LABORATORY FOR
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Advanced Algorithms

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Preface

This document consists of the lecture notes for *6.854J/18.415J Advanced Algorithms* as it was taught by Michel Goemans in the Fall 1994. The notes are for the most part based on notes scribed by students during the last four years, with help from the teaching assistants, Marios Papaefthymiou (Fall 1990), Michael Klugerman (Fall 1991 and 1992), Esther Jesurum (Fall 1993) and Matthew Andrews (Fall 1994). The notes are not meant to be in polished form, and they probably contain several errors and omissions. Rather, they are intended to be an aid in teaching and/or studying a few advanced topics in the design and analysis of algorithms. Part of these notes have not been covered in class, but have been included for completeness. Also, some topics which have been covered in the past but not this year (such as basis reduction for lattices) have been omitted. The topics covered this year are online algorithms, randomized algorithms, linear programming, network flow, and approximation algorithms. A few new results have been covered for the first time this year, such as the result of Koutsoupias and Papadimitriou on the competitiveness of the work function algorithm for the k-server problem, and the approximation algorithm of Linial, London and Rabinovich and Aumann and Rabani for the multicommodity cut problem using embeddings of metrics.

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