

# Computer Algebra (2013)-Aalborg University

## Second set of exercises

**The deadline for this set of exercises is 5/11.** I would like to get (by email) an electronic file with your solutions. Furthermore, a (brief) reasoned explanation should follow the solution of the exercises, you can write your explanation in the electronic file or print the computer solution and hand-write your explanation.

Solve the following exercises using a Computer Algebra System:

**Exercise 1** Write a table/list with all the elements of  $\mathbb{F}_{32}$  in Maple or Sage where you consider the representation using a power of a primitive element and the polynomial notation.

**Exercise 2** Implement Algorithm 8.1 (Karatsuba) in Maple or Sage. Compute an example.

**Exercise 3** Solve Exercise 8.10 in [GG]. For “ $V_1\alpha, V_1\beta$ ” read “ $V_1f, V_1g$ ”, where  $f, g \in F^8$  are the coefficients of the polynomials  $f$  and  $g$ .

**Exercise 4** Compute the distinct-degree decomposition of the polynomial  $f$  in exercise 14.3 in [GG] using a command in Maple or Sage.

**Exercise 5** Solve Exercise 14.3 in [GG] using Maple or Sage. You do not have to implement Algorithm 14.3, but you are welcome to do it.

**Exercise 6** Factor the polynomial  $f$  in exercise 14.12 in [GG] using a command in Maple or Sage.

**Exercise 7** Solve Exercise 14.12 in [GG] using Maple or Sage. You do not have to implement Algorithm 14.10, but you are welcome to do it.

Best regards,

Diego