

**CM20019—COMPUTATION III:  
FORMAL LOGIC AND SEMANTICS  
EXERCISE SHEET 2, 12.10.2007**

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**Problem 1.** Give a grammar for the language that consists of strings of  $b$ 's separated by single  $a$ 's.

**Problem 2.** Given a computable function, can we design a string rewriting system that computes it? If so, how? If not, why not?

**Problem 3.** Find a string rewriting system  $P$  such that for every string  $a1^n b$ , where  $n \geq 0$ , there is a unique string  $X$  such that  $a1^n b \Rightarrow_P^* X$  and  $X$  is terminal, and such that  $X = c1^n d1^n e$  (note:  $1^n$  means a string of  $n$  characters, all of which are 1).

**Problem 4.** Find a grammar that generates  $\{1^n \mid n \text{ is a positive Fibonacci number}\}$ , where positive Fibonacci numbers are 1, 2, 3, 5, 8, 13, 21, ....

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The web page for the course is at [1]. You can find other exercises in Dan Richardson's notes, available from the web page.

References

1. Alessio Guglielmi, *CM20019—Computation III: Formal logic and semantics*, <http://cs.bath.ac.uk/ag/CM20019>, 2007.