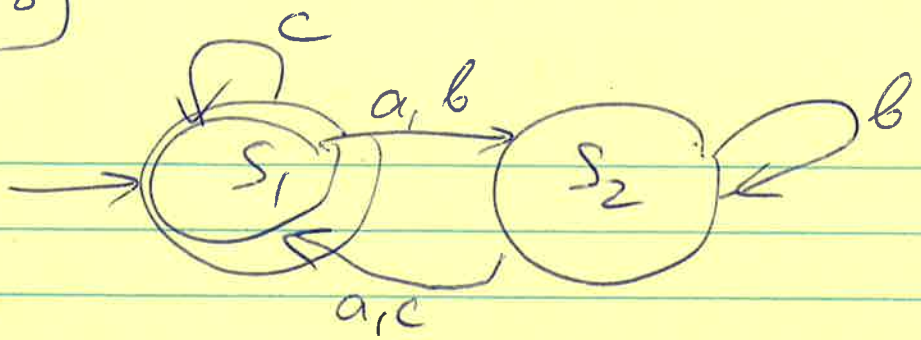
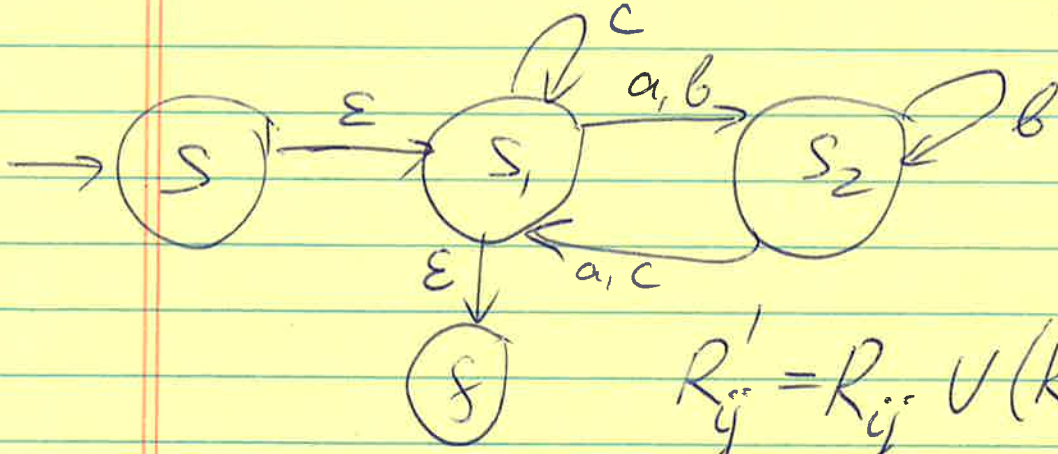
10/22/18

-M-



FA → reg. expr.



$$R_{ij}^{k} = R_{ij}^{k-1} \cup (R_{ik}^{k-1} (R_{kk}^{k-1})^{*} R_{kj}^{k-1})$$

Chomsky normal form

What we want: either $S_0 \to \varepsilon$ where S_0 is a starting variable
or $A \to a$ or $A \to BC$

How: Preliminary step: we add a new starting variable S_0 and a rule $S_0 \to S$, where S is the original starting variable

Step 0: If we have a rule $A \to \varepsilon$, and A is not a starting variable, then for every rule $V \to uAv$ which has A is rhs we add $V \to uv$

Step 1: If we have a rule $A \to B_1 \dots B_k$, then for each rule $B_i \to u$, we add a new rule $A \to u$

Step 2: For every terminal symbol a, we add a new variable V_a and replace a in rhs of rules of length ≥ 2 with V_a, add $V_a \to a$

Step 3: $A \to BCD \Rightarrow A \to V_{BC}D$, $V_{BC} \to BC$

10/22/18

(-3-)

After Step 2:

$V_a \to a$

$A \to AV_aB$

$B \to BV_bA$

$S_0 \to AV_aB$

$S_0 \to V_aB$

$S_0 \to AV_a$

$S_0 \to a$

$V_b \to b$

$A \to V_aB$

$B \to BV_b$

$A \to AV_a$

$B \to V_bA$

$A \to a$

$B \to b$

$S_0 \to BV_bA$

$S_0 \to BV_b$

$S_0 \to V_bA$

$S_0 \to b$

$S \to AV_aB$

$S \to V_aB$

$S \to AV_a$

$S \to a$

$S \to BV_bA$

$S \to BV_b$

$S \to V_bA$

$S \to b$

$S_0 \to \varepsilon$

$A \to V_{Aa}B$, $V_{Aa} \to AV_a$, $S_0 \to V_{Aa}B$

$B \to V_{Bb}A$, $V_{Bb} \to BV_b$, $S \to V_{Aa}B$

$S \to V_{Bb}A$

$S_0 \to V_{Bb}A$

Step 0: $S \to A$, $S \to B$, $A \to \varepsilon$, $B \to \varepsilon$, $A \to AaB$

$B \to BbA$, $S_0 \to S$

$A \to aB$, $B \to Bb$, $S \to \varepsilon$, $A \to Aa$

$B \to bA$, $A \to a$, $B \to b$, $S_0 \to \varepsilon$

$S \to AaA$ $S \to aA$, $S \to Aa$, $S \to a$

Step 3: $abc = a \cdot b \cdot c$

$r = a \cdot b$

$x = r \cdot c$

$S \to ABC$

$S \to V_{AB}C$

$V_{AB} \to AB$

$S \to abcd$

$r = a \cdot b$

$s = r \cdot c$

$x = s \cdot d$

$V_{ABC} \to V_{AB}C$

$V_{AB} \to AB$

$S \to abcd$

$S \to ABCD$

$S \to V_{ABC}D$

$V_{ABC} \to V_{AB}C$

$V_{AB} \to AB$