
EXPLORING CAREERS AS A COMPUTER TECHNICIAN

By
Jean W. Spencer



**EXPLORING CAREERS
AS A
COMPUTER TECHNICIAN**

Published in 1985 by The Rosen Publishing Group, Inc.
29 East 21st Street, New York City, New York 10010

First Edition
Copyright 1985 by Jean Spencer

All rights reserved. No part of this book may be reproduced in any form without permission in writing from the publisher, except by a reviewer.

Library of Congress Cataloging in Publication Data

Spencer, Jean W.

Exploring careers as a computer technician.

1. Electronic digital computers--Vocational guidance.
2. Electronic data processing--Vocational guidance.

I. Title.

QA76.25.S66 1984

001.64'023

84 6977

ISBN 0-8239-0626-4

Manufactured in the United States of America

About the Author

Jean W. Spencer is the Public Information Officer for Oxnard College and a member of the California Association of Community Colleges' Commission on Public Information, the Ventura County Public Information Communication Association, and ComputerTown Inc. A long-time reporter, feature writer, poet, and free-lance writer-photographer, she has been published by more than a dozen newspapers (including the Philadelphia *Bulletin*) on both coasts and more than two dozen national magazines and books. A graduate of Ventura College, she also attended Charles Morris Price School of Advertising and Journalism on an academic scholarship. She is an ordained elder in the Presbyterian Church and a lay leader for Faith at Work, Inc., and has been honored as an Outstanding Young Woman of America for civic and philanthropic involvement. She is a computer enthusiast and computer literacy advocate.

Acknowledgments

Special thanks are in order for the many individuals, companies, and organizations that contributed to the substance of this book. Their overwhelming contributions are, of course, to the Information Age that is now upon us. I am grateful for the time, knowledge, and interest shared by:

Apple Computer Co.
Computer and Business Equipment Manufacturers Association
American Association of Engineering Societies
Society of Manufacturing Engineers
U.S. Department of Labor
California Employment Development Department
American Federation of Information Processing Societies
California State Department of Education
TRW
U.S. Air Force
ComputerTown Inc.
DeVry Institute of Technology
Bell and Howell Education Group
NRI/McGraw-Hill Continuing Education
Vocational Studies Center, University of Wisconsin
Cleveland Institute of Electronics
Mt. San Antonio College
San Jose Community College District
Evergreen Valley College
Los Angeles Harbor College
Digital Equipment Corporation
Wang
Radio Shack/Tandy
Jensen Tools
Sperry Univac
Honeywell, Inc.
Sorbus
Institute of Electrical and Electronic Engineers

x EXPLORING CAREERS AS A COMPUTER TECHNICIAN

**Association for Systems Management
Data Processing Management Association
Ventura County Community College District
Heathkit/Zenith
Computerland
Contact East**

Also, Jerry Dywasuk, Mary Catherine Powers, Sharilyn A. Shampine, Rod Franz, Dale Ackerman, Tanya Burke, Dr. Ruth Hemming, Dr. Diane Moore, Ron Jackson, Allan Signor, Tom Castenada, Lee Nagel, Marvin Lane, Chris Melton, and significant others whose encouraging words are appreciated.

Contents

I. <i>Careers in the Wonderful World of Computers</i>	1
II. <i>Job Prospects</i>	7
III. <i>What Does a Computer Technician Do?</i>	16
IV. <i>Are You a Good Candidate?</i>	31
V. <i>Education and Training</i>	35
VI. <i>What Do You Need to Know?</i>	44
VII. <i>Other Pathways to Your Goal</i>	51
VIII. <i>How to Test Yourself</i>	56
IX. <i>Opportunities for Women</i>	62
X. <i>Equipment, Tools, and Computer Environments</i>	68
XI. <i>Job-finding Techniques</i>	76
XII. <i>Advancement and Job Satisfaction</i>	84
<i>Appendix A: Colleges and Schools</i>	93
<i>Appendix B: Helpful Organizations</i>	99
<i>Appendix C: Publications</i>	101
<i>Appendix D: Glossary</i>	103

Careers in the Wonderful World of Computers

There is a word for people who think that electronic computers are exciting and that computers will have much to do with shaping the world in the 1980's, 1990's, and beyond. That word is futurist.

A futurist is someone who looks ahead in time and begins to realize the direction in which the world is moving. A futurist also plans to be involved in the exciting new ventures that will shape the coming world. The futurist wants to be where the action is, to be part of that action, and, therefore, is willing and eager to explore new ideas.

That is why so many men and women, boys and girls, are thinking about computers and computer careers. Both adults and young people can be futurists. The key factor is that they are looking ahead. They want to be a part of the important things that computers will accomplish for all people.

Computers and what they can do are interesting. That's a fact.

By using computers, people can manage and use great amounts of information. They can do things that have never been done before. They can accomplish more—and faster—than any person has been able to do before. In addition, computers are capable of performing many important functions more logically and in a more organized way.

Already we are seeing automatic tellers at banks, retail computer terminals instead of cash registers in stores, advertising mailings that address each receiver in a personal manner, and auto repair scopes that can discover car problems almost instantly. Computer systems play a vital role in our lives. They help us make telephone calls, receive paychecks on time, and reserve tickets for travel, hotels, and entertainment. That is only the beginning.

People who work with computers are even more interesting. Some interest us because they possess the brainpower to design and create

computers. Others are interesting because they understand these wonderful machines and are able to keep them operating as they were meant to operate.

In the years to come, almost everyone will use computers as routinely as people use telephones or typewriters. Computers will be in every business and in almost every home. Students preparing for every type of career will need to study computers also in order to carry out the functions of those careers. That includes fields such as business, engineering, natural sciences, economics, medicine, and sales.

Young people who are looking ahead are beginning to think like futurists. For instance, you are probably starting to think about your career. After all, you know that schoolwork is only the beginning. You will want to earn money and be a part of society's work force. And of course you will want to choose a career that will be interesting and challenging as well as providing money for living.

Futurists Plan to Learn New Skills

If you are considering a computer career, you are a futurist.

Are you excited about the future? Do you like challenges? Do you like to work with your hands? Do you like to make things happen? Do you like to feel capable?

Specific skills are needed to make computers perform "miracles." You may already know that, and, somewhere inside of you, you may believe that you can become one of the skilled people who are contributing to the electronic computer's ability to change the world.

The computer field is the new frontier and is very exciting both to work in and to plan for. The whole field didn't even exist when your parents were planning their careers. Now it is opening up to you with a variety of specialized computer careers to choose from.

Operators, programmers, engineers, designers, researchers, supervisors, and instructors are all part of the sophisticated team of workers who are inventing and using computers.

But what do computer users do when the system goes down? That is a key question. And it points to a career you may want to consider.

Think about this.

Who has the knowledge and the expertise to make that computer system function again? Who understands silicon chips and motherboards? Who can read flowcharts? Who determines whether a particular problem is in the software, the hardware, or the operator? Who understands the effect of ultraviolet light on an EPROM? Or what buffers do?

Computer technicians know. And they will be in increasing demand



COURTESY RADIO SHACK, A DIVISION OF TANDY CORPORATION

A technician uses an oscilloscope to trace a malfunction.

as business computers, home computers, instructional computers, and other specialized computers not only grow but skyrocket in use in the United States and around the world.

Computer technicians not only understand *why* a computer performs its speedy and complex functions, they also know the rewards of serving society. They experience a sense of satisfaction when they correct a problem, when they get the ailing computer to perform its wonderful work again. In addition, they will be able to choose from jobs in industry, in private business, or in government. They may also choose to be their own boss.

A Growing Need

Early in the 1980's, about 83,000 people worked as computer service technicians. Most were employed by manufacturers of computer equipment and by companies that provide repair services. Some were employed directly by companies that have large computer systems installed at their own work sites.

Computer technicians most often work in large cities and perform



COURTESY DIGITAL EQUIPMENT CORPORATION

A technician replaces a circuit board in a mainframe computer.

service work for several companies, usually working under a contract arrangement. Job situations vary according to the type of equipment the user has and the technician's special abilities. This type of computer technician must travel from place to place to take care of the computer systems and to make emergency repairs.

Sometimes more than one technician work more or less as a team and service different parts of the same system. Or experienced technicians may work full time at one computer installation and service all phases of one operation.

An important fact is that employment of computer technicians is expected to grow much faster than the average for all occupations through this decade. That means that more jobs will be available for computer technicians than for many other fields. Well-trained computer technicians who are good at their work will be able to choose from many job offers.

As the business climate of the nation expands and becomes healthier, more and more computer equipment will be used and many more technicians will be needed to install and maintain it. Business, government, and other organizations will buy, lease, or rent additional equipment to manage vast amounts of information, control manufacturing processes, and aid in scientific research.

Developing new uses for computers in fields such as education, medicine, traffic control, and agriculture also will create demand for trained technicians.

That strong demand goes hand in hand with the growing number of computers in operation and the locations of those computer installations throughout the nation.

As both the size and the cost of computer hardware become smaller, more and more small companies, organizations, and individuals can afford it. With more computer installations, both the amount of work for the technician and the travel time between locations increase. Each of these factors will increase the number of technicians needed.

Employment of computer service technicians is not likely to be affected by business slumps. Computer operations are rarely cut back or slowed during bad times, so employment for computer service technicians should be steady and secure.

Technicians Are Important to Computer Operation

As we are beginning to see, two basic kinds of workers keep computers computing as their inventors designed them to do. One is the operator. Operators, analysts, and programmers are the users of this sophisticated equipment. They learn how to use it. They give the commands that make it work. They tell it what to do. And the computer does exactly what they tell it to do. If they give correct commands, the computer will operate quickly and efficiently.

A second kind of worker who is important to the operation of a

computer is the technician. Computer technicians are very important in a variety of ways.

Some technicians help to build computers, and later other technicians service them.

The builder types of computer technicians, usually called "R and D" or research and development technicians, are very important in the manufacture of new computers. They take the instructions and make the first working model of a new design. They obtain the correct parts and make the connections between those parts. They test and check and recheck as they are building computers or computer elements. They try to prevent breakdowns or problems from occurring. They do their jobs well because computers tend to be very reliable.

However, like anything that is mechanical or made up of interacting parts, computers do sometimes need servicing. That is when speed becomes very important, and the technician must be able to determine—and correct—the problem in the shortest possible time.

Technicians come to the rescue when the computer goes "down," a term meaning that the computer is not performing the functions that operators expect it to do.

In either case, computer technicians must know what and where and when and how and why a computer functions as it does. They must understand much more about how a computer functions than anyone else.

Computer technicians must be able to help the users when there is a problem of any kind. Computer technicians can be like a knight on a white horse, riding to the rescue when someone is in distress.

If you are beginning to think about yourself in that role, and if you are eager to learn, computer technology can carry you into a future that your elders never even dreamed about.

You will be capable, in demand, and confident—even in a rapidly changing future.

Chapter II

Job Prospects

More and more people are recognizing that the computer field offers very real opportunities to those who are willing to invest study and preparation time and to explore new ways to accomplish things.

For instance, let's look first at the booming personal computer market. Retail sales are expected to quadruple from 1982 to 1987. Significant growth will be in large and small corporations, together totaling nearly three-quarters of the market. That gives an indication of the value and expected future impact of personal computers in the business world. Management uses of microcomputers are seen as a strong influencing factor.

Computers for home and educational uses are also growing. Home computers alone are expected to create a market as large as the entire personal computer market during the explosive 1982 growth period.

It is interesting to note that much of the growth in professional use reflects managers and chief executive officers of companies becoming accustomed to having their own desktop computers. The prime difference between managers' computers and clerical-use computers is in the software. Electronic spreadsheets are used increasingly by managers in decision-making. Spreadsheets are software applications that make it possible to process hundreds of numbers at once. With them, managers can find patterns, reach conclusions, and explore alternative courses of action.

Multi-user systems with separate terminals linked to one central unit are losing favor in the market, even though they are a healthy business. But the single-user, or personal, computer that stands alone is rapidly moving out in front. Vendors of these units say that it is more cost-effective for managers to have their own unit. They seem to be proving that point.

In another study by the Department of Commerce, new and unfilled orders for communications equipment are showing a steady stair-step

increase, rising to approximately \$47 billion by 1984. New orders add up to \$15 billion.

These broad looks at the booming computer industry give you some perspective on the projected needs for computer workers.

Let's look at the job outlook for computer technicians in particular.

Employment of computer technicians is expected to grow much faster than the average for all occupations through the 1980's. As the nation's economy expands, more computer equipment will be used and many more technicians will be needed to install and maintain it.

Business, government, and other organizations will buy, lease, or rent additional equipment to manage vast amounts of information, control manufacturing processes, and aid in scientific research. The development of new uses for computers in fields such as education, medicine, and traffic control will also spur demand.

This very strong demand for computer technicians is related to the growing number of computers in operation and their geographic distribution.

Continued reductions in the size and cost of computer hardware will bring the computer within reach of a rapidly increasing number of small organizations. As more and more of these small systems are installed, the amount of time technicians must spend traveling between clients will increase, as will the necessity to service more computer systems.

Employment of computer service technicians is much less likely to be affected by downturns in business activity than is the case in other fields. Because computer operations are not likely to be curtailed during economic slumps, employment of computer service technicians should remain relatively stable.

• Let's look at some numbers and percentages.

While jobs in general are expected to increase 17 percent to 25 percent over the next decade, jobs for computer operators will increase by 22 to 30 percent. For computer programmers, opportunities are expected to be up 49 to 60 percent.

As attractive as those figures sound, the prospects for computer service technicians are even better. The job increase in this field will climb a whopping 93 to 113 percent. That means that for every computer technician now working, there will be a need for two technicians by 1990.

This is the highest predicted increase in any work field for the coming decade, according to projections of the United States Department of Labor. One private survey estimated the increase as high as 164 percent.

So we see employment of computer service technicians projected to rise much faster than the average for all occupations through the 1980's as the number of computers in operation continues to increase.

In addition to job openings created by rapid growth, many others will also open up. Replacing workers who transfer, advance in their jobs, or retire will account for more jobs.

If those expectations are not enough, the Department of Labor also sees the youth labor force, ages 16 to 24, declining by about two million young workers. The decline will make it easier to compete for entry-level jobs in all fields.

Computer service technicians tend to be young. About six of every ten openings at the start of this decade were filled by workers in their 20's, many of whom had worked previously in another occupation. As we shall see, occupations that require a knowledge of electronics and provide a good background include business machine repairer, television service technician, and engineering technician.

A significant number of openings were filled by recent graduates of electronics training programs offered by two-year community colleges, trade schools, or vocational schools. Some entered from the military, where they had received both electronics training and work experience.

Translated into specific numbers, the 1980 employment figure of 83,000 is expected to climb to 176,000 by 1990. Each year of this decade, the average number of openings should reach 21,000. This represents 9,000 new jobs and 12,000 replacement jobs.

What does all this mean to you?

Well, it means that if you are interested in a computer technician career, there should be some outstanding opportunities for you.

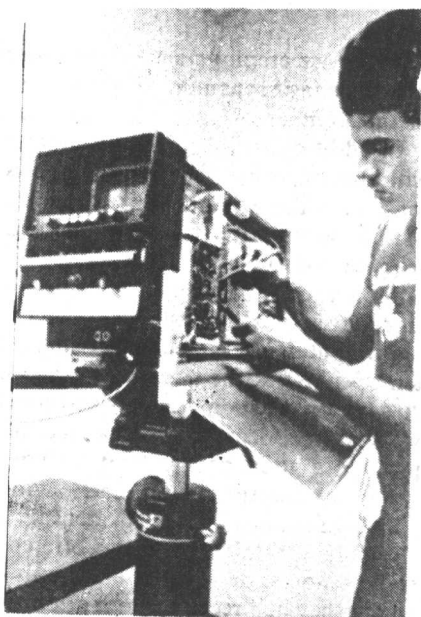
Not only will there be great numbers of computer service technician jobs open to you, there will also be a great variety of jobs open both in the service field and in industry.

Let's consider some of the possibilities.

Just as a television set is only the means by which entertainment is transmitted into your home, a computer is only a means by which many purposes can be accomplished. The variety of those purposes gives us some idea of how many fields are open to job seekers. It gives us an idea of how a computer technician can become involved in some of the most interesting business fields in the world today. It also gives us some idea of how valuable computer technologists will be as society enters the Information Age.

Let's look at some of the broad uses of computer technology in our society.

A medical specialty known as tomography combines both com-



COURTESY DeVRY INSTITUTE OF TECHNOLOGY

A student faces a diagnostic problem in a camera.

puters and X-ray machines. The X-ray pictures are processed by the computer and produce images of the internal body organs. Analyzing physical problems in this way reduces the need for diagnostic surgery and helps to make sure that operations on the patient are successful.

Computers are important in education. In colleges and schools, students are learning foreign languages, grammar and punctuation, auto mechanics, mathematical and scientific experiments, statistics gathering, and word processing on computers. They can study instructor-prepared materials and learn instantly whether their answers are right or wrong. By using computers, instructors can give each student individualized attention.

Computer-aided instruction (CAI) is making a strong entry into industry as well. For instance, CAI is emerging as a strong contender for improving CAD/CAM (computer-aided design/computer-aided manufacturing) training. Major reasons why business leaders are finding CAI productive include maintaining operator attention; providing a self-paced customized method of instruction, allowing analysis and improvement of weak areas, allowing learners to move at their own