Homework 8

Deadline: Tuesday, December 9 at 14:00.

Please submit your solutions either on paper at the beginning of the practicals or as a pdf-file in https://owl.mff.cuni.cz/ . Everything that is not immediately obvious needs to be proved or quoted from lecture notes.
Note that you should solve only one of the following questions below.

1. Prove that $\mathbb{Z}_2[\alpha]/(\alpha^4+\alpha^3+1)$ forms a field, determine the number of its elements, and calculate α^{-1} and α^9 in the field.

2. Find irreducible factorization of the polynomial x^6+x+1 in the fields $\mathbb{Z}_2$ and $\mathbb{Z}_2[\alpha]/(\alpha^2+\alpha+1)$.