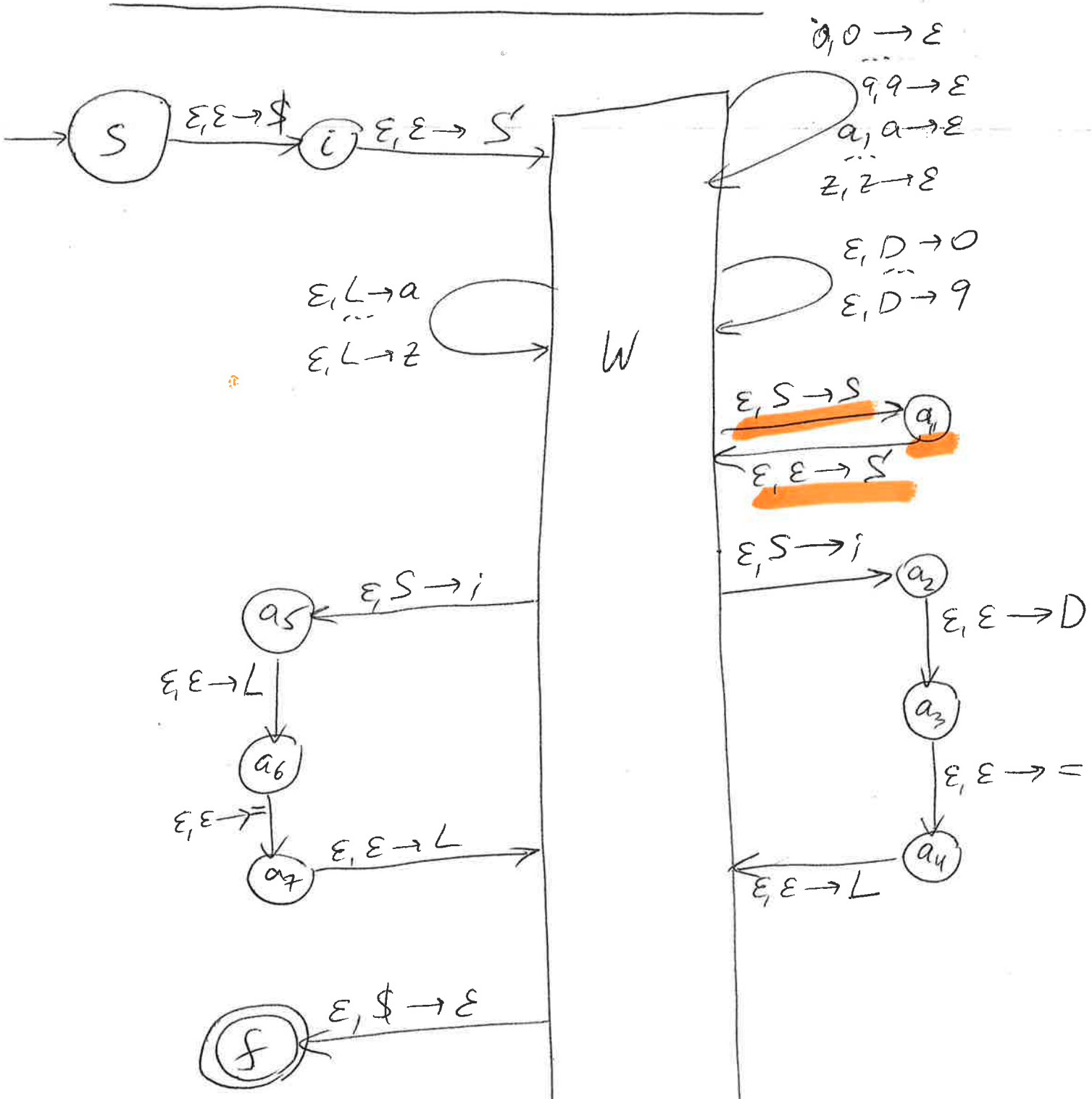
HW9, SPRING 2024, P.5



Again no choice we push S'

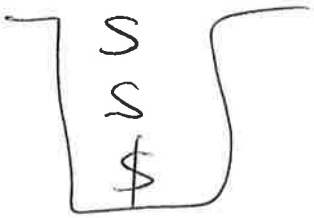
stack

HW9, SPRING 2024, P.6

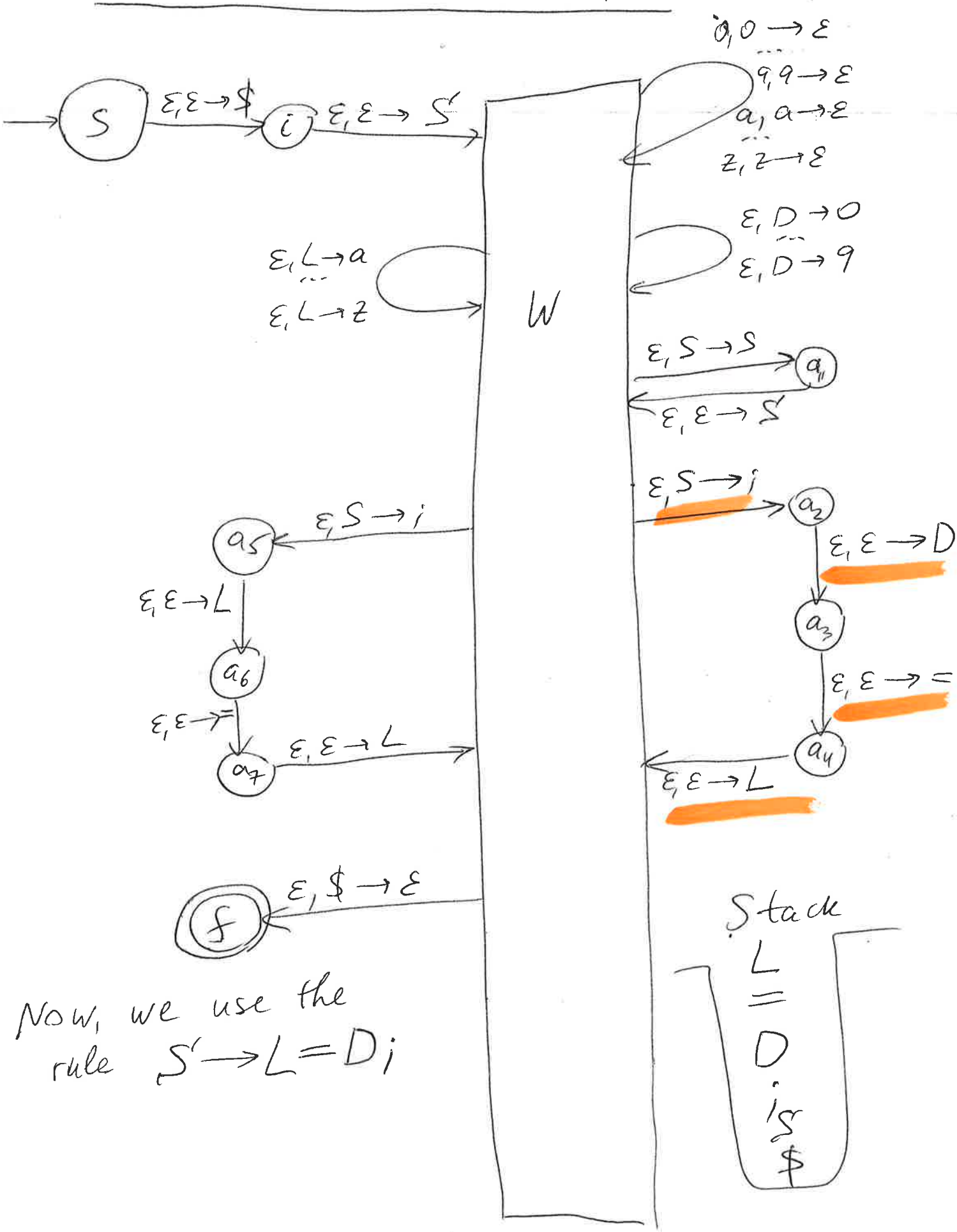


The first rule we use was $S \to SS$, so we pop S, push S, then go to a_1, push S again

Stack

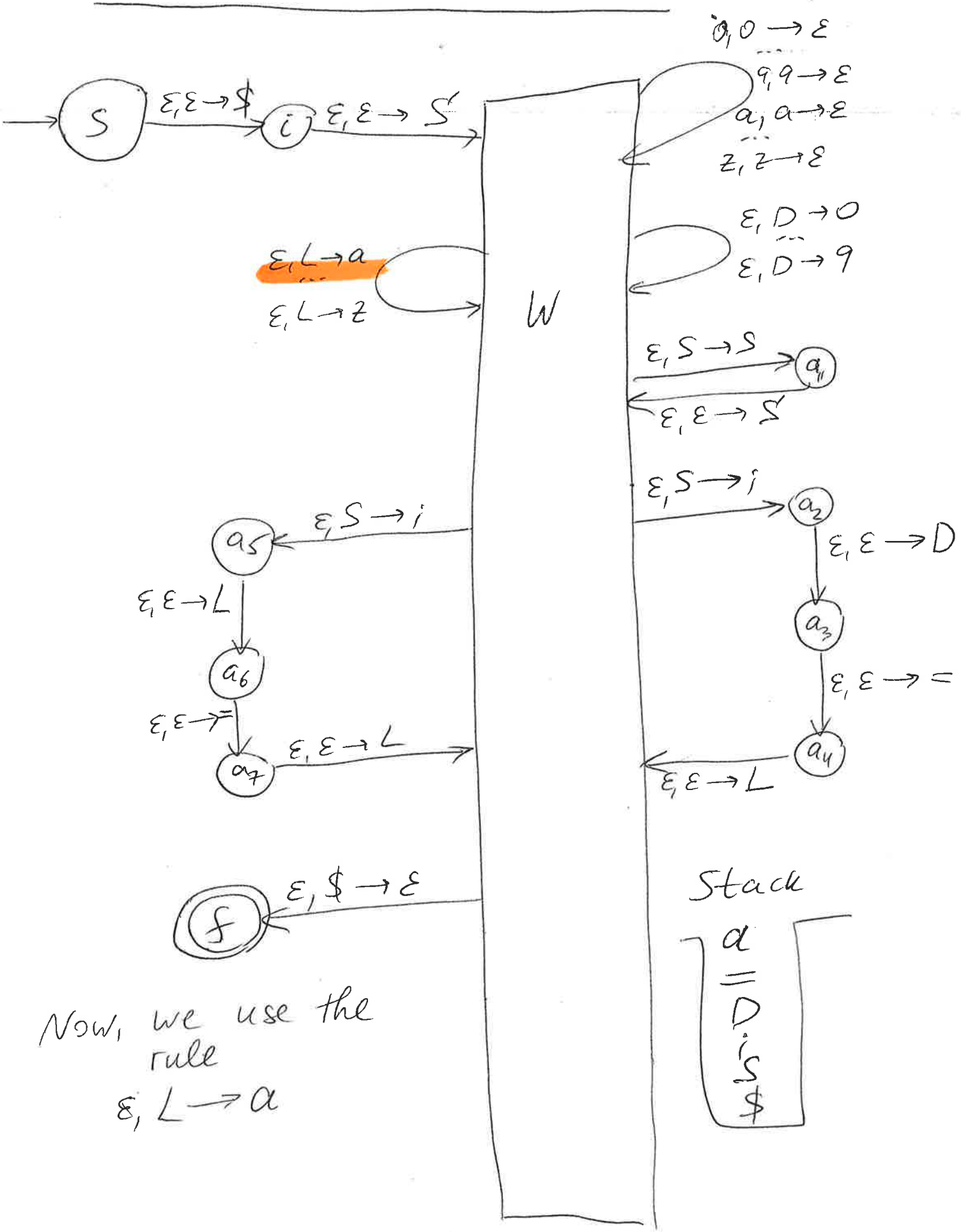


HW9, SPRING 2024, P.7



Now, we use the rule $S' \to L = D\,i$

HW9, SPRING 2024, P. 8

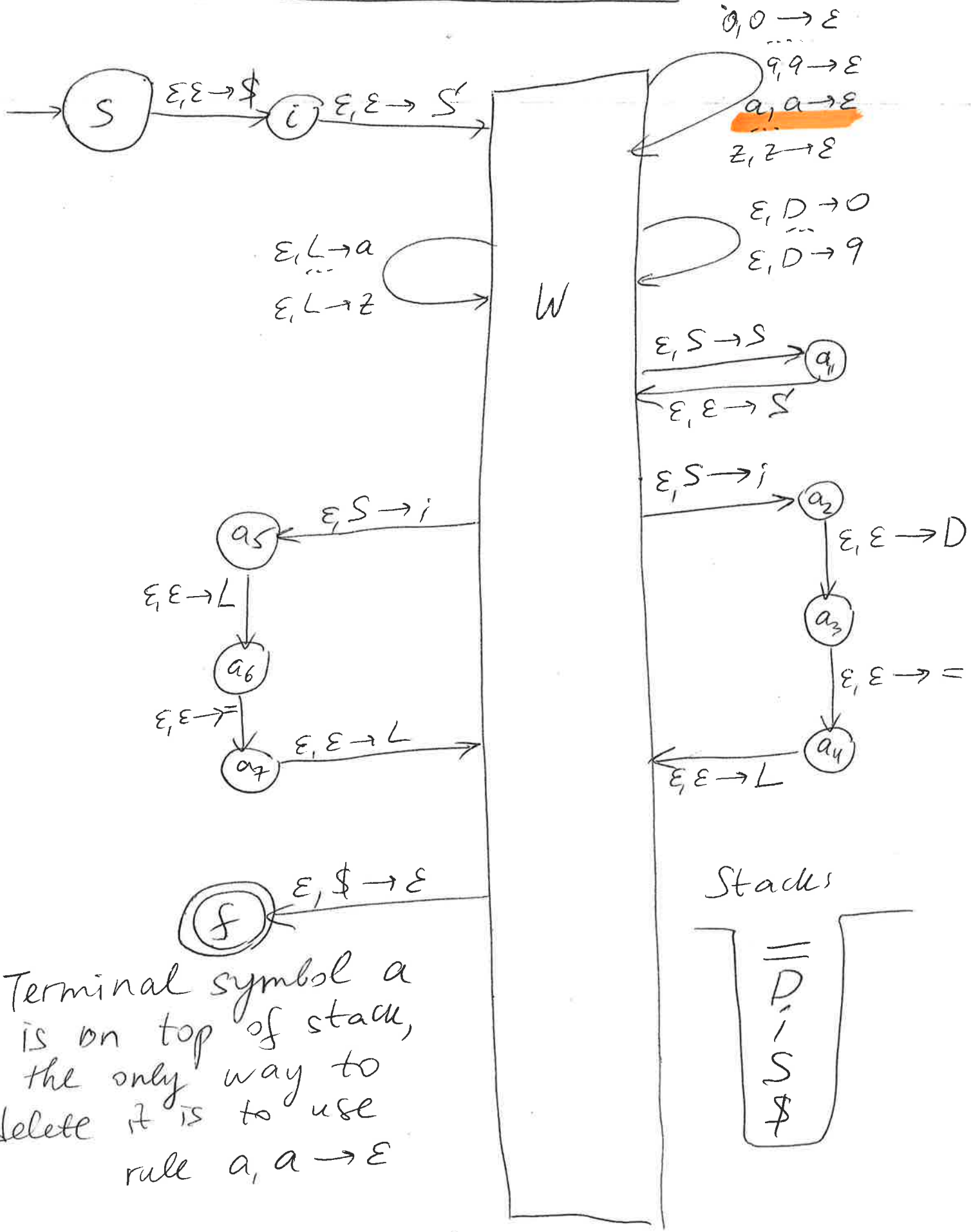


Stack

Now, we use the rule

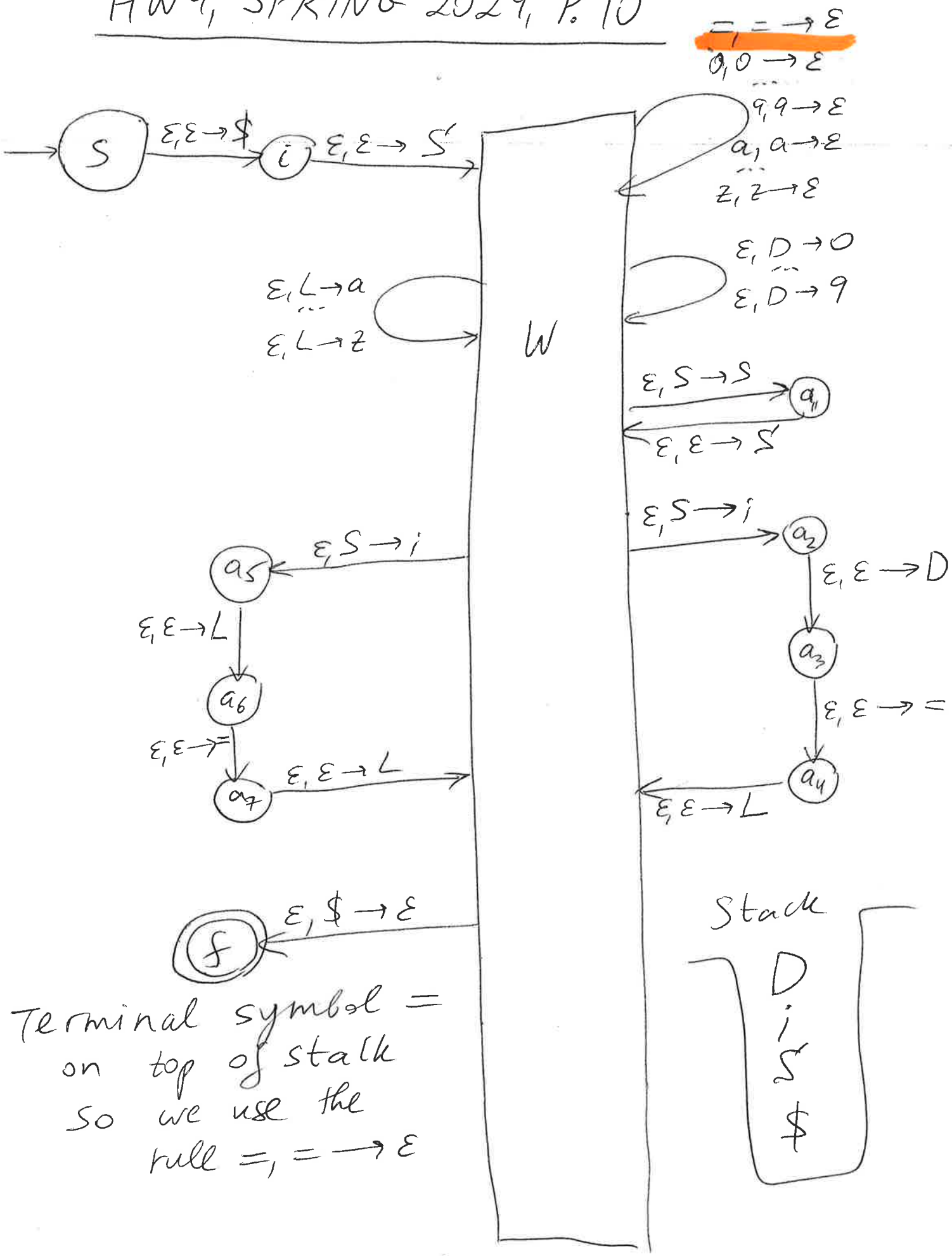
$\varepsilon, L \to a$

HW9, SPRING 2024, P.9



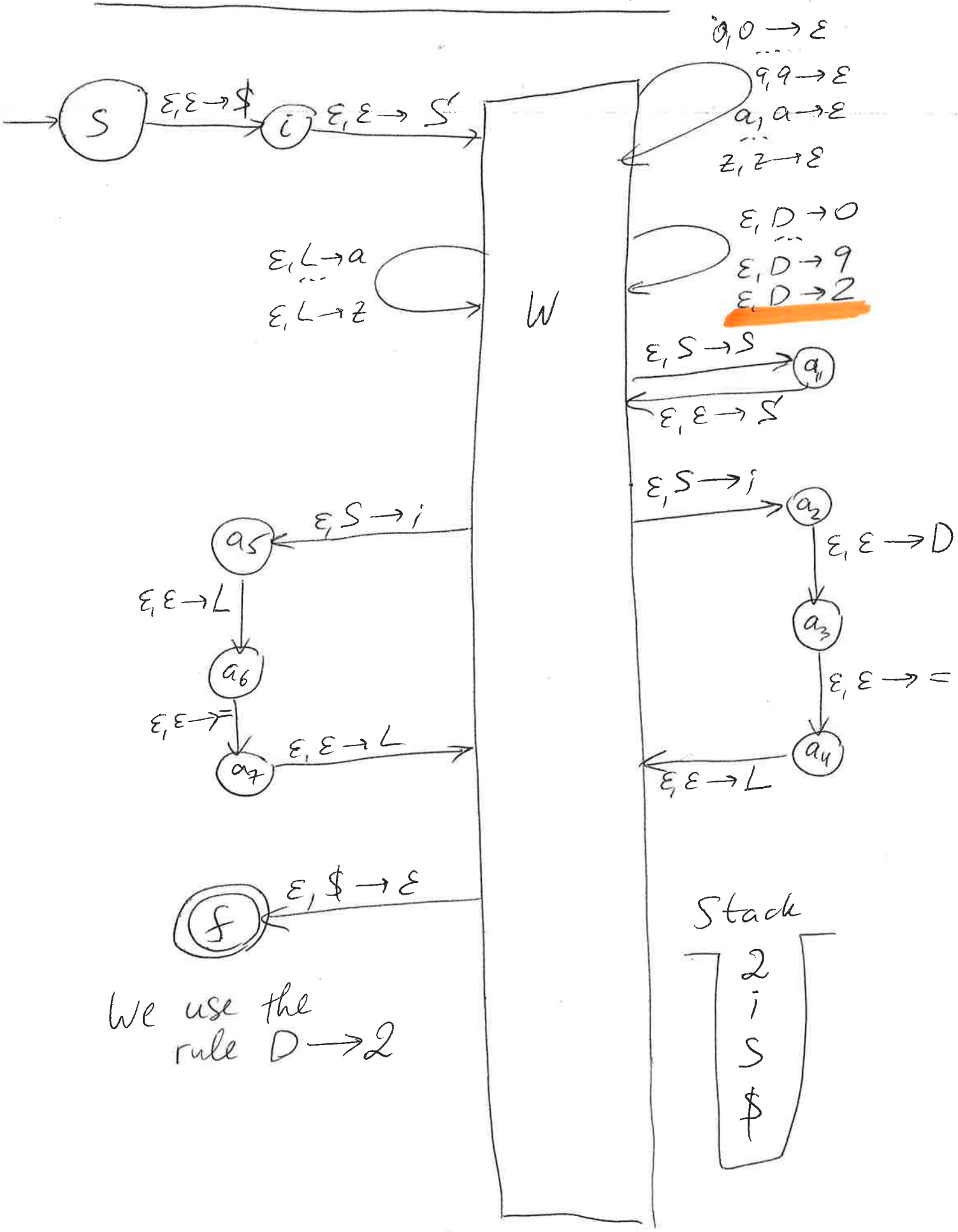
Terminal symbol a is on top of stack, the only way to delete it is to use rule a, a → ε

HW9, SPRING 2024, P. 10



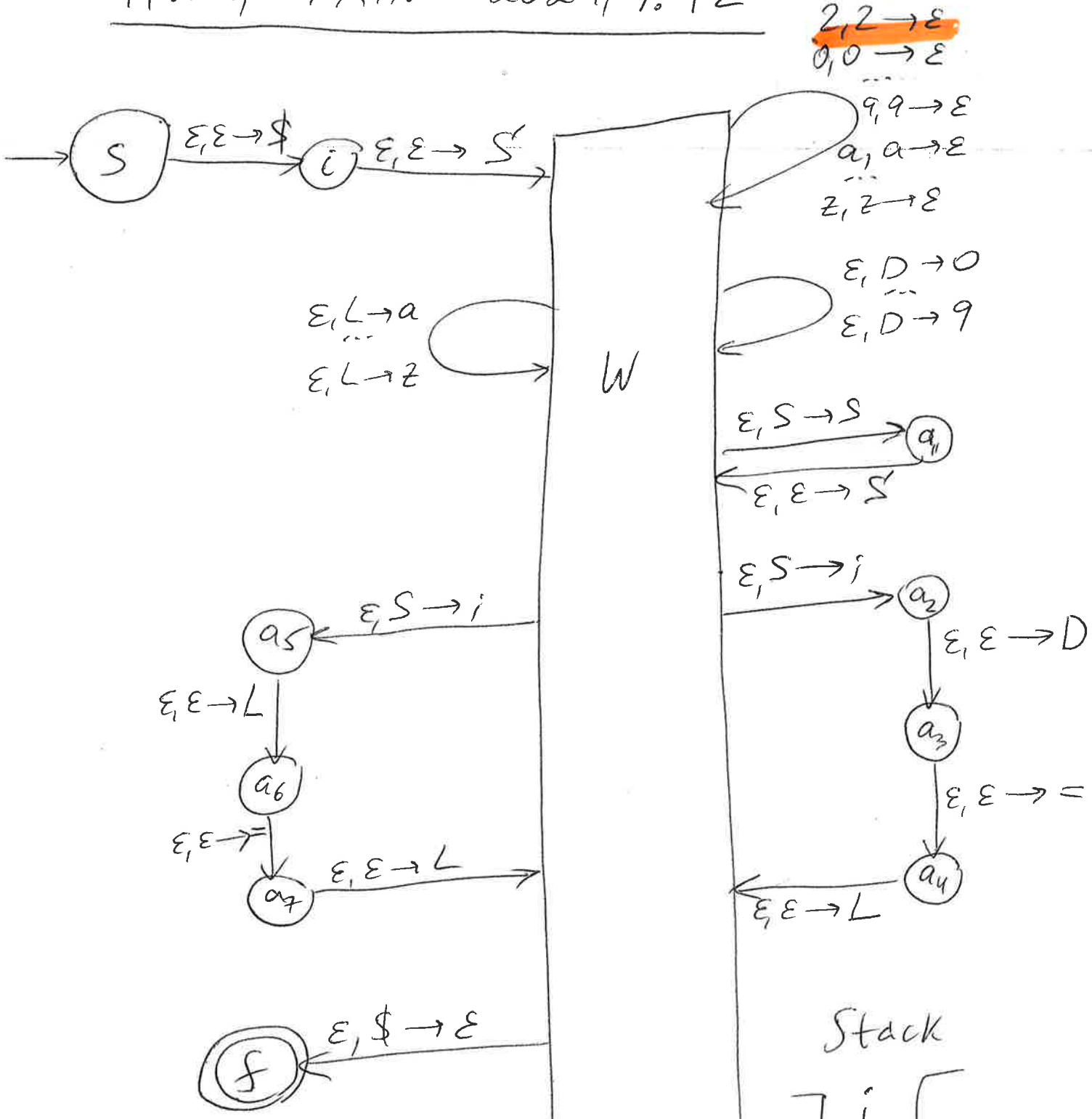
Terminal symbol = on top of stalk so we use the rule =, = → ε

HW9, SPRING 2024, P. 11



We use the rule $D \to 2$

HW9, SPRING 2024, P. 12

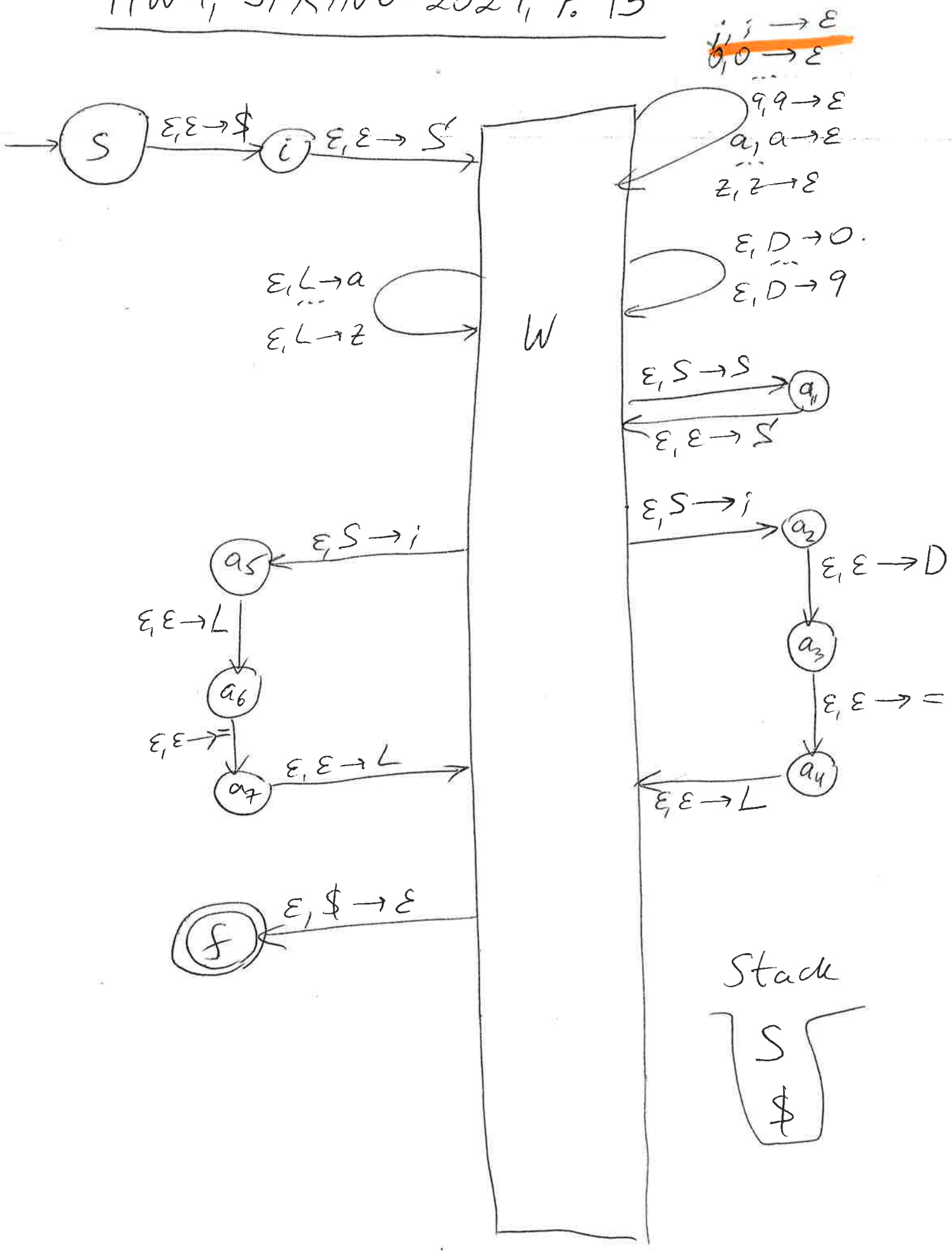


Two terminal symbols on top of stack, so we use rules

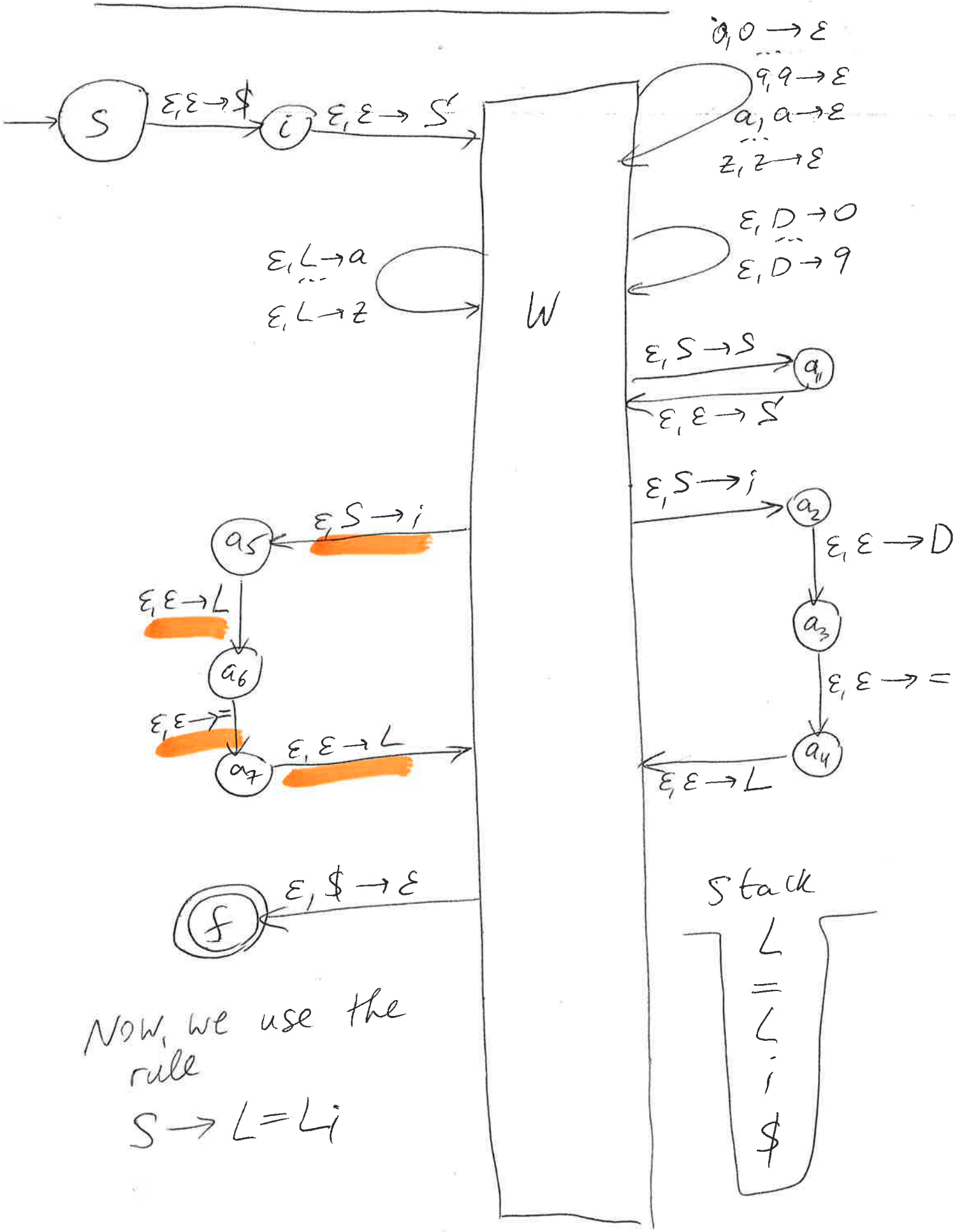
$2, 2 \to \varepsilon$ and

$i, i \to \varepsilon$

HW9, SPRING 2024, P. 13



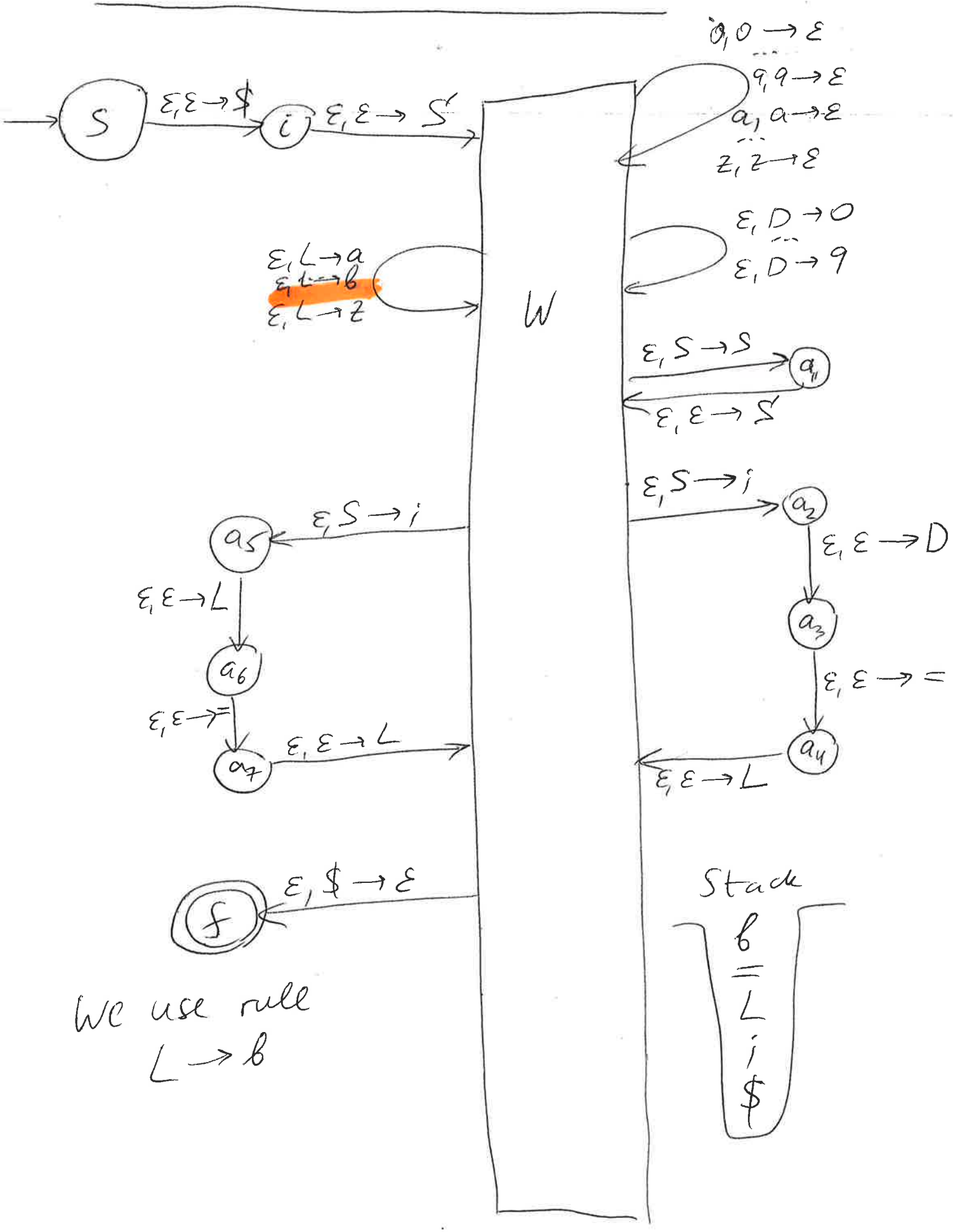
HW9, SPRING 2024, P. 14



Now, we use the rule

$S \to L = Li$

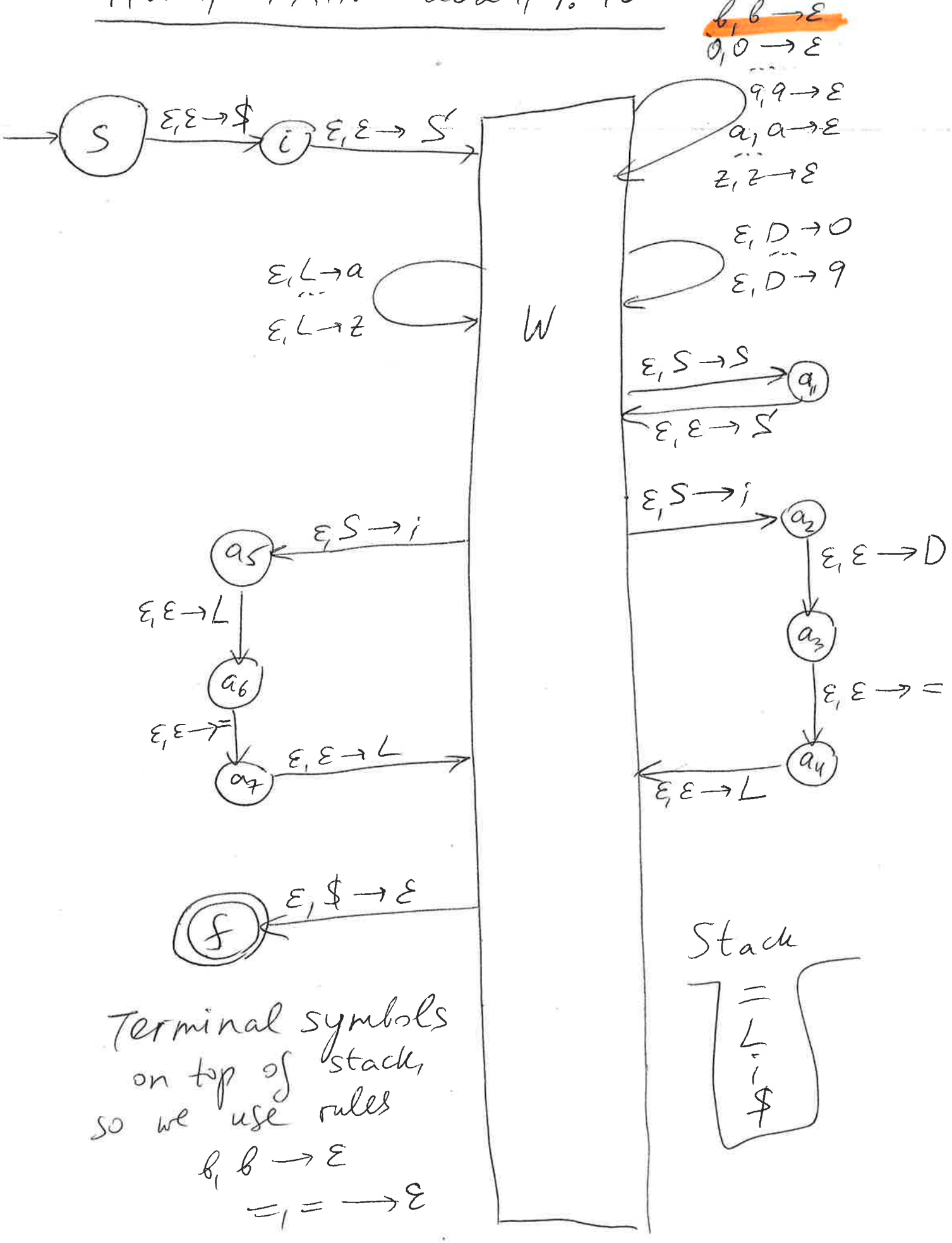
HW9, SPRING 2024, P. 15



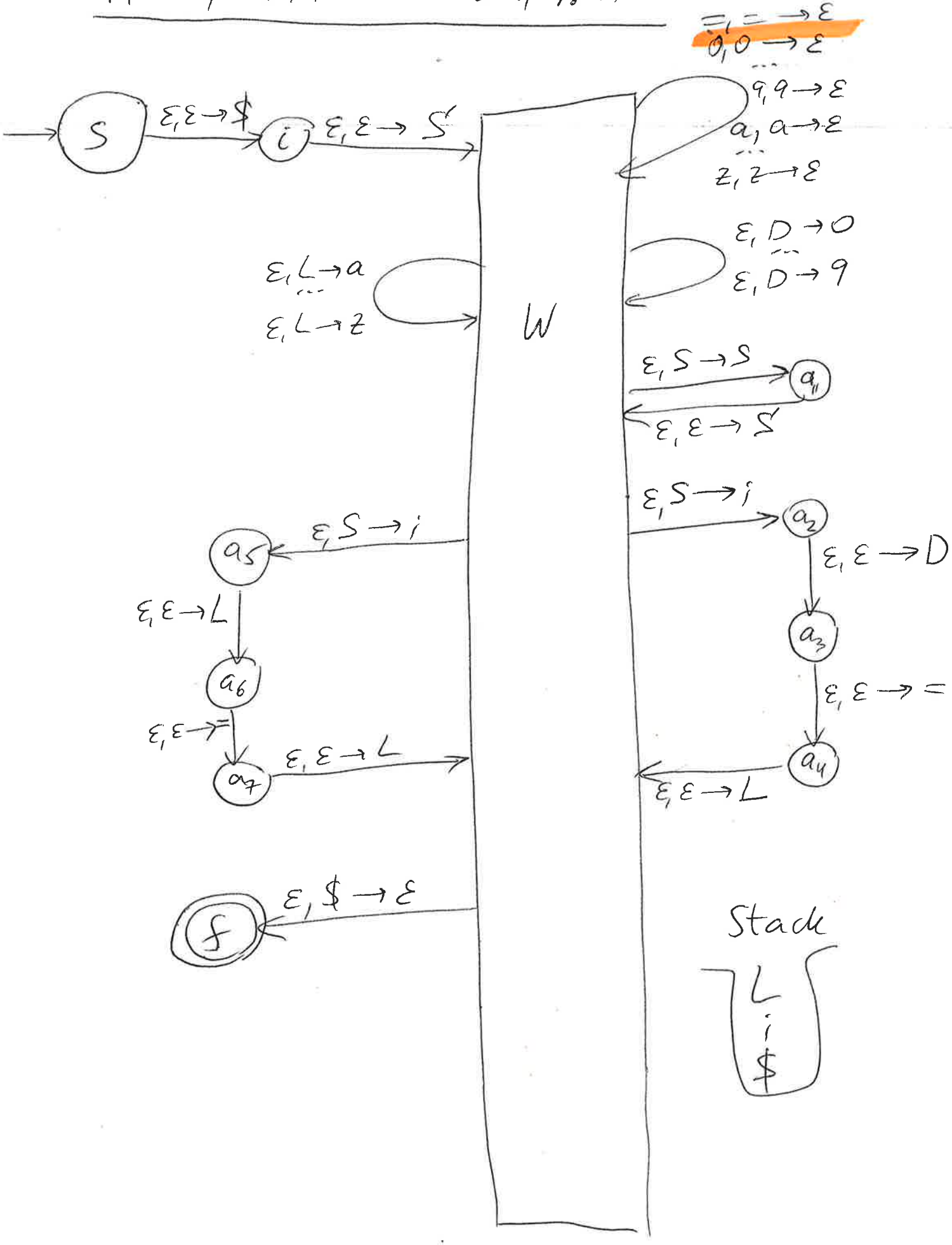
We use rule

$L \to b$

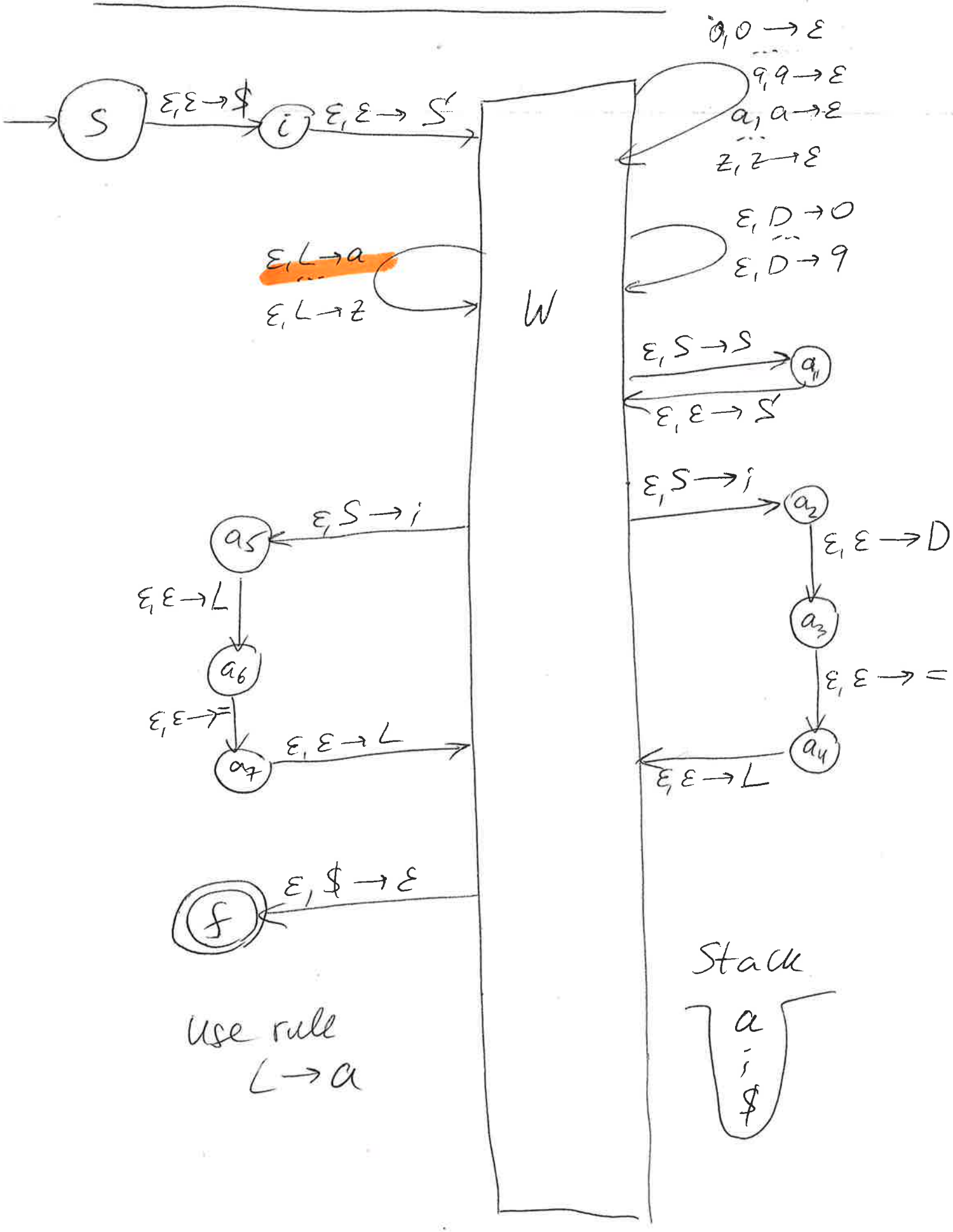
HW9, SPRING 2024, P. 16



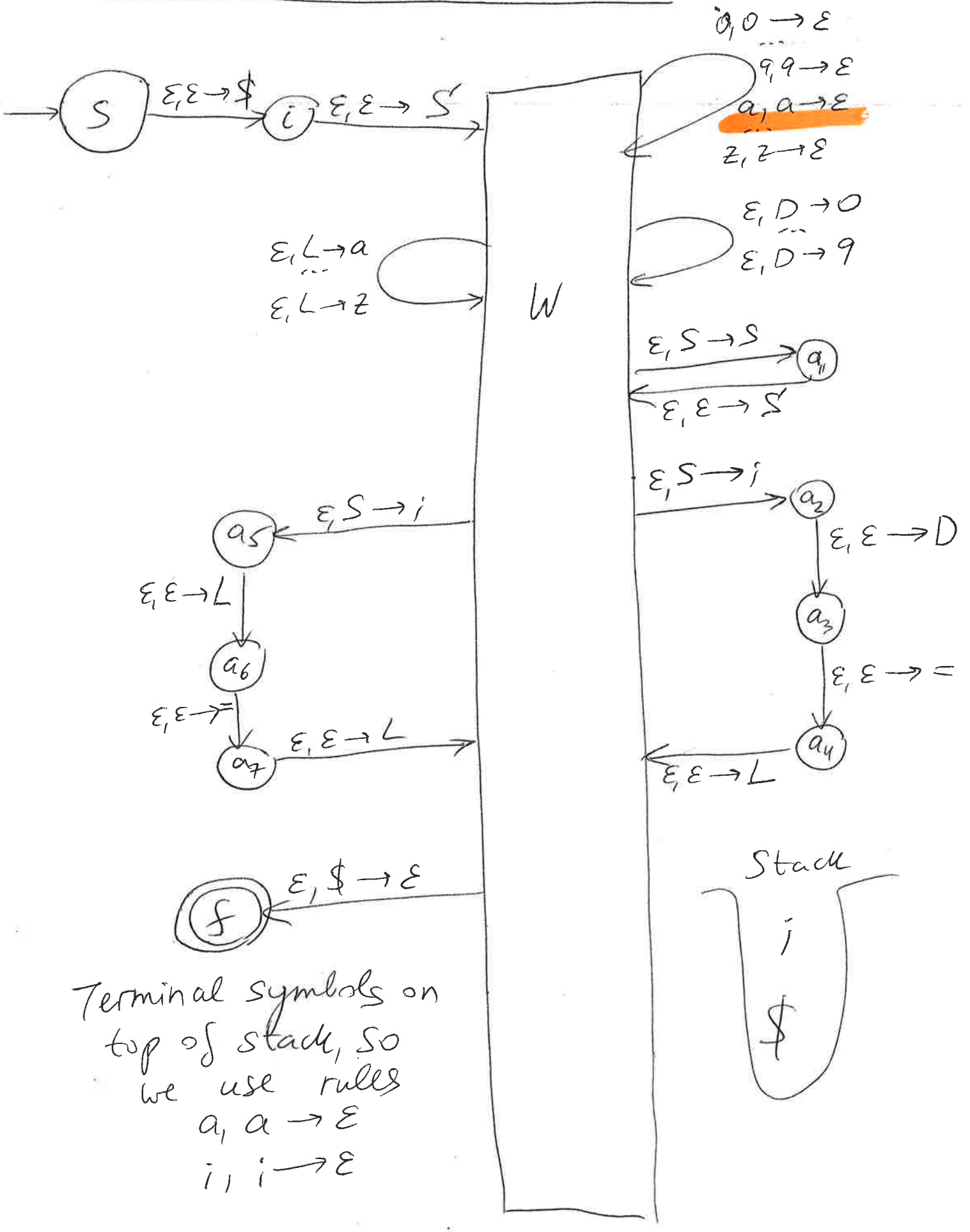
HW9, SPRING 2024, P.17



HW9, SPRING 2024, P. 18



HW9, SPRING 2024, P. 19

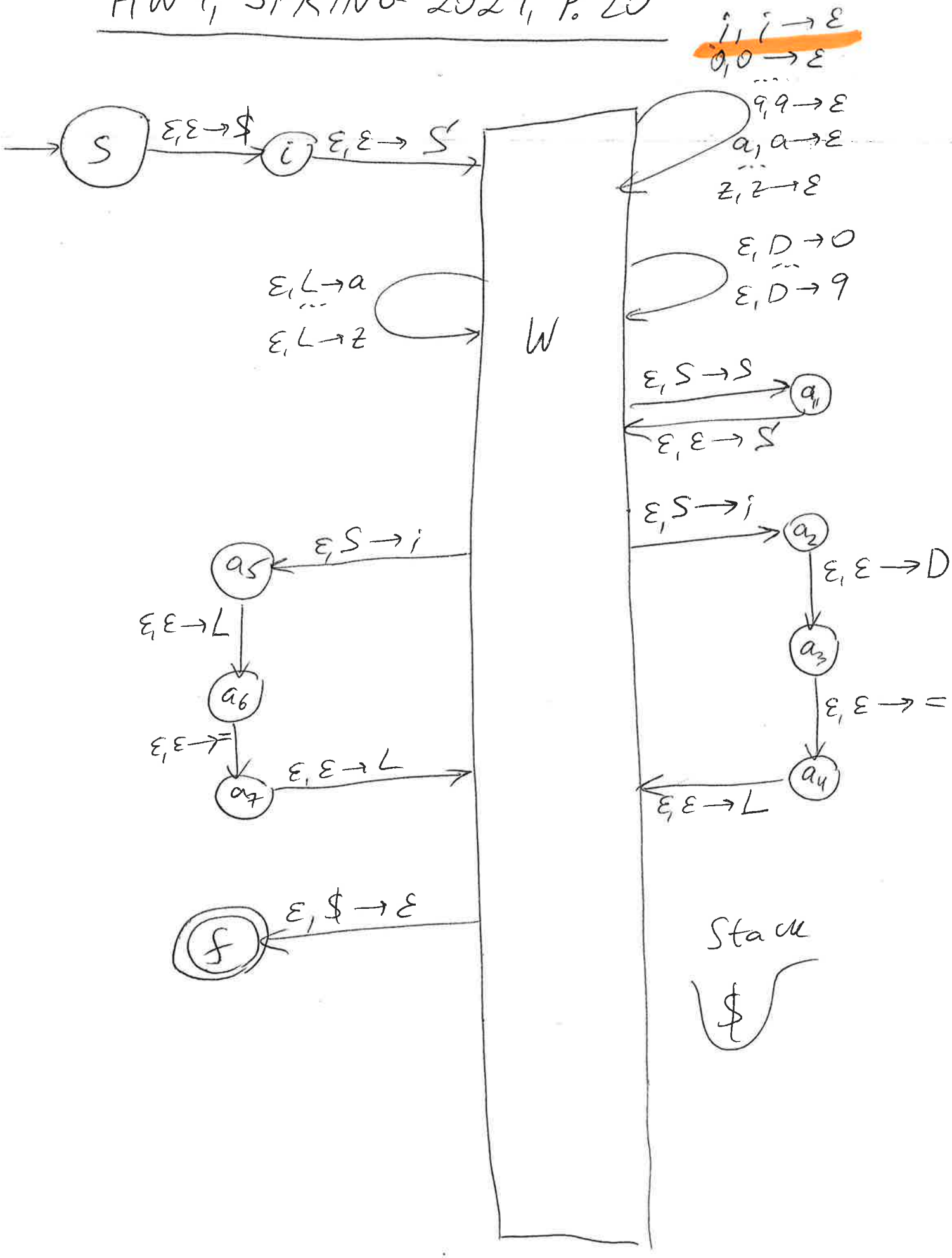


Terminal symbols on top of stack, so we use rules

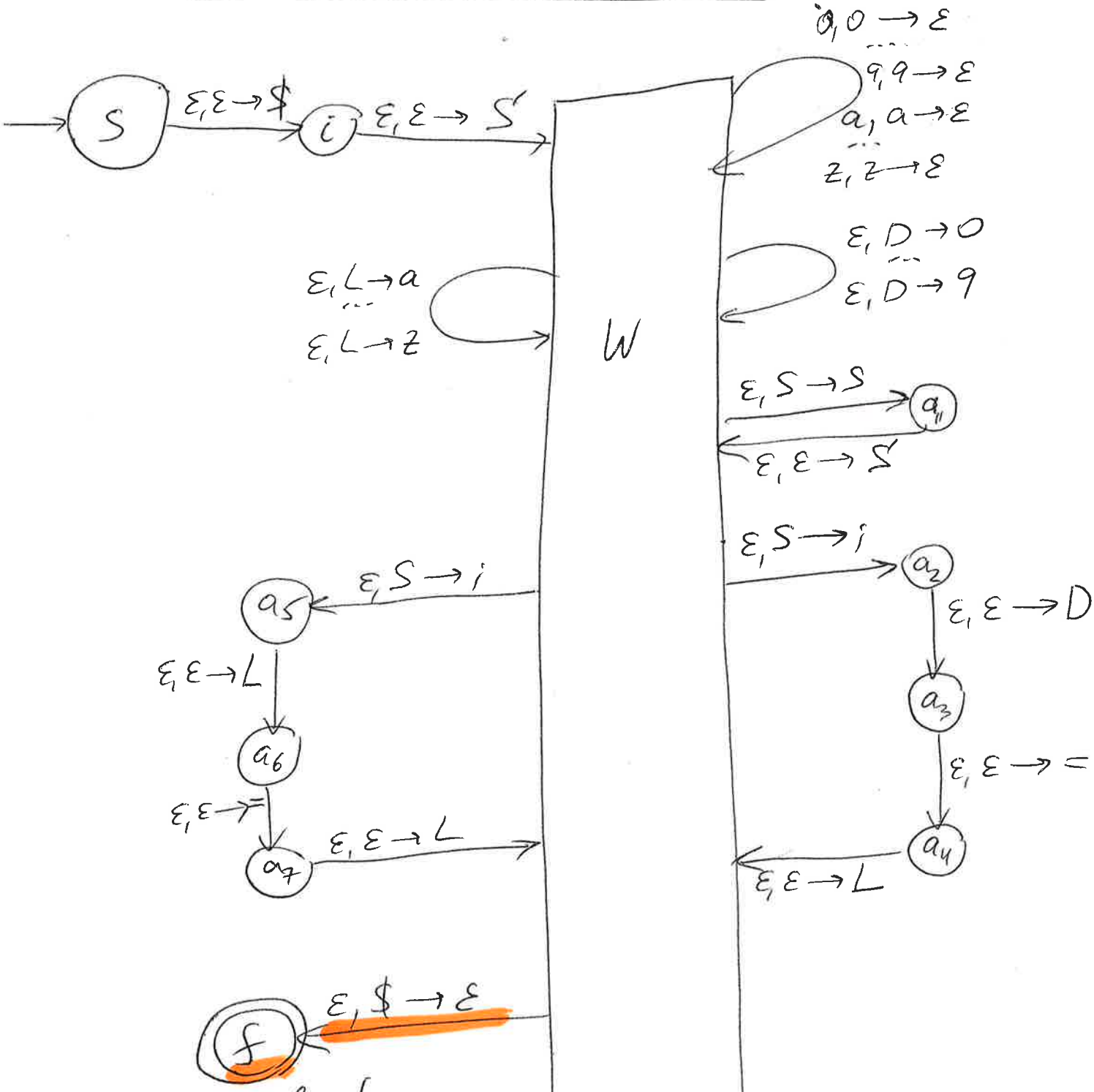
$a, a \to \varepsilon$

$i, i \to \varepsilon$

HW9, SPRING 2024, P. 20



HW9, SPRING 2024, P. 21



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

HW9, SPRING 2024, P. 22

Graphical description of all transitions:

read											a	=		2	i
state	s	i	w	a_1	w	a_2	a_3	a_4	w	w	w	w	w	w	w
stack		$	S $	S $	S S $	i S $	D i S $	= D i S $	L = D i S $	a = D i S $	= D i S $	D i S $	2 i S $	i S $	S $

read						b	=		a	i		
state	a_5	a_6	a_7	w	w	w	w	w	w	w	f	
stack	i $	L i $	= L i $	L = L i $	b = L i $	= L i $	L i $	a i $	i $	$		