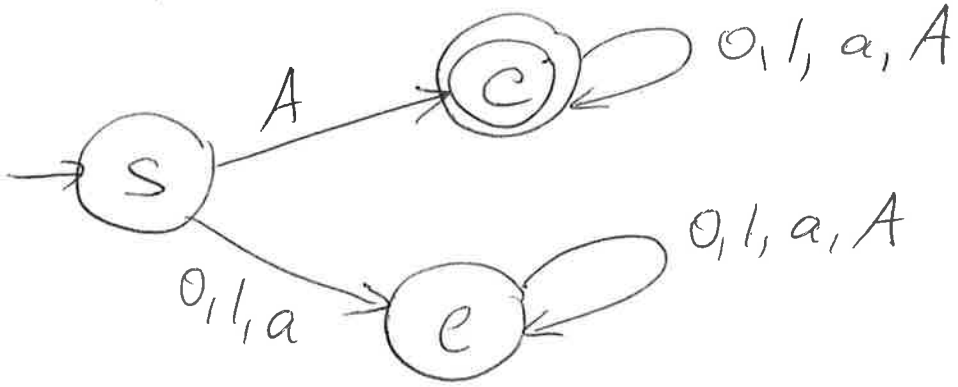
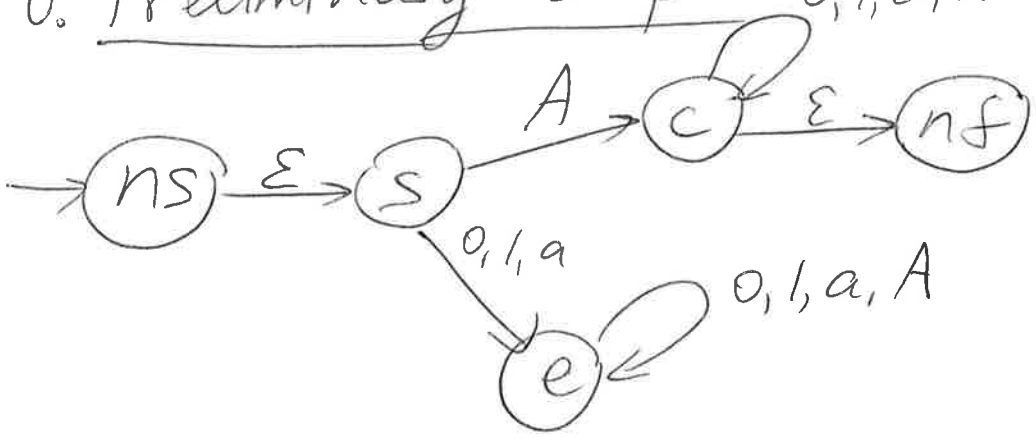
HW3, FALL 2023, P.1



General formula

$$R'_{ij} = R_{ij} \cup (R_{ik} R^*_{kk} R_{kj})$$

0. Preliminary step:



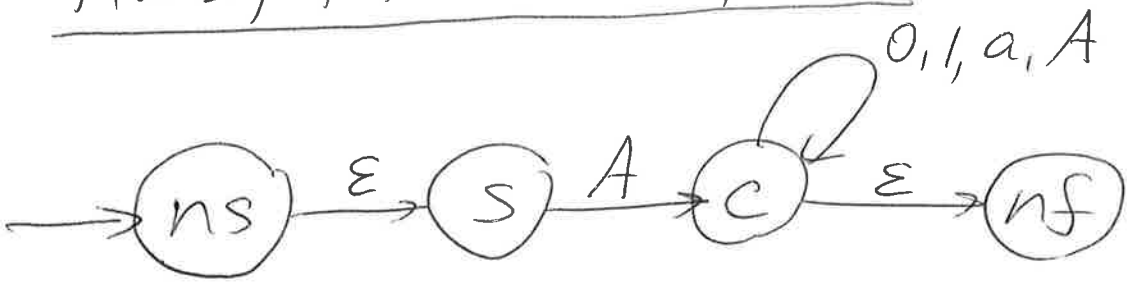
1. Eliminating state e

$$R'_{ij} = R_{ij} \cup (R_{ie} R^*_{ee} R_{ej})$$

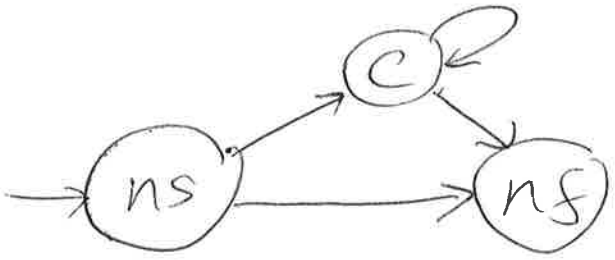
For $j \neq e$, there are no arrows from e to j, so $R_{ej} = \phi$, and concatenation with ϕ is ϕ.

So $R'_{ij} = R_{ij}$:

HW 3, FALL 2023, P.2



2. Eliminating state S



$$R'_{ns,c} = R_{ns,c} \cup (R_{ns,s} R_{s,s}^{*} R_{s,c}) =$$

$$\phi \cup (\wedge \phi^{*} A) =$$

$$\phi \cup (\wedge \wedge A) = \phi \cup A = A$$

$$R'_{ns,nf} = R_{ns,nf} \cup (R_{ns,s} R_{s,s}^{*} R_{s,nf}) =$$

$$\phi \cup (\wedge \phi^{*} \phi) = \phi \cup \phi = \phi$$

$$R'_{c,c} = R_{c,c} \cup (R_{c,s} R_{s,s}^{*} R_{s,c}) =$$

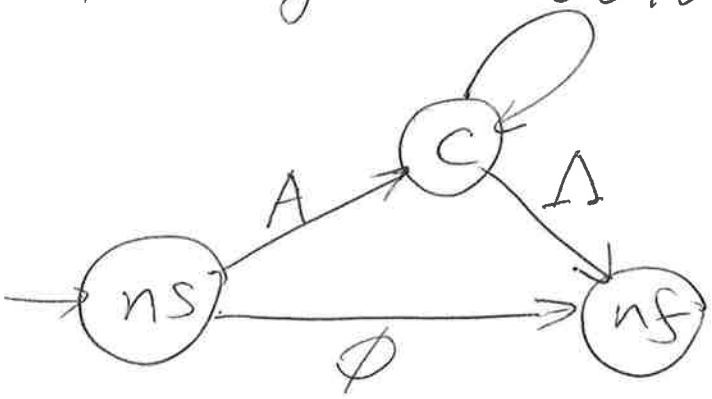
$$0 \cup 1 \cup a \cup A \cup (\phi \ldots) = 0 \cup 1 \cup a \cup A$$

$$R'_{c,nf} = R_{c,nf} \cup (R_{c,s} R_{s,s}^{*} R_{s,nf}) =$$

$$\wedge \cup (\phi \ldots) = \wedge$$

HW 3, FALL 2023, PB

So, we get: $0 \cup 1 \cup a \cup A$



3. Eliminating state c:

General formula leads to:

$$R'_{ns,nf} = R_{ns,nf} \cup (R_{ns,c} R_{c,c}^{*} R_{c,nf}) =$$

$$\emptyset \cup (A(0 \cup 1 \cup a \cup A)^{*} \Lambda) =$$

$$A(0 \cup 1 \cup a \cup A)^{*}$$