Tik-79.146 **Kevät 2000**
Logiikka tietotekniikassa: erityiskysymyksiä I
Laskuharjoitus 13
Ratkaisut

1. Aloitetaan lauseen negaatiosta

$$\neg\Big(\big(Q \vee (P \wedge \mathbf{AXA}(P\mathbf{U}Q))\big) \rightarrow \mathbf{A}(P\mathbf{U}Q)\Big).$$

Muunnetaan lause positiiviseen normaalimuotoon

$$\big(Q \vee (P \wedge \mathbf{AXA}(P\mathbf{U}Q))\big) \wedge \neg\mathbf{A}(P\mathbf{U}Q)$$
$$\big(Q \vee (P \wedge \mathbf{AXA}(P\mathbf{U}Q))\big) \wedge \mathbf{E}(\neg P\mathbf{B}Q)$$

Muodostetaan taulu.

$$D_0 = \Big\{\big(Q \vee (P \wedge \mathbf{AXA}(P\mathbf{U}Q))\big) \wedge \mathbf{E}(\neg P\mathbf{B}Q)\Big\}$$

D_0:n AND-seuraajat:

$$\begin{aligned}C_0 = \Big\{&\big(Q \vee (P \wedge \mathbf{AXA}(P\mathbf{U}Q))\big) \wedge \mathbf{E}(\neg P\mathbf{B}Q),\\ &Q \vee (P \wedge \mathbf{AXA}(P\mathbf{U}Q)), \mathbf{E}(\neg P\mathbf{B}Q),\\ &Q, \neg Q, \neg P \vee \mathbf{EXE}(\neg P\mathbf{B}Q), \neg P\Big\}\\ C_1 = \Big\{&\big(Q \vee (P \wedge \mathbf{AXA}(P\mathbf{U}Q))\big) \wedge \mathbf{E}(\neg P\mathbf{B}Q),\\ &Q \vee (P \wedge \mathbf{AXA}(P\mathbf{U}Q)), \mathbf{E}(\neg P\mathbf{B}Q),\\ &Q, \neg Q, \neg P \vee \mathbf{EXE}(\neg P\mathbf{B}Q), \mathbf{EXE}(\neg P\mathbf{B}Q)\Big\}\\ C_2 = \Big\{&\big(Q \vee (P \wedge \mathbf{AXA}(P\mathbf{U}Q))\big) \wedge \mathbf{E}(\neg P\mathbf{B}Q),\\ &Q \vee (P \wedge \mathbf{AXA}(P\mathbf{U}Q)), \mathbf{E}(\neg P\mathbf{B}Q),\\ &P \wedge \mathbf{AXA}(P\mathbf{U}Q), P, \mathbf{AXA}(P\mathbf{U}Q), \neg Q,\\ &\neg P \vee \mathbf{EXE}(\neg P\mathbf{B}Q), \neg P\Big\}\\ C_3 = \Big\{&\big(Q \vee (P \wedge \mathbf{AXA}(P\mathbf{U}Q))\big) \wedge \mathbf{E}(\neg P\mathbf{B}Q),\\ &Q \vee (P \wedge \mathbf{AXA}(P\mathbf{U}Q)), \mathbf{E}(\neg P\mathbf{B}Q),\\ &P \wedge \mathbf{AXA}(P\mathbf{U}Q), P, \mathbf{AXA}(P\mathbf{U}Q), \neg Q,\\ &\neg P \vee \mathbf{EXE}(\neg P\mathbf{B}Q), \mathbf{EXE}(\neg P\mathbf{B}Q)\Big\}\end{aligned}$$

Solmut C_0, C_1 ja C_2 voidaan karsia pois, koska ne sisältävät jonkin atomilauseen ja sen negaation.

C_3:n OR-seuraaja: $D_1 = \{\mathbf{A}(P\mathbf{U}Q), \mathbf{E}(\neg P\mathbf{B}Q)\}$

D_1:n AND-seuraajat:

$$\begin{aligned}
C_4 &= D_1 \cup \{Q, \neg Q, \neg P \vee \mathbf{EXE}(\neg P\mathbf{B}Q), \neg P\} \\
C_5 &= D_1 \cup \{Q, \neg Q, \neg P \vee \mathbf{EXE}(\neg P\mathbf{B}Q), \mathbf{EXE}(\neg P\mathbf{B}Q)\} \\
C_6 &= D_1 \cup \{P \wedge \mathbf{AXA}(P\mathbf{U}Q), P, \mathbf{AXA}(P\mathbf{U}Q), \neg Q, \\
&\qquad \neg P \vee \mathbf{EXE}(\neg P\mathbf{B}Q), \neg P\} \\
C_7 &= D_1 \cup \{P \wedge \mathbf{AXA}(P\mathbf{U}Q), P, \mathbf{AXA}(P\mathbf{U}Q), \neg Q, \\
&\qquad \neg P \vee \mathbf{EXE}(\neg P\mathbf{B}Q), \mathbf{EXE}(\neg P\mathbf{B}Q)\}
\end{aligned}$$

Solmut C_4, C_5 ja C_6 karsitaan pois.

C_7:n OR-seuraaja: $\{\mathbf{A}(P\mathbf{U}Q), \mathbf{E}(\neg P\mathbf{B}Q)\} = D_1$

C_7 voidaan karsia pois, koska tulevaisuuslause $\mathbf{A}(P\mathbf{U}Q)$ ei toteudu (Q ei koskaan tosi). Tämän jälkeen karsitaan D_1, C_3 ja D_0, joten jäljelle jää tyhjä taulu. Siten alkuperäinen lause on pätevä.

2. Muunnetaan lause positiiviseen normaalimuotoon:

$$\mathbf{AG}(req \rightarrow \mathbf{AF}ack) \wedge \mathbf{EF}req \wedge \mathbf{AF}\neg ack$$
$$\mathbf{AG}(\neg req \vee \mathbf{AF}ack) \wedge \mathbf{EF}req \wedge \mathbf{AF}\neg ack$$

Rakennetaan taulu.

$$D_0 = \{\mathbf{AG}(\neg req \vee \mathbf{AF}ack) \wedge \mathbf{EF}req \wedge \mathbf{AF}\neg ack\}$$

Lasketaan D_0:n AND-seuraajat. Merkitään

$$\begin{aligned}
A = \{&\mathbf{AG}(\neg req \vee \mathbf{AF}ack) \wedge \mathbf{EF}req \wedge \mathbf{AF}\neg ack, \\
&\mathbf{AG}(\neg req \vee \mathbf{AF}ack), \mathbf{EF}req, \\
&\mathbf{AF}\neg ack, \neg req \vee \mathbf{AF}ack, \\
&\mathbf{AXAG}(\neg req \vee \mathbf{AF}ack)\}.
\end{aligned}$$

$$
\begin{aligned}
C_0 &= A \cup \{\neg req, req, \neg ack\} \\
C_1 &= A \cup \{\mathbf{AF}ack, ack, req, \neg ack\} \\
C_2 &= A \cup \{\mathbf{AF}ack, \mathbf{AXAF}ack, req, \neg ack\} \\
C_3 &= A \cup \{\neg req, \mathbf{EXEF}req, \neg ack\} \\
C_4 &= A \cup \{\mathbf{AF}ack, ack, \mathbf{EXEF}req, \neg ack\} \\
C_5 &= A \cup \{\mathbf{AF}ack, \mathbf{AXAF}ack, \mathbf{EXEF}req, \neg ack\} \\
C_6 &= A \cup \{\neg req, req, \mathbf{AXAF}\neg ack\} \\
C_7 &= A \cup \{\mathbf{AF}ack, ack, req, \mathbf{AXAF}\neg ack\} \\
C_8 &= A \cup \{\mathbf{AF}ack, \mathbf{AXAF}ack, req, \mathbf{AXAF}\neg ack\} \\
C_9 &= A \cup \{\neg req, \mathbf{EXEF}req, \mathbf{AXAF}\neg ack\} \\
C_{10} &= A \cup \{\mathbf{AF}ack, ack, \mathbf{EXEF}req, \mathbf{AXAF}\neg ack\} \\
C_{11} &= A \cup \{\mathbf{AF}ack, \mathbf{AXAF}ack, \mathbf{EXEF}req, \mathbf{AXAF}\neg ack\}
\end{aligned}
$$

Karsitaan C_0, C_1, C_4 ja C_6.

C_2:n OR-seuraaja: $D_1 = \{\mathbf{AG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack\}$
C_3:n OR-seuraaja: $D_2 = \{\mathbf{AG}(\neg req \vee \mathbf{AF}ack), \mathbf{EF}req\}$
C_5:n OR-seuraaja: $D_3 = \{\mathbf{AG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, \mathbf{EF}req\}$
C_7:n OR-seuraaja: $D_4 = \{\mathbf{AG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}\neg ack\}$
C_8:n OR-seuraaja: $D_5 = \{\mathbf{AG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, \mathbf{AF}\neg ack\}$
C_9:n OR-seuraaja: $D_6 = \{\mathbf{AG}(\neg req \vee \mathbf{AF}ack), \mathbf{EF}req, \mathbf{AF}\neg ack\}$
C_{10}:n OR-seuraaja: D_6
C_{11}:n OR-seuraaja: $D_7 = \{\mathbf{AG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, \mathbf{EF}req, \mathbf{AF}\neg ack\}$

D_1:n AND-seuraajat:

$$
\begin{aligned}
C_{12} &= D_1 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), ack, \neg req\} \\
C_{13} &= D_1 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AXAF}ack, \neg req\} \\
C_{14} &= D_1 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), ack\} \\
C_{15} &= D_1 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AXAF}ack\}
\end{aligned}
$$

D_2:n AND-seuraajat:

$$\begin{aligned}
C_{16} &= D_2 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, req\}\\
C_{17} &= D_2 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, \mathbf{EXEF}req\}\\
C_{18} &= D_2 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, ack, req\}\\
C_{19} &= D_2 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, ack,\\
&\qquad \mathbf{EXEF}req\}\\
C_{20} &= D_2 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack,\\
&\qquad \mathbf{AXAF}ack, req\}\\
C_{21} &= D_2 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack,\\
&\qquad \mathbf{AXAF}ack, \mathbf{EXEF}req\}
\end{aligned}$$

Karsitaan C_{16}.

D_3:n AND-seuraajat:

$$\begin{aligned}
C_{22} &= D_3 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), ack, \neg req, req\}\\
C_{23} &= D_3 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AXAF}ack, \neg req,\\
&\qquad req\}\\
C_{24} &= D_3 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), ack, \neg req,\\
&\qquad \mathbf{EXEF}req\}\\
C_{25} &= D_3 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AXAF}ack, \neg req,\\
&\qquad \mathbf{EXEF}req\}\\
C_{18} &= D_3 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), ack, req\}\\
C_{26} &= D_3 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), ack, req,\\
&\qquad \mathbf{AXAF}ack\}\\
C_{19} &= D_3 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), ack, \mathbf{EXEF}req\}\\
C_{27} &= D_3 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), ack, \mathbf{EXEF}req,\\
&\qquad \mathbf{AXAF}ack\}\\
C_{20} &= D_3 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AXAF}ack, req\}\\
C_{21} &= D_3 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AXAF}ack,\\
&\qquad \mathbf{EXEF}req\}
\end{aligned}$$

Karsitaan C_{22} ja C_{23}.

D_4:n AND-seuraajat:

$$C_{28} = D_4 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, \neg ack\}$$
$$C_{29} = D_4 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, \mathbf{AXAF}\neg ack\}$$
$$C_{30} = D_4 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, ack, \neg ack\}$$
$$C_{31} = D_4 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, ack, \mathbf{AXAF}\neg ack\}$$
$$C_{32} = D_4 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, \mathbf{AXAF}ack, \neg ack\}$$
$$C_{33} = D_4 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, \mathbf{AXAF}ack, \mathbf{AXAF}\neg ack\}$$

Karsitaan C_{30}.

D_5:n AND-seuraajat:

$$C_{34} = D_5 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, \neg ack, ack\}$$
$$C_{35} = D_5 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, \neg ack, \mathbf{AXAF}ack\}$$
$$C_{36} = D_5 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, \mathbf{AXAF}\neg ack, ack\}$$
$$C_{37} = D_5 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, \mathbf{AXAF}\neg ack, \mathbf{AXAF}ack\}$$
$$C_{30}$$
$$C_{38} = D_5 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, ack, \mathbf{AF}\neg ack, \neg ack, \mathbf{AXAF}ack\}$$
$$C_{31}$$
$$C_{39} = D_5 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, ack, \mathbf{AF}\neg ack, \mathbf{AXAF}\neg ack, \mathbf{AXAF}ack\}$$
$$C_{32}$$
$$C_{33}$$

Karsitaan C_{34}, C_{30} ja C_{38}.

D_6:n AND-seuraajat:

$$C_{40} = D_6 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, req, \neg ack\}$$
$$C_{41} = D_6 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, req, \mathbf{AXAF}\neg ack\}$$
$$C_{42} = D_6 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, \mathbf{EXEF}req, \neg ack\}$$
$$C_{43} = D_6 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, \mathbf{EXEF}req, \mathbf{AXAF}\neg ack\}$$
$$C_{44} = D_6 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, ack, req, \neg ack\}$$
$$C_{45} = D_6 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, ack, req, \mathbf{AXAF}\neg ack\}$$
$$C_{46} = D_6 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, ack, \mathbf{EXEF}req, \neg ack\}$$
$$C_{47} = D_6 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, ack, \mathbf{EXEF}req, \mathbf{AXAF}\neg ack\}$$
$$C_{48} = D_6 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, \mathbf{AXAF}ack, req, \neg ack\}$$
$$C_{49} = D_6 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, \mathbf{AXAF}ack, req, \mathbf{AXAF}\neg ack\}$$
$$C_{50} = D_6 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, \mathbf{AXAF}ack, \mathbf{EXEF}req, \neg ack\}$$
$$C_{51} = D_6 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, \mathbf{AXAF}ack, \mathbf{EXEF}req, \mathbf{AXAF}\neg ack\}$$

Karsitaan C_{40}, C_{41}, C_{44} ja C_{46}.

D_7:n AND-seuraajat:

$C_{52} = D_7 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, req, \neg ack, ack\}$

$C_{53} = D_7 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, req, \neg ack,$
$\mathbf{AXAF}ack\}$

$C_{54} = D_7 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, req,$
$\mathbf{AXAF}\neg ack, ack\}$

$C_{55} = D_7 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, req,$
$\mathbf{AXAF}\neg ack, \mathbf{AXAF}ack\}$

$C_{56} = D_7 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, \mathbf{EXEF}req,$
$\neg ack, ack\}$

$C_{57} = D_7 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, \mathbf{EXEF}req,$
$\neg ack, \mathbf{AXAF}ack\}$

$C_{58} = D_7 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, \mathbf{EXEF}req,$
$\mathbf{AXAF}\neg ack, ack\}$

$C_{59} = D_7 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req, \mathbf{EXEF}req,$
$\mathbf{AXAF}\neg ack, \mathbf{AXAF}ack\}$

C_{44}

$C_{60} = D_7 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), ack, req, \neg ack,$
$\mathbf{AXAF}ack\}$

C_{45}

$C_{61} = D_7 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), ack, req,$
$\mathbf{AXAF}\neg ack, \mathbf{AXAF}ack\}$

C_{46}

$C_{62} = D_7 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), ack, \mathbf{EXEF}req, \neg ack,$
$\mathbf{AXAF}ack\}$

C_{47}

$C_{63} = D_7 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), ack, \mathbf{EXEF}req,$
$\mathbf{AXAF}\neg ack, \mathbf{AXAF}ack\}$

C_{48}

C_{49}

C_{50}

C_{51}

Karsitaan C_{52}, C_{53}, C_{54}, C_{55}, C_{56}, C_{44}, C_{60}, C_{42} ja C_{62}.

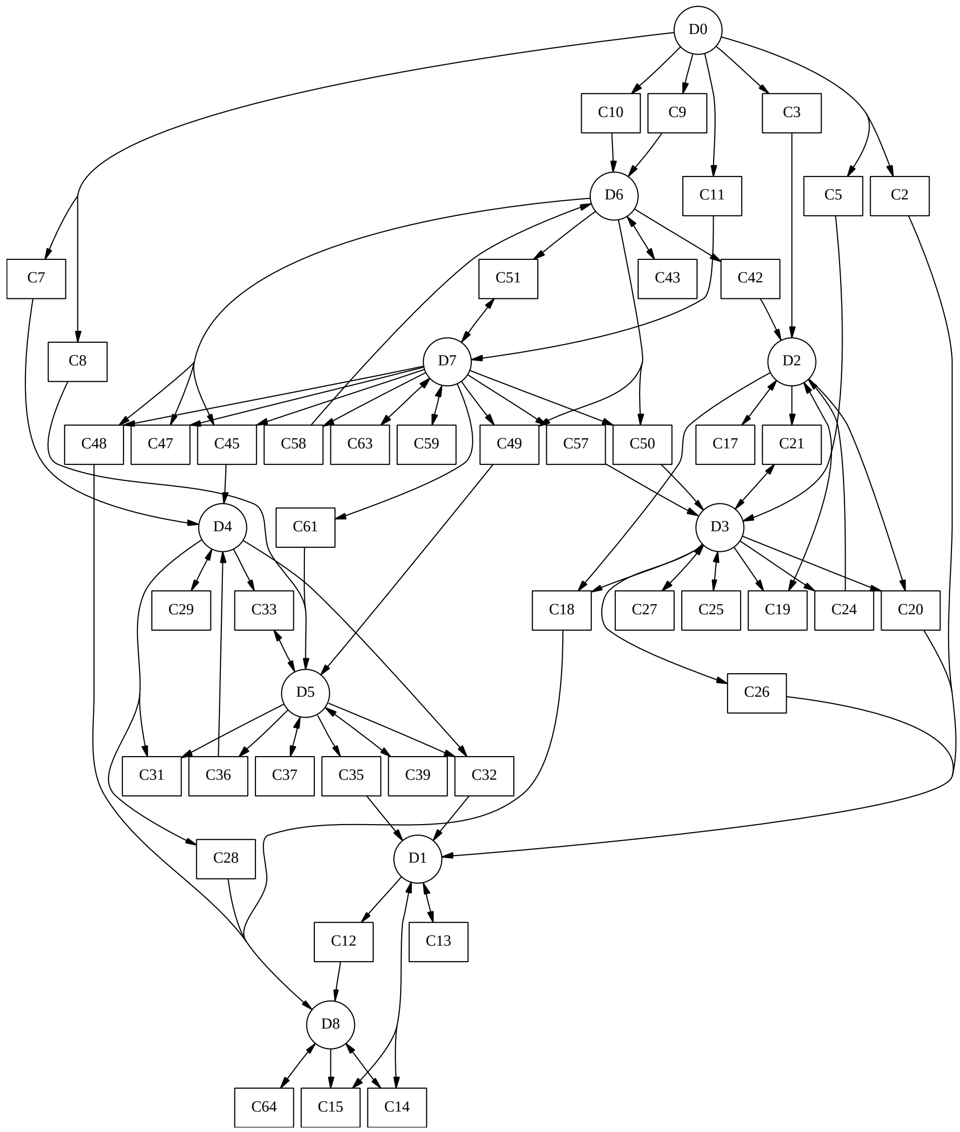
C_{12}:n OR-seuraaja: $D_8 = \{\mathbf{AG}(\neg req \vee \mathbf{AF}ack)\}$
C_{13}:n OR-seuraaja: D_1
C_{14}:n OR-seuraaja: D_8
C_{15}:n OR-seuraaja: D_1
C_{17}:n OR-seuraaja: D_2
C_{18}:n OR-seuraaja: D_8
C_{19}:n OR-seuraaja: D_2
C_{20}:n OR-seuraaja: D_1
C_{21}:n OR-seuraaja: D_3
C_{24}:n OR-seuraaja: D_2
C_{25}:n OR-seuraaja: D_3
C_{26}:n OR-seuraaja: D_1
C_{27}:n OR-seuraaja: D_3
C_{28}:n OR-seuraaja: D_8
C_{29}:n OR-seuraaja: D_4
C_{31}:n OR-seuraaja: D_4
C_{32}:n OR-seuraaja: D_1
C_{33}:n OR-seuraaja: D_5
C_{35}:n OR-seuraaja: D_1
C_{36}:n OR-seuraaja: D_4
C_{37}:n OR-seuraaja: D_5
C_{39}:n OR-seuraaja: D_5
C_{42}:n OR-seuraaja: D_2
C_{43}:n OR-seuraaja: D_6
C_{45}:n OR-seuraaja: D_4
C_{47}:n OR-seuraaja: D_6
C_{48}:n OR-seuraaja: D_8
C_{49}:n OR-seuraaja: D_5
C_{50}:n OR-seuraaja: D_3
C_{51}:n OR-seuraaja: D_7
C_{57}:n OR-seuraaja: D_3
C_{58}:n OR-seuraaja: D_6
C_{59}:n OR-seuraaja: D_7
C_{61}:n OR-seuraaja: D_5
C_{63}:n OR-seuraaja: D_7

D_8:n AND-seuraajat:

$C_{64} = D_8 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \neg req\}$
$C_{14} = D_8 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, ack\}$
$C_{15} = D_8 \cup \{\neg req \vee \mathbf{AF}ack, \mathbf{AXAG}(\neg req \vee \mathbf{AF}ack), \mathbf{AF}ack, \mathbf{AXAF}ack\}$

C_{64}:n OR-seuraaja: D_8

Alustava taulu T_0:



Tulevaisuuslause $\mathbf{AF}ack$ ei toteudu solmuissa C_{13} ja C_{15}, joten ne voidaan karsia. Mm. solmut C_2, C_{12}, C_{14}, C_{64}, D_8, D_1 ja D_0 jäävät graafista saatavaan lopulliseen tauluun, joten lause $\mathbf{AG}(req \to \mathbf{AF}ack) \wedge \mathbf{EF}req \wedge \mathbf{AF}\neg ack$ on toteutuva.

Lauseen malli muodostetaan valitsemalla siihen lopullisen taulun AND-solmuja sekä niille seuraajat siten, että solmuissa olevat tulevaisuus-lauseet toteutuvat, kun atomilauseiden totuusarvot asetetaan AND-solmujen sisältämiä atomilauseita vastaavasti. Malli voidaan muodostaa solmuista C_2 (s), C_{12} (t), C_{64} (u) ja C_{14} (v), jolloin alkuperäinen lause toteutuu solmussa s (C_2 sisältää alkuperäisen lauseen). (Jos jokin AND-solmu ei erityisesti kiinnitä jonkin atomilauseen totuusarvoa, se voidaan valita vapaasti.)

$$
\begin{tikzcd}
s \arrow[d] & req, \neg ack \\
t \arrow[d] & \neg req, ack \\
u \arrow[d, bend right] & \neg req, ack \\
v \arrow[u, bend right] & \neg req, ack
\end{tikzcd}
$$