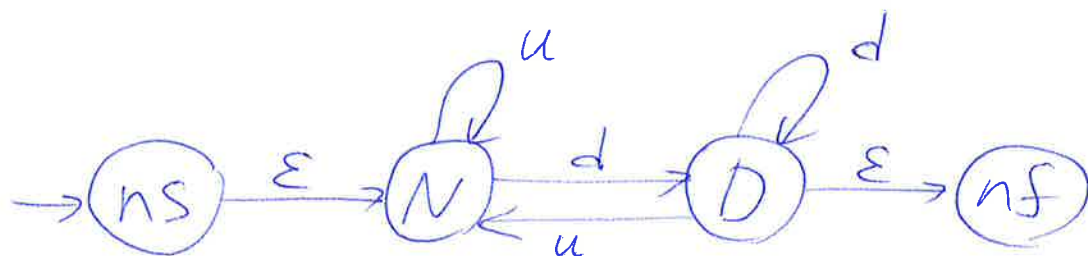
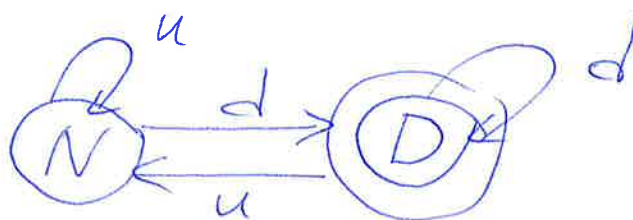
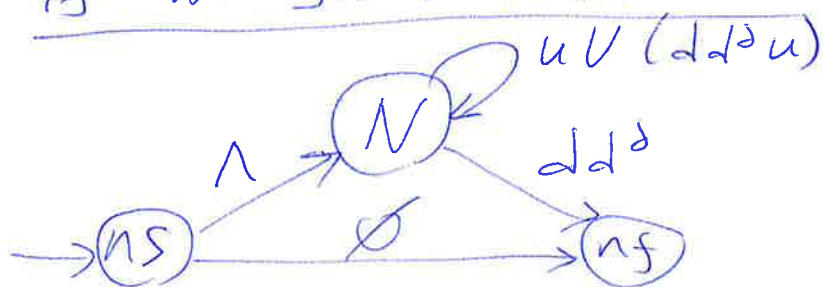


HW 3
p.1



If we first delete D:



$$R'_{ns,N} = R_{ns,N} \cup (R_{ns,D} R_{D,D}^* R_{D,N}) = \Lambda \cup (\emptyset \dots) = \Lambda$$

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

$$R'_{N,N} = R_{N,N} \cup (R_{N,D} R_{D,D}^* R_{D,N}) = u \cup (dd^* u)$$

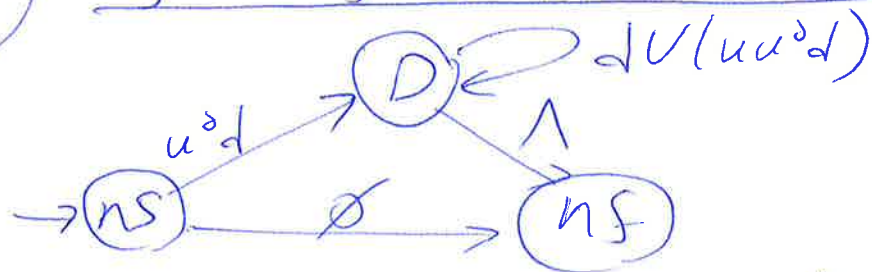
$$R'_{N,nf} = R_{N,nf} \cup (R_{N,D} R_{D,D}^* R_{D,nf}) = \emptyset \cup (dd^* \Lambda) = dd^*$$



$$R'_{ns,nf} = R_{ns,nf} \cup (R_{ns,N} R_{N,N}^* R_{N,nf}) = \emptyset \cup (\Lambda (u \cup dd^* u)^* dd^*) = \underline{(u \cup dd^* u)^* dd^*}$$

HW 3
p. 2

If we first eliminate N

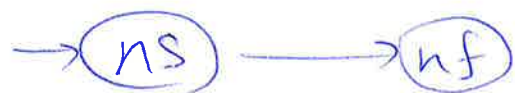


$$R'_{ns,D} = R_{ns,D} \vee (R_{ns,N} R_{N,N}^{\partial} R_{N,D}) = \emptyset \vee (\wedge u^{\partial}d) = u^{\partial}d$$

$$R'_{ns,nf} = R_{ns,nf} \vee (R_{ns,N} R_{N,N}^{\partial} R_{N,nf}) = \emptyset \vee (\wedge u^{\partial}\emptyset) = \emptyset$$

$$R'_{D,D} = R_{D,D} \vee (R_{D,N} R_{N,N}^{\partial} R_{N,D}) = \downarrow V(uu^{\partial}d)$$

$$R'_{D,nf} = R_{D,nf} \vee (R_{D,N} R_{N,N}^{\partial} R_{N,nf}) = \wedge \vee (uu^{\partial}\emptyset) = \wedge$$



$$R'_{ns,nf} = R_{ns,nf} \vee (R_{ns,D} R_{D,D}^{\partial} R_{D,nf}) = \emptyset \vee (u^{\partial} \downarrow (\downarrow V(uu^{\partial}d))^{\partial} \wedge) = \underline{u^{\partial} \downarrow (\downarrow V(uu^{\partial}d))^{\partial}}$$