MATH 724, SPRING 2012, HOMEWORK 5
DUE WEDNESDAY 11 APRIL

Exercise 1. Let X be a topological space, and let $\mathcal{F}$ be a sheaf of abelian groups on X. Let $U \subseteq X$ be a non-empty open subset, and consider U with the subspace topology induced from X. (Because U is open in X, in the subspace topology on U, a subset $Y \subseteq U$ is open in U if and only if it is open in X. You do not need to prove this.)

(a) Prove that $\mathcal{F}|_U$ is a sheaf of abelian groups on U.
(b) Prove that if $\mathcal{F}$ is a sheaf of rings on X, then $(U, \mathcal{F}|_U)$ is a ringed space and that the natural inclusion and restriction functions describe a morphism of ringed spaces $(U, \mathcal{F}|_U) \to (X, \mathcal{F})$.
(c) Prove that if $\mathcal{F}$ is a sheaf of k-algebras on X, then $\mathcal{F}|_U$ is a sheaf of k-algebras on U.