

Report on the Scientific Background Written Assessment Computer Science

The exam contained three exercises with questions of increasing difficulty. The questions were designed to assess the candidate's understanding, knowledge and the quality of his or her initiatives. Some of the questions also intended to check basic mathematical knowledge required by computer studies at ENS.

The first exercise was by far the most classical of the three, and it is no surprise that it is the one which was best understood, though the answers could have been better explained. The exercise consisted of four questions : the first one dealt with an analysis of a variant of merge sort, the second one with simulating a queue with two stacks, the third and fourth ones on streams of numbers. Any candidate who had read the Cormen/Leiserson/Rivest textbook on algorithms would have been able to answer the first two questions of the first exercise. The third and fourth questions were based on a simple trick.

The second exercise was more mathematical, and it was unfortunately poorly understood. The goal of the exercise was to adapt the classical Gram-Schmidt orthogonalization procedure to compute only with integers, given vectors with integer coordinates. This procedure is known as integral Gram-Schmidt. The candidates seemed to be confused between rational numbers and integers.

The third exercise, for students who chose Computer Science as their secondary subject, dealt with the discrete logarithm problem. Although there was no major difficulty, nobody solved the full exercise, and the answers should have been better written.

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