Step-by-step—A career structure for systematic EDP growth

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The mushrooming growth of data processing applications in the past decade has been a boon in many ways for the country. One of the problems, however, has been that growth was so rapid and so demanding that there was little time or manpower resources left over in which plans and standards or other procedures could be formalized. Only in the recent past has there been time to go into this area. Some fragmented standards have appeared here and there and it is now time to draw these together and provide one standard guideline to help managers, professional EDP personnel, as well as those desiring to enter the EDP career area.

In recognition of the need to fill this void, last year a small group in the Washington, D.C., area got together to approach this very important matter. Paul Oyer established this under the shelter of a special interest group of ACM and he was joined by myself plus many other idealistic pragmatists such as Dave Skeen, Bob Meyer, Mary Jo Blair, Ken King. Our purpose was to provide a set of documentation to serve as a fairly comprehensive guideline for the industry. We recognize in advance that it will not answer the needs of everyone or be a be-all-to-end-all. On the other hand, as everyone knows, it is easier to take documentation already provided and change it than it is to create it in the first place. This project, then, is to provide one set of guidelines which would be presented to a Board of Review to be selected from experienced persons of integrity and vision from industry, government, managers, supervisors, professionals in neither the managerial nor supervisory areas, professional associations, and academic institutions. The approved document will then become a recommendation for use by individuals and organizations in management planning and individual career development planning.

THE PLAN

The plan as presently proposed is a five-pointer. 

Point 1: Establish a career path network for data processing personnel. Extensive work done previously by a consulting firm reduced over 1700 positions to a basic 54 positions. In the group selected, these 54 general position descriptions included 189 variations by the addition of locally desirable requirements. This is, in fact, the entire thrust of the project: namely, to provide a basic set of guides which can be customized to individual organization needs. The positions resolved themselves into ten (10) family clusters.

- **EDP Management**—management of branches, divisions, and groups of divisions.
- **EDP Research and Development.**
- **Technical Supervisors**—support and first-line supervisors.
- **Systems Specialists**—major systems development, design, and data base development.
- **Programming**—writing and maintaining computer programs.
- **Technical Specialists**—computer operations analysis, software at the systems level, and applications systems analysis and design (although this latter is still a matter of controversy).
- **Production Management**—scheduling, directing, controlling, and coordinating the operation of computer complexes.
- **Equipment Operations**—operation of all computer complexes and peripheral hardware.
- **Technical Support**—collection, assembling and delivery of materials among functional areas of EDP and provision of clerical support in these areas.
- **General Support**—EDP training and administrative support.

Following the identification of these positions within family clusters, a relative level is assigned to each. The levels presently utilized are those of the governmental GS (General Schedule) standards.

Point 2: Establish basic descriptions of each position including:

- **Knowledge required** by the job. General and specific tasks.
- **Responsibilities.** General statement of commitments, supervisory control; and impact of work.
- **Difficulty of the level.** Nature, complexity, scope, guidelines provided, judgment.
- **Personal Relationships.** Contacts and purpose of such contacts.
- **Environmental Demands.** Variables depending on hardware, software systems, but identifiable as pertaining to a specific level.
• **Performance Measurement.** Specific achievement requirements.

**Point 3:** For each level of position, develop achievement points which must be available to meet the position requirements, and to pinpoint those which may be achieved by academic means as a substitute for experience. Total academic credits may not be substituted, however. Some of these attributes are:

- **Qualifications** of the position itself.
- **Employee appraisal** on such matters as quantity of work and quality, analytical reasoning, resolution of problems, initiative, oral communication, etc.
- **Test scoring** if a prerequisite.
- **Experience.** An example of this would be experience indicating skill in planning and developing machine logic, and program steps for preparing instructions for machine processing. If a total of 14 points were given to this item, a substitution of 7 points could be given for each full year of experience in a position where only two years experience were required. No excess over the 14 would be allocated.
- **Training and self development.** This could include a graduate or professional school or major areas of study have provided skills and knowledge relative to the position; undergraduate college degree with the same provision; or partial credit for courses in the field being considered.
- **Awards received.**
- **Outside activities** which indicates SIGNIFICANT participation in matters proving aptitudes and ability for the position.
- **Encourage certification examinations for each level of each position family.**

**Point 4:** Provide logical crossover channels between family clusters, and from position to position within a family. This is, of course, the point most desired by the EDP professional or would-be professional for his own advancement. Any overlooked advantage, however, would also be for the manager or supervisor in counselling and planning upward mobility for his personnel. It is of immense importance to the vast majority of workers to have an upward goal in mind. It is of even more importance for each employee to know just how he must proceed in order to reach the goal effectively.

In developing logical crossover points and channels, a reasonable road map is established together with the means of arriving at a predetermined destination. Note on the Exhibit 5 (sample crossover chart from the computer operator cluster to the programming cluster) that no transfer is permitted from entry level operator. It has been determined that sufficient responsibility must be exercised by the individual to complete one phase of his training before attempting to transfer. Therefore, the operator must complete entry level and be in the process of working as a non-entry level employee in that field before a crossover is deemed desirable. All positions for which criteria are to be established must of necessity assume that certain basic prior knowledge is inherent in experience at a certain level. Thus, although the experience of a programmer II specifies certain knowledge of EDP terminology, other knowledge obtained at a lower level of experience must be assumed. For this reason, the programmer II experience would not specifically designate basic hardware knowledge and thus must be obtained either as a programmer III or computer operator II or III.

Note the crossover chart also specifies certain courses which may be substituted for some experience. Exhibit 6 shows a sample listing of course names, and Exhibit 7 contains a sample course description. The initial character specifies the family—in this case the P stands for the programmer family. The suffix indicates the level of instruction required:

- 0 = orientation
- 1 = basic course
- 2 = journeyman level
- 3 = advanced material
- 4 = specialized material

One additional point (Point 5) which is dealt with more thoroughly by Bob Meyer's Group would be a compilation of courses within a geographic area so that each individual could know where to find the course required.

**CONCLUSION**

This then is the plan. To provide a road map by means of which everyone concerned would know where he stood in the scheme of things. It would no longer be necessary for an employer to guess from a resume whether or not an applicant was qualified. It would no longer be possible for an employee not to know his necessary experience or academic requirements for the position of his choice. By also inserting examinations (not the same thing as certifications) for each level of position, everyone concerned would know if a professional or his would-be counterpart were qualified for a specific position level.

Such a procedure would give dignity to a profession. It would tend to give integrity to the professional. It would also give a sense of purpose and measurement for a methodical progression.

It is realized that such a set of guidelines would have to be updated periodically, module by module. But is not this the basis of a progressive profession? To develop such a set of guidelines is not an easy matter. We have been fortunate to have such a good start on it, and from the interest generated at all levels for the completed project (or any part of an interim product), there should be many interested in helping to carry it on. As a matter of fact, Bob Henry of the University of Minnesota, has already volunteered his resources and the Federal ADP Users Group of Washington, D. C., has asked us to act as a special interest group under their auspices. What a really great helping hand these people are.

Only by having the backing of all aspects of the field will it be successful—academic community in planning and providing curriculum; professional societies in encouraging acceptance, testing, certification, and professionalism; man-
agers in using it as a guide in planning and operating their establishments; and last but far from least, the individual himself.

SELECTED BIBLIOGRAPHY

12. Slein, David R., "EDP Certification... Is It Necessary?" PROCEEDINGS OF NCC, Volume 43.
### Exhibit 6

#### SAMPLE CONTENTS OF THE COURSE CATALOG

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### Exhibit 7

#### Course

- **P 201-1. Computer Programming**

#### Scope

Provides a thorough knowledge of hardware concepts, a working knowledge of programming in Assembler and COBOL languages, and a basic knowledge of Job Control language.

#### Topics

1. History and Concepts of Data Processing
2. Programming Fundamentals
3. Introduction to S/360 and S/370*
4. Assembler Language Coding
5. COBOL Programming
6. Decision Logic Tables
7. Job Control Language*
8. Debugging
9. Case Studies and Examinations
10. Reference and Standards Manuals*

*Separate modules for different equipment manufacturers

#### Achievement Criteria

Ability to analyze, organize, write, test, and debug a program written in assembler and in ANSI COBOL. Written tests provided.

#### Prerequisites

Entrance test

#### Course Length

280 hours (7 weeks)