
QUEUEING SYSTEMS

Problems and Solutions

LEONARD KLEINROCK

Computer Science Department

School of Engineering and Applied Science

University of California, Los Angeles

RICHARD GAIL

IBM Thomas J. Watson Research Center

Yorktown Heights, New York



A Wiley-Interscience Publication

JOHN WILEY & SONS, INC.

New York / Chichester / Brisbane / Toronto / Singapore

CONTENTS

Preface	ix
1 A Queueing Theory Primer	1
2 Random Processes	35
3 Birth–Death Queueing Systems	69
4 Markovian Queues	97
5 The Queue M/G/1	119
6 The Queue G/M/m	179
7 The Queue G/G/1	189
Index	223