Crossroads The ACM Magazine for Students

SUMMER 2025 VOL.31 · NO.4 XRDS.ACM.ORG

XRDS

The Future of Cybersecurity

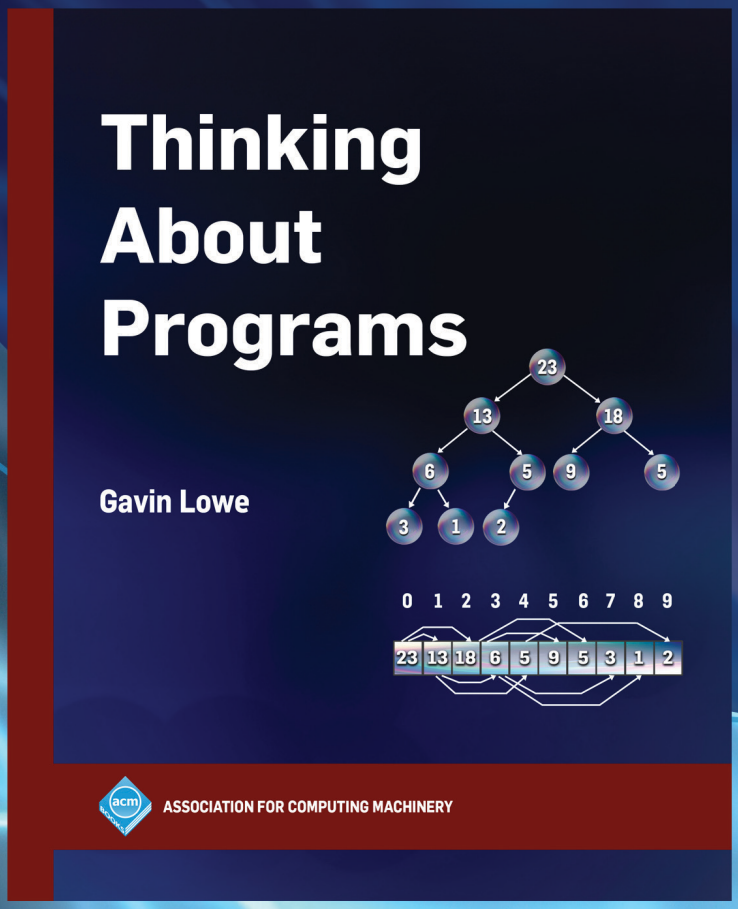
A City That Thinks—but Doesn't Overthink

Cyber-Physical Security in Healthcare

Can You Trust What AI Hears (and Says)?

Association for Computing Machinery

NEW BOOK RELEASE



ACM BOOKS
Collection III

Thinking About Programs

Gavin Lowe

ISBN: 979-8-4007-3163-1
DOI: 10.1145/3731333

This book is based on the author's experience of 30 years of teaching programming at the University of Oxford and is an excellent choice for early programming courses offered by universities worldwide. It is a rigorous and thoughtfully structured textbook designed to equip students with both the theoretical underpinnings and practical skills essential in today's programming landscape.

The first part of the book considers small programs that use a loop, and how to demonstrate their correctness using loop invariants. It also covers some algorithms and algorithmic techniques that every programmer should know. The second half of the book considers slightly larger programs. It teaches the basics of modularization, splitting up a program into manageable chunks. It teaches about abstract datatypes, values within a program that can be treated as mathematical values: how to specify their behaviors formally; and how to treat them as abstract mathematical objects when programming. It also teaches how to use data structures to represent abstract datatypes, and what it means for such a representation to be correct. And it presents some abstract datatypes and data structures that every programmer should know. The book is pragmatic: the philosophy is to include enough formality to be convincing and to guide the programmer towards correct code, without getting bogged down in the mathematics.

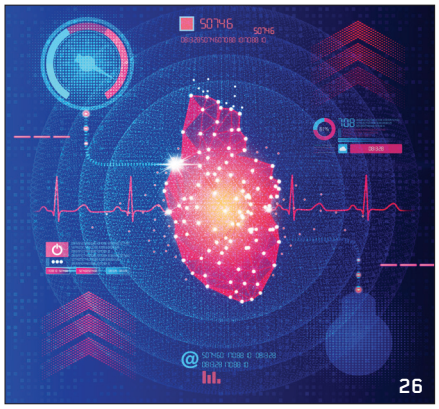
http://books.acm.org

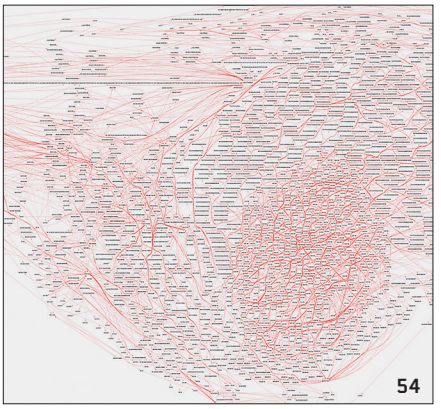
XRDS
Crossroads
The ACM Magazine for Students
SUMMER 2025 VOL.31 · NO.4

begin

On the Cover:
Image by Kirill Stytsenko / Shutterstock.com

Images L-to-R by: mohammadhridoy1 / Shutterstock.com; Dethal / Shutterstock.com





features

end

Association for Computing Machinery

Images L-to-R by: ArtemisDiana / Shutterstock.com; IDropoo83 / Shutterstock.com; SySec Lab, Louisiana State University

XRDS

Association for Computing Machinery

ACM

Association for Computing Machinery
1601 Broadway,
10th Floor
New York, NY
10019-7434 USA
+1 212-869-7440

CONTACT
General feedback:
xrds@acm.org

For submission guidelines, please see http://xrds.acm.org/authorguidelines.cfm

SUBSCRIBE

Subscriptions ($19 per year includes *XRDS* electronic subscription) are available by becoming an ACM Student Member www.acm.org/membership/student

Non-member subscriptions: $80 per year http://store.acm.org/acmstore

ACM Member Services
To renew your ACM membership or *XRDS* subscription, please send a letter with your name, address, member number and payment to:

ACM General Post Office
P.O. Box 30777
New York, NY
10087-0777 USA

Postal Information
XRDS (ISSN# 1528-4981) is published quarterly in spring, winter, summer and fall by Association for Computing Machinery, 1601 Broadway, 10th Floor, New York, NY 10019. Application to mail at Periodical Postage rates is paid at New York, NY and additional mailing offices.

POSTMASTER: Send addresses change to:
XRDS: Crossroads,
Association for Computing Machinery,
1601 Broadway, 10th Floor, New York, NY 10019.

Offering# XRDS0171
ISSN# 1528-4972 (print)
ISSN# 1528-4980 (electronic)