
Preface

People, problems, and proofs are the lifeblood of theoretical computer science, which we call *theory* for short. When you switch on any of the computing devices that have transformed our lives, you are thinking of applications, *apps* for short. But behind many applications there are clever algorithms, and for every worthwhile algorithm there is a problem that it solves and a proof that it works. Before this proof there was an open problem: can one create an efficient algorithm to solve the computational problem? If so, how? If not, why not? Finally behind these questions are people who are excited by fundamental issues about our computational world.

In this second book based on posts from the weblog *Gödel's Lost Letter and $P = NP$* (GLL), we tell stories of what motivates the people toward their problems and—in many cases—proofs. We begin, however, with a long chapter spanning several posts on a case that attacked the famous problem in our blog's title, but did not end with a valid proof. We follow with some chapters on the language of theory, on the nature of proofs, and on several important conjectures that are seeking proofs. Then we give a selection of other stories that we posted in the year 2010. They are not in chronological order.

Every post on our blog, and every chapter in this book, begins with the names of one or more people as featured subjects. The chapter may cover their work, and important ideas of theirs, or an important association to them in work by others. Then our second paragraph makes a short statement of the chapter's topic. On the blog we always begin that with the word “today,” but in this book our pitch invites the reader in other ways. Another invariant is that our posts and chapters never close—the “closing” is a section titled “Open Problems” with further questions to pursue. Our chapters here also have a “Notes and Links” section that includes all references that were hyperlinked in the post, and sometimes additional remarks and references.

GLL was started by me, Dick Lipton, in February 2009, assisted by my student Subruk Kalyanasundaram and some other Georgia Tech locals. That summer I contacted Ken Regan, whom I have known in the field since the 1980s and worked with in the 1990s, about the subjects of a few posts, featuring him in one. Ken joined my copy-editing rota, and his role became larger by summer 2010. By late 2010 he started co-authoring and writing posts fairly regularly, and I am glad to welcome him as a co-author of this collection. We have kept the usage of “I” referring to me as it was in the posts, except in the long first chapter and Chaps. 32 and 60 which

were written by him. Posts in which I referred to him retain the way his name was given then. We both hope you will enjoy this collection.

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