

# CS & IT ENGINEERING

## Theory of Computation

### Regular Languages

Lecture No.- 20



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# Recap of Previous Lecture



**Topic**

**Model-I (Easy:  $\Phi$ ,  $\Sigma^*$ , only epsilon,  $\Sigma^+$ )**

**Topic**

**Construction of DFA Model II (Length)**

**Topic**

**Construction of DFA Model III (No. of symbols)**

**Topic**

**Construction of DFA Model IV (Over 1 symbol)**

**Topic**

**Construction of DFA Model V (Sequence based)**

**Topic**

**Construction of DFA Model VI (Length & Remainder)**

**Topic**

**Construction of DFA Model VII (Symbols & Remainder)**

# Topics to be Covered



**Topic**

**Construction of DFA Model VIII (Multiple Conditions)**

**Topic**

**Construction of DFA Model IX (Start, End , Contain)**

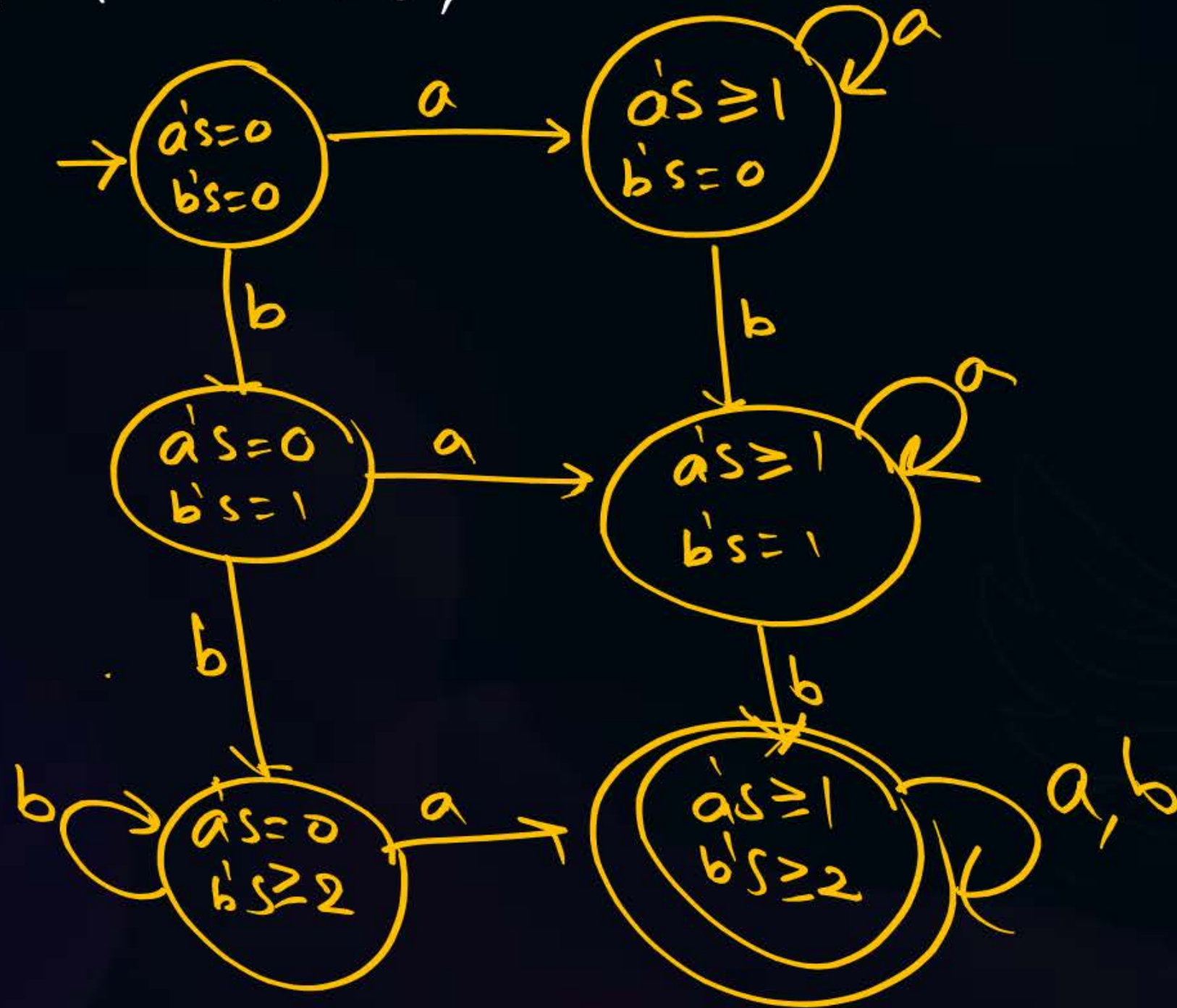
*on Symbols*



(56)  $\{w \mid w \in \{a,b\}^*, n_a(w)=1, n_b(w)=2\}$

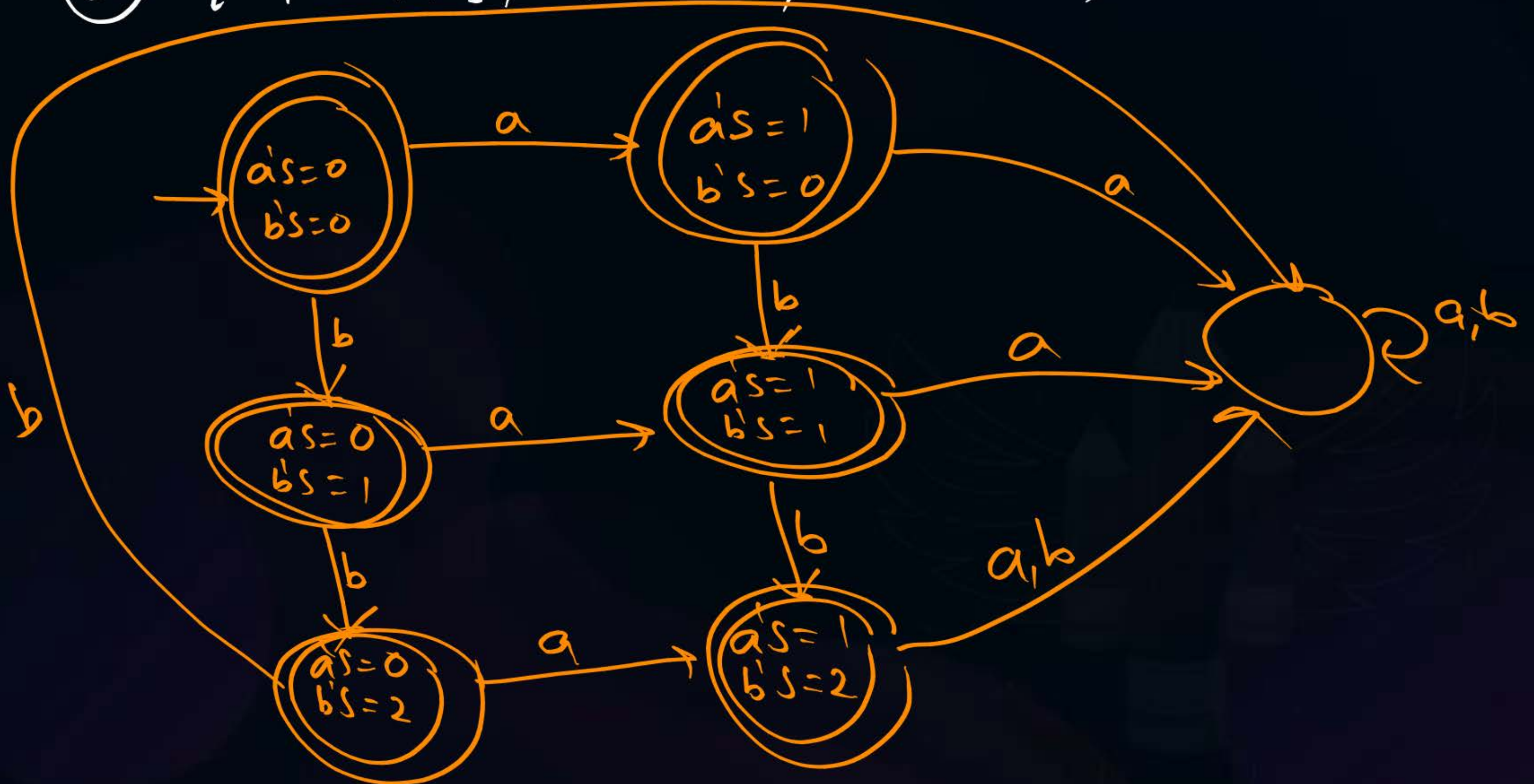


(57)  $\{w \mid w \in \{a,b\}^*, n_a(w) \geq 1, n_b(w) \geq 2\}$



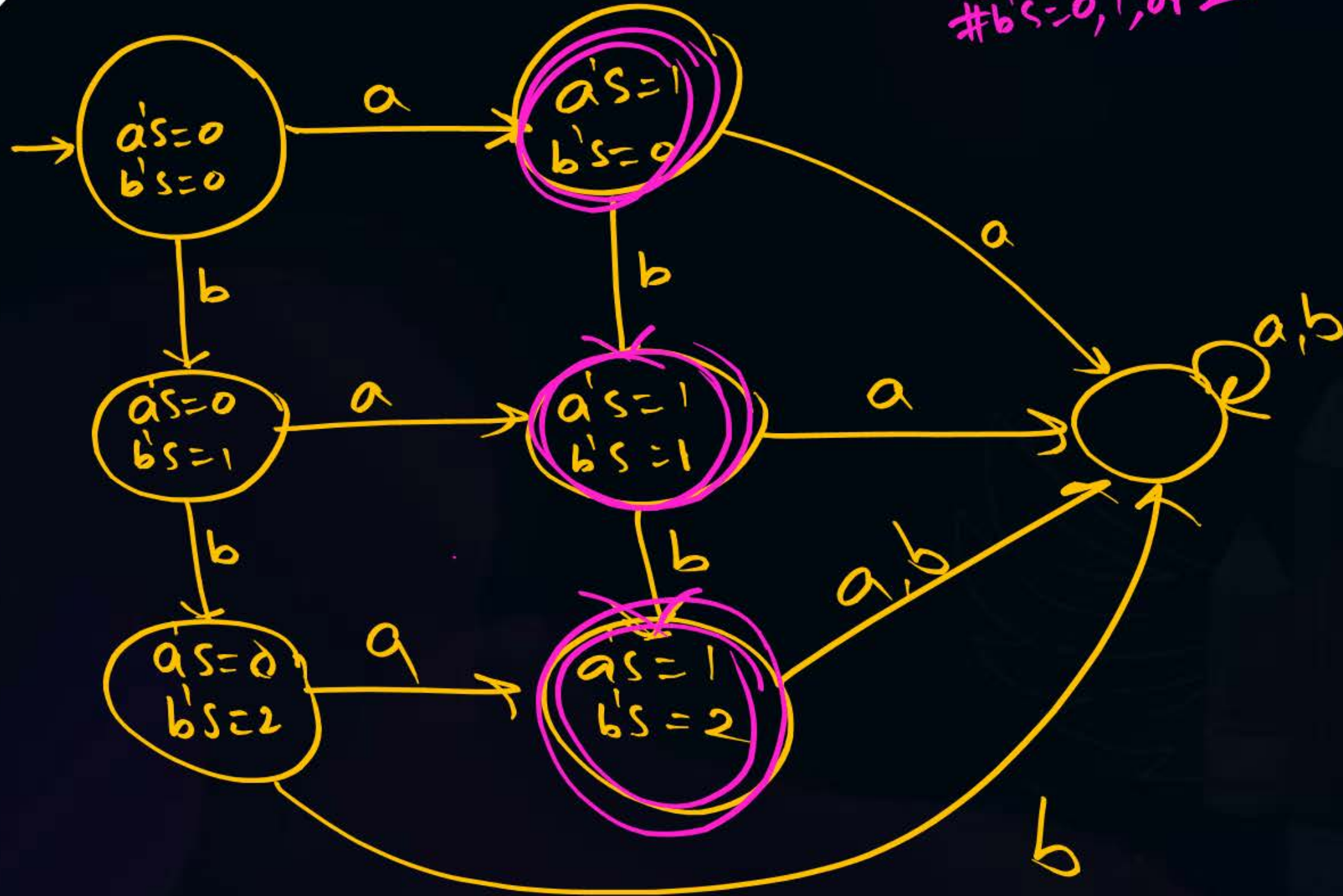


(58)  $\{w \mid w \in \{a,b\}^*, n_a(w) \leq 1, n_b(w) \leq 2\}$





(59)  $\{w \mid w \in \{a, b\}^*, n_a(w)=1, n_b(w) \leq 2\}$   
 $\#b's = 0, 1, \text{ or } 2$

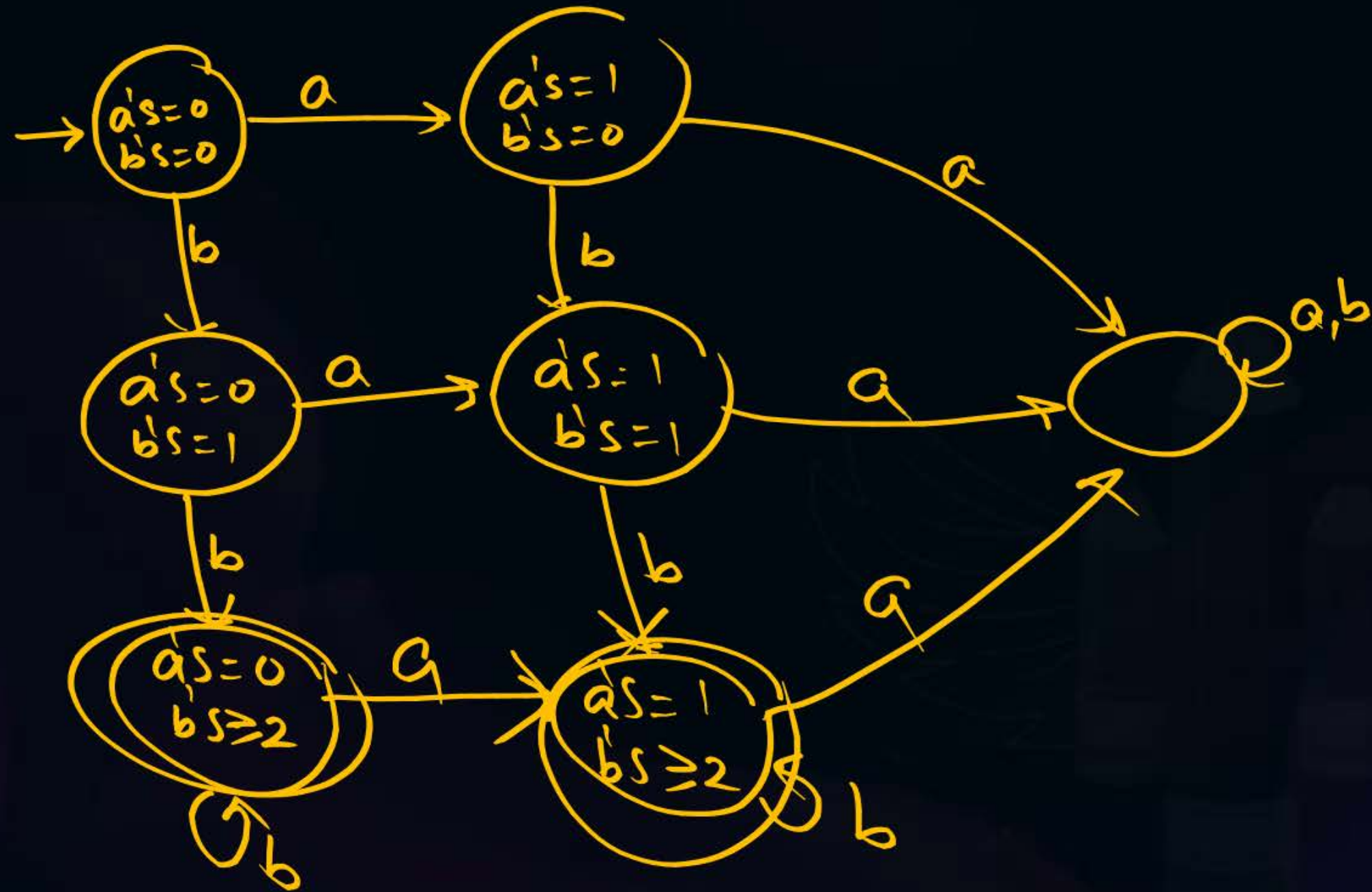


(60)  $\{w \mid w \in \{a, b\}^*, \underbrace{n_a(w) \leq 1}_{\#a's = 0 \text{ or } 1}, n_b(w) = 2\}$





(6)  $\{w/w \in \{a,b\}^*, n_a(w) \leq 1, n_b(w) \geq 2\}$



# Model-IX [start, end, contain]

- (62)  $L = a(a+b)^*$  Min = a
- (63)  $L = aaa(a+b)^*$  Min = aaa
- (64)  $L = (a+b)^*a$  Min = a
- (65)  $L = (a+b)^*aaa$  Min = aaa
- (66)  $L = (a+b)^*a(a+b)^*$  Min = a
- (67)  $L = (a+b)^*aaa(a+b)^*$  Min = aaa
- Trap state needed
- No trap state





## 2 mins Summary



Topic

Model-I (Easy:  $\Phi$ ,  $\Sigma^*$ , only epsilon,  $\Sigma^+$ )

Topic

Construction of DFA Model II (Length)

Topic

Construction of DFA Model III (No. of symbols)

Topic

Construction of DFA Model IV (Over 1 symbol)

Topic

Construction of DFA Model V (Sequence based)

Topic

Construction of DFA Model VI (Length & Remainder)

Topic

Construction of DFA Model VII (Symbols & Remainder)

VIII ✓

IX Next

**THANK - YOU**