

# Algebraic Geometry 2

## Exercises Tutorium 8

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**Exercise 1.** Let  $X$  be a scheme and  $\mathcal{A}$  a quasi-coherent  $\mathcal{O}_X$ -algebra.

- (1) Construct a scheme  $\underline{\text{Spec}}(\mathcal{A})$ , affine over  $X$ .
- (2) Show that the construction  $\mathcal{A} \mapsto \underline{\text{Spec}}(\mathcal{A})$  induces a contravariant equivalence of categories between quasi-coherent  $\mathcal{O}_X$ -algebras and affine  $X$ -schemes.
- (3) Deduce that there is a bijection between isomorphism classes of closed subschemes of  $X$  and quasi-coherent ideal sheaves on  $X$ .