

COMPUTER SCIENCE TRIPOS Part IA – 2014 – Paper 1

7 Algorithms (FMS)

- (a) Consider the radix sort algorithm.
- (i) Explain how radix sort works, to what inputs it can be applied and what its asymptotic complexity is. [5 marks]
 - (ii) Explain why running radix sort does not proceed from most to least significant digit, as would at first seem more intuitive. [4 marks]
 - (iii) Give a proof by induction of the correctness of radix sort. [4 marks]
- (b) Clearly describe an algorithm, strictly better than $O(n^2)$, that takes a positive integer s and a set A of n positive integers and returns a Boolean answer to the question whether there exist two distinct elements of A whose sum is exactly s . Evaluate its complexity. [7 marks]