Theory of Computation

Basics/DFA

Lecture 3

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Symbol $\{a, b\}$

$\Sigma^* = \Sigma^0 \cup \Sigma^1 \cup \ldots$

Alphabet $\Sigma = \{a, b\}$

String

Σ^0 : ϵ, 0

Σ^1 : a, b, 1

Σ^2 : aa, ab, ba, bb, 2

Σ^3 : aaa, aab, ... 3

Language : a^*, b^*, $(a+b)^*$ etc.

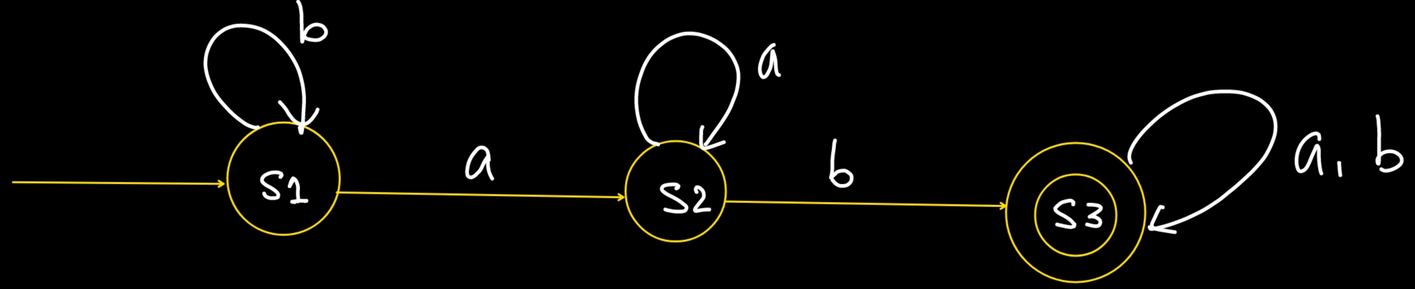
Language	Machine	Grammar
R.L	DFA $\cong$ NFA	R.G
CFL	NPDA $>$ DPDA	CFG
CSL	NLBA ? DLBA	CSG
R.E	NTM $\cong$ DTM	.....

$\longrightarrow$ Type-3

6. Construct minimal Finite Automata that accepts all strings of a's and b's, where each string contain ab as substring.

$L = \{ \in, a, b, aa, ab, ba, bb, aba, abb, \ldots\ldots ab(\Sigma^*), \}$

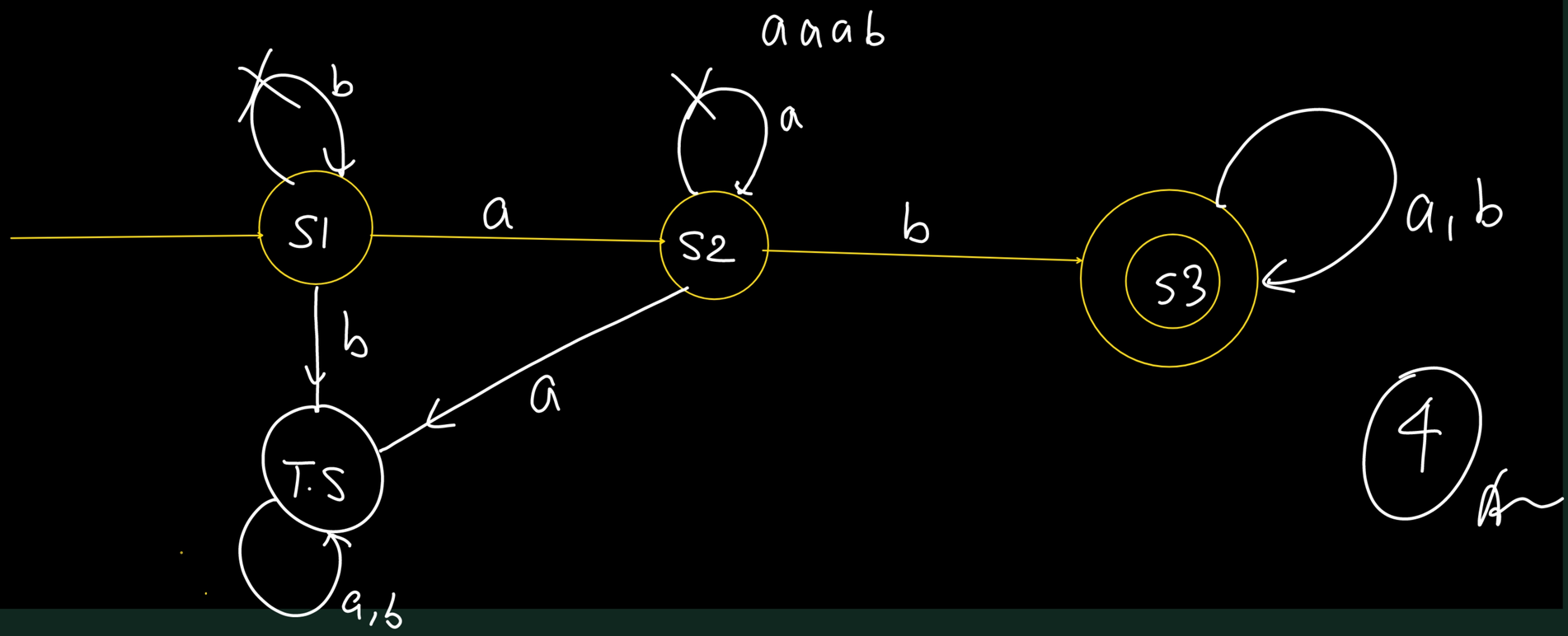
$\Sigma^* ab \Sigma^*$, , $\Sigma^* (ab)$



3 - States

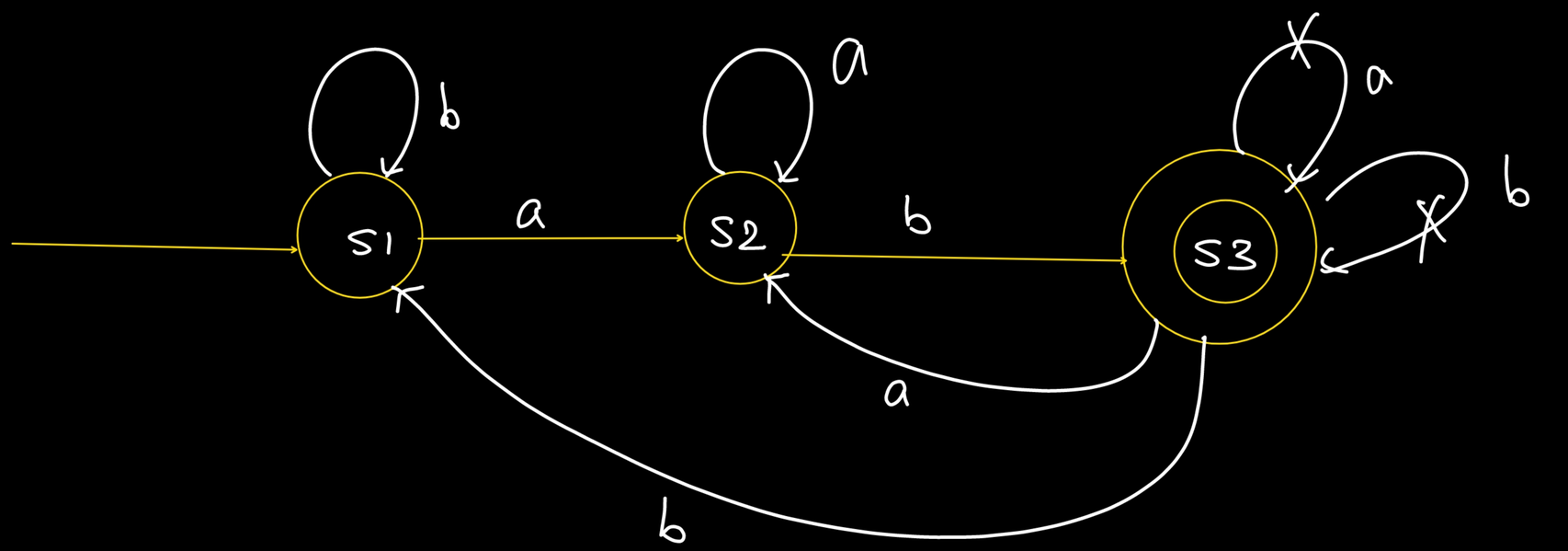
7. Construct minimal Finite Automata that accepts all strings of a's and b's, where each string starts with the substring ab.

$L = \{ ab, abz^* \}$



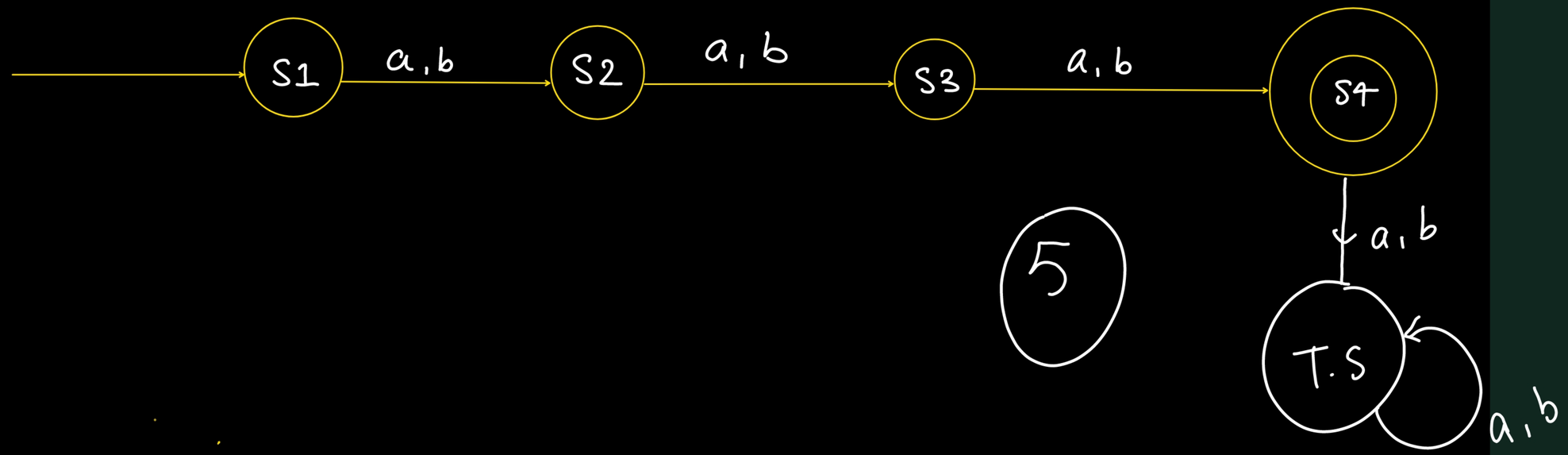
8. Construct minimal Finite Automata that accepts all strings of a's and b's, where each string ends with the substring ab.

$L = \{ ab, \ldots$

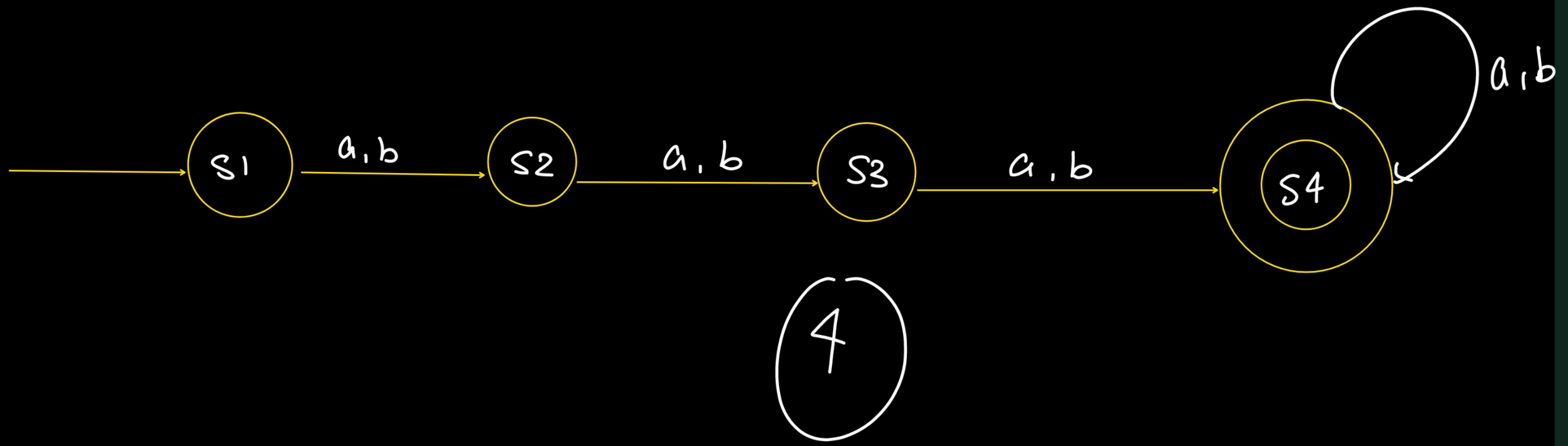


abbbbb
X

9. Construct minimal Finite Automata that accepts all strings of a's and b's, where the length of the strings are exactly three.

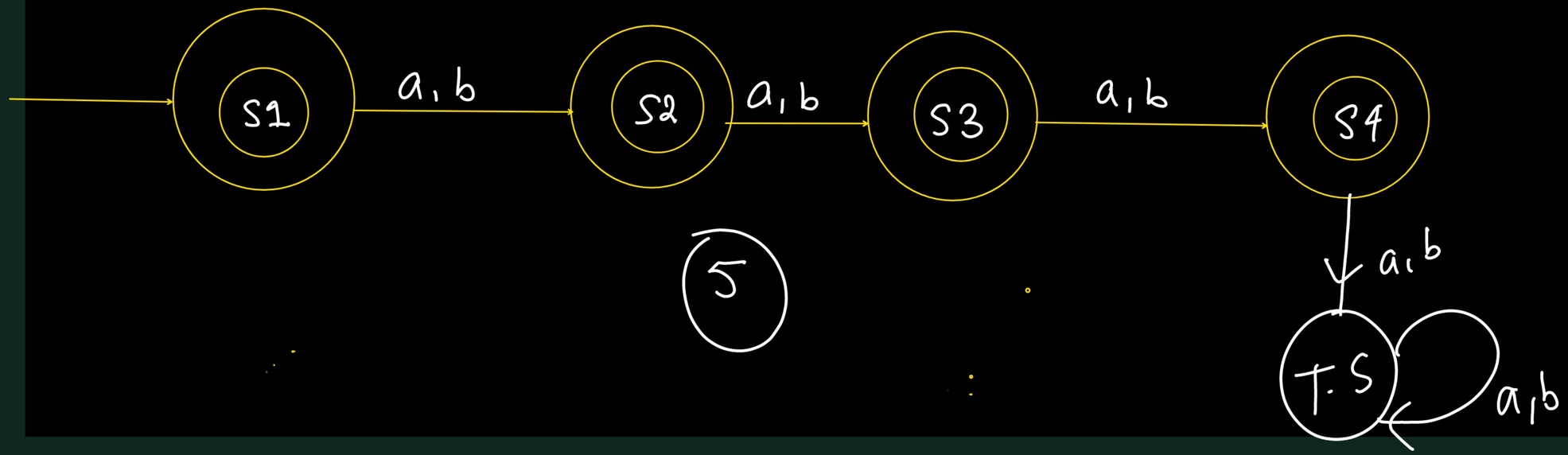


10. Construct minimal Finite Automata that accepts all strings of a's and b's, where the length of the string is at least three.



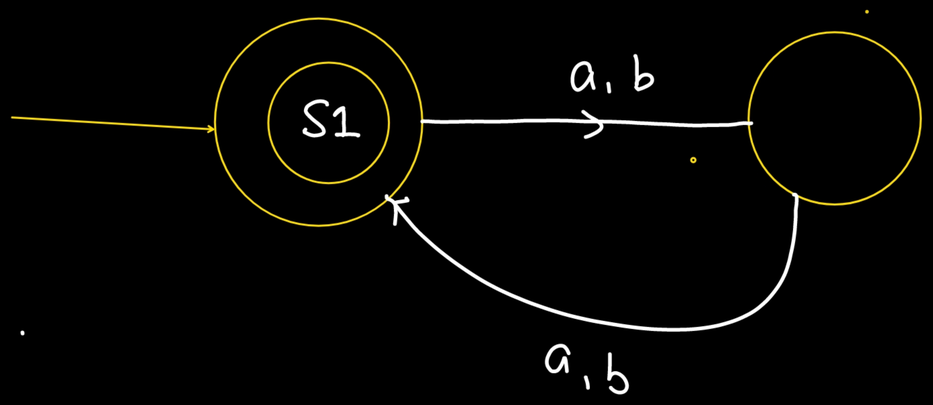
11. Construct minimal Finite Automata that accepts all strings of a's and b's, where the length of the string is maximum three.

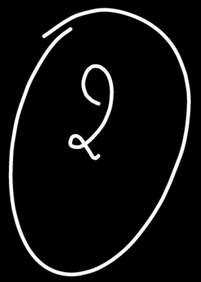
$L = \{ \in, a, b, aa, ab, ba, bb, aaa, aab, aba, abb, baa, bab, bba, bbb \}$

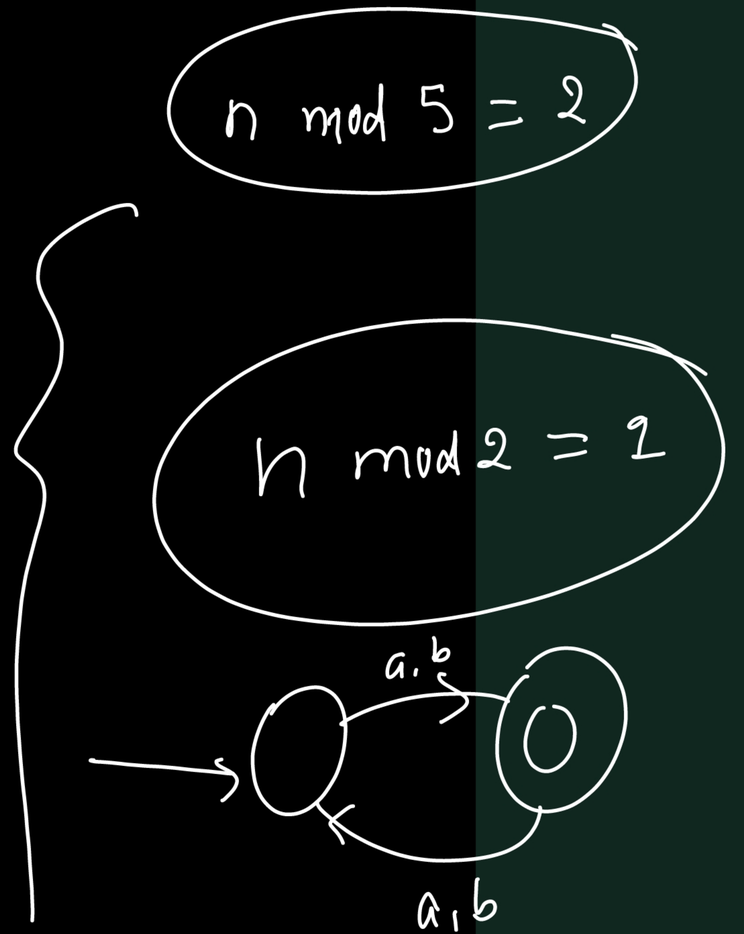


12. Construct minimal Finite Automata that accepts all strings of a's and b's, where the length of the string is divisible by 2.

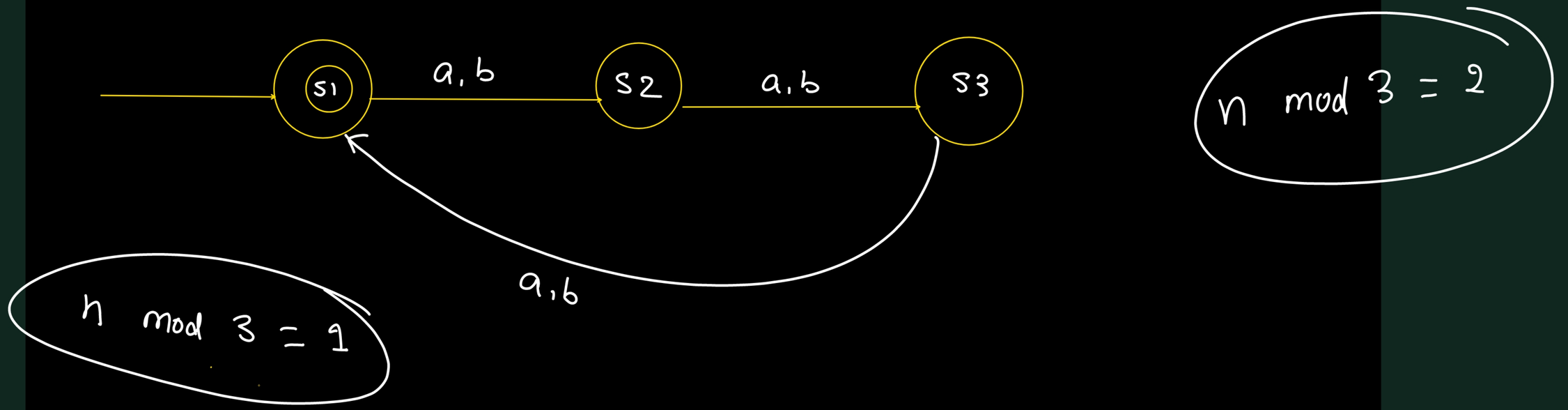
$L = \{ \in, \underline{1}, \underline{\underline{2}}, \underline{3}, \underline{\underline{4}}, \ldots \}$



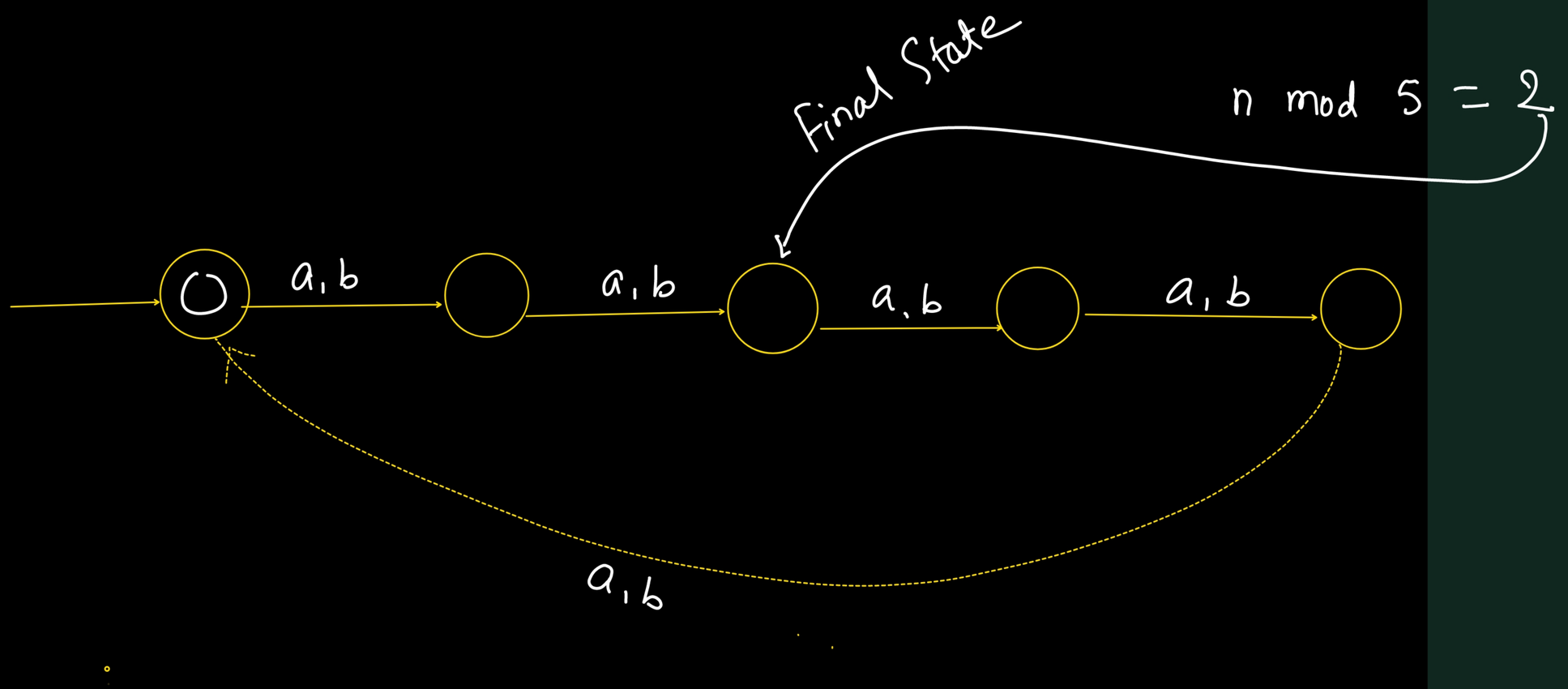




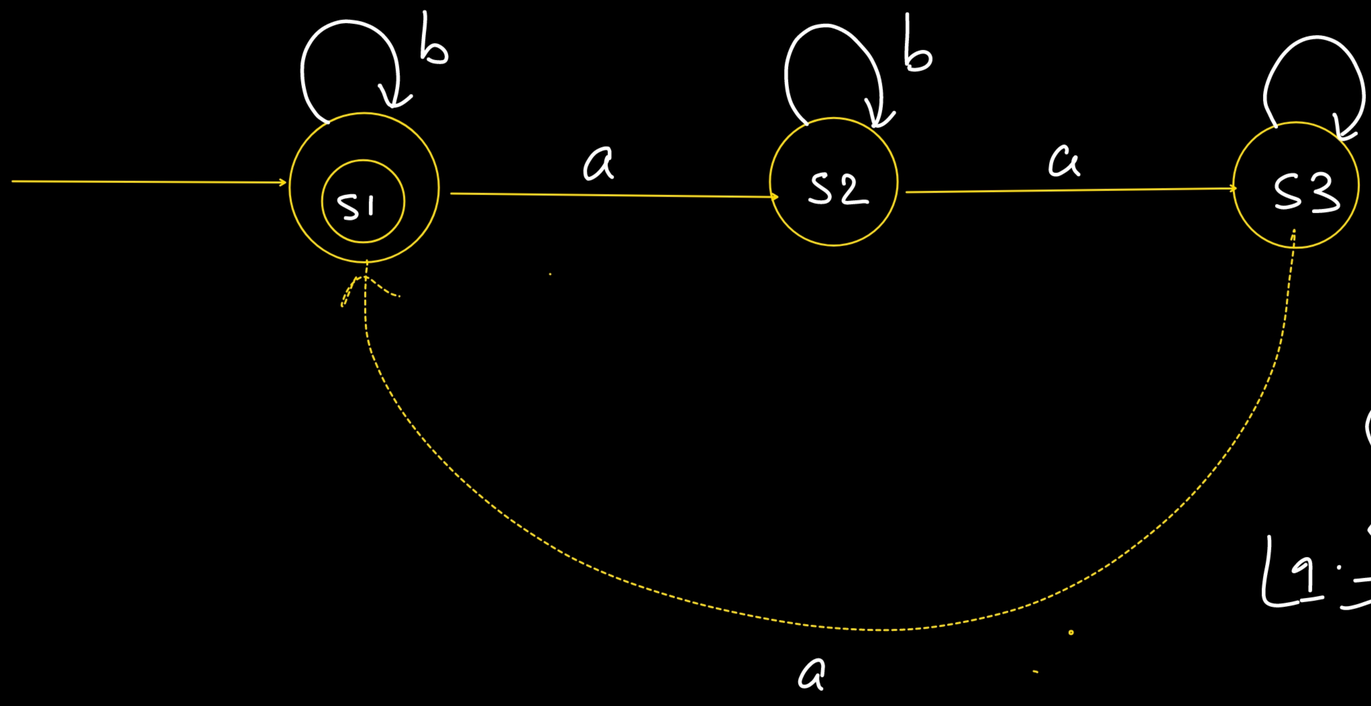
13. Construct minimal Finite Automata that accepts all strings of a's and b's, where the length of the string is divisible by 3.



14. Construct minimal Finite Automata that accepts all strings of a's and b's, where the length of the string is divisible by 5.



15. Construct minimal Finite Automata that accepts all strings of a's and b's, in which number of a is divisible by 3.



$L_1 = \{ b^* \underline{a} , b^*(aaa) \}$

Thank You