EMPLOYMENT IN COMPUTER-RELATED OCCUPATIONS

Betsy Jensvold

Due to the explosive growth in the use of computers, interest has increased in computer-related occupations. Forecasts concerning the direct and indirect employment impacts of computers vary. Despite the fact that computers will impact a wide variety of occupations, five occupations can be identified which are most closely related to use of computers. These five occupations; systems analysts, computer programmers, computer operators, data entry clerks, and computer service technicians, are the primary focus of this article.

Systems Analysts design electronic data processing (EDP) systems. This involves analysis, planning and implementation of equipment (hardware) and program (software) aspects of an overall EDP system. Systems analysts should be able to think logically, work well with others, and deal effectively with abstract ideas.

Computer Programmers develop coded instructions that allow computers to accomplish EDP tasks. There are two types of programmers; systems programmers and applications programmers. Systems programmers write programs which provide computers with the general capability to do specific tasks. Applications programmers write programs which do specific tasks, such as print payroll checks or make scientific calculations. The abilities required in programming are similar to those required of systems analysts.

Computer Operators run computers and peripheral equipment. This involves loading of input media, such as tapes, disks and cards, monitoring system, and solving any operating problems which occur. This occupation requires mechanical and reasoning abilities.

Data Entry Clerks use equipment such as CRT terminals and keypunch machines to convert data into forms which can be used by EDP systems. Manual dexterity and tolerance for stress, monotony and noise are important.

Computer Service Technicians install and service EDP equipment. They must have thorough technical knowledge of EDP equipment, mechanical ability, and be able to work independently.

Education and Training

Minimum Entry Requirements

Systems Analysts: Although requirements vary, a bachelor's degree wi... courses in computer science is generally the minimum requirement. Related work experience and/or a graduate degree may be required by some employers.

Computer Programmers: There are no universal requirements. Most programmers are college graduates. Engineering and scientific applications usually require a degree in computer science. Experience and/or education in the field in which the programmer is working (accounting, statistics, etc.) is helpful. Individuals interested in computer programming should choose a field in advance and train appropriately.

Computer Operators and Data Entry Clerks: High school graduation is the minimum educational requirement. Formal training is desirable because most employers look for applicants who are already skilled in operating data entry equipment or computer consoles. Employers generally prefer computer operators who have some community or junior college education, although they provide additional training on the job.

Computer Service Technicians: Employers usually require applicants to have one to two years of post-high school training in basic electronics or electrical engineering from a computer school, technical institute, junior college, or four-year college. A few technicians are trained through apprenticeship programs or the Armed Forces.

Educational Programs in Alaska

Alaska has few computer science programs, compared to other states certificate in data processing is available from the University of Alaska Juneau (UAJ). This program requires about one year to complete (34 semester hours). A two-year associate degree program is available at Anchorage Community College (ACC). Fairbanks' (UAF) associate degree program is being phased out and only those who are already enrolled in it are being allowed to complete it. Four-year bachelor's degree programs are available at UAF and the UA Anchorage (UAA). Both programs are new. Additionally, UAJ offers a Bachelor's of Business Administration with an emphasis in computer information systems. This program is entering its third year. No graduate degree programs are currently available in the field of computer science in Alaska.

Alaska Supply Information

Few people have completed computer science degree or certificate programs in Alaska, although the numbers are increasing. The table on page 7 shows

the number of people who have been awarded such degrees anywhere within the state between 1978-79 and 1982-83. Although the numbers are low, there are several additional factors which must be taken into account.

st, it must be recognized that all three bachelor's degree programs are .rly new. Second, more people receive training than complete degrees. In fact it is quite possible that some people leave school before completing their degree precisely because of the fact that their training has made them employable. Third, and possibly most important, is the fact that these numbers do not show how many people include computer training as part of another degree program.

There is, and will continue to be, a demand for people trained at all levels—from certificate programs through graduate education. Until enrollments have increased significantly and programs have been added at the graduate level, Alaska will continue to depend on workers trained out of state.

Continuing Education

Anyone planning to enter the computer field should be aware that due to the extremely rapid rate of change in the industry, continuing education and training is a necessity. Employers may sponsor training for their employees, or individuals may need to pursue it on their own.

United States Supply Information

Nationally, the number of computer and information science programs offered at every degree level more than doubled over the period from 1966-67 to 1978-79. Associate degree programs grew 225%. Bachelor's degree programs grew 554%. Master's degree programs grew 162%, and Ph.D. progams grew 117%. Numerous vocational schools sprang up or 'ed programs to handle the demand.

The number of persons receiving degrees in the computer sciences also increased sharply. From 1970-71 to 1977-78, the total number of bachelor's, master's, and doctoral degrees in these fields grew 194% (from 4,104 to 12,060). The number of associate degrees fluctuated considerably during the 70's, ranging from 6,821 in 1974-75 to 10,833 in 1978-79. The number trained by vocational schools is not available.

According to the U.S. Bureau of Labor Statistics, even with the increases which have occurred over the last 15 years, graduates of programs in computer science are only filling 1 out of 6 jobs at the bachelor's level, 1 out of 11 jobs at the master's level, and 1 out of 4 at the doctoral level. Obviously the remainder of these jobs are being filled by someone. The most likely explanation is that people in other fields, but with some background in computer science, are filling the gap.

Computer occupations are expected to be the most rapidly growing occupational group in the economy over the next decade. Overa''

Figure 1
U.S. Employment in Computer Occupations
1970, 1980 and Projected 1990
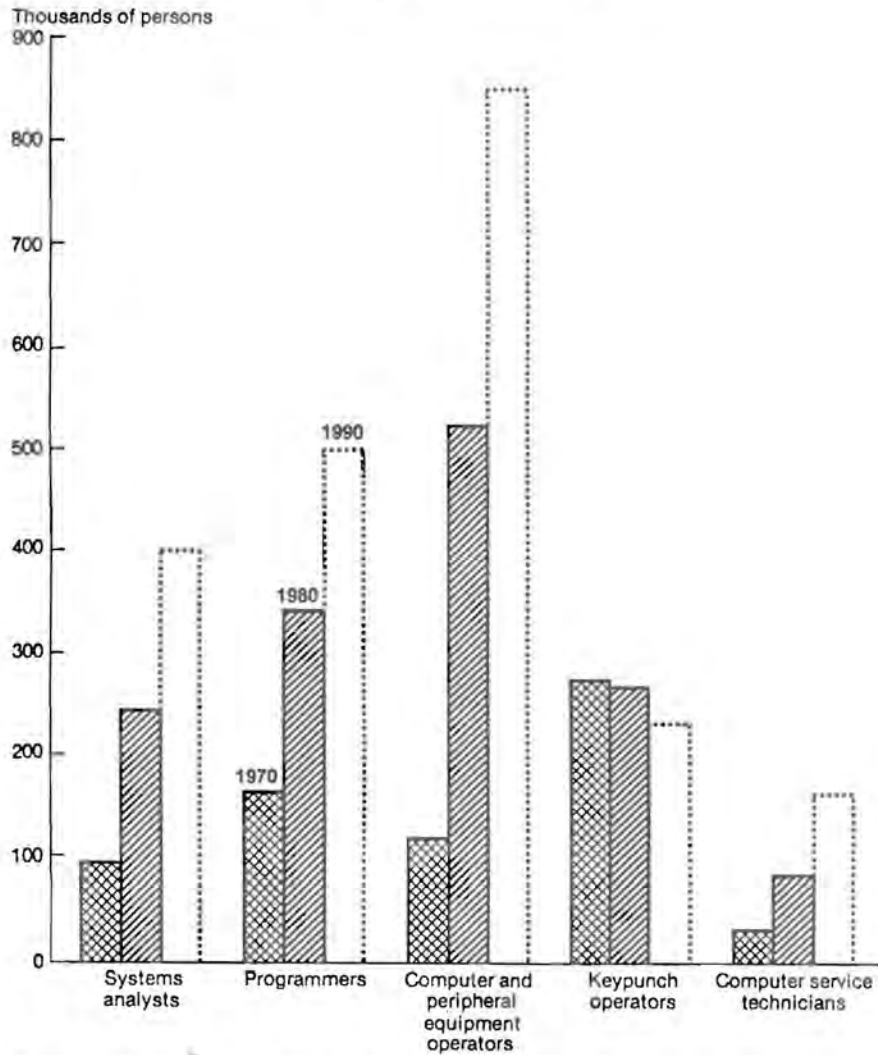
Source: U.S. Department of Labor, Bureau of Labor Statistics.

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employment in computer occupations is expected to rise from 1,455,000 in 1980 to 2,140,000 in 1990, a 47% increase. This is nearly three times as fast as the expected rate of growth for all occupations.

Among the five major computer occupations, computer service technicians will have the fastest rate of growth, and computer and peripheral equipment operators will have the greatest actual growth. Systems analysts are expected to increase 65%, programmers by 47%, computer and peripheral equipment operators by 63%, and computer service technicians by 93%. Only keypunch operators can expect a decline (14%). See figure below.

The industrial distribution of employment and the current geographic distribution of jobs in computer related fields provide additional insight. Although computer workers are found in every major industry, 80% work in four major industry divisions: services; manufacturing; wholesale and retail trade; and finance, insurance and real estate. This broad dispersion of computer occupations throughout the economy provides job stability.

Geographically, there is a high correlation between the distribution of computers and employment in computer occupations. Computer systems tend to be geographically concentrated. In fact, the 25 largest computer markets account for about 56% of the total value of computer systems, and the top 100 markets constitute 84% of the total. Consequently, persons planning a career working with computers should expect to work in or near a metropolitan area.

Alaska Employment Forecast

Computer occupations face a bright future in Alaska as well as in the rest of the nation. However, it is important to keep in mind the small number employed in these occupations. In 1980 there were only 250-350 people employed in each of the following occupations: systems analysts, computer programmers, computer operators, and data entry clerks. Together they represent only 0.6% (or 6 out of 1,000) of the total wage and salary employment in the state—only one-fifth the number of people employed as elementary and secondary school teachers in Alaska.1 /

Important distinctions exist between the distribution of employment in Alaska compared to the rest of the nation. The four industries which provide 80% of the employment nationwide provide only 40% of the employment in Alaska. Also, whereas government employment is relatively insignificant nationwide, it provides 40% of the Alaska computer-related employment. Almost 60% of employment is located in Anchorage and another 20% is located in either Fairbanks or Juneau. Therefore, even in Alaska, most computer-related employment will be in one of the three major cities.

UNITED STATES

ALASKA
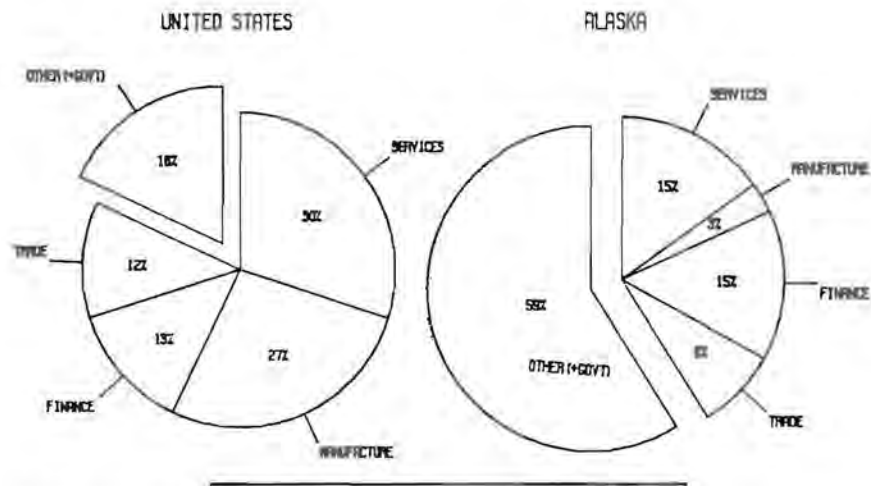
Emerging Occupations

There are a few occupations for which an extremely bright future has been predicted. These "emerging occupations," such as robotics technicians, have drawn public attention and created a level of interest which is out of proportion to their actual employment potential. It is important to understand that even nationally, the openings which these occupations are expected to provide are small in comparisons to the opportunities expected in any large, established occupation. In Alaska, they will have an even smaller impact.

Conclusion

Most computer-related occupations, despite the very rapid growth projec for them, have relatively few job openings because of their relatively sm size and low separation rates.

On a nationwide basis, computer service technicians, the fastest growing computer occupation, is expected to have only 11% as many openings as carpenters and 13% as many as automobile mechanics. Programmers and systems analysts combined will have fewer openings than either accountants or kindergarten and elementary school teachers. Computer operators, because of their larger number and higher separation rate, will have many more openings.

In Alaska, computer-related employment represents a much smaller proportion of total employment than it does nationally. Therefore, the number of employment opportunities in computer occupations are expected to be proportionately smaller. Still, adequately trained individuals will encounter good employment prospects.

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Computer-Related Certificates and Degrees Completed in Alaska

	78-79	79-80	80-81	81-82	82-83
Certificate Programs:					
University of Alaska Juneau			•		n/a
Associate Degree Programs:					
Anchorage Community College	1	11	5	14	19
University of Alaska Fairbanks**	3	3	1	13	14
Bachelor's Degree Programs:					
University of Alaska Anchorage					•
University of Alaska Fairbanks				•1	3
University of Alaska Juneau				•	-

* First year of program.
** This program has been discontinued.

Source: Office of Institutional Planning, University of Alaska, Statewide System of Higher Education.

Further information about computer occupations and their national employment outlook can be found in the following Bureau of Labor Statistics publications:

Occupational Outlook Quarterly
U.S. Department of Labor, BLS
Summer 1981

Employment Trends in Computer Occupations
U.S. Department of Labor, BLS
Bulletin 2101, October 1981

Alaskan specific occupational information is available through the Alaska Career Information System (AKCIS). This is a computer-based interactive system which integrates localized occupational and educational information. The Occupational Data System (ODS) is being developed as a component of AKCIS, and is intended primarily for use by administrators and program planners. AKCIS gives programs of study and training available in all authorized post-secondary schools in Alaska and essentially all four-year colleges, universities, and graduate and professional schools in the nation.

AKCIS currently covers 245 occupations, and supplementary ODS information has been developed for approximately 70 occupations. The sort of

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information which is available includes a narrative description of job duties, working conditions, wages, employment outlook, methods of preparing for the occupation, tabular data on the major industries, required training levels, wages, employment trends, and employmer forecast. Some localized information is available for wages, employmen trends, and employment forecast. Additional features enable one to sort through the occupations on the basis of occupational characteristics and labor market data, to locate additional reference materials, and to obtain monthly economic data for Alaska.

For information about AKCIS and whether it is already available in your local area contact:

Dick Wilson, User Services Coordinator
Alaska Career Information System
Pouch F
Juneau, Alaska 99811
(907) 465-2980

1/   *New occupational employment estimates will be available in September.*