Computer Science CSC478/2412 Spring 1997
St. George Campus University of Toronto

Homework Assignment #4
Due: Friday, 28 March 1997
Mark: 15%

1. Problem 4.18, page 148 of the textbook.

2. Implement the fast algorithm for division of polynomials covered in class. Give several examples with the output from both your algorithm and MAPLE's division algorithm.

3. Compute the squarefree factorization of

$$x^8 + x^6 + 2x^5 + 2x^3 + x^2 + 1,$$

over $\mathbb{Z}$ and $\mathbb{Z}_3$. (You can use MAPLE for computing gcds, derivatives, and so on.)

4. Implement the distinct-degree factorization algorithm (DDF). Then, do Problem 8.17, page 386 of the textbook.

5. Using the ideas behind the distinct-degree factorization method, derive an algorithm for testing the irreducibility of polynomials over finite fields. Implement your algorithm in MAPLE. Find all irreducible polynomials of degree 4 over $\mathbb{F}_2$.

References

K.O. Geddes and S.R. Czapor and G. Labahn, *Algorithms for Computer Algebra*, Kluwer Academic Publishers, Boston, 1992.