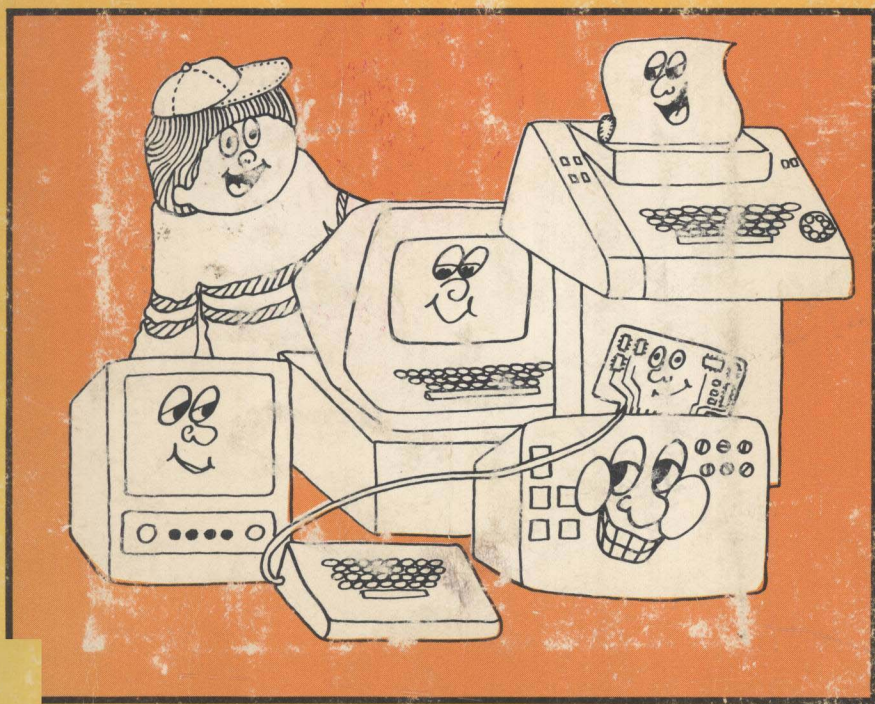


# The First Book OF Microcomputers

THE HOME COMPUTER OWNER'S BEST FRIEND

Robert Moody

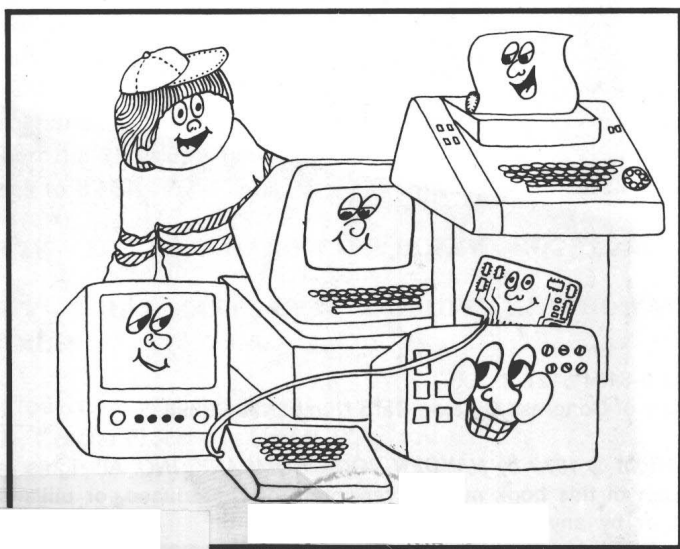


HAYDEN

# The First Book OF Microcomputers

THE HOME COMPUTER OWNER'S BEST FRIEND

Robert Moody



HAYDEN BOOK COMPANY, INC.

Rochelle Park, New Jersey

Without the strong support of a few good friends, this book would not have come about. I am dedicating this book to them: to Sue Olsen, my typist, who has the fastest fingers in the west; Phil Roark, who created my character, Willy, and did the cartoons; Robin Weckesser, who had such a steady hand with the illustrations; Lynne Lee, my typesetter who never sleeps; Dr. Jerry Fox for his support on the technical side; Mike Trioca on software; and, last but not least, to my wife, Karolynn, and two children, Justin and Shannon, who put up with me over the course of writing it. I love you all and thank you.

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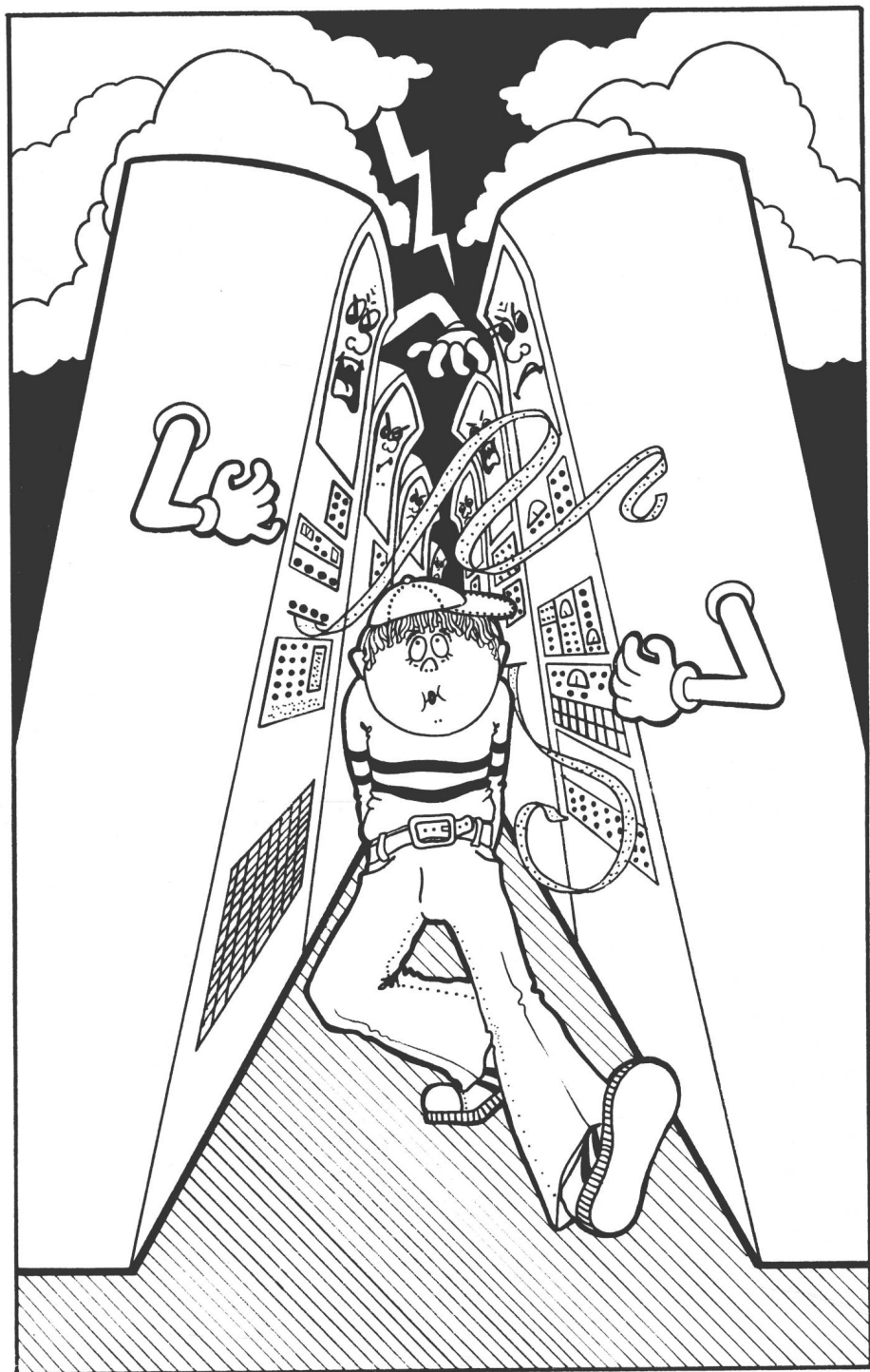
# I.

## INTRODUCTION — YOUR COMPUTER IS WAITING

Computers are now personal! Whoever you are, whatever you do — whether housewife, small businessman, student, professional, musician, or real estate salesperson — computers are being made and sold at prices **you** can afford for applications beneficial to **you**. A personal computer will open possibilities that will almost certainly change your lifestyle at work and play.

You may ask yourself, “What is a personal computer? The only computers I’ve ever seen have been huge. How can anyone afford to put such an expensive piece of equipment in their home, and where would I put it?” Like Willy over there, almost everyone’s first impression of a computer is of a monstrous machine, owned only by wealthy businesses, that towers over them, overseeing all and doing all. This may have been an accurate impression 10 to 15 years ago, but not today. The technology that has been developed over the past few years has not only reduced the physical size of computers, but has lowered computer prices tremendously.

You have been in direct contact with computers in one way or another most



of your life without knowing it. For example, many school records and schedules are stored in computers. Your family or business tax returns are processed by a computer. Most major department stores handle their buying, stocking, and billing by computer. Many newspapers and magazines are set in type under computer control. All credit card purchases are handled by computer. Every check written is processed by computer. Dentist, doctor, hospital, gas, and phone bills are handled by computer. The reasons why are obvious.

In a city the size of San Francisco, for instance, it would take a tremendous amount of manpower to process all the checks San Francisco banks receive in one day, or to log the number and duration of all phone calls made in one day. Computing power is needed to handle that amount of information, and that kind of computing power is at your fingertips today.

This book was written principally for two reasons: (1) to bring a little light into misunderstandings about computers and (2) to show its readers how personal computers can help them in their everyday lives.

## **A BRIEF, BRIEF HISTORY**

The first digital computer, ENIAC, was built at the University of Pennsylvania in 1946. It filled a large room (1,500 square feet), and weighed 30 tons. ENIAC used vacuum tubes (18,500) to store ten-digit numbers. The tubes were so short-lived, ENIAC would not run for more than seven or eight minutes without a tube failure. Special vacuum tubes were developed to cut down its tremendous power requirements (130,000 watts), so the machine could run at a cooler temperature. After constant and deliberate work, ENIAC would run for several days without a tube failure.

Constant improvement over the years made ENIAC a very useful machine. The U.S. census of 1950 was possible largely because of ENIAC, which was retired in 1955.

It took a tremendous amount of knowledge to operate and talk to ENIAC and its early relatives — ENVAC, IAS, UNIVAC, and the early IBM machines. Engineers and scientists labored for months to understand and implement their usefulness.

The ENIAC computer cost more than half a million dollars (that's 1950 dollars!) to develop. Today you can buy the same computing power for under \$1000 (that's 1978 dollars).

Through constant improvement these early computers grew into the most influential tool of the twentieth century. The advancement of many important fields could not have come about without them. Medicine, communications, space exploration, travel, and mass merchandizing (to mention just a few) could not have come as far as they have without computer technology.



## COMPUTERS TODAY — CHIPS OFF THE OLD BLOCK

The average person today, young or old, can use and enjoy with ease what computer technology has developed for him. What cost a half a million dollars and months of implementation and study in 1950 can be purchased at a fraction of the cost and be used and understood in a matter of a few hours. This is possible solely through the development of integrated circuits, in which circuit components are reduced in size and packed closely in small areas.

The *computer on a chip*<sup>h</sup> was developed in the early 1970's by Intel Corp. of Santa Clara, California. The 8080, as they named it, took the place of many integrated circuits. To give you a little comparison, this small electronic device would have replaced all 18,800 vacuum tubes in the ENIAC computer of 1950. Many cousins of the 8080 are in use in microcomputers today. You will hear of them often: the 6800, the Z80, the 6502, and others.

Computer languages have been developed over the years to make it possible for anyone to use these powerful, compact machines. What took months of study and understanding to be able to accomplish with the earlier computers can now be done with simple English terms today.

## INTRODUCTION TO A FRIEND

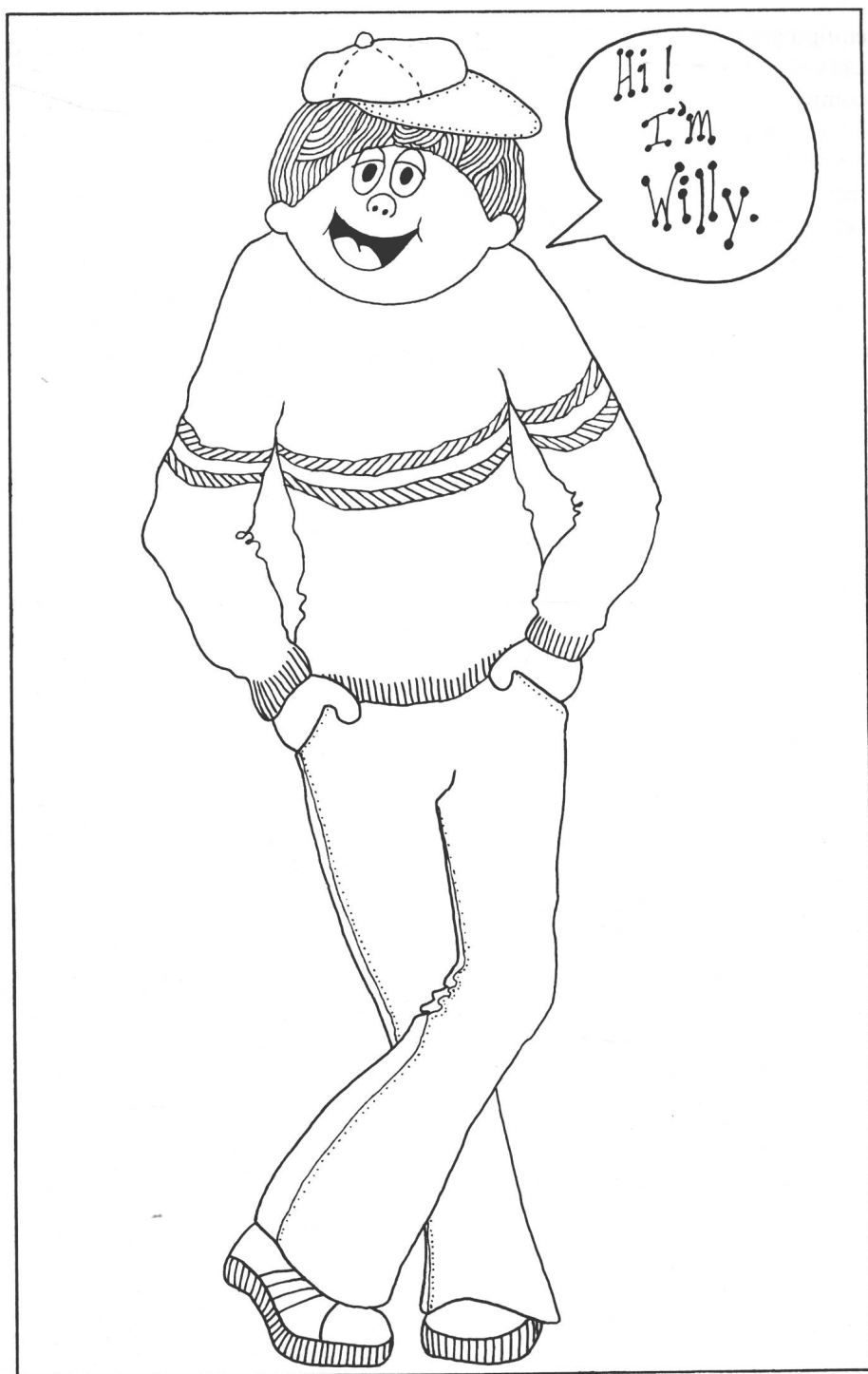
I would like you to meet a friend of mine, Willy. He is going to help me tell you about microcomputers. He was inspired by an acquaintance I had when my computer store first opened. This person would hang around all day asking questions, trying to understand what these things, personal computers, were all about. He is the main reason I have written this book. He is one of the thousands of kids who have the inquisitive mind to reach out to a new subject and then drag their parents and friends along with their useful, probing questions.

I have written this, as well, for you parents who might pick this book up. It should keep your interest as well, and help you stay one step in front of your kids.

## ABOUT THIS BOOK

In this book the segments of computing are broken down into easily understood blocks. First, I will start off with a glossary of useful terms in programming and software. We will discuss what it takes to communicate with a home computer, some of the rules, so to speak, to follow, and the language that the computer talks in.

Next I will give you another glossary of useful terms on hardware, the



equipment itself. I will talk about what makes up a home computer and basically how it works. Another section will be an interview between Willy and his computer. The computer will let Willy explore the inner workings of what a home computer does and how computers interact with each other.

I will finish the book with answers to the most-often asked questions that I receive, "What do you do with a home computer?", and a chapter on what's next in personal computing. I will give a review of the more popular periodicals treating home computing, as well as a list of computer stores and computer clubs.

This book is your beginning in personal computing. Your first friend in computing. There are many other friends waiting for you — on the book racks in your local store, in the computer clubs near you, and, especially, behind the counter of any computer store you enter.

能

## II.

# THE BEST SOFTWARE BUZZWORDS

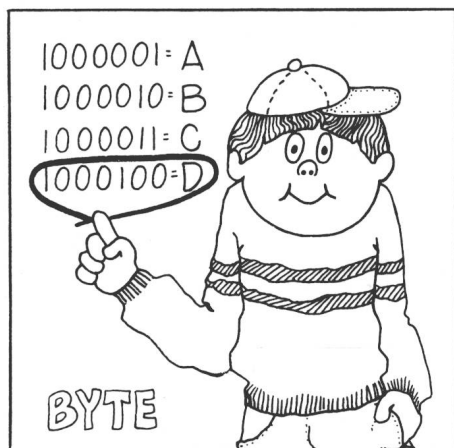
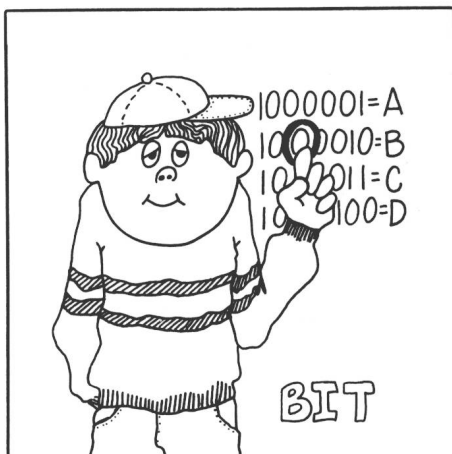
meaningless  
sound

light frame to be jumped over

The first major hurdle you have to face in home computing is learning the lingo. As a group, computer people have probably abused the English language more than those in any other industry. Our specialized language has overgrown, trying to distinguish word by word, to the point where English-speaking people have great difficulty deciphering our apparent "gibberish." If it were up to me I would like to start all over again and use terms that everyone would be able to understand and not have to adapt to a complete new way of conversing. I can't do that, so all you folks who are reading this book to gain an insight as to what personal computers are all about will have to forget the accepted definitions of some of the words that you have learned in school and take up **Computerese**. It's not going to be that difficult to do — just deprogram your brain and THINK COMPUTER.

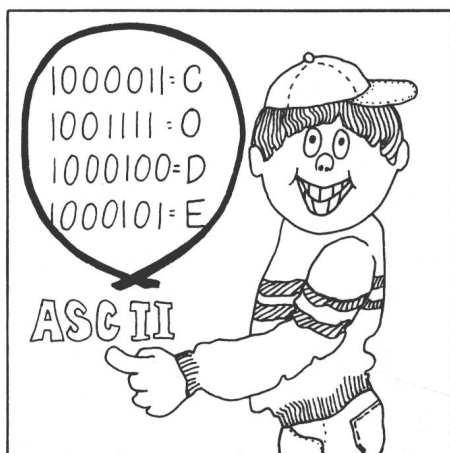
The first computer terms we will deal with describe the way we talk to our computers. **Software**, as it is called, is the list of instructions we give to the computer to do a job. It is also the way the computer takes this list and converts it to the language it knows.

**BIT**: The smallest unit of measure in a computer word; several bits make up a byte, or a computer word.



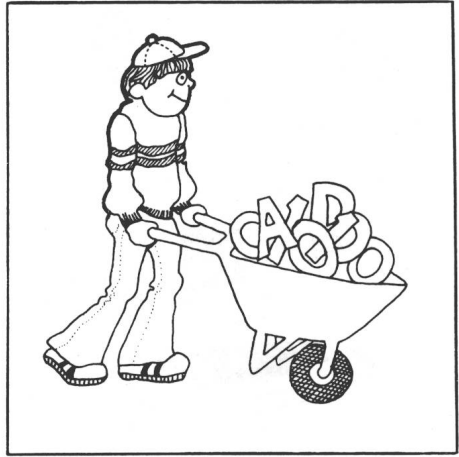
**BYTE**: The space which a letter or digit (one character) takes up in a computer. Space in a computer is measured in bytes. A megabyte is a million bytes.

**ASCII**=American Standard Code for Information Interchange: this is a seven-bit code that defines letters and numbers that the computer uses as its input.

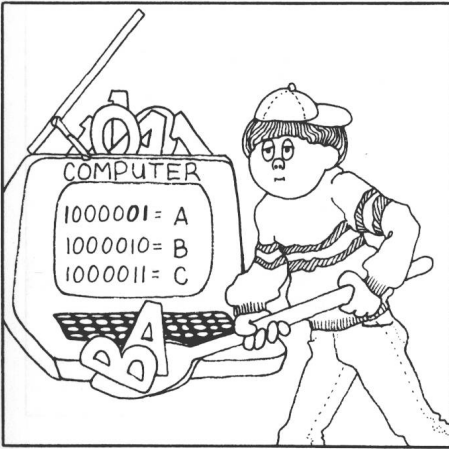


## ALPHANUMERIC:

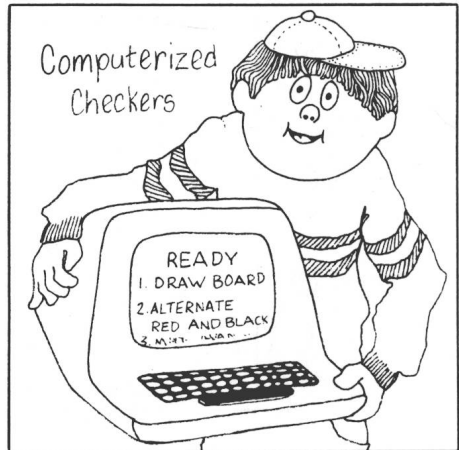
Information that is made up of letters (the alphabet) and digits (numbers).



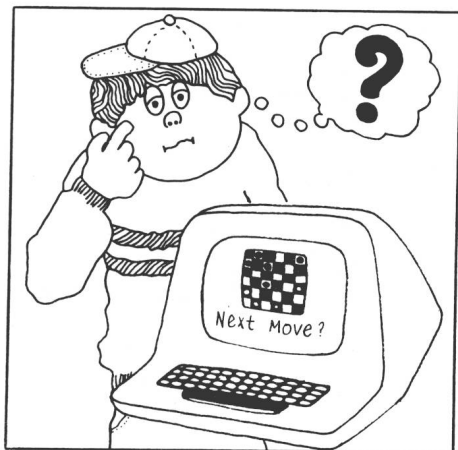
**INPUT:** The information that goes **IN** to your computer system. The computer's "food."



**PROGRAM:** A list of instructions to the computer, telling it what to do and when to do it.

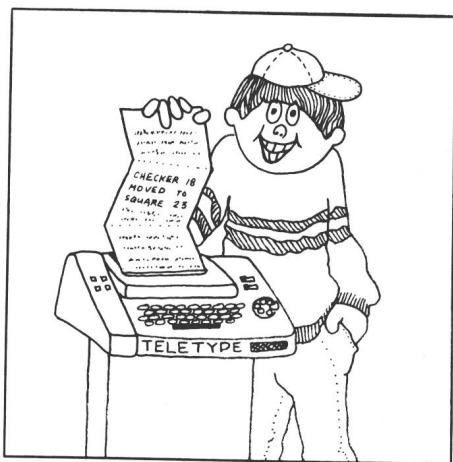






**DATA** = The information that gets **WORKED OVER** when your program runs. Data is all the information you have your computer use, everything that you put into your computer to store and retrieve.

**OUTPUT** = Using the program you have put into your computer as the instructions and the data for information, the output is the finished product your computer system produces.



**BASIC** = Beginners All-Purpose Symbolic Instructional Code = A "language" that you will use to write your programs for your computer, using English words and phrases.

**FORTRAN** = Formula Translation = another computer language used in programming that is composed of English words and symbols for instructions.

### III.

## PROGRAMMING

The best way to start this chapter off is by defining the term *program*. A program is a list of instructions that we give a computer so it can do a specific job for us. Though there are certain rules that we have to follow, it's no more difficult to write or follow a computer program than it is to bake a cake from scratch ingredients. Both take time and practice to be done correctly, but they can be done.

The computer is a machine that has been designed to know two things, on or off. However simple this may sound, it is true. Knowing that a combination of circuits is either on or off, enables the computer to "recognize" letters and numbers.

Programs contain strange and familiar words (and familiar numbers). Let's break down what we in the computer industry call a *word*. First of all, the name is changed. It's not a word but a *byte*, and it's not a complete word like those you are reading, but a single character or number. Confusing!? It will get better.

**byte:** A SINGLE CHARACTER OR NUMBER

**bit:** ONE PORTION OF THE WHOLE BYTE

AS WE KNOW IT  
THE CAPITAL LETTER

**A**

=

AS THE COMPUTER  
SEES IT

**10000001**

**bit** = JUST ONE  
OF THE SEVEN ZERO'S  
OR ONE'S

a byte

## FROM ASCII TO BASIC

If you examine the first illustration, I think we can clear up your uncertainty. The normal alphabet as we know it has to be broken down to a simple code so a computer can understand it. This code is called the ASCII character set. ASCII stands for **AMERICAN STANDARD CODE for INFORMATION INTERCHANGE**. This code plays a very important part in the role of conversing with a computer. Because it is a standard, we can safely say that all digital computers use the ASCII code to communicate with humans.

The ASCII code is made up of seven bits. These one's and zero's, when in certain combinations of seven, will make up our English alphabet and numbers. Being computer people and tending towards being difficult at times, we have added one small detail to this code: an eighth bit. This one or zero is placed in front of the other seven and called a **parity bit**. This parity bit allows the computer to double check the information we have put in. Depending on how the computer and the sending device are set up, the sending device chooses the eighth bit so that the total number of ones in the byte is even (if it is using even parity) or odd (if it is using odd parity).

Once the computer has received the byte from the sending device, it can check to see if the parity is the same as when the byte was sent. If not, an error