1) (GAP) Let $G = \text{SL}_2(3)$ (the group of invertible $2 \times 2$ matrices over $\mathbb{F}_3$ with determinant 1). Find a generating set for $G$ (take enough matrices such that they generate a group of size $|\text{SL}_2(3)| = 24$).

The commands:

```gap
gap> l:=ConjugacyClassesSubgroups(G);;
gap> l:=Union(List(l,Elements));
```

produce a list of all subgroups of $G$. Use these (and the command `IsSubset`) to draw the lattice of $G$.

Identify the isomorphism types of subgroups you know.