Problem 1
Let \((X, <)\) be a partially ordered set on a countably infinite set \(X\). Show that \((X, <)\) contains an infinite chain, or an infinite antichain.

Problem 2
Show that Aut\((\mathbb{Q}; \text{Cycl})\) strictly contains Aut\((\mathbb{Q}; <)\).

Problem 3
Verify the claim from the lecture that isomorphic structures have isomorphic automorphism groups.

Problem 4
Give an example of two non-isomorphic structures that the same signature and isomorphic automorphism groups (isomorphic as permutation groups).