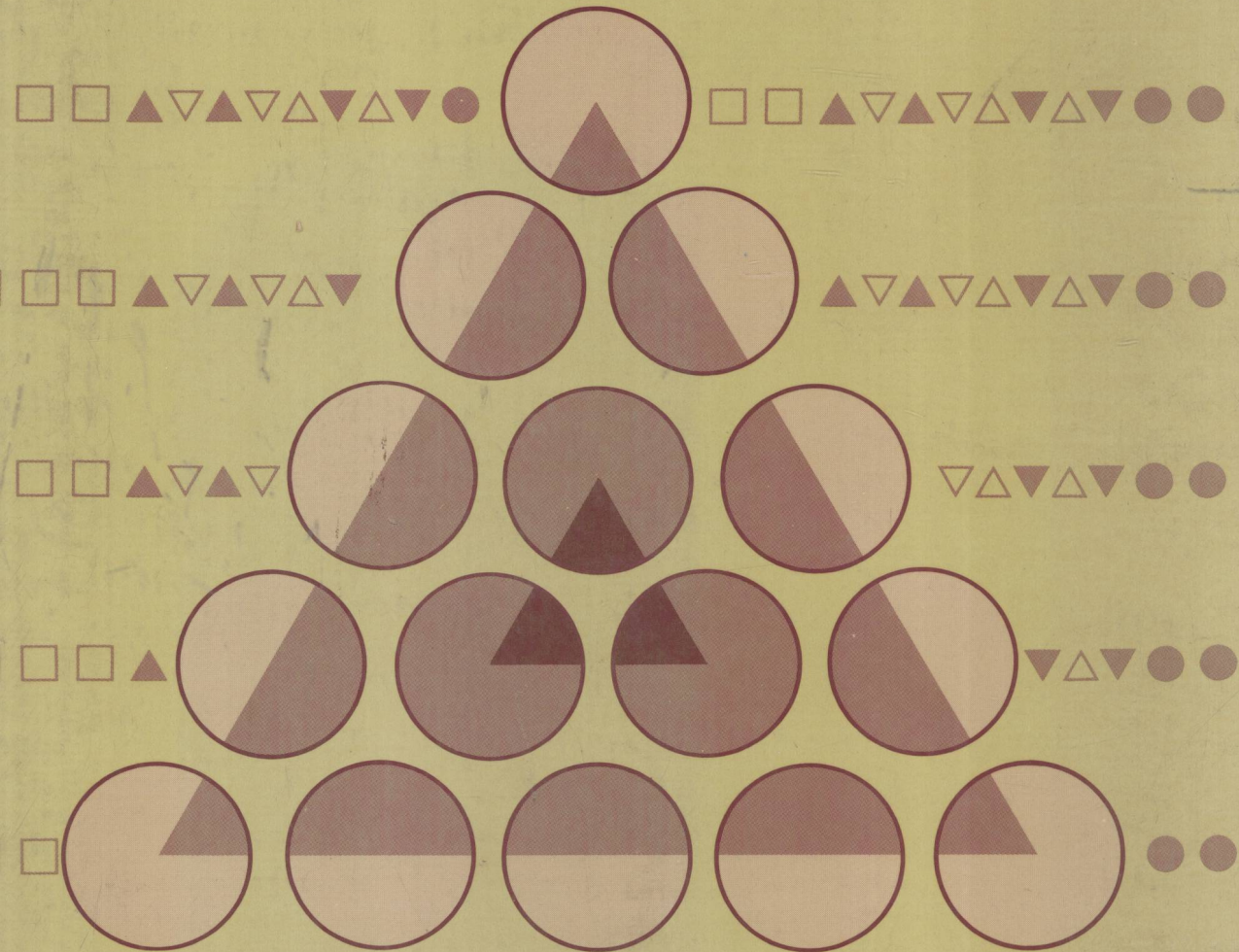


SYSTEMS ANALYSIS AND DESIGN



ALTERNATIVE STRUCTURED APPROACHES

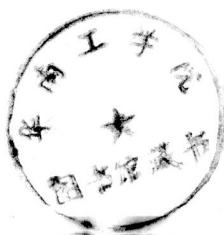
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Systems Analysis and Design: Alternative Structured Approaches

GEORGE R. MARSHALL



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Ashton-Tate, 20101 Hamilton Avenue, Torrance, CA 90502

Library of Congress Cataloging-in-Publication Data

Marshall, George R.

Systems analysis and design.

Bibliography

Includes index.

1. System analysis. I. Title.

T57.6.M347 1985 658.4'0388 85-11776
ISBN 0-8359-7445-6

A Reston Book published by Prentice-Hall
A Division of Simon & Schuster, Inc., Englewood Cliffs, N.J. 07632

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1 3 5 7 9 10 8 6 4 2

PRINTED IN THE UNITED STATES OF AMERICA

8761584

Systems Analysis and Design: Alternative Structured Approaches



*This text is respectfully and joyfully dedicated
to my best friend, C. T. Mukpo,
an analyst and synthesist of cosmic proportions.*

Preface

Small Systems Oriented

The purpose of this text is to introduce the reader to the approaches and methods of systems analysis and design. Many of the tools of analysis and design emerged in large-system environments. This text studies analysis and design in small-system environments, and the cases used in this text are small systems oriented.

It is quite likely that by the time you read this text the number of small computer installations will surpass mainframe installations. Small systems are becoming a major force in the industry, and their impact is felt in organizations of all sizes. In fact, small-computer use is highest among large enterprises. A 1983 Dun and Bradstreet survey of approximately 3,000 companies in the United States revealed that a third used small computers. Of that third, over 70 percent were companies with 5,000 employees or more, whereas 15 percent were companies with less than 20 employees. Although small systems would provide great benefits to small companies, they are not the present high users. The knowledge to be gained from this text should build a bridge to creative computer use.

Since most systems in the past were large and in the service of large enterprises, the approaches and methods of systems analysis and design that we have inherited from the past are primarily large-system oriented. Some of the questions addressed by this text include:

- Are the tools we inherit from large systems relevant to small systems?
- If they are, when should they be used?
- What new approaches and methods are emerging?
- What new approaches need to emerge and require study and development?

Intended Reader

The text is intended to support undergraduate courses in systems analysis and design and computer applications in business. The text may also be used with adult

or extension education courses and workshops designed for persons interested in computer selection and application. The text will also be of interest to the manager or business person faced with the introduction of small computers into their operation. They may wish to study more than is usually available in the many “How to . . .” books on the subject, but nevertheless want to study something practical. For example, this text includes coverage of the types of small systems available and the software that operates on those small systems.

A Survey of Students

Many computer science students appear to be unaware of the computer technology that is generally available. No academic means exist for them to acquire this knowledge unless a course is offered that introduces such information. As analysts they must have this information, because as analysts they will be asked to recommend systems.

A survey of the students in my own systems analysis and design classes revealed that, as third-year students entering the analysis and design course, few had any familiarity with analysis on the level of the enterprise, project management, cost-benefit analysis, preparing requests for proposals, structured analysis, data base, prototyping, and application software. However, most were familiar with some structured program design, but not HIPO charts, Warnier-Orr diagrams, or Nassi-Schneiderman charts. If not familiar with the tools, students are unable to select and use them when appropriate.

A survey helps direct the focus of a course of study. The actual results obtained support the comprehensive nature of the content of this text. A blank copy of the form used to survey students is provided in Appendix H if the course instructor would like to conduct his or her own survey.

Approach

Three major areas of study are covered in the text:

- Comprehensive knowledge of the tools of systems analysis
- Practical skill in the application of the tools
- Skill in communicating analysis and design results*

The text is rich in methodology. The tools of systems analysis and design are expanding. They must grow at the same rate as the technology itself. The analyst has more demands made on him or her to do a better job with less resources

*It is tempting to use the term “entrepreneurial knowledge and skills” rather than the more limited term “communication.” The former would cover the broader range of skills that the systems analyst to an increasing extent needs to know. Certainly the analyst should possess good written and verbal communication skills. But, then, who should not?

and in less time. The technology itself provides the tools for analyzing and designing. There is, therefore, a broader body of knowledge for the analyst to be aware of and know how to apply. The fortunate aspect is that the expanding technology provides the analyst with more power to handle the expanding demands.

Parts I through V provide an introduction to the expanding family of the tools of systems analysis and design; Part VI provides guidance to their practical application. Throughout the text the student is introduced to the required verbal and written communication skills.

People and Enterprises

The text introduces methods for performing analyses on the level of the enterprise, the software, and the system. It is obvious that findings on the level of the enterprise should determine activities undertaken on the software and system level. Therefore, careful attention is paid in the text to working with people, structured approaches to problem solving, engaging people's creativity, and analyzing data and information needs on the enterprise level.

On all levels for all approaches and methods discussed, the reader should assume a critical and questioning attitude to the approaches and methods, their relative worth, and where they are best used, if at all.

Multidisciplinary

The content of this text is based on many disciplines, not one. Sometimes this is initially disturbing to students because the subject may appear to lack a definite identity or appear to possess an indefinite focus. It has been found, however, that students, when they stay with the process, start to catch on to the fact that systems analysis is extremely challenging, can be quite difficult, and is very rewarding.

Case Study

Systems analysis and design is a practical art. It cannot be learned from a text alone. It is learned by working in the field with clients and users. The text is as much a guide to fieldwork and the actual process of analysis and design as it is an academic text. Part VI guides the student in performing a case study that is introduced at the end of Chapter 1. The text is designed so that the student follows the guidance provided in Part VI to the field case study as he or she progresses through the chapters in Parts I through V.

Text Modularity and Flexibility

Alternate orders of study may recommend themselves. The instructor may choose to have students read Chapter 10 on structured analysis much earlier. It has been treated as one systems development option among a number of options available.

However, the instructor may wish to emphasize the structured analysis approach. The text lends itself to different orders of study.

Active Participation

Strong attempts were made to make the text participatory, that is, to provide an environment for creative and active participation by providing many things to do and the tools to do them.

Key Words and Concepts

As a guide to study, key words and concepts are given at the end of each chapter. The reader is advised to consult the index when a key word or concept is of interest and check related discussion in the text or in the references.

Chapter Questions

As a further guide to study, a set of questions for each chapter is provided at the end of the text.

Supplementary Support Materials for the Course

A number of supplementary materials are available for the course or the course instructor:

1. *An Instructor's Manual* with notes on course organization, lectures, additional cases, and student exercises. Upon request this manual is available directly from the publisher.
2. *Charts in paper form* used to evaluate word processors, data-base management systems, electronic spread sheets, application software in general, computers, monitors and keyboards, printers, and hardware components in general.
3. *Worksheets for evaluating accounting software* needs including general ledger, accounts receivable, accounts payable, payroll, job cost, sales, inventory, and invoicing.
4. *Analysis Software including SURVEY* a system for designing, collecting, and analyzing survey data, and *E-CHART* a system for evaluating, comparing, and selecting computer systems and system components, both software and hardware.

These latter supplementary support materials may be obtained by sending an order to Kristina Productions, COMP. 34, RR 1, Wolfville, Nova Scotia BOP 1X0, Canada. Order form on page xix.

Acknowledgments

I wish to thank all my students in Systems Analysis and Design who over the past few years helped considerably in testing out different ideas and materials. In particular, I would like to thank Jane Knickle, Norman MacNeil, Stephen Snell, and De'Ann Stubb for helping to develop different software and vendor evaluation materials. A special word of thanks to Mike Nash who has contributed ideas, criticisms, and helped design E-CHART. Further, my thanks to Mike Nash, John DeSilva, and David Carter for programming E-CHART. My thanks to colleagues at the Jodrey School of Computer Science, Acadia University for their support, especially Wayne Brehaut and Bill Davenport who always gave generously of their time. A special thank you to Mary Jo Atwell and Elizabeth Grigg. Their administrative and secretarial help was always given with great generosity and good humor. To my good friend Scot Gardiner who always told me I could do it, thanks for your confidence. The text was assisted in so many ways through the support, effort, and understanding of my constant companion Christine Anthony that I am hard pressed to express adequately my gratitude to her. To my children, Dana, Adam, and Randy, who receive less attention and love in action than they should from one who devotes too much time to research and writing, I thank you for your understanding and continued good humor. Many authors helped me write this text, especially the work and thinking of Marilyn Bohl, C.J. Date, Bill Dauphinais, William Davis, Chris Gane and Trish Sarson, Marvin Gorre and John Stubbe, David Kroenke, James Martin, Hillel Segal, Roger Von Oech, Edward Yourdon, and Carol Ziegler. I am particularly indebted to the insight of James Martin's work. To all those who helped and because of my failing memory remain unnamed, thank you.

*

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*

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Additional Trademarked products are referenced in the Appendices

ORDER FORM

Support materials are available for *Systems Analysis in the Small Systems Environment*. Paper items come on loose punched letter size sheets. Please note that an Instructor's Manual is available at no cost directly from the publisher.

Accounting Evaluation Worksheets for evaluating software needs in relation to general ledger, accounts receivable, accounts payable, payroll, sales, invoicing, inventory, and job cost. These sheets include means for determining output, processing, input, locations, users, loads, and links to other applications. These sheets are appropriate for use by professional analysts and consultants, or students in training. (60 pages - Cost: \$8.95)

Evaluation Charts for evaluating and comparing word processors, data base management systems, electronic spread sheets, project managers, other software in general, small computers, printers, monitors, keyboards, and other hardware in general. (60 pages - Cost \$8.95)

Analysis Software for the IBM PC, IBM PC compatibles, and the APPLE Macintosh including SURVEY, a system for designing, administering, and analyzing surveys, and E-CHART, a system for evaluating, comparing, and selecting small computer systems software and hardware. (One disk with manuals - Cost: \$149.00.)

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