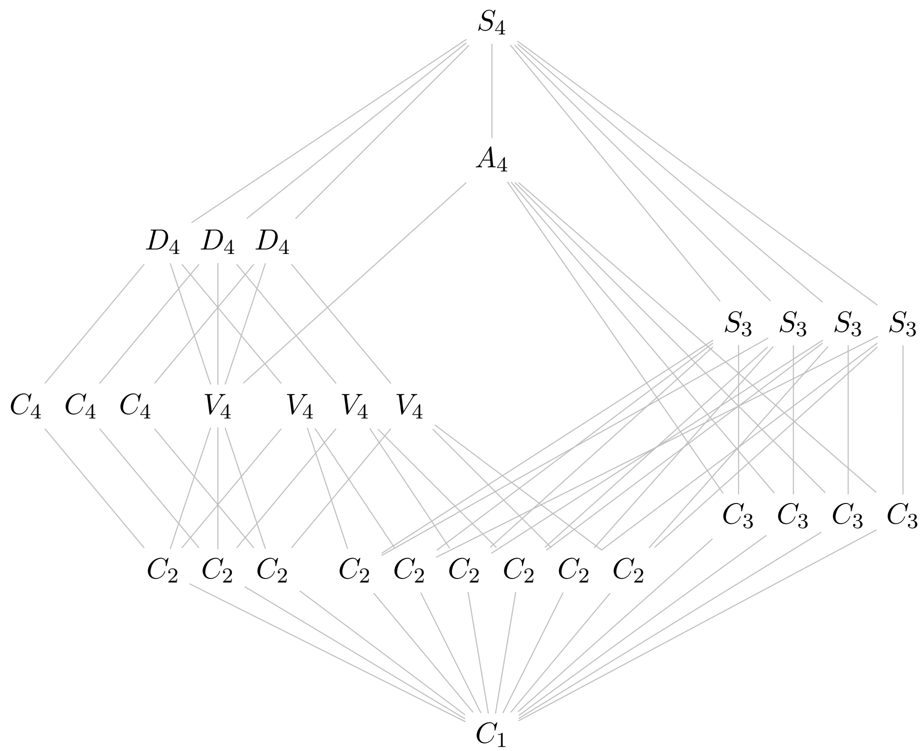
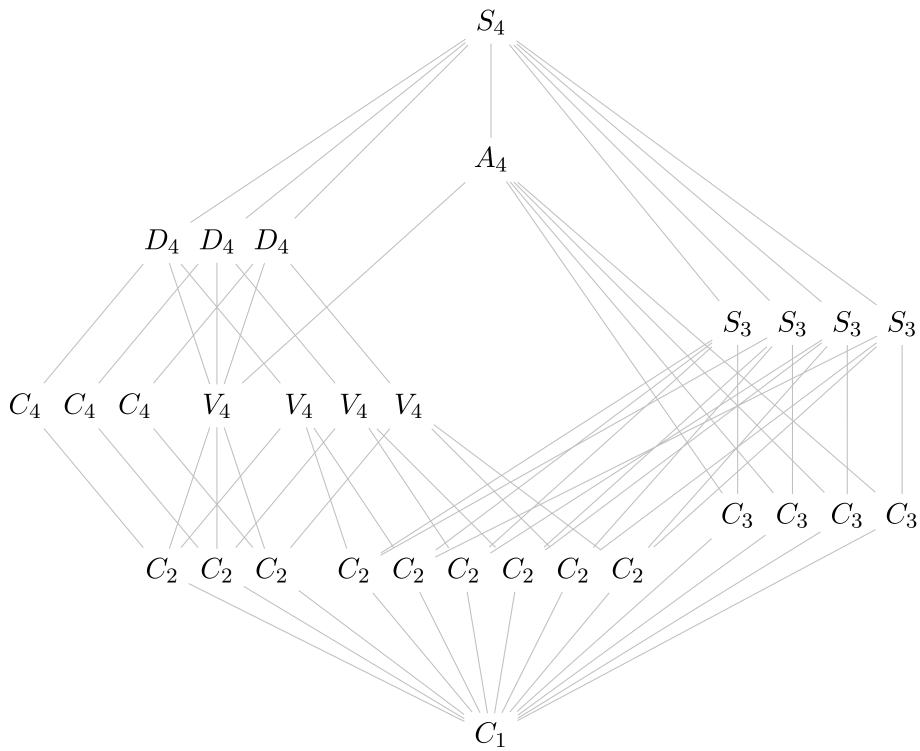
Supplemental material for Math 4130, HW 6

#1: The group $G = S_4$, constructed as a sequence of abelian extensions, from "top-to-bottom": $\quad G = G_0 \trianglerighteq G_1 \trianglerighteq G_2 \trianglerighteq G_3 = \langle 1 \rangle$.



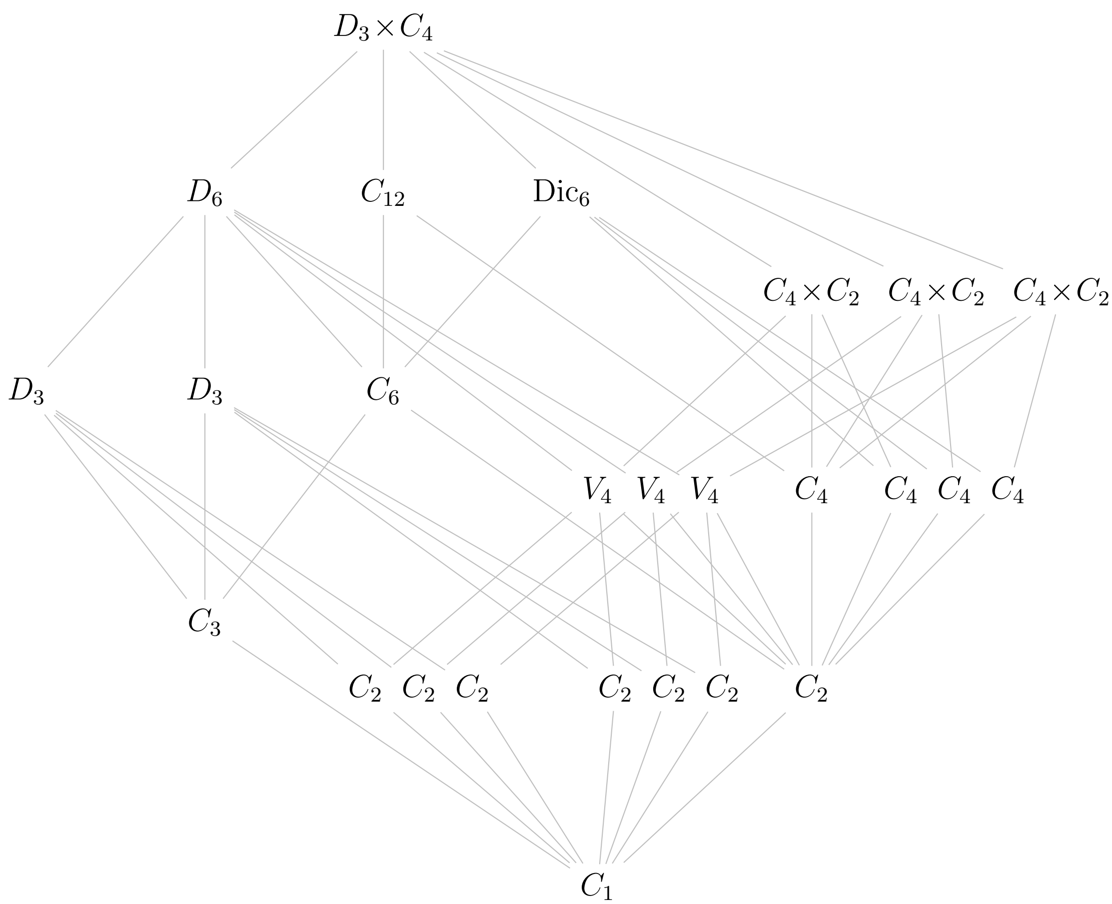
$$\begin{tikzcd}
 & & 1 \arrow[r] & G' \arrow[r, hook] \arrow[d, dashed] & G \arrow[r, two heads] & G/G' \arrow[r] & 1 \\
 & 1 \arrow[r] & G'' \arrow[r, hook] \arrow[d, dashed] & G' \arrow[r, two heads] & G'/G'' \arrow[r] & 1 & \\
1 \arrow[r] & G''' \arrow[r, hook] & G'' \arrow[r, two heads] & G'''/G'' \arrow[r] & 1 & &
\end{tikzcd}$$

#1: The group $G = S_4$, constructed as a sequence of abelian extensions, from "bottom-to-top": $\langle 1 \rangle = G_3 \trianglelefteq G_2 \trianglelefteq G_1 \trianglelefteq G_0 = G$.

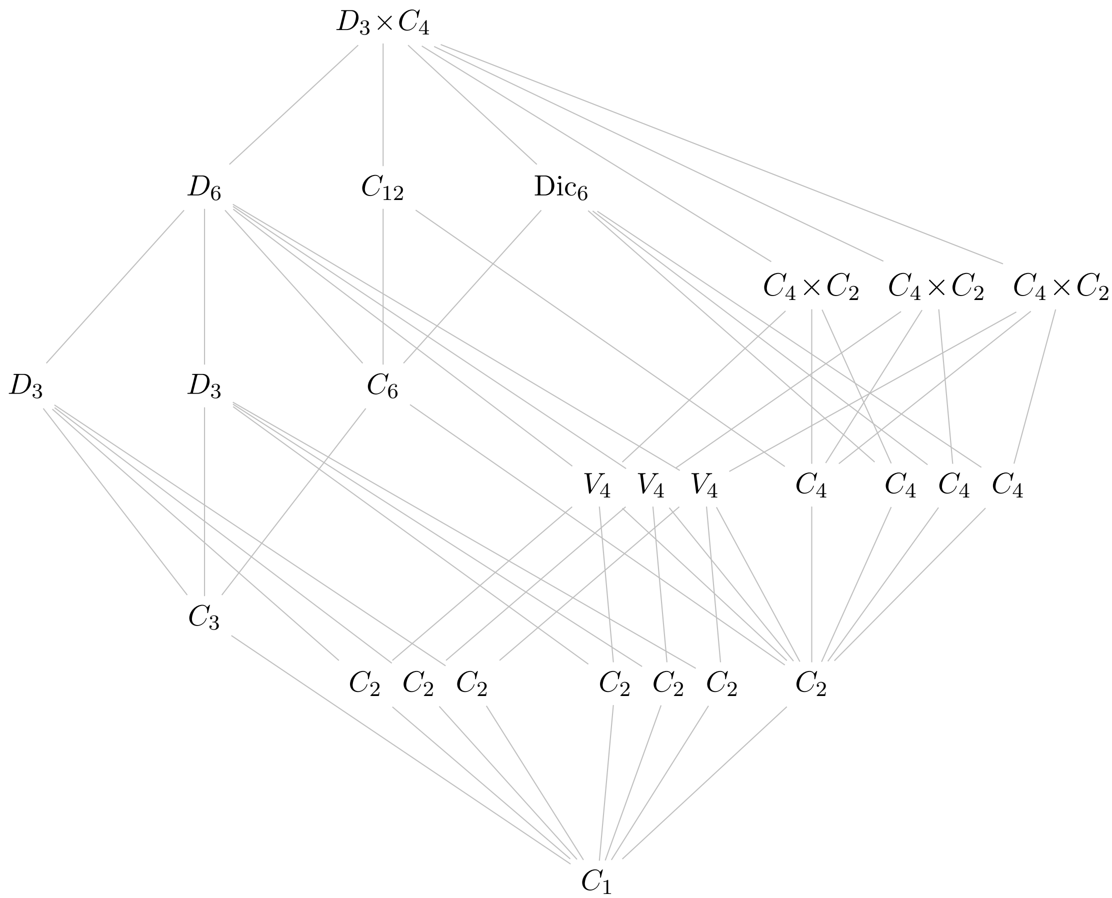


$$
\begin{tikzcd}
 & & 1 \arrow[r] & G/G' \arrow[r, hook] & G/G' \arrow[r, two heads] & G/G \arrow[r] & 1 \\
 & 1 \arrow[r] & G'/G'' \arrow[r, hook] & G/G'' \arrow[r, two heads] & G/G' \arrow[r] \arrow[u, dashed] & 1 & \\
1 \arrow[r] & G''/G''' \arrow[r, hook] & G/G''' \arrow[r, two heads] & G/G'' \arrow[r] \arrow[u, dashed] & 1 & &
\end{tikzcd}
$$

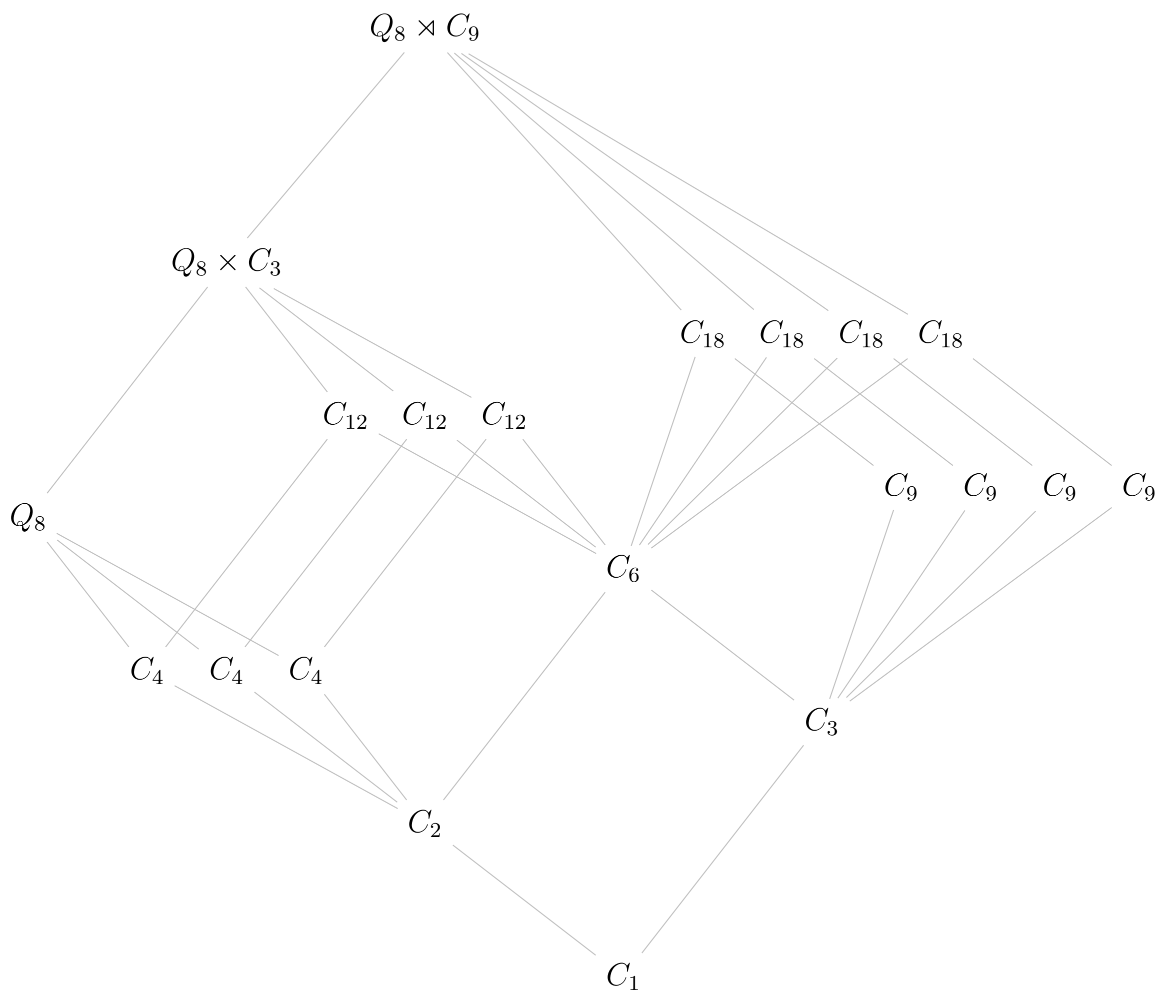
#2: The group $G = D_3 \times C_4$, constructed as a sequence of abelian extensions, from "top-to-bottom": $\quad G = G_0 \trianglerighteq G_1 \trianglerighteq G_2 \trianglerighteq G_3 = \langle 1 \rangle$.



#2: The group $G = D_3 \times C_4$, constructed as a sequence of abelian extensions, from "bottom-to-top": $\langle 1\rangle = G_3 \trianglelefteq G_2 \trianglelefteq G_1 \trianglelefteq G_0 = G$.



#2: The group $G = Q_8 \rtimes C_9$, constructed as a sequence of abelian extensions, from "top-to-bottom": $G = G_0 \trianglerighteq G_1 \trianglerighteq G_2 \trianglerighteq G_3 = \langle 1 \rangle$.



#2: The group $G = Q_8 \rtimes C_9$, constructed as a sequence of abelian extensions, from "bottom-to-top": $\langle 1 \rangle = G_3 \trianglelefteq G_2 \trianglelefteq G_1 \trianglelefteq G_0 = G$.