A 16-WEEK TWO-SUMMER INSTITUTE WAS HELD TO ASSIST IN DEVELOPING THE KNOWLEDGE AND SKILL ESSENTIAL FOR TEACHING SPECIALIZED COURSES IN A 2-YEAR CURRICULUM IN BUSINESS ELECTRONIC DATA PROCESSING. THE REPORT DESCRIBES THE INSTITUTE'S ENROLLMENT, ENVIRONMENT (AREA AND SCHOOL), TEACHING STAFF, TEXT MATERIAL, AND COURSE OUTLINES. EVALUATIONS BY BOTH THE INSTRUCTORS AND THE PARTICIPANTS INDICATED A CONFIDENCE IN HAVING GAINED THE NECESSARY KNOWLEDGE AND SKILL TO MEET THE REQUIREMENTS OF THEIR DATA PROCESSING TEACHING ASSIGNMENTS. (GD)
AN EIGHT WEEK SUMMER INSTITUTE TRAINING PROGRAM
TO RETRAIN OFFICE EDUCATION TEACHERS FOR
TEACHING BUSINESS ELECTRONIC DATA PROCESSING

June 1, 1965 to December 31, 1965

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PROJECT AND OBJECTIVES

By general definition, business data processing consists of recording and reporting business information, whether it be as an individual, owners of business, or government agencies. In many cases pencil and paper are still used, but there has been a general trend for the need to use machines to attain goals in a more efficient way by relieving humans of routine clerical tasks.

Much of the routine work necessitated specific processing methods which started with the manual method, evolving into mechanical, and presently the electronic state. At this latter stage, human effort of a higher level of competence is considered more necessary than previously. Pressures exerted from without and from within organizations make the job of machine data processing a "must."

Due to "technological change" in the manufacturing and use of machines for data processing, the shortage of skilled personnel has become critical and best estimates indicate a growing demand.

Along with the shortage of skilled persons for the labor market, is the bigger shortages of instructional staffs to teach the techniques of machine data processing.

The general objective of this summer institute project was to assist in developing the knowledge and skill essential for teaching specialized courses in a two-year curriculum in business electronic data processing under the federally-supported Vocational and Technical Education Act.

Specific objectives included the development of self-confidence in techniques of machine wiring, operation and programming. In addition to this, hands-on skill, pedagogy and vocabulary were to be gained through group training and practice.

The complete institute consisted of sixteen weeks, two summers in length.

PROCEDURES

Enrollment

Applicants from a nine-state geographical area (North Dakota, Indiana, Minnesota, Illinois, Michigan, Iowa, Wisconsin, Ohio, Missouri) applied for admittance through their State Director of Vocational Education.

The criteria for selection of applicants included the following:

1. Bachelor degree in business mathematics, or equivalent; preferably with approximately one year of study in accounting.

2. At least three years of teaching experience or combination of teaching and work experience in the field of business or data processing; preferably in accounting, administration, mathematics, or business law.

3. Currently employed as a teacher or department chairman with teaching responsibilities in the field of business or data processing.
4. Available for a teaching assignment and capable of qualifying, at the completion of the institute, under the State plan as a teacher of business data processing in a curriculum designed to prepare computer programmers and application analysts.

5. Recommended for enrollment by State Director of Vocational Education in sending State.

A detail list of those attending the 1965 institute is shown in Exhibit I. Twenty-three attended the first eight-week session, eight attended the second eight-week session, and four participated in an experimental eight-week session, described later in this report under Results and Conclusions.

Successful completion of the institute courses may entitle the participant to degree or nondegree credit, depending upon the wishes and status of the participants in a degree program.

Environment - Area and School

Campus facilities were located in the central part of the city, easily accessible for living and transportation facilities. Transportation was furnished for off-campus activities, such as industry visitations.

Ample classroom space was provided for both lecture and study space. A separate, air conditioned machine laboratory, consisting of approximately 9,000 square feet was available on a continual supervised basis from 8 a.m. to 10 p.m. for instructional purposes only.

Laboratory machines included the following:

- Desk adding machines and calculators.
- Burroughs and NCR bookkeeping machines.
- IBM key punch and verifiers.
- IBM sorters, collators, interpreters, reproduce-summary punch and accounting machines.
- IBM 1620 and 1401 digital computers.

NCR and UNIVAC machines were observed by actual demonstrations at plant visitations.

Films, visual aids, programmed learning devices, and guest speakers were in addition to regularly scheduled teacher contact hours.

Teaching Staff

Exhibit II lists teacher names and academic background. All teachers were full-time, regularly employed teachers of data processing at the Milwaukee Institute of Technology.

Text Material

See Exhibit III for list of texts and suggested text reference. Most machine manuals were furnished to participants without charge. In most cases, textbooks were furnished by the publisher without charge.
Course Outlines

Course outlines were specifically developed for this institute in preparation for the original summer institute held in 1963. (See Exhibit IV.)

In addition to receiving a copy of the summer institute outlines, participants were also furnished copies of outlines used in the regular two-year curriculum at the Milwaukee Institute of Technology. As a term project in the first eight-week session, each participant was required to develop visual aids and lecture notes to fit the course outline. Each student was further required to "practice teach" in presenting one lecture period to the class on some portion of the program.

The institute consisted of both first- and second-year courses, and the content was designed specifically to meet the needs of participants.

It was expected that the content of the courses in the institute evolved from, but was not necessarily limited to, the outlines of four specialized courses included in the first-year program and the outlines of the five specialized courses included in the second-year program of the suggested curriculum guide, "Electronic Data Processing--I," U.S. Office of Education, OS-80024. The programs consisted of subject matter content, as well as pedagogy.

First Year

C 102 Introduction to Business Data Processing - Study of the development of computer systems from manual methods to stored programs. Designed to provide a foundation for detailed study of specific systems.

C 105 Electric Accounting Machines - A survey of electric accounting machines, illustrating the need for machines in accounting and record keeping and the concept, power, and flexibility of the unit record. The importance and scope of unit record equipment as an independent system will be developed throughout the course. Laboratory exercises will be executed involving planning and wiring a range of unit record equipment. Practical exercises offered will be typical of those performed in the existing electric accounting machine installations.

C 122 Data Processing Applications - Designed to acquaint the participant with business data processing applications, practical case studies illustrate the use of data processing equipment in various types and sizes of representative companies.

C 124 Computer Programming I - Consideration of the function and capabilities of a specific data processing machine and the tools and raw materials necessary for becoming a programmer. Participant will perform programming drills, exercises, and case studies which will serve to bridge the gap from the theoretical to the real world of data processing.
Second Year (Planned primarily for participants who have completed first-year program.)

C 215 Computer Programming 2 - A continuation of the C 124 Computer Program 1 (see first-year program). The principles presented in the first-year course will be employed repeatedly. Programming the tape data processing system will be taught as well as the fundamentals of random access programming.

C 213 Programming Systems - An introduction to programming systems to familiarize the student with the purpose and function of the various types of systems.

C 264 Business Systems Design and Development - Designed to guide the student through the three stages in the evaluation of a system, analysis of present information flow, information flow, system specifications and equipment selections and implementation of the system.

C 266 Advanced Programming Systems - Efforts will be made to provide the student with sufficient knowledge of programming systems concepts so that he may master any specific system with a minimum of instruction. Furthermore, he should be qualified to analyze, evaluate, and make minor modifications to such systems.

C 262 Data Processing Field Project - The project will consist of individual assignments related to a data processing installation. The primary purpose is to give an overview of practical data processing.

Academic Credit

Successful completion of the institute course entitled the participant to degree or nondegree credit, depending upon the status of the participant. Participants desiring college credit needed to request specific information from the director of the institution.

Participant daily contact hours consisted of the following:

1. First-year group - 8 hours
   a. Lecture - 4
      Lab - 4

2. Second-year group
   a. 8 hours first four weeks
      (1) Lecture - 4
         Lab - 4
   b. 4 hours second four weeks
      (1) Lecture - 2
         Lab - 2
3. Student spent afternoons of last four weeks in the following firms. One week with each firm.
   a. Allis Chalmers
   b. A. J. Smith
   c. General Merchandise Corporation (J. C. Penney)
   d. Northwestern Mutual Life Insurance Company

4. Outline for industry observation included:
   a. Programming
   b. Operations
   c. Control Methods and Techniques

5. Students talked with heads of various departments listed in three (a-d) above, as well as members of these departments. They also had an opportunity to observe what machines, people, etc., were doing in these departments.

Other features of the training included the following:

A. Assistance Received from Manufacturers and/or Employees
   1. Guest lecturers: 7 from Milwaukee industry
   2. Industry observation
   3. Tours
   4. Graduation banquet and speaker furnished by IBM. Banquet paid by IBM.

B. Seminars
   1. Burroughs Corporation
   2. Honeywell Corporation
   3. National Cash Register
   4. Friden Office Machines
   5. IBM (Chicago Data Center)
   6. UNIVAC Corporation
   7. UARCO Business Forms Company
   8. Films and Visual Aids Demonstrations

C. Tours
   1. First Wisconsin National Bank (G. E. Equipment)
   2. Louis Allis Company (National Cash Register)
   3. A. O. Smith (IBM Equipment)
   4. General Merchandising Corporation (J. C. Penney) (IBM and National Cash Register)
   5. Pabst Brewing Company (IBM Equipment)
   6. Marshall and Ilsley Bank (IBM Equipment)
   7. Northwestern Mutual Life Insurance Company (IBM Equipment)
   8. Wisconsin Telephone Company (IBM Equipment)
D. Hand-Out Reproductions

1. Punch card and computer test problems
2. Data decks and solutions
3. Suggested unit lecture material and transparency masters
4. Ditto copies of all reports
5. Suggested text and reference books and course outlines

E. Special Features

1. Five programmed instruction machines from United States industries, including three films on computers, one film on math, and one film on scientific programming.
2. Programmed key punch course on magnetic tape.
   a. Completed a survey of both firms as part of Systems and Procedures of second-year program. Made recommendations for each company.

F. Equipment Used

1. IBM 403 Accounting Machine
2. IBM 407 Accounting Machine
3. IBM 557 Interpreter
4. IBM 085 Collater
5. IBM 1401 Model G Computer
6. 082 Sorter
7. 083 Sorter
8. 026 Key Punch
9. 056 Verifier
10. 1620 Computer
11. 1622 card Read Punch
12. 1443 Printer
13. 082 Sorter
14. 083 Sorter
15. (2) Disk Pacs
16. 519 Reproducer
17. 1620 Computer
18. 1443 Printer
19. Other: National Cash Register Accounting Machines, Burroughs Sensimatic Accounting Machines with Key Punch Attachment. Thermofax and ditto copy machine.

RESULTS AND CONCLUSIONS

The objectives of the institute were completed. Eleven of the twelve participants satisfactorily completed the sixteen-week, two-summer, institute and are actively using their skill and knowledge gained during the institute in their present job assignments. They were awarded certificates of completion.

Twenty-three of the twenty-seven enrollees in the first year satisfactorily completed the eight-week institute and have been given new teaching assignments in Introductory Data Processing curriculums. Additional training is required to permit their advancement into second-year curriculum.

In conclusion, it is our opinion that the institute was very successful in meeting the objectives. The evaluations by both the instructors and the participants indicate a confidence in having gained the necessary knowledge and skill to meet the requirements of their data processing teaching assignments.

We recommend the continuation of the institutes until such time that comparable training is available at regular teacher training institutions, or schools of higher learning on a wide basis.
We further recommend that a study be made to measure the effectiveness of the training received by the participants and students being trained by those participants.

A next step should be the establishment of teacher job requirements in data processing in order to maintain and update the skills gained in this summer data processing training institute.

The eight-week time period is not considered to sufficiently provide adequate training for participants in all areas of EDP. Basic knowledge was developed and we have strongly urged further study, both formal and informal. We feel a third summer of institute-type study would be highly desirable due to the rapid pace of changes taking place.

Based on these beliefs we conducted an eight-week experimental workshop for five participants that completed sixteen weeks of the summer institute training. These five spent 90% of their available time in local industry data processing installations under controlled environment.

Results of this study, submitted to HEW under separate cover, were highly satisfactory from the standpoint of reinforcement and advancement of prior learning.
EXHIBIT I
SCHEDULE OF PARTICIPANTS 1965 BUSINESS DATA PROCESSING INSTITUTE

FIRST YEAR

Terry E. Berryman
Southeastern Indiana Area Vocational School
Box 156
Versailles, Indiana

Merriman Bersch
Oshkosh Institute of Technical Education
228 Algoma Boulevard
Oshkosh, Wisconsin

Richard Chamberlain
Lorain County Community College
128 O'Neil Sheffield Center
Lorain, Ohio

Gideon Fenkl
Kenosha Technical Institute
625 52 Street
Kenosha, Wisconsin

Robert Germer
School of Vocational Technical and Adult Education
128 West Frederick Street
Rhineland, Wisconsin

Robert L. Geske
Morton High School - West
2400 South Home Avenue
Berwyn, Illinois

Brother K. Gilbert, FSC
Hill High School
2051 East Larpenteur Avenue
St. Paul, Minnesota 55109

William Guess
Arsenal Technical High School
1500 East Michigan Street
Indianapolis, Indiana 46207

Arthur D. Harb
Facine Vocational Technical and Adult School
800 Center Street
Racine, Wisconsin

June Hayward
Merriman, Wisconsin

Wilma Jackson (Miss)
37 Blackburn Drive, Apt. 1
Belleville, Illinois

Manford L. Kistler
Danville Junior College
Fairchild at Jackson Streets
Danville, Illinois

Walter Klug
Waukesha Vocational Technical and Adult School
222 Maple Avenue
Waukesha, Wisconsin

Merlin Jacobs
200 South Broadway
Green Bay, Wisconsin

Melvin L. Knodel
North Dakota State School of Science
Wahpeton, North Dakota

Edith May (Mrs.)
Vincennes University
Vincennes, Indiana 47591

Duane W. McKay
Milwaukee, Wisconsin

Luella M. Norman
City-County Building
Room 1542
Indianapolis, Indiana 46204

Robert J. Nystrom
Holy Name High School
Escanaba, Michigan

Terrence Shea
721 Park Ridge Drive
Eau Claire, Wisconsin

*Milwaukee Vocational Technical and Adult Schools, 1015 North Sixth Street.
Leonard C. Stekiel  
Pulaski High School  
2500 West Oklahoma Avenue  
Milwaukee, Wisconsin 53215

Brother Stephen, FSC  
Cretin High School  
495 South Hamline Avenue  
St. Paul, Minnesota 55116

Loren J. Swedelius  
North High School  
2520 East 12 Avenue  
North St. Paul, Minnesota 55109

James A. Urness  
Wausau Technical Institute  
River Drive  
Wausau, Wisconsin

SECOND YEAR

Douglas Benn  
Kenosha Technical Institute  
625 52 Street  
Kenosha, Wisconsin

Robert E. Davenport  
Des Moines Technical High School  
1800 Grand Avenue  
Des Moines, Iowa

James F. Dowis  
Des Moines Technical Institute  
1800 Grand Avenue  
Des Moines, Iowa

Arvin W. Fettkether  
Des Moines Technical Institute  
1800 Grand Avenue  
Des Moines, Iowa

Roland Hersig  
Vocational Technical and Adult Education  
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Fond du Lac, Wisconsin

Donald M. Kruger  
Northern Michigan University  
Area Training Center  
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Marquette, Michigan

*John Wargin  
Milwaukee, Wisconsin 53203

Virginia G. Williams (Miss)  
School of Business and Industry  
St. Cloud State College  
St. Cloud, Minnesota

Floyd Zwieg  
Muskego High School  
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Muskego, Wisconsin 53150

James F. Dowis  
Des Moines Technical Institute  
1800 Grand Avenue  
Des Moines, Iowa

Betty J. Miller  
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Indianola, Iowa

James P. Ollila  
Northern Michigan University  
Area Training Center  
107 Main Street  
Marquette, Michigan

*Gilbert Paradowski  
Milwaukee, Wisconsin

Robert Reynolds  
Green Bay, Wisconsin

Gene P. Rogers  
Des Moines Technical Institute  
1800 Grand Avenue  
Des Moines, Iowa

Jack Smythe  
State Board of Vocational and Adult Education  
1 West Wilson Street  
Madison, Wisconsin 53702

*Milwaukee Vocational Technical and Adult Schools, 1015 North Sixth Street.
EXHIBIT II

TEACHING STAFF

Business Instructors

1. Richard Tibbits, B.S., CDP, Chairman, Business Data Processing Department
2. Eugene Maurer, B.B.A., CDP, Instructor, Business Data Processing Department
3. Royce Mensink, B.A., B.S., CDP, Instructor, Business Data Processing Department
4. Robert Holzbach, B.S.M.E., MBA, Instructor, Business Data Processing Department
5. Roger Boese, Lab Assistant, Business Data Processing Department
6. Jerome Monfre, Lab Assistant, Business Data Processing Department

EXHIBIT III

TEXT MATERIAL

Required books and supplies must be purchased in advance on an individual basis. Normal student class material such as note paper, pencils, pens, erasers, and IBM block diagram template are the only supplies needed.

The following list of text material will be necessary for lecture-lab use. IBM manuals indicated with an * are normally furnished free of charge to instructors through local IBM sales offices. Please try to arrange for these in advance.

The following is a minimum list of texts required. Every attempt was made to keep purchases at a minimum. Several other texts will be available for reference:


*IBM 407 Accounting Machine (A24-1011-1)
* Functional Wiring Principles (A24-1007)
* Introduction to IBM Data Processing Systems (F22-6517)
* Flow Charting and Block Diagram Techniques (C20-8008)
* 1620/1710 Symbolic Program Systems (C26-5600-5)
* 1620 Reference Manual (A26-4500-2)

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EXHIBIT IV

Milwaukee Institute of Technology - Summer Institute I

BUSINESS DATA PROCESSING - COURSE OUTLINE

ELECTRIC ACCOUNTING MACHINES

Division I The Unit Record

A. Card Format and Code (Transcribed Record) Lecture
B. Control Punches (Zones for Alpha) x + 12 Lecture
Punch Control Lecture
C. Card Field Arrangement Transparencies
D. Flexibility in Processing Chalk Board
E. Card Handling - Joggling and Penning Demonstration

Division II Processing Concepts

A. Recording Lecture
B. Classifying Lecture
C. Calculating Lecture
D. Report Preparation (Summarizing) Lecture

Division III Elements of a Machine

A. Card Feeding and Reading Lecture, Transparencies
B. Printing Units and Counters and Visual Demonstrations
C. The Control Panel

Division IV The Card Punch and Verifier

A. Functions and Features Lecture
B. Alphabetic and Numeric Punching Chalk Board
C. Explicating Transparencies
D. The Control Card or Program Drum Card Demonstration
E. Verification Laboratory Problems

Division V Interpreter

A. Functions and Features Lecture
B. Column Splits and Selectors Chalk Board
C. Interpreting with Selection Transparencies

Division VI Sorter

A. Features and Speeds Lecture
B. Principles and Operating Procedures Chalk Board
C. Numeric and Alphabetic Sorting Transparencies
D. Block Sorting Demonstration

Division VII Reproducing Punch

A. Functions and Features Lecture
B. Operating Procedures Chalk Board
C. Reproducing and Gangpunching Transparencies
D. Comparing and Verifying Demonstration
EXHIBIT IV
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Division VIII Collator

A. Functions and Features
B. Operating Procedures
C. Sequence Checking
D. Merging, Matching, and Match Merging
E. Selection

Division IX Tabulators - Accounting Machines

A. Functions and Features
B. Control Panel
   1. Detail Printing
   2. Program Control
   3. Addition and Subtraction - Counter Control
   4. Group Printing and Group Indication, Comparing
   5. Selective Printing
   6. Summary Punching

Division X Calculators and Other Punch Card Machines

A. Functions and Features

DATA PROCESSING APPLICATIONS

I. Billing

A. Types - Cycle - Prebilling - Order Writing
B. Procedures - Flow Charts - Editing
C. Controls (from hand system through machine systems)
D. Basis for Sales Analysis System

II. Accounts Receivable

A. Theory, Concepts, Objectives and Relationships
B. Open Item Approach vs. Balance Forward
C. Payments Procedures - Updating - Credit Information - Statements - Aging Reports - Other Reports
D. Mechanized Systems - Comparisons

III. Accounts Payable

A. Theory, Concepts, and Functions
B. Establishing and Validating Liability
C. Posting and Check Writing Procedures
D. Distribution and Controls
E. Discounts - Trade-Cash - Anticipation
F. Variety and Advantages of Machine System

TEACHING METHODS

Lecture
Chalk Board
Transparencies
Demonstration
Control Panel
Laboratory Problems
EXHIBIT IV

IV. Payroll

A. Theory, Concepts and Relationships
B. Types of Payroll and Documents Involved
C. Methods of Computation and Compiling
D. Machine Payroll Writing
E. Governmental Requirements - Controls

Lecture
Demonstration
Flow Chart

V. Payroll Distribution

A. Accounting and Management Requirements
B. Cost Analysis - Efficiency Reports
C. Relationship to Production Control

Lecture
Demonstration
Flow Chart

VI. Inventory Control

A. Theory and Concepts
B. Inventory Systems
C. Controls - Coding - Procedural Approaches
D. Mechanization
E. Physical Inventory Pricing

Lecture
Demonstration
Flow Chart

VII. Production Control

A. Relationship to Inventory and Engineering
B. Functions and Procedures
C. Dependence upon Forecasting
D. Information Control

Lecture
Demonstration
Flow Chart

Emphasis was placed on the interrelationship of the above applications. Further emphasis was placed on the value of management reports obtainable as a result of placing certain volume applications on punched cards. Control panel wiring was required as laboratory practice on all machines other than the calculator.
INTRODUCTION TO COMPUTER PROGRAMMING

Division I Development of Electronic DP Systems
A. Evolution from Manual to Computer Methods
   1. Highlights of Data Processing Development
   2. Manual Methods through Key Driven Machines
   3. Brief Overview of Punched Card Systems
   4. The Need for Electronic DP Systems

B. The Business Organization and DP
   1. Function of Business
   2. The Organization Chart
      a. The Company
      b. The DP Unit
   3. The Nine Key Operation
   4. Forms - Flow Chart
   5. Procedures - Flow

Division II Computer Characteristics
A. Components of Systems
   1. Stored Programs
   2. Elements of Problem Solving
   3. Central Processing Unit
      a. Cards
      b. Paper Tape
      c. Magnetic Tape
      d. Magnetic Character Sensing
      e. Optical Reader
      f. Printers
      g. Random Access Devices
   5. Primary Storage
   6. Arithmetic Unit
   7. Logic Ability
   8. Documentation

TEACHING METHODS
Lecture
Film
Overhead Transparency

Lecture
Demonstration
Chalk Board
B. Types of Systems

1. Large, Medium, Small Scale
2. Commercial, Scientific, Mixed
3. Analog and Digital
4. Serial and Parallel
5. Buffered and Unbuffered
6. Sequential and Nonsequential
7. Numeric and Alphanumeric
8. Variable and Fixed
9. An Integrated DP System

C. Digital Data Representation

1. Bit Configurations

Division III Internal Processing

A. Loading the Stored Program
B. Accessing
C. Registers
D. Data Flow

Division IV The Number Systems

A. Base 10 Numbering System
B. Rational and Irrational Numbers
C. Powers and Roots
D. Logarithms

Division V Representation of a Number with an Arbitrary Base

A. Binary
B. Octal
C. Conversion from One Base to Another

Division VI Fixed and Floating Point Numbers

A. Fixed Point
   1. Scaling
   2. Advantages

B. Floating Point
   1. Mantissa
   2. Exponent
   3. Advantages
Division VII  Elements of Problem Solving

A. Problem Definition and Organization
B. Procedure Development
C. Block Diagramming
D. Stored Program Concepts

Division VIII  Instructions and Data Flow - 1620 Card System

A. Format Control Codes
B. Card System Input/Output Instructions
C. Data Movement Instructions
D. Arithmetic
E. Branching
F. Logic Instructions
G. Miscellaneous Codes

Division IX  Programming Systems

A. Computer Languages
   1. Fortran
   2. COBOL

B. Compilers
C. Utility Programs
D. 1401 Computer System
EXHIBIT IV

Milwaukee Institute of Technology - Summer Institute II

BUSINESS DATA PROCESSING - COURSE OUTLINE

ADVANCED COMPUTER PROGRAMMING

Division I Programming a Tape System

A. Characteristics of Magnetic Tape Drive Units
   1. Low Density Tape Drives
   2. Hyper Density Tape Drives

B. Organization of Tape Data
   1. Unit Record Storage
   2. Blocked Record Storage
   3. Tape Labeling

C. Tape I/O Program Instructions

D. Macro-Report Generator and Utility Programs

E. Case Problem - Tape Program

Division II Programming a Random Access Device

A. Characteristics of the IBM 1620-1311
B. Organization of Disk Storage
C. Monitors and Supervisory Programming Systems
D. Case Problem - Disk Program

Division III COBOL Programming System

A. Development of the COBOL Language

B. Divisions of COBOL
   1. Data Division
   2. Procedure Division
   3. Environment Division
   4. Identification Division

C. Program Coding Methods
   1. Code Source Documents
   2. Program Assembly Process
   3. Program Correction

TEACHING METHODS

Lecture
Slides
Sample Tape
Tape Reel

Discus Sample Program
AP 1 and 2
Individual Lab Assignment
Handout - Suggested Procedure
and Result

Machine Demonstration
Discuss Sample Program
AP 3, 4, and 5. Lab. Assignment

Lecture
Slides
Machine Demonstration
Discuss Sample Program
AP 3, 4, and 5. Lab. Assignment

Flip Chart
COBOL Film
Compare with Seminar - Tour 3

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Division IV FORTRAN Programming for Business

A. Basic FORTRAN Review
   1. FORTRAN Programming Rules
   2. FORTRAN Exercise

B. Mixing Programming Languages
   1. Program Exercise

Division V Computer Applications and Simulations

A. Critical Path Scheduling
B. Management Games
   1. Operation of Game
   2. Use of Game Results
   3. Materials Required

COMPUTER UTILIZATION

The purpose of this course was to permit guided application of knowledge gained in the total area of data processing. Specific individual and group assignments were designed to reinforce technical knowledge of punch card, computer, and programming needs. It was further designed to develop and broaden the concepts of systems and procedures for business management.

Division I Manufacturing Order Writing Application
Division II Manufacturing Billing Application
Division III Manufacturing Sales Analysis Application
Division IV Manufacturing General Ledger Application
Division V Integrated Computer System of Manufacturing Order Writing, Billing, Sales, and General Ledger Applications

SYSTEM AND DESIGN PROCEDURES FOR BUSINESS

Division I History of Business Systems
A. The Growth and Changing Role of Clerical Operations
   1. Clerical Factory Operations
   2. Clerical Office Operations

Division II Planning and Systems Concepts
A. Organization and Systems Concepts
E. Control and Systems Concepts
C. Integration of Systems Concepts
Division III Modern Role of Business Systems

A. Management Science
   1. Problem Solving
   2. Scientific Method
   3. Mathematical Analysis Models
   4. Simulation

B. People and Systems
C. Systems Management in the Future

Division IV Developing a System

A. The Approach to Systems Development
B. Requirements of Systems Implementation
C. Methods of System Control
   1. Definition and Elements of Control
   2. Relationship and Examples of System Controls

Division V Systems Implementation and Integration

A. Means and Need for Systems Integration
B. Responsibility for Systems Maintenance
C. Postinstallation Evaluation of System

Division VI Systems Project Review