THE ANALYSIS, DESIGN, AND IMPLEMENTATION OF INFORMATION SYSTEMS

THIRD EDITION

Henry C. Lucas, Jr.

Professor of Computer Applications and Information Systems Schools of Business New York University

McGRAW-HILL BOOK COMPANY

New York St. Louis San Francisco Auckland Bogotá Hamburg Johannesburg London Madrid Mexico Montreal New Delhi Panama Paris São Paulo Singapore Sydney Tokyo Toronto

CONTENTS

	PREFACE	xi
PART 1	INTRODUCTION	
1	The Information Systems Environment	3
	INTRODUCTION / OVERVIEW / SYSTEMS THEORY / ORGANIZATIONS / CLASSIC VIEW OF ORGANIZATIONS / TRANSITIONAL VIEWS / MODERN ORGANIZATION THEORY / MAJOR ORGANIZATIONAL CONSIDERATIONS	
2	Managers and Decision Making: Key Components of Information Systems	27
	INTRODUCTION / CLASSIC VIEWS / MANAGERIAL ROLES / DECISION MAKING / MODELS / THE ROLE OF INFORMATION SYSTEMS	
3	An Overview of Computer Applications	43
	TYPES OF SYSTEMS / APPLICATIONS / IN CONCLUSION	
4	The Impact of Computers	54
	IMPACT ON THE ORGANIZATION / IMPACT ON INDIVIDUALS / INFORMATION SYSTEMS IN THE CONTEXT OF THE ORGANIZATION / IMPLEMENTATION ISSUES / RESEARCH ON IMPLEMENTATION / AN IMPLEMENTATION STRATEGY	
PART 2	SYSTEMS ANALYSIS AND DESIGN: OVERVIEW AND TECHNOLOGY	
5	Systems Development Overview	81
	INTRODUCTION / THE SYSTEM'S LIFE CYCLE / NEW APPROACHES TO	

DESIGN / RESOURCES FOR NEW SYSTEMS / THE PRACTICE OF

vii

CONTENTS

	PREFACE	xi
PART 1	INTRODUCTION	
1	The Information Systems Environment	3
	INTRODUCTION / OVERVIEW / SYSTEMS THEORY / ORGANIZATIONS / CLASSIC VIEW OF ORGANIZATIONS / TRANSITIONAL VIEWS / MODERN ORGANIZATION THEORY / MAJOR ORGANIZATIONAL CONSIDERATIONS	
2	Managers and Decision Making: Key Components of Information Systems	27
	INTRODUCTION / CLASSIC VIEWS / MANAGERIAL ROLES / DECISION MAKING / MODELS / THE ROLE OF INFORMATION SYSTEMS	
3	An Overview of Computer Applications	43
	TYPES OF SYSTEMS / APPLICATIONS / IN CONCLUSION	
4	The Impact of Computers	54
	IMPACT ON THE ORGANIZATION / IMPACT ON INDIVIDUALS / INFORMATION SYSTEMS IN THE CONTEXT OF THE ORGANIZATION / IMPLEMENTATION ISSUES / RESEARCH ON IMPLEMENTATION / AN IMPLEMENTATION STRATEGY	
PART 2	SYSTEMS ANALYSIS AND DESIGN: OVERVIEW AND TECHNOLOGY	
5	Systems Development Overview	81
	INTRODUCTION / THE SYSTEM'S LIFE CYCLE / NEW APPROACHES TO	

DESIGN / RESOURCES FOR NEW SYSTEMS / THE PRACTICE OF

SYSTEMS ANALYSIS AND DESIGN / CONVENTIONAL' SYSTEMS ANALYSIS AND DESIGN / PROCESSING ALTERNATIVES / SUMMARY / AN ILLUSTRATIVE EXAMPLE

6	The Role of the Systems Analyst	107
	THE ROLE OF THE ANALYST / USER DESIGN / STEPS TO FOLLOW / THE HARDSERVE EXAMPLE	
7	Traditional Tools for Analysis and Design	125 👡
	DATA COLLECTION / ANALYSIS AND DESIGN TOOLS / CONCLUSIONS	
PART 3	FOLLOWING THE LIFE CYCLE	
8	File Design	149
	FILE ELEMENTS / SEQUENTIAL FILES / DIRECT-ACCESS FILES / ERROR CONTROL / FILE DESIGN CONSIDERATIONS	
9	Data-Base Management	177
	DATA STRUCTURES / SYSTEMS DESIGN / DATA-BASE MANAGEMENT SYSTEMS / CHOOSING A MODEL / SUMMARY	
10	Data Communications	195
	BASICS / PROTOCOLS / TRANSMISSION NETWORKS / TRANSMISSION SOURCES / SOFTWARE / THE FUTURE	
11	Applications Generators and Nonprocedural Languages	209
	BACKGROUND / REPORT GENERATORS / QUERY LANGUAGES / QBE / APPLICATIONS GENERATORS / SUMMARY	
12	Packages	221
	GENERAL CONSIDERATIONS / TYPES OF PACKAGES EXAMPLE / ACQUISITION / IMPLEMENTATION / SUMMARY	

232

PROTOTYPES / END-USER PROGRAMMING

13 Prototyping and End-User Programming

14	Preliminary Survey and Feasibility Study	247
	INTRODUCTION / THE EXISTING SYSTEM / SURVEY AND FEASIBILITY STUDY CONTENTS / THE DECISION-MAKING BODY / THE HARDSERVE EXAMPLE	
	APPENDIX Hardserve Preliminary Survey	
	EXECUTIVE SUMMARY / THE EXISTING SYSTEM / ANALYSIS OF EACH ALTERNATIVE	
15	Systems Design Specifications	269
	STUDY OUTPUT / OUTPUT CONSIDERATIONS / INPUT / FILES / PROCESSING / CODING / MANUAL PROCEDURES / ERRORS / WORK PLAN	
16	Systems Design for Hardserve	297
	PRELIMINARY SURVEY / DESIGN TEAM MEETINGS / SYSTEM SPECIFICATIONS	
17	Managing Computer Systems Design Projects	321
	UNCERTAINTIES / MANAGEMENT TASKS / PROJECT SCHEDULING / TECHNICAL MANAGEMENT / THE HARDSERVE EXAMPLE	
18	Documentation	345
	DESIGN DOCUMENTATION / USER DOCUMENTATION FOR TRAINING / OPERATIONS DOCUMENTATION / USER REFERENCE DOCUMENTATION	
19	Testing and Installation	359
	TESTING / USER CONSIDERATIONS / THE AFTERMATH / REVIEW OF THE ANALYST'S ROLE / THE HARDSERVE EXAMPLE	
20	Hardserve On-Line	37 1
	A NEW VERSION / ALTERNATIVES / AN ON-LINE SYSTEM	
21	Examples of Information Systems	389
	AN ON-LINE ADMINISTRATIVE SYSTEM / RAFT / A PORTFOLIO SYSTEM / A STRATEGIC PLANNING SYSTEM / ELECTRONIC MAIL / IMPLICATIONS	

.

ı

PART 4 THE MANAGEMENT OF INFORMATION SYSTEMS

22 The Computer Department

STATUS OF THE DEPARTMENT / DEPARTMENT ORGANIZATION / MANAGING COMPUTER OPERATIONS / CONTROL OF PROCESSING / RELATIONSHIP WITH USERS / CHARGING FOR SERVICES / PERSONNEL / OUTSIDE PERSPECTIVE / PLANNING / THE COMPUTER DEPARTMENT MANAGER / SUMMARY

23 The Evaluation and Acquisition of Hardware and Software 447

BACKGROUND / TO BUY OR NOT / THE SERVICES INDUSTRY / COMPARISON OF SOURCES / ACQUISITION STRATEGY / PERFORMANCE EVALUATION / ACQUISITION OF A NEW COMPUTER SYSTEM: MAINFRAMES AND MINIS / OTHER COMPUTERS / APPLICATIONS PACKAGES

24 The Computer Profession and Its Social Responsibilities 471

CAREER PATH / SOCIAL RESPONSIBILITIES / THE FUTURE OF INFORMATION SYSTEMS

BIBLIOGRAPHY 483 INDEX 489

417