

SECOND EDITION

THE

C



PROGRAMMING
LANGUAGE

BRIAN W. KERNIGHAN
DENNIS M. RITCHIE

Google Exhibit 1056
Google v. Parus
IPR2020-00846

THE

C

PROGRAMMING
LANGUAGE

Second Edition

By Brian W. Kernighan & Dennis M. Ritchie

Prentice-Hall, Inc., Englewood Cliffs, New Jersey 07632

© 1978 Prentice-Hall, Inc.

0-13-023695-0

THE
C

PROGRAMMING
LANGUAGE

Second Edition

Brian W. Kernighan • Dennis M. Ritchie

AT&T Bell Laboratories
Murray Hill, New Jersey



The C programming language.

Includes index.

1. C (Computer program language) I. Ritchie,
Dennis M. II. Title.
QA76.73.C15K47 1988 005.13'3 88-5934
ISBN 0-13-110370-9
ISBN 0-13-110362-8 (pbk.)

Copyright © 1988, 1978 by Bell Telephone Laboratories, Incorporated.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher. Printed in the United States of America. Published simultaneously in Canada.

UNIX is a registered trademark of AT&T.

This book was typeset (picitblieqnlitroff -ms) in Times Roman and Courier by the authors, using an Autologic APS-5 phototypesetter and a DEC VAX 8550 running the 9th Edition of the UNIX® operating system.

Prentice Hall Software Series
Brian Kernighan, Advisor

Printed in the United States of America

10 9 8

ISBN 0-13-110362-8 {PBK}
ISBN 0-13-110370-9

Prentice-Hall International (UK) Limited, *London*
Prentice-Hall of Australia Pty. Limited, *Sydney*
Prentice-Hall Canada Inc., *Toronto*
Prentice-Hall Hispanoamericana, S.A., *Mexico*
Prentice-Hall of India Private Limited, *New Delhi*
Prentice-Hall of Japan, Inc., *Tokyo*
Simon & Schuster Asia Pte. Ltd., *Singapore*
Editora Prentice-Hall do Brasil, Ltda., *Rio de Janeiro*

Preface

Preface to the First Edition

Introduction

Chapter 1. A Tutorial Introduction

- 1.1 Getting Started
- 1.2 Variables and Arithmetic Expressions
- 1.3 The For Statement
- 1.4 Symbolic Constants
- 1.5 Character Input and Output
- 1.6 Arrays
- 1.7 Functions
- 1.8 Arguments—Call by Value
- 1.9 Character Arrays
- 1.10 External Variables and Scope

Chapter 2. Types, Operators, and Expressions

- 2.1 Variable Names
- 2.2 Data Types and Sizes
- 2.3 Constants
- 2.4 Declarations
- 2.5 Arithmetic Operators
- 2.6 Relational and Logical Operators
- 2.7 Type Conversions
- 2.8 Increment and Decrement Operators
- 2.9 Bitwise Operators
- 2.10 Assignment Operators and Expressions
- 2.11 Conditional Expressions
- 2.12 Precedence and Order of Evaluation

Chapter 3. Control Flow

- 3.1 Statements and Blocks
- 3.2 If-Else

tion Data

language) I. Ritchie,
Title.
0.13'3 88-5934

laboratories, Incorporated.

tion may be reproduced, stored in a retrieval
ny means, electronic, mechanical, photocopy-
prior written permission of the publisher.
ublished simultaneously in Canada.

off -ms) in Times Roman and Courier by
totypesetter and a DEC VAX 8550 running
tem.

K}

London
dney

exico
w Delhi

Contents

Preface	ix
Preface to the First Edition	xi
Introduction	1
Chapter 1. A Tutorial Introduction	5
1.1 Getting Started	5
1.2 Variables and Arithmetic Expressions	8
1.3 The For Statement	13
1.4 Symbolic Constants	14
1.5 Character Input and Output	15
1.6 Arrays	22
1.7 Functions	24
1.8 Arguments—Call by Value	27
1.9 Character Arrays	28
1.10 External Variables and Scope	31
Chapter 2. Types, Operators, and Expressions	35
2.1 Variable Names	35
2.2 Data Types and Sizes	36
2.3 Constants	37
2.4 Declarations	40
2.5 Arithmetic Operators	41
2.6 Relational and Logical Operators	41
2.7 Type Conversions	42
2.8 Increment and Decrement Operators	46
2.9 Bitwise Operators	48
2.10 Assignment Operators and Expressions	50
2.11 Conditional Expressions	51
2.12 Precedence and Order of Evaluation	52
Chapter 3. Control Flow	55
3.1 Statements and Blocks	55
3.2 If-Else	55

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.