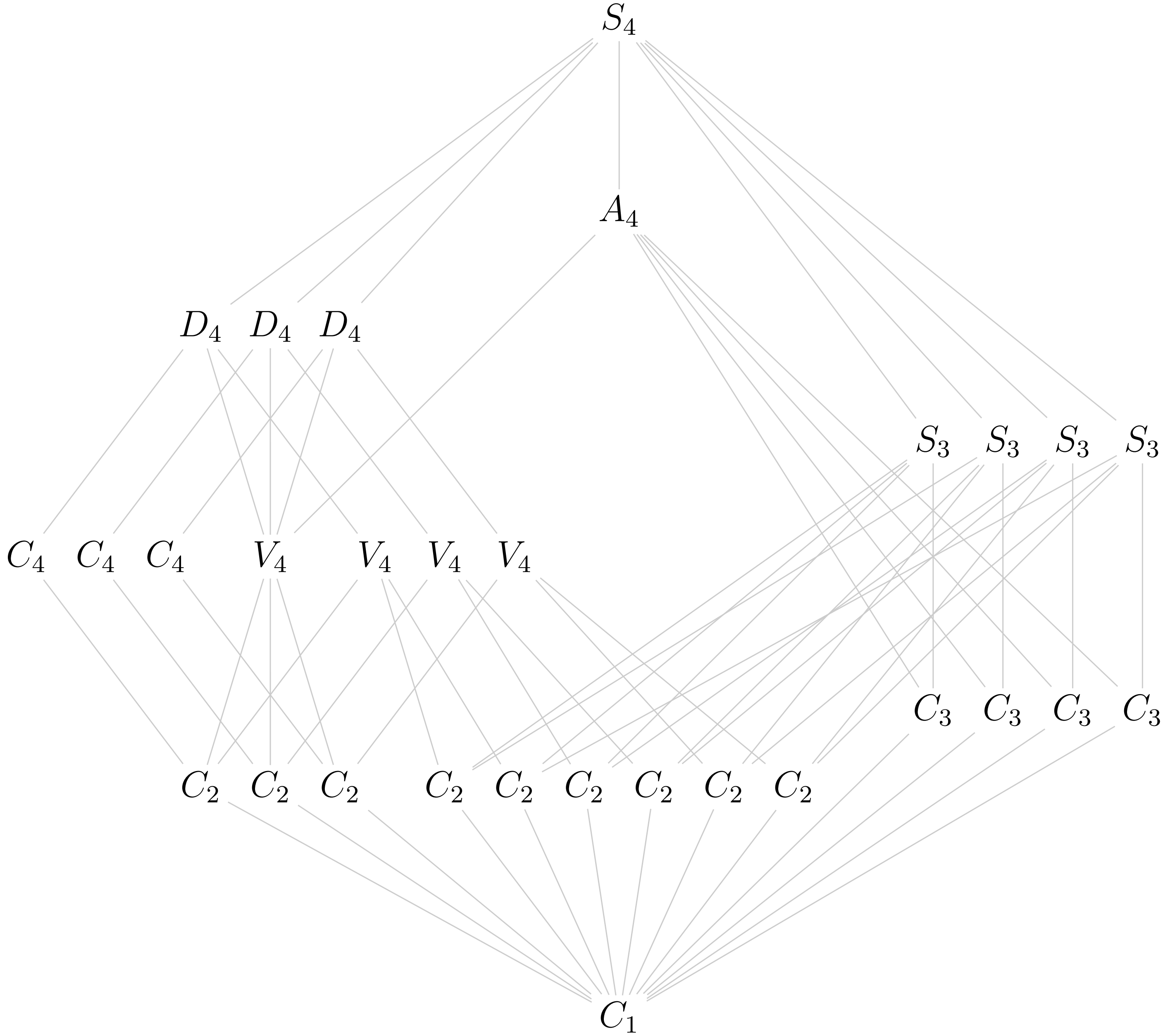
Supplemental material: Visual Algebra (Math 4120), HW 12

#1(a): The subgroup lattice of the symmetric group S_4, partitioned into conjugacy classes.



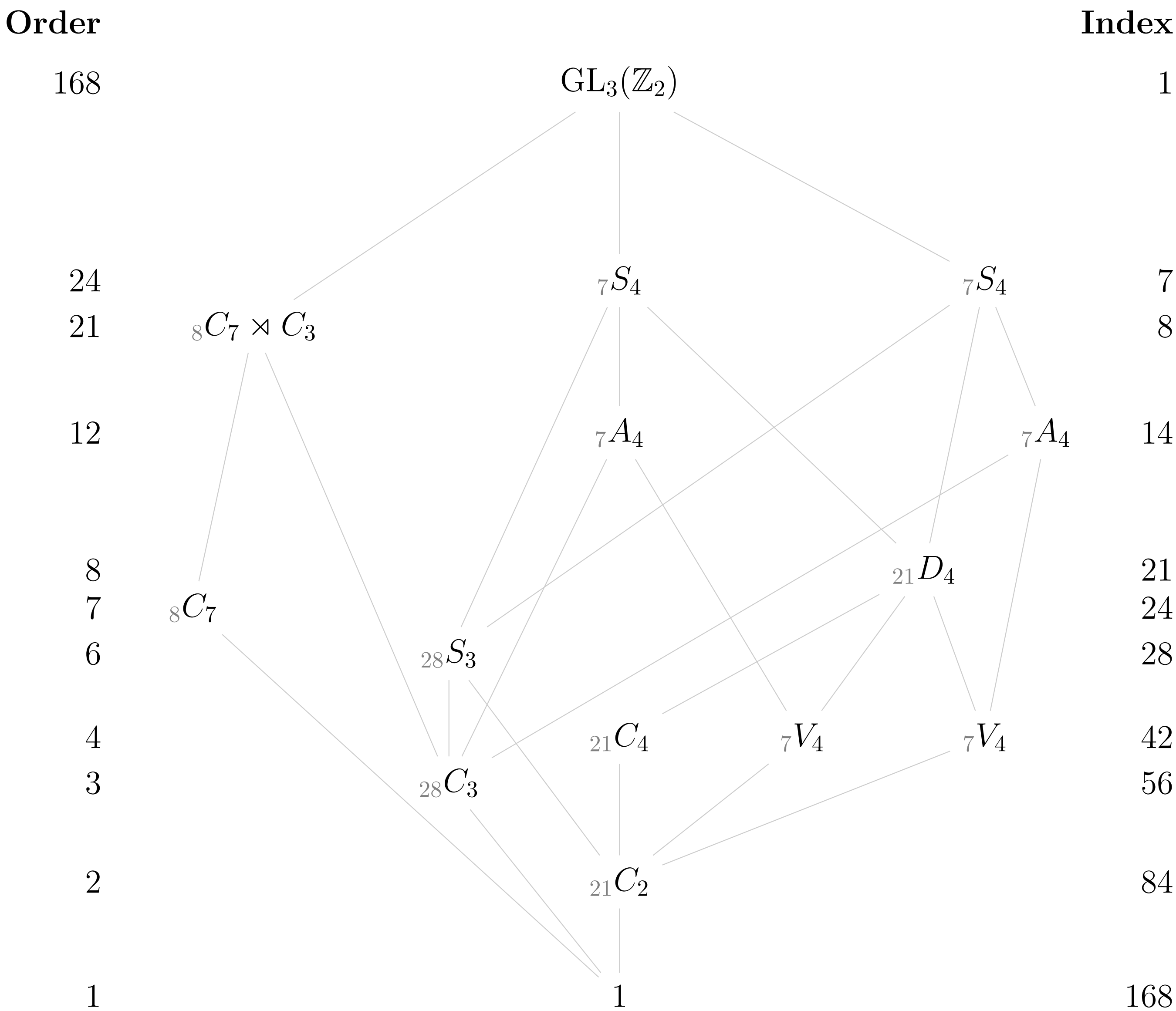
#1(c): A table of all 15 groups of order 24.

group	alias(es)	#subgroups	n_2	P_2	n_3	P_3
C_{24}	$C_8 \times C_3$					
$C_{12} \times C_2$						
$C_6 \times C_2^2$						
S_4						
D_{12}						
Dic_{12}						
$\mathrm{SL}_2(\mathbb{Z}_3)$						
$C_3 \rtimes C_8$						
$C_3 \rtimes D_4$						
$A_4 \times C_2$						
$S_3 \times C_4$						
$D_4 \times C_3$						
$S_3 \times C_2^2$						
$Q_8 \times C_3$						
$\mathrm{Dic}_6 \times C_2$						

#3(a): The subgroup lattice of the general linear group $\mathrm{GL}_3(\mathbb{Z}_2)$, with:

(i) the p-subgroups color-coded,

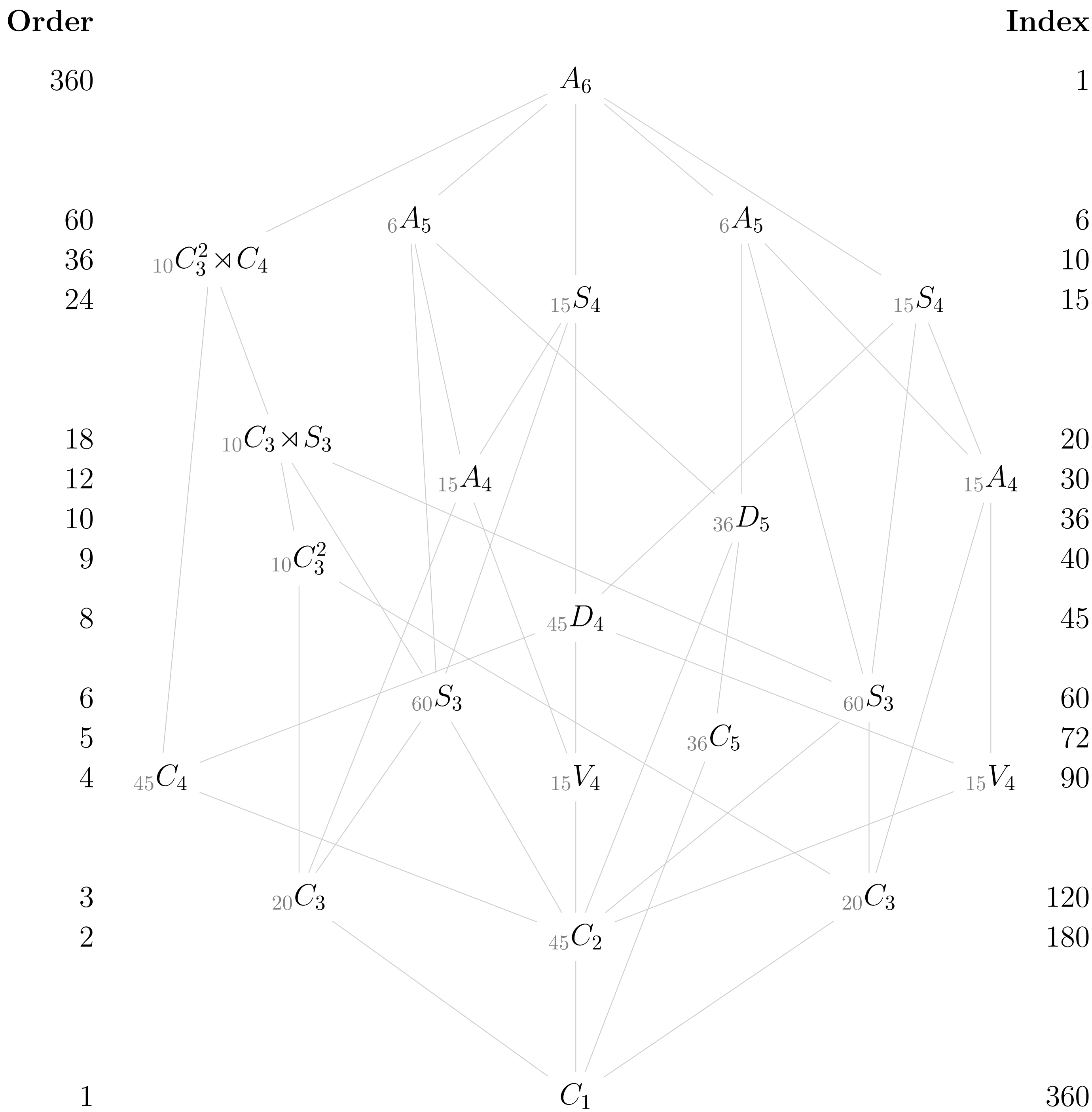
(ii) arrows from each non-singleton conjugacy class $\mathrm{cl}(H)$ to the class $\mathrm{cl}(N(H))$ of its normalizer.



#5(a,b): The subgroup lattice of the alternating group A_6, with:

(i) the p-subgroups color-coded,

(ii) arrows from each non-singleton conjugacy class $\mathrm{cl}(H)$ to the class $\mathrm{cl}(N(H))$ of its normalizer.



#5(c): The ten subgroups of order $90 = 2 \cdot 3^2 \cdot 5$, the number of their subgroups, Sylow p-subgroups, and the isomorphism type of their Sylow 3-subgroup(s).

	#subgroups	n_2	n_3	P_3	n_5
C_{90}					
$C_{30} \times C_3$					
D_{45}					
$C_{15} \times D_3$					
$C_{15} \rtimes D_3$					
$C_9 \rtimes D_5$					
$C_3^2 \times D_5$					
$C_5 \rtimes D_9$					
$C_3 \times D_{15}$					
$C_3 \rtimes D_{15}$					