EXAM AND STUDY SKILLS

The lesser the importance you attach to past examination papers and to model solutions of the coursework, the better you will do in the examination.

The purpose of the examination is to test your *understanding* of the syllabus, and your ability to *explain* the concepts you have learnt and their mutual relations. This is quite different from (and a lot more than) *doing* examination questions, in the sense of performing computations. I regard the latter as a small part of the assessment, and of value only if connected to the rest.

To test your readiness for the exam, choose an item at random from the index at the end of the web-book. Identify the associated *definitions* and state them precisely, using symbols. Then do the same using words. Illustrate each definition with an example and a counter-example. Identify the main *theorems* and *algorithms* related to such definitions. State them first, then explain in words what they mean. When a sufficiently important theme emerges, write a short essay about it.

A definition will invariably refer to theorems and other definitions, for which you should repeat the process. Continuing in this way, you can in principle explore the entire syllabus, starting from anywhere. If you succeed, it means that you have learnt, that is, that you have established *connections between facts.*

For example, choosing *'long division'* takes you to *divisibility, quotient, remainder,* hence to MOD, DIV, and Euclid's algorithm `GCD` and `ExtendedGCD`. From there you find *recursive algorithm, loop invariant,* etc. Long division rests on two structurally similar theorems, for integers and polynomials, respectively. The former uses the notion of absolute value, the latter that of *degree*, and so on.

'Doing' exercises chosen at random from the web-book (which are essentially the same as coursework problems), is also necessary, but by no means sufficient.

During the exam, check your calculations, whenever possible. In the essays, aim for precision and conciseness. Read carefully what you have written; rewrite

as often as necessary. (Half of the students write essays without a rough copy or an outline: they invariably perform poorly.)

If you aim for top marks, practise designing algorithms, and attempt proofs from the exercises in the recommended textbook(s). Concentrate on the essays; this is where the best students distance themselves from the rest.