OPPORTUNITIES I

Computer Careers

JULIE KLING BURNS

VGM Opportunities Series

OPPORTUNITIES IN **COMPUTER CAREERS**

Julie Kling Burns

Foreword by
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of Computer Professionals

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ABOUT THE AUTHOR

Julie Kling Burns is an independent consultant providing market research and analysis to hardware and software vendors, including Apple, Borland, Component Integration Labs (CI Labs), Taligent, and others. Her clients benefit from her twenty years of industry experience in developing and marketing software products.

Prior to launching her consulting practice, Julie served as vice president of marketing for PeerLogic, Inc., a communications middleware vendor. In this role, she established the overall marketing direction for the company, including product positioning, marketing strategy, and channel development.

From 1986 to 1991, Julie held a wide range of positions in product, developer, technical, and channel marketing at Lotus Development Corporation. She was instrumental in launching such breakthrough products as Lotus Agenda, the first PIM, and Lotus Express, a pioneering PC-based electronic mail application. As marketing manager for networked products, Julie developed a keen understanding of today's networked computing environment. She also spearheaded development of a reseller program for Lotus Notes and other networked products.

Before joining Lotus, Julie worked on office automation and data communications products for Data General and as an independent consultant. She was a tenured member of the graduate faculty at Texas A&M University and also taught business communications at California State University, Long Beach. She has been a featured speaker at industry conferences and seminars.

Julie holds a B.A. from the University of California, Santa Cruz, and an M.A. and Ph.D. from the State University of New York at Buffalo.

FOREWORD

The opportunities are endless for a person who considers a career in the exciting world of computers. Challenging and rewarding positions are available in every area of business and in every corner of the world.

The twenty-first century has opened doors for students in some industries that are relatively new to computerized techniques. Other doors will continue to open in established computerized businesses that need knowledgeable practitioners of the newest technologies. Imagine working on a cruise ship in the Caribbean or being part of a research team at IBM. These opportunities and others just as varied are available to computer science graduates.

The knowledge you have gained in high school is a substantial base for additional higher level education in computer science. By building on your knowledge, you can open many more doors in the growing and changing information processing industry.

Your career choice deserves all of the advantages it can use. In this fast paced, competitive business, any assistance you can give your resume will help move you along your career path.

Joining a professional society is one way to assist you in defining your career goals and educational development. Professional societies with student chapters allow students to interact with professionals who have been successful in this ever-changing field. By joining a student chapter of a

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society, you can gain valuable knowledge from seasoned pros, you can learn about the day-to-day operations in the industry, and you can pinpoint the specialized area of the industry in which you would like to practice.

Choosing a career can be confusing and a little bit scary. Julie Kling Burns explores the challenging and interesting field of computer science. Take advantage of all the information in this book, and then you will be able to offer only your best to one of the most exciting careers available today!

George R. Eggert, CSP
Executive Director
Institute for Certification
of Computer Professionals

PREFACE

For most of us, when we think of computers, the image that immediately comes to mind is that of the gray or tan or sometimes tangerine, aqua, or lime-green case that sits atop our work desks or in our school labs. Computers, however, do come in a variety of sizes from the large mainframe computer, which can fill a room, to a microprocessor, which can fit through the eye of a needle. Large computer systems are valuable for processing huge amounts of data, such as engineering, governmental, or scientific data. And microprocessors are ubiquitous, found in virtually every electronic device imaginable, such as automobiles, wristwatches, telephones, video recorders, and much, much more.

Again though, for most of us, the desktop computer is the most common and versatile device available. With it we can do word processing, store and update a variety of data, play games, and keep track of inventories, employees, and customers. We can also use computer-aided design programs to simulate, say, how a new car design will handle wind resistance or how various medical devices can help alleviate physical disorders. These small but ever more powerful machines are playing a larger and larger part in our everyday work lives. Name your area of interest, and it is likely that a computer and a specific type of software will in some way be involved.

For those of you interested in desktop computing, we hope that you will find enough information here to get started on the career you have chosen. The first part of the book provides specific information on careers inside the computer industry, from developing hardware systems to working in research and development to striking out as an independent. You will also find out about computer-related careers in areas such as technical writing, education, medicine, and more. Finally, you'll learn about the education and preparation you'll need and the salaries you can expect to make in this burgeoning and important career.

The second part of the book zeros in on working in CAD, CAM, CAE, and robotics. The bent is definitely more technical, and if you have what it takes, you can use your skills in computer graphics to draw and/or design images that offer much more in terms of how a product will look and operate than any flat, paper-bound drawing.

As the first part of the book provided information on more mainstream computer jobs, the second part offers educational and professional strategies you'll need to succeed, given the more technical uses of computers today. Information on apprenticeships, opportunities abroad, and associations in this field will all combine to give you the edge you need in this fascinating field.

Whatever the area of computer expertise you choose, you'll find information in these pages that will give you an overview of what to expect and ideas to help you plan your career. We hope it proves to be an exciting and fulfilling one.

The Editors of VGM Career Books

INTRODUCTION

Computers are everywhere—in homes and schools, offices and banks, on farms, in supermarkets and airlines, in architectural and manufacturing firms—everywhere that people and ideas flourish. Artists use computers to produce graphics and special effects in movies. Computer games have a sophisticated computer in them. Computers help us in making plane reservations, phoning for business or pleasure, and can be programmed to write music or poetry. And that means that careers in computers can also be found everywhere.

You just have to know where to find them and which careers might appeal to you. For example, information systems professionals can combine their education in software and business analysis to develop applications that keep businesses up and running. Or you may turn your technical skills into sales and marketing or explore the opportunities in technical documentation, quality assurance, customer support, education, and even entertainment. Software professionals even work in publishing, television, and the movies.

Some careers demand a college degree; others require a master's degree; still others need a Ph.D. Some have found their careers in computers after attending a two-year college. The possibilities are almost endless because of the wide variety of careers available. You are limited only by your own dreams and talents.

Computer careers also are affected by the economy, especially the global economy. Downsizing in the 1990s and the so-called "tech wreck" of the early part of 2001 have left some startups and computer-related companies in the dust. But others will withstand the strain and endure, perhaps in another form or shape, but ready to bounce back and provide lucrative careers for those who want them.

All careers are dependent on a healthy economic environment, but since computers are comparatively new and subject to sudden and major changes in technology, anyone pursuing a career in computers should be especially aware that continuing education, networking, and memberships in professional organizations are particularly important in keeping up with the latest developments.

Although the computer takeover is relatively new, an older generation of computers, computer languages, and computer programmers still exist. Some more experienced programmers assert that younger workers are more in demand because they have real-life experience in using Java and XML as opposed to training courses as the older workers might have. The Information Technology Association of America reports that 843,000 IT jobs went unfilled in the past year, including 20 percent, or 168,000, in programming.

In addition, Congress recently passed a bill allowing twice as many foreign high-tech workers into the country who would probably demand lower salaries than older American workers.

More experienced workers may be more suited to project management, tech support, or programming with government agencies. Younger workers may be more suited to working on the developing technologies. Since this is a growing and somewhat volatile industry, anyone wanting to enter it should keep abreast of the latest

developments in technology and the economy, maintain membership in professional organizations, and update skills as necessary.

TERMS YOU SHOULD KNOW

Computer science, like other fields, has its own specialized terminology. For example, *hardware* is the physical equipment of a system. Hardware specialists design and develop new systems, from chips to complete systems. You may have a background in electrical engineering or hardware design and work in the manufacturing sector of the computer industry. *Software* is the set of instructions (or *programs*) that control the system and tell it how to solve specific problems. Programs are of two types: *applications* and *systems*. Applications programs are sets of instructions written to perform a certain task or compute the answer to a particular problem. Systems programs direct, maintain, and otherwise assist the computer to operate and to execute applications programs. Windows is, for example, an operating system—an example of a systems program.

Most applications programs have been written in *high-level languages* such as COBOL, Fortran, or C. Today you can add Java, XML, and C++ to the mix. Computers understand only *machine language,* which means that high-level languages must be converted to machine language. *Databases,* or large organized collections of data, may store information for hospitals, department stores, or practically any subject for any company. *Networking* is linking computers to one another over wires to create a local- or wide-area network (LAN or WAN). *Multimedia* involves the delivery of pictures, video, and sound to a

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personal computer. Its content can be distributed on a CD-ROM or over the network. *Computer-aided design* (CAD) uses the computer to create, modify, or evaluate product design. *Computer-aided manufacturing* (CAM) uses the computer to plan, control, and operate the production of a product. *Computer-aided engineering* (CAE) helps engineers analyze and improve designs, through modeling and simulation, before products are actually produced. *Computer-integrated manufacturing* (CIM) uses a computer to coordinate activities from market forecasting, sales, and engineering through production and distribution. *Computer numerically controlled* (CNC) processes use machine tools or machines controlled by a computer. *Numerical control* (NC) controls processes automatically by interpreting data that have been prerecorded in symbolic form.

These are just a few basic terms that are necessary to understand certain concepts as you explore your opportunities. You will learn many more related to your choice of career as you increase your depth of knowledge of this industry.

The first part of this book addresses the computer industry in general. The second part concentrates on CAD/CAM and related technologies.

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CHAPTER 1

OPPORTUNITIES ABOUND

As we now know, computer careers are almost limitless for programmers, systems analysts, operators, technicians, graphic artists, writers, and Web developers—to name just a few. Nonetheless, four major industries account for most computer-related employment:

- services
- manufacturing
- finance, insurance, and real estate
- wholesale and retail trade

However, computer personnel, in many capacities, can be found in transportation, communications, public utilities, government, and the military. And that's just the tip of the iceberg. As we said earlier, computers are everywhere, and increased opportunities for computer-related employment are the product of the expanded applications of computers to many fields.

EMPLOYERS

When you enter the career world of computers, you will probably work for either vendors (inside the computer

industry) or end-users (outside the computer industry). Vendors include manufacturers of large and small general-purpose computers and peripheral devices or those who specialize in special-purpose systems and equipment. Within a vendor organization, these are some of the specialized functions:

- development
- quality assurance
- customer support
- sales and marketing
- documentation
- training
- end-user organizations

WHERE THE JOBS ARE

If you work outside the computer industry, you will work as part of the information systems team to provide computer support to the business operations of the organizations. Management information systems (MIS), information systems (IS), and information technology (IT) are terms to describe these jobs. For example, corporate IS jobs include:

- MIS and data processing
- the information center
- network administration
- data communications and telecommunications

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