THE BUSINESS GUIDE TO SMALL COMPUTERS

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THE BUSINESS GUIDE TO SMALL COMPUTERS

This book is dedicated to
AARON *and* JANE CALMUS,
who taught me the tools of learning.

ABOUT THE AUTHOR

Lawrence Calmus has been involved with computers for nearly 20 years. His application programs have been used in all areas of business, from banking to retail sales organizations. Since the start of his career, the author has been involved with and interested in the design of computer systems for non-computer-oriented people. He has designed programmed learning courses for use with elementary school children and has overseen many second to third generation mainframe processor conversions.

For the past 3 years he has implemented systems utilizing Apple II, Z80, and 8080 CP/M-based processors. He has successfully developed and implemented computer systems in such areas as personnel management, word processing, management information, and financial accounting. Currently he is a partner of PERELMAN/CALMUS, which designs, configures, and implements small computers for business. He and his associates are also involved in the development and marketing of business application packages for use on small computers. As consultants, their clients range from small businesses setting up their primary electronic data processing center to Fortune 500 companies utilizing small computers as distributed processing centers.

PREFACE

This guide is an account of systems analysis for the business use of a small computer. In the last few years microprocessors have made the computer small, personable, and friendly. The turn-key system has arrived, and any establishment that has an electric typewriter can have a small computer. Fortunately or unfortunately, a small computer differs from an electric typewriter in all respects. Although the new computers are comparatively easy to operate, take up little room, and are inexpensive, they are also incredibly powerful. The impact a small computer can have on the business environment is enormous.

Today's small computer is as powerful as yesterday's computer. This means that all the accoutrements of electronic data processing that occupied a business organization in the past are still with us. The advent of the microprocessor chip has shrunk the computer room to the corner of a desk. However, the need for support material and personnel, systems analysts, programmers, operations managers, and data librarians hasn't shrunk. In fact, of this entire list only the programmer has been replaced. Packaged software is an efficient and economical solution to the data processing personnel problem of in-house development. However, all the remaining functions still exist and must be performed if a small computer is to be used to its full potential.

This book is a work and procedures manual to take you step-by-step through the installation of a small computer.

A small computer can be compared to a fine automobile. It will travel far and fast, but only if it has the roads to travel on. Without a network of roads a car is unable to operate at its peak of efficiency. A small computer without clearly defined systems of information flow is unable to effectively traverse the business environment.

This book will enable both current and first-time users to chart the paths of the work flow. A glossary has been provided for both the text and for commonly used computer terms not covered by the book. Techniques for determining your data processing needs are detailed. An exploration of the underlying principles of computer hardware and software will enable the reader to choose equipment to satisfy the system's requirements. And finally, daily operation of the projected system is covered so that the final phase of implementation will leave you with a fully functioning system. By working through the steps described in the text, the reader will not only implement a new system but will also create a work and procedures manual for the system.

The ideas and views presented in this book are neither new nor original. They are, however, the expression of computer common sense that has been accumulated by many people over many years. One individual whose human common sense helped in the preparation of this manuscript is Mr. Morton Schaeffer.

Lawrence Calmus

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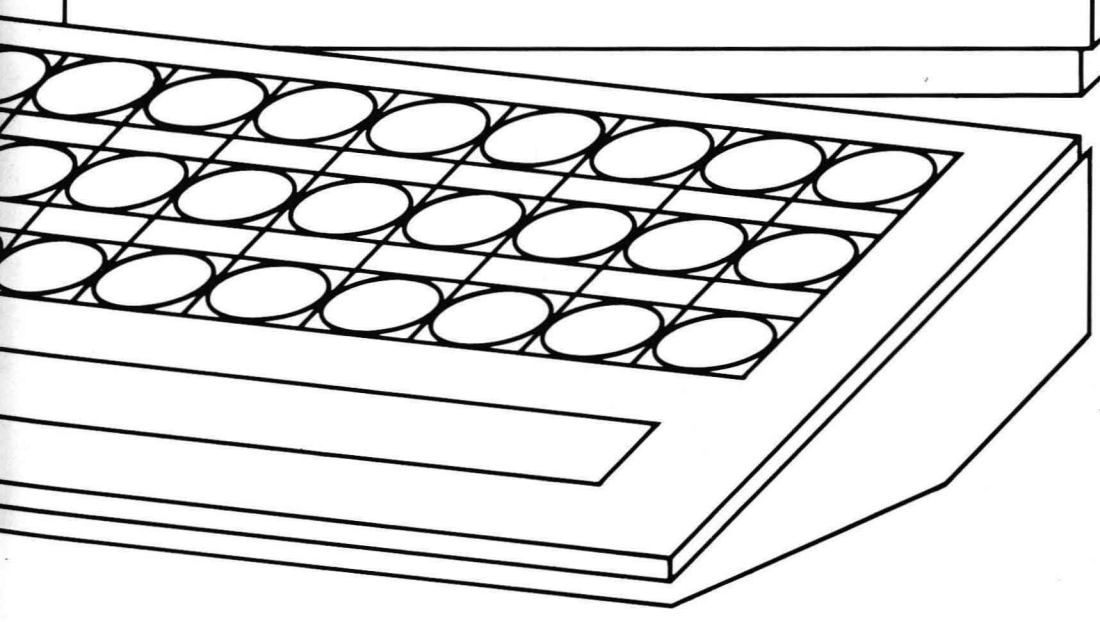

1 INTRODUCTION TO SYSTEMS ANALYSIS

Provide a point of view from which to describe your electronic data processing needs. Make tools available to begin the process of analysis. Break down your business activity in order to identify the elements in your work flow.

I. SYSTEMS ANALYSIS—A POINT OF VIEW

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SYSTEMS ANALYSIS—A POINT OF VIEW

Computers are a tool. To use them properly it is necessary to know their place in the business system, and the systems point of view is to look at the interrelationship of parts rather than the parts themselves.

Obviously, an object may be a system at one level and a discrete element at another. The heart, for example, is a part of the circulatory system, while at another level the heart itself is a system made up of different elements: muscle tissue, nerves, veins, arteries. The field of view and the orientation of the observer determine whether an object is seen as a system or as a part.

Systems analysis by definition is concerned with analyzing the interrelationship of parts—it defines a system. The clue to an understanding of systems analysis is that it views objects from a dynamic perspective. A tree, for example, could be seen as a static collection of separate parts. It is made up of roots, trunk, branches, leaves, sap, bark, and cellulose, and defining a tree in these terms can be helpful when it is necessary to identify and classify it. We can then describe a tree by those data elements we have collected. However, if we wish to look at how the parts make up a particular tree, we would also look at their relationship to each other.

The job of the systems analyst is to identify the effective factors and describe their relationship. Systems analysis is a complex field of study with many highly trained practitioners. The purpose of this book is to make you aware of the pattern of thinking used by analysts and computer professionals. The more familiar you become with computer common sense, the more you can utilize the new tools of the small computer age.

A small computer is powerful, but it is not the entire business. Its utilization always requires some preliminary analysis of the environment in which it will be used. Many first-time computer users are so impressed by the magic of the machine, they have an image of a box with a removable lid into which everything is poured. Then, by pushing a few buttons, the results will come out. This is a tragically false impression that has resulted in underutilization of computers and anger on the part of users. The point is that installing and making use

of a computer requires planning. Luckily, all businesses have some resident experts on the nature of that business: the people doing the work. As computers become friendlier, they interact with the people using them by asking questions. Systems analysis, computer common sense, makes the questions understandable and points out the direction in which the answers lie.

In journalism, reporters look for the who, what, when, where, why, and how of a story; that way they are sure of covering it completely. A story written with all the elements has a flow to it that seems quite natural, and any area of business treated in the same way will yield the same result: a description of the flow of activity.

Regardless of the orientation of a business, i.e., profit, nonprofit, self-aggrandizement, or research, the survival of the business is dependent on activity. So, like journalism, the first task of systems analysis is the isolation and description of the main activity of a business. A major tool for doing this is a description of the obvious.

DETERMINE THE ELEMENTS

A large, decentralized corporation knows this and provides extensive paper trails (hopefully) for its employees to follow. A relatively small, centralized business with less than 200 employees run by 1 to 5 people will often rely on the knowledge of the leaders to ensure the business flow. And if the particular boss can't keep up with everything, then there is the indispensable assistant who handles all the details.

It is just those details that need to be isolated and described if a computer is to be inserted into the business activity. And it is just those details that may be jealously guarded because of the power they bring to the individual. Chapter 2 discusses some specific techniques for gaining this information and organizing it for the computer.

Information is the life's blood of business. It may take the form of a letter to a supplier, an invoice to a dealer, an inventory tag, an amount of money to be paid out, an amount of money to be paid in, or any of the thousand and one things that make up the daily activities of a business. And a computer is a tool for making sure that no matter how heavy the flow, the business remains strong and healthy.

Systems analysis charts this flow for the same reason that a river is charted before a shipping service is launched. There may be sandbars that can be eliminated, alternate routes that could speed up or slow down the traffic, way stations to test progress, or unfriendly natives to be avoided.

Context: Where does the business element come from?

No matter how large or small a company may be, it will fall somewhere on a line between centralized and decentralized. In other words, it has a certain style to its operation. This style, this manner of doing business, is an integral part of the system. It is important to determine the attitude toward information on the part of the operating powers.

A centralized company often sees itself as paternal and all-knowing, providing firm guidelines wherever needed. Therefore, detailed information must be made available to a central control and acted on, and the result must be communicated to the periphery. The concern with this type of operation is that a bottleneck can occur, and business could come to a halt.

A decentralized organization often sees itself as a collection of smaller entities, the whole of which is greater than the sum of its parts. Here, information is acted upon as it occurs. This necessitates that the knowledge of decision requirements be dispersed and available at individual decision points. Information is delegated. Extensive summary information must be given to a coordinating control, and up-to-date status information must be made available to all decision points.

Let us take a one-person business, where the individual alone sells property and carries the mortgages. A computer is needed to keep track of the monthly payments by principal and interest. A centralized system would lean toward a full accounting system with the individual making all the necessary decisions. A decentralized system would keep track of the mortgage payments but give summary payment sheets to the accounting service that takes care of the books. It is important to keep in mind that an attitude is being described. Computers, amoral machines that they are, will work for anyone.

Work Flow: What is done to the element?

Work flow is such an understandable phrase that we are unaware of its meaning. We no longer look at its constituent parts—work and flow. Work is one thing; flow is another thing. A description of each thing gives meaning to the phrase. Computers are by their nature hairsplitters.

Most of us see the words "ignorant" and "stupid" interchangeably. But "ignorant" means "not aware of," while "stupid" means "difficulty in learning." Most computers are not stupid; they're ignorant.

The more you can tell a computer, the better it performs. Computer performance requires that:

1. You have loads of things to tell it.
2. It has the capacity to absorb all these things.

Small computers have less room for details than large computers. It's the details that determine a computer's efficiency.

Work, by definition, is something that effects something else. Carpenters work on wood to build houses. Joiners work on wood to build furniture. Accountants work on figures to build businesses. Secretaries work on letters to build communication.

Take the example of the work involved in sharpening a wooden pencil. The secretary or accountant may look at the tip, decide it's too short, sharpen it in a pencil sharpener, and go back to work. The designer of a wooden pencil would look at the same event, but have other considerations. In manufacturing a wooden pencil that can be sharpened by the user, the designer would ask:

1. What was the minimum diameter of the lead before it broke?
2. What is the average pressure on a sharpened point?
3. What kind of wood sharpens easily?
4. How can the wood be bonded together to hold the lead?

Same problem, different points of view, and so different questions. The problem of sharpening a pencil has a different work flow for the user than it does for the designer.

Perhaps the easiest way to approach work flow is from the point of view of the black box.

The Black Box: Am I asking enough different questions?

A black box is a device that does "what you want it to do." Whatever you want, it will do it—you don't need to know how it does it; you just know that it does it.

When you walk into a store to buy a black box, the first question the salesperson asks is, "What do you want it to do?" You might reply:

1. I want it to make ice cream.

2. I want it to sharpen pencils.

3. I want it to do my accounting.

4. I want it to type my letters.

Answer number 1, "I want it to make ice cream," might find the salesperson asking, "Do you want it to make one flavor or many flavors?" Answer number 2, "I want it to sharpen pencils," might find the salesperson asking, "Do you want the black box to sharpen pencils or to make pencils that can be sharpened?" The more details you can give, the better the salesperson can help you find the correct black box.

At a primary level, the computer is just another black box, one that is designed to fit the work flow. Remember, a black box is always in the middle. It is never the beginning and never the end. Something always has to go into the black box and something always has to come out. Black boxes take "input," do something, and give "output." Black boxes that make ice cream require milk, flavoring, cold, and energy in order to yield ice cream. Leaving out one essential ingredient will give a different result. Ice cream makers don't yield yogurt, even