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CODASYL COBOL COMMITTEE VOTING PATTERNS AND THE ACCEPTANCE OF PROPOSED CHANGES TO THE COBOL LANGUAGE

MIDDLE TENNESSEE STATE UNIVERSITY M.S. 1982

CODASYL COBOL COMMITTEE VOTING PATTERNS

AND

THE ACCEPTANCE OF PROPOSED CHANGES TO

THE COBOL LANGUAGE

Samuel Thomas Baker

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CODASYL COBOL COMMITTEE VOTING PATTERNS

AND

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ABSTRACT

CODASYL COBOL COMMITTEE VOTING PATTERNS AND
THE ACCEPTANCE OF PROPOSED CHANGES TO
THE COBOL LANGUAGE

by Samuel Thomas Baker

COBOL is the most widely used computer programming language in the development of more than 20 billion dollars worth of software each year. Changes in the language, therefore, have significant economic impact. Proposals and voting data considered by the CODASYL COBOL Committee from January 1973 through June 1978 were analyzed to identify bias among the COBOL Committee membership which might adversely affect the Committee's objectives.

Significant differences in vote averages and significant vote correlations were found for several members. Three voting blocs were identified. Votes of one of the blocs were significantly correlated with proposal acceptance or rejection. Proposal disposition does not appear to be prejudiced by non-technical factors or by implementors voting in concert as a result of common economic or technical problems or needs. Additional exploratory and especially confirmatory analyses are needed. CODASYL needs to seek an increased level of support and participation from some members and representatives.

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The paper by Drs. Basili and Reiter comparing software development approaches was especially helpful as a model of organization and as an example of how to analyze and interpret a study involving many variables. Dr. Pound's book provided invaluable assistance on the organization and scope of the introductory and concluding materials in Chapters 1 and 4.

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Chapter 1

CODASYL AND COBOL

Background

The first commercially available computer, the UNIVAC I, was delivered in 1951. It was designed to be relatively easy to program in its own language. However, even at this early time there was interest in avoiding machine-level language for human use. Dr. Grace Hopper was at the time working with the first commercial automatic programming group at Eckert-Mauchly Computer Corporation. Her work in developing problem-oriented languages was the beginning for higher-level, machine-independent languages [Rosen, 1967:3,4].

The "IBM Mathematical FORmula TRANslating System, FORTRAN" [Backus, 1978:168], was the most successful of the pre-1960 languages.

> The FORTRAN project was begun in the summer of 1954. Its purpose was to reduce by a large factor the task of preparing scientific problems for IBM's next large computer, the 704. If it were possible for the 704 to code problems for itself and produce as good programs as human coders (but without the errors), it was clear that large benefits could be achieved. . . . It was expected that such a system would reduce the coding and debugging task to less than one-fifth of the job it had been [Backus, 1957 in Rosen, 1967:29].

Establishment

By the end of the 1950's the movement to higher level languages was well underway in the United States. Dr. Hopper's work at Remington Rand in support of business data processing languages had helped set the stage for the birth of COBOL [Sammet, 1969:144], COmmon Business Oriented Language [JOD, 1978:I-1-1]. A small group of users, manufacturers, and academic representatives met on April 8, 1959 to discuss the possibility of a common business language. It is believed the meeting was held at the University of Pennsylvania Computing Center partly to provide neutral ground for the manufacturers to discuss what otherwise might have been a violation of the antitrust statutes [Sammet, 1978:124]. This group left the meeting convinced that their ideas were feasible. They asked the Department of Defense to sponsor a meeting to organize such a project. The requested meeting was held at the Pentagon on May 28 and 29, 1959.

The May 1959 meeting at the Pentagon was chaired by Mr. Charles A. Phillips of the Department of Defense. The meeting was balanced with government representatives, users, and manufacturing representatives present. Represented at the meeting were Burroughs, GE, Honeywell, IBM, ICL, NCR, Philco, RCA, Remington-Rand-Univac, and Sylvania Electric Products. Two major outcomes of this meeting were: 1) a list of desirable characteristics for the proposed language and 2) the creation of three committees plus an Executive

Committee to coordinate the groups' efforts. [Sammet, 1978:124]. The May 1959 meeting is considered the beginning of the COnference on DAta SYstems Languages (CODASYL) [Sammet, 1969:330].

Original Committees

The Short-Range Committee was charged with developing an immediate language (within three months) for temporary use [Sammet, 1978:125]. The Short-Range Committee eventually became the current CODASYL COBOL Committee. It is still maintaining and developing that "temporary" language. [JOD, 1978:I-1-1 - I-1-2].

> I am certainly convinced in my own mind that had the Short-Range Committee realized at the outset that the language it created was going to be in use for such a long period of time, it would have gone about the task quite differently and produced a rather different result [Sammet, 1978:125].

The COBOL Committee of CODASYL was known as the Programming Language Committee (PLC) from July 1968 until May 1977 [JOD, 1978:I-2-4 - I-2-5]. The return to the title "COBOL Committee" appears to have resulted in part from CODASYL's growing involvement with Database language facilities and with an Operating System Command Language.

The Intermediate Range Committee, which was supposed to produce "a really good business data processing language" [Sammet, 1978:125], eventually became part of the Systems and Language Structures Committees [JOD, 1978:I-1-2]. Whether the Long Range Committee ever existed is questionable. Sammet [1978:125] says it did not while the

Journal of Development [JOD, 1978:I-1-2] implies that it did. The work of the Systems Committee in investigating various possible developments was certainly in the spirit of the original two committees [JOD, 1978:I-2-6 - I-2-8].

CODASYL Committees - 1978

CODASYL committee organization in 1978 [JOD, 1978:I-2-8] was structured as follows:

Executive Committee

- COBOL Committee
- COSCL Committee
- DDL Committee
- End Users Facilities Committee
- DML Committee
- Systems Committee

CODASYL's original interest in a business data processing language has now broadened into involvement with operating systems and the definition and use of data.

COBOL Utilization

COBOL has been generally acknowledged as the most widely used programming language in the world. (See Sammet, 1978:144.) While this belief cannot be documented with a tabulation of all users, it is evident that the extensive use of data processing in business type applications certainly should produce this result.

Daniel D. McCracken has estimated that there is at least 100 billion dollars worth of current programs [ICP,

1981:14]. Other estimates are 200 billion dollars [Munson, 1981:103]. It is reasonable to believe that at least one-fourth of all current programs are being written in COBOL since the other dominant production languages are FORTRAN and Assembler. One may easily conclude that there exists 25 billion dollars worth of COBOL code. Based on an average five-year life for programs, one may conclude that the annual investment in COBOL programs is at least 5 billion dollars.

Since COBOL was the result of the development of a common business data processing language, it is not surprising that efforts were soon underway to standardize the language in order to eliminate much of the variation in existing compilers. The first COBOL standard was issued in 1968 by American National Standards Institute [ANSI, 1968]. It was revised in 1974 [ANSI, 1974]. The third standard is currently under review.

The CODASYL COBOL Committee and Bias

Problem Statement

The problem of this study is to determine whether there are important, non-random differences or biases among the membership of the CODASYL COBOL Committee which might adversely affect the technical quality of the Committee's work.

Need for Study

Because of the large annual investment in COBOL referred to above, language changes which cause even tiny changes in language effectiveness represent significant investment amounts. Based on the above estimates of program investment, a change of .01 percent in effectiveness represents approximately $500,000.

Technical capability in the language is only one of the factors which determine its usability and extent of use. The human element is becoming increasingly important in modern computer systems as the proportion of human investment increases [Welty and Stemple, 1981:626,627]. Language improvements, therefore, must be designed to satisfy multiple, sometimes conflicting requirements in order to maximize effectiveness.

Standardization groups are aware of the economic impact of language improvement and standardization. Clark Wiedmann, chairman of the ANSI X3J10 Committee on the APL Language, estimates that for a 5% improvement the payback period for the development cost of an ANSI standard (currently projected at $500,000) will be about half a day. This is equivalent to an annual return on investment of about 78,000 percent [Wiedmann, 1981:335,336].

Commercial bias by the companies which are responsible for implementing COBOL compilers appears to be a distinct possibility. The following statement is attributed

to Howard Bromberg, former chairman of the USASI COBOL Working Group X3.4.4 (now ANSI subcommittee X3J4):

> There is little doubt that timing plays an important part in our activities. Premature actions have a tendency to yield imperfect results. Overdue efforts conflict with accepted practices. The pursuit of standards so abounds with traps and hidden dangers that extreme care must be taken to avoid the interference of commercial conflicts, economic pressures and corporate policies all camouflaged as technical justifications [Business Automation, 1968:42-43].

Commercial software products may be impacted by a proposed change in at least three ways. 1) The COBOL proposal may use an alternative approach which is incompatible with the product. (CODASYL's adoption of network structure for databases was incompatible with IBM's IMS database product.) 2) The COBOL proposal may require product enhancements or changes. (The COBOL Communications Facility required additions and changes to many telecommunication monitors.) 3) Minor changes to the COBOL language may have widely varying impacts on compiler maintenance because of differences in system architecture. (The definition of intermediate data item precision would have had varying impacts.)

The probability of commercial bias occurs when a proposal is seen as particularly adverse to a given company. The company representative, although personally convinced of a proposal's technical merit, will vote against the proposal due to company direction.

A second form of bias is institutional in nature. It is frequently referred to as the "Not Invented Here"

syndrome. This insidious bias exists in most organizations to some extent.

Both kinds of bias have been asserted in trade publications. However, these assertions appear to have no objective study to confirm or deny that either kind of bias exists. Occasional references to specific instances of bias by a single organization are sometimes mentioned [e.g. Sammet, 1978:135-136,142].

Awareness of bias frequently produces efforts to reduce or eliminate its effect. However, public pressure sometimes only changes the appearance, but not the actual level of bias. It is hoped that any problem areas identified in this study would be positively resolved in favor of the "over-all efficiency of the data processing function" [JOD, 1978:II-1-1].

Purpose of Study

This study should provide some objective evidence that significant non-random differences either do or do not exist with respect to:

1. Attendance and voting participation of members
2. Voting tendencies of members and the existence of aligned voting groups
3. Acceptance or processing of member and non-member proposals.

The identification of non-technical criteria which significantly predict acceptance or rejection of a proposal would indicate the probability of bias if other factors can

be eliminated. However, the absence of predictive criteria would indicate that bias is not apparent in the aspects studied.

Scope and Delimitations

This study is based on data extracted from the meeting minutes of the CODASYL COBOL Committee (CC, formerly the Programming Language Committee, PLC) during the period January 1973 through June 1978. All numbered committee items which were active at any time during the period are included. A complete list of items is included in Appendix B. Voting data for proposals voted from January 1973 through June 1978 is included in the study. Proposal survival data is available for committee items 73-001 through 78-039 which were accepted or rejected by June 1978.

The primary variables are proposal attributes and votes. Numerous relationships are explored. Vote correlations are extensively analyzed. Significant differences in statistical parameters for various distinguishing criteria are sought. Efforts are made to locate significant and meaningful predictive variable combinations.

The length of the study should reduce the effect of short-term deviations. However, it may mean that there is a lack of homogeneity in the data collected because of changes in committee membership as well as changes in philosophy caused by advances in computer science.

Basic Assumptions

CODASYL's objective through the COBOL Committee is to provide a problem-oriented, machine-independent language for business data processing. Its use as an economically and technically efficient programming tool should contribute to the "over-all efficiency of the data processing function" [JOD, 1978:II-1-1].

It is assumed that the objective stated above is the proper basis for actions taken by the PLC (or CC, hereafter referred to as PLC/CC). In addition several other assumptions appear to be reasonable.

1. The actions of the PLC/CC members during 1973-1978 reflect their attitudes toward the proposals processed.
2. The attitudes of the PLC/CC members during the period are similar to the attitudes immediately prior to and following the period studied.
3. The recorded proposal votes of the members reflect corporate attitudes when the proposal would significantly impact the member.
4. Preferential or hostile attitudes toward non-priority proposals originating outside the committee would be revealed by the number of meetings required for the proposal to be accepted or rejected.
5. The Decisiveness Index (see Definition of Terms later in this chapter) measures the unanimity of

the committee toward a proposal.

6. The Abstention Index (see Definition of Terms later in this chapter) measures the lack of concern or opinion of the Committee toward a proposal.
7. Votes are discrete positive, neutral, or negative actions based on an underlying continuum of attitudes.

Hypotheses

The basic premise of this study is that various factors influence the actions and votes of the member representatives so that the results of the committee's deliberations are not always the best economic and technical solution to satisfy the objective stated above in the Assumptions. With respect to conflict of interest, some PLC/CC members do not act independently in support of the objective identified above with regard to proposals. Specifically, implementor member votes are significantly influenced by common corporate economic or technical needs or problems. With respect to proposals certain non-technical factors can be used *a priori* to determine the probability of acceptance or rejection of a proposal. Especially discriminating is whether the proposal is originated by a committee member or originates from a non-member. With respect to member involvement some PLC/CC members exhibit attitudes toward change which are significantly different

from other members. In general, member attendance and voting involvement varies significantly based on unknown causes external to the committee.

Review of Related Literature

COBOL as a language has attracted little academic study [Sammet, 1978:145]. The 1970's have produced a few papers about various aspects. Probably more has been written about the database philosophy than any other single aspect. Some historical material has been compiled. The best historical background is probably provided by Sammet [1978]. Her comment on proposals indicates that no published studies were known to her:

> The total number of changes suggested to COBOL is so large and they are so lengthy that there is simply no way to indicate their type or quantity, even in just the early days, let alone since then. It is worth noting that according to Jones (1978) a large number of the suggestions for changes have come from Europe and Japan [Sammet, 1978:145].

Data Processing Digest contained some articles or abstracts related to minor aspects of the study but yielded no indication of a formal study addressing the basic questions of bias.

A literature search of Dissertation Abstracts was conducted in the areas of Engineering, Business, and Mathematics using "COBOL" and "CODASYL" as subjects. A similar search of selected masters' abstracts was also done. No directly relevant literature was found.

Nature and Sources of Data

The data in this study was obtained from the PLC/CC Meeting Minutes from January 1973 through June 1978. Membership attendance was abstracted for use in classifying non-voting reasons. Final votes on all proposals were tabulated by member. Each meeting was assigned a sequence number for use in analyzing periods by meeting. Selected attributes about the organization submitting the proposal were obtained. Also some meeting attributes regarding the meeting at which the proposal was voted on were tabulated. An effort was made to classify each proposal by proposal level and type of action; however, this was generally not possible without extensive reading of each proposal in the context of the requested change.

Method, Techniques, and Procedures

Research Method

This study of PLC/CC records is both descriptive and experimental in nature [Hill, 1967:91-116]. The lack of research in this area makes it necessary to provide descriptive data to acquaint the reader with many of the characteristics of the problem. The experimental method using ex post facto design [Hill, 1967:99,100] is then used to explore preplanned questions of interest and to investigate questions which arose during the analysis [Tukey, 1969:83].

Research Techniques

Five entities are the primary subjects for the descriptive part of the study: 1) Meetings, 2) Proposals, 3) Votes, 4) Proposal Originators, and 5) Members. In addition to the raw data variables, both natural and ad hoc categorization variables were developed. A list of all variables is included at Appendix A:21-23. Univariate descriptive statistics, appropriate to the variables' level of measurement, were then obtained. Selected multivariate frequency tabulations were also obtained.

The analytical portion is primarily concerned with voting and proposal survival. The techniques employed include both parametric and non-parametric tests of means and populations, correlation, and association.

Research Procedures

Based on tentative record layouts, an initial set of proposal records was prepared from the minutes of the PLC/CC meeting. This file was used to prepare vote tabulation worksheets and also used as a source for later data files. Data error detection utilized a variety of techniques from visual scanning to automated consistency checking. Corrections were made by hand to the master data deck.

The data was then subjected to a number of different statistical techniques: univariate and multivariate frequency tabulations, parametric and non-parametric correlations, differences of means, non-parametric tests,

and survival analysis. This information was then analyzed to identify items that were significant to the study questions.

Definition of Terms

This section includes definitions for selected terms in this paper which may not be familiar to all readers.

Absent
: The recorded vote of a PLC/CC member (not suspended) whose representative or alternate representative is attending the meeting but is temporarily not present for a recorded vote.

Abstention Index
: An index number ranging from 0 to 1 which measures the proportion of members which abstained during a vote.

Decisiveness Index
: An index number which ranges from -1 to 1. It measures the decisiveness of members during a vote. It ignores abstentions while measuring the proportion of net Yes or No votes.

Implementor
: An organization which has as a major function the production of a language processing system for COBOL.

Member
: An organization which has applied for and been admitted to membership in the COBOL Committee.
NOTE--Individuals may not hold membership in the COBOL Committee; only organizations may hold membership.

NEW REGRESSION
: An SPSS program in Version 9 of SPSS which calculates multiple linear regression equations. Several methods are available for entering variables into and removing them from an equation. This program will replace REGRESSION in Version 10 of SPSS [SPSS Update, 1981:94-121].

Not Attending
: The recorded vote of a PLC/CC member whose representative or alternate is not attending a meeting.

Processed Proposals
: Proposals which are no longer being considered by the PLC/CC. Proposals may be Accepted, Rejected, Completed, Withdrawn, or Referred.

REGRESSION
: An SPSS program in Versions 6, 7, 8, and 9 of SPSS which calculates a multiple linear regression equation from a set of variables. It provides two methods for entering variables into the equation [SPSS, 1975:320-367].

Suspended
: The recorded vote of a PLC/CC member whose representative or alternate is attending a meeting while the member has been suspended from voting by the PLC/CC Bylaws.

Task Group
: A group of technical experts working under the guidance and direction of the PLC/CC. A task group is normally created to provide expertise in a major functional area for an extended period of time. Examples are the File Processing Task Group, the Screen Management Task Group, and the Asynchronous Processing Task Group.

User
: An organization which utilizes the COBOL language but is not an implementor.

Voting Bloc
: A group of three or more members each of whose votes exhibit a significant positive correlation with a majority of the other members of the group.

List of Abbreviations

Several terms which are used repeatedly in this paper or which are sometimes used when discussing statistical analysis or the work of the PLC/CC are abbreviated in this paper. A list of the abbreviations follows.

ANSI
: The American National Standards Institute.

CODASYL
: The COnference on DAta SYstems Languages.

JOD
: The CODASYL COBOL Journal of Development is the document which contains the COBOL language definition. It is published every 2-3 years.

PLC/CC
: An abbreviation used in this paper to refer to both the Programming Language Committee and the COBOL Committee as a single entity.

SPSS
: Statistical Package for the Social Sciences is an integrated system of programs for analyzing statistical data.

Organization of Remainder of Report

The next section provides a detailed discussion of the procedures used to obtain the data in this study. The analysis of the data is covered in separate discussions for univariate frequencies, multivariate frequencies, parameter differences (e.g. difference of means), correlation, regression, and survival analysis.

The meaning and significance of the data is discussed in the topical areas of proposals, originators, votes, meetings, and members. The results are then summarized and their relation to the problem discussed. The conclusions relating the problem provide a basis for recommendations. Finally, some limitations of the study are presented to indicate further research opportunities.

Chapter 2

AN ANALYSIS OF THE COMMITTEE DATA

The preparation and analysis of the data are discussed in detail under the headings of 1) data preparation, 2) univariate tabulations and statistics, 3) multivariate tabulations and statistics, 4) tests of differences in populations and statistical parameters, 5) correlations, 6) proposal survival, and 7) regression.

Data Preparation

The first step in data preparation was to establish a tentative record layout using the data elements identified for the thesis proposal. The initial record layout consisted of two Hollerith cards. The first was a title and status card; the second was for vote tabulation. The first card included the PLC/CC item number, the originator item identification, the document subject, the vote date if any, the proposal status, and an optional cross reference. This data was all available from the list of proposals included with each set of minutes. Copies of these pages were used as the source document for keypunching PROPOSAL cards. This set of cards was listed and proofed to locate and correct errors. The second card format was never used for reasons discussed below.

The next major step was to build a set of vote tabulation sheets. The PROPOSAL cards were reformatted into VOTE WORK SHEET cards. These were sorted by vote date. Control cards for use with RUNOFF were inserted into the deck at appropriate points. The cards were then loaded to a time-sharing file. The record size was expanded to 132 characters and the file printed. Figure 1 is a copy of the tabulation sheet. Vertical lines were drawn from the heading to the footing to provide columns to record the votes. Multiple colors of ink were used to reduce the probability of writing data in the wrong column. The process of tabulating the votes utilized one person to record the data on the tabulation sheets while another located the data in the minutes. It became apparent during this process that the meeting data could no longer be maintained in this card. A complete record redesign was then undertaken. A copy of those record formats is at Appendix A:21-23. The vote tabulation worksheet was used to keypunch and verify Type 3 cards for voted items. (The type numbers are based on the card code in column 80 of each card.) A set of master cards for meetings was used to duplicate absent, suspended, not attending, or non-member codes into the vote cards for each meeting. A Type 3 card for all non-voted items was reformatted from the PROPOSAL card.

7302.1

CODASYL COBOL COMMITTEE VOTING RECORD WORKSHEET

MEETING DATE - FEB 13-15, 1973
HOST - IBM LOCATION - New Orleans
CHAIRMAN - Ham

CC	###	ORG	YR	###	S	DOC TYP	PETG	PROPOSAL LVL	TYP	AUR	AMS	ATT	BUR	CDC	CFG	CSC	CSI	DCA	DEC	DSA	FLA	HIS	IBM	ICL	NBS	NCR	RI	SRS	UNI	USA	USAF	USN	USS	VPI	WES	XRX	UNAN
												•	•	•	•	•			•	•		•	•		•	•	•	•	•	C	•	•	•	•		
71	147	USC	71	001	P	W										B																				U
72	007	HOF	72	001	P	M		X								B																				U
72	011	AUS	72	001	P	W		X								B																				U
72	114	SHARE	72	002	P	W		X																												
72	144	ANSI	72	~~015~~ 013	P	M		X				Y	Y	Y	Y	Y			Y	B		Y	Y		A	Y	A	Y	Y		Y	N		Y	Y	Y	
72	156	UNX	72	006	P	M																															U
73	008	ANSI	73	007	P	M						Y	Y	B	Y	B			Y	A		Y	Y		A	Y	Y	Y	Y		N	N		Y	B	B	
73	011	ANSI	73	001	P	M								B		B				B												B			B	B	U
73	012	ANSI	73	002	P	M								B		B				B					B							B			B	B	U
73	013	ANSI	73	003	P	M								B		B			B	B					B							B			B	B	U
73	014	ANSI	73	004	P	M								B		D			B	B					B							B			B	B	U
CC	###	ORG	YR	###	S	DOC TYP	PETG	PROPOSAL LVL	TYP	AUR	AMS	ATT	BUR	CDC	CFG	CSC	CSI	DCA	DEC	DSA	FLA	HIS	IBM	ICL	NBS	NCR	RI	SRS	UNI	USA	USAF	USN	USS	VPI	WES	XRX	UNAN

FIGURE 1 VOTE TABULATION WORKSHEET

Type 1 cards were reformatted from the PROPOSAL cards. Cards for non-voted items were immediately punched with the not voted code. Cards for voted items had meeting data duplicated into each card for the meeting at which they were voted. The cards were then sorted by PLC/CC number, and the data for the meeting at which they were added to the outstanding proposal list was duplicated into each card. Finally, all the Type 1 cards were sorted by originating organization code, and certain organizational category codes were duplicated into the card for each organization which had a proposal active during the study period.

Type 2 cards were reformatted from the PROPOSAL cards. Finally, the Type 1, Type 2, and Type 3 cards were merged into one file for data analysis. The merged file was listed and visually checked for errors. After corrections, the file was input into an SPSS (Statistical Package for the Social Sciences) run to produce frequency data for each variable and to build an SPSS system file for further analysis. The SPSS system file was processed in subsequent runs to generate multivariate tabulations, correlations, and comparisons.

Univariate Tabulations and Statistics

Proposals

The year of origin for the 837 documents, with origin year indicated, ranged from 1967 to 1978. Twenty

percent of the proposals originated prior to the study period (1).

Appendix C:82 indicates that over 90% of all proposals were processed within one year of receipt by the committee. Although the average processing period was 4.5 meetings, the median was 2 meeting periods. Almost one-third were processed at the first meeting following their receipt by the committee. A more complete discussion of this topic will be found below in the proposal survival analysis.

Originators

The proposals included in the study were submitted by ninety different identifiable organizations. Eight documents were not identified with an originator code. The number of proposals submitted by an organization ranged from 1 to 119. Over one-fourth of all proposals were originated by the eight major hardware implementors, BUR, CDC, DEC, HISI, IBM, ICL, NCR, and UNI (2).

An examination of the source of the proposals (3) indicates that over 75% originated from the categories of implementor, standardization group, and users in roughly equal proportions. Nearly 10% originate from the committee and its subordinate task groups, while only about 5% were developed by the professional and technical societies.

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(1) See Appendix C:21 for frequency of proposals by year of origin.

(2) See Appendix C:17 for frequency of proposals originated by organizations.

(3) See Appendix C:32 for frequency of proposals by type of originating organization.

Approximately 38% of the proposals originated from organizations without direct PLC/CC relationships (4). The majority of proposals originated by PLC/CC members were from the major hardware implementors. Federal and business users follow with approximately 20%, and 15% of the proposals originated from PLC/CC members.

Over 90% of the proposals included in the study have been finished by the PLC/CC (5). Nearly one-third of the proposals were passed. Only about 15% were rejected. The others were not formally voted by the committee. They were referenced to another proposal, withdrawn, or marked as complete as a result of deliberations or discussions. Consequently, this study includes only 444 proposals which have been voted. A considerable number of documents processed by the PLC/CC (6) were not considered proposals to change the language, but were working papers to initiate discussion or provide written comments on proposals. Approximately 11% of the documents received were preprocessed (7) by the Proposal Editing Task Group. The number of proposals received peaked in the months of May and

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(4) See Appendix C:31 for frequency of proposals by type of organization for PLC/CC members.

(5) See Appendix C:33 for frequency of proposals by status through June 30, 1978.

(6) See Appendix C:34 for frequency of documents by type.

(7) See Appendix C:38 for frequency of preprocessing by the PETG.

June (8), and there appears to be a similar peak, although less pronounced, in dispositions by the committee (9).

Votes

Almost two-thirds of the proposals voted by the committee were unanimous votes (10); therefore, only about 15% of the 980 proposals in the study resulted in any disagreement when voted. Appendix C:46-75 contains tabulations of voting status for each member of the committee. DEC, Honeywell, and the Air Force were the only members who attended all the committee meetings. Seven members were present for voting on over 90% of the documents.

Some members' voting records were heavily affected by absence or lack of attendance. Five members, AMS, CSC, DSA, FLA, and RI were present for less than 50% of the votes. Seven members (11), CDC, CSC, DSA, FLA, ICL, WES, and XRX, were penalized for failure to attend meetings by having their voting privilege suspended one or more times. The most significant suspensions involved CSC and DSA which were suspended for more than 10% of documents completed while they held committee membership. However, the two worst attendance records were by members which were not suspended;

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(8) See Appendix C:39 for frequency of proposals received by month.

(9) See Appendix C:40 for frequency of disposition of proposals by month.

(10) See Appendix C:44 for frequency of unanimous votes.

(11) See Appendix A:26 for list of PLC/CC members and codes.

AMS and RI were not in attendance for the processing of over 50% of the proposals. CSI and VPI failed to attend for over 30% of the proposals. The median rate of absence from the meeting room during votes was 7%. CSC, DSA, and NBS, however, were absent for over 20% of the documents. DEC, FLA, IBM, VPI, and XRX had absence rates exceeding 10%.

A Runs test of the votes cast by each member indicates that the voting records of three members were not random, at the .01 significance level, with respect to PLC/CC item number.

Table 1

Runs of Yes and No Votes Sequenced by PLC/CC Item Number

Member Code	Cases	Runs	2-tailed probability
CFG	404	49	0.0059
DCA	111	9	0.0012
USA	342	40	0.0031

Source:
Appendix I:181-189.

Table 2 below indicates that, on the average, proposal votes by the committee were not subject to a great amount of disagreement. Three to four members typically failed to vote because of absence or suspension.

Table 2

Votes and Voting Status Statistics

Vote Status	Minimum	Median	Average	Maximum
NO	0	0.2	0.9	8
ABSTAIN	0	0.2	1.0	10
YES	4	14.6	14.1	21
SUSPENDED	0	0.2	0.3	2
ABSENT	0	1.1	2.1	10
NOT ATTENDING	0	1.5	1.6	6

Source:
Appendix C:88-93.

Meetings

Committee meetings were either three or four days long. Although only one-third of the meetings lasted four days, they accounted for almost one-half of the proposals processed.

The number of members not attending a meeting ranged from zero to six (12) with an average of 1.6 members not attending. Suspensions of voting privileges ranged from zero to three with an average of 0.3 suspensions.

(12) See Appendix A:27 for list of PLC/CC meetings--January 1973 - June 1978.

Table 3

Meeting Days and Proposals Processed

Meeting Length (Days)	Number of Meetings	Total Meeting Days	Proposals Processed	Proposals per Day
3	31	93	376	4.04
4	15	60	323	5.38

Sources:
Appendix A:27.
Appendix C:81.

Members

Members of the COBOL Committee are classified as either implementors or users with limits on the maximum membership in a class in order to provide a balanced view of needs and problems. The number of users ranged from eight to thirteen (13) during the study while the number of implementors varied from eight to eleven (14). Users averaged ten and one-half members during the study, one more than the implementors who averaged slightly over nine members.

(13) See Appendix C:84 for frequency of proposals finished by number of user members.

(14) See Appendix C-83 for frequency of proposals finished by number of implementor members.

Multivariate Tabulations and Statistics

The multivariate analysis in this section is the beginning point for the demonstration of relationships among study variables. Many of the points of interest identified in this section do not indicate a level of statistical significance. This is usually because the tables from which they were derived failed the assumptions for the chi-square test of independence [Harshbarger, 1971:204-210]. In some of the cases the usual technique of combining or eliminating categories would have allowed determining a level of significance for the table distribution. This was not usually done because of the time and effort involved. Multivariate techniques other than cross tabulation are discussed in subsequent sections.

Proposals

The distribution of processed proposals varied considerably from year to year. The proportion of completed proposals in 1975-1978 was approximately double the proportion in 1973 and 1974. The proportion of passed and rejected proposals varied widely. The proportion of withdrawn proposals was approximately 50% less during 1975-1978 than during 1973 and 1974. The referral of a proposal to another one usually could not be related to a specific meeting or date (15).

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(15) See Appendix D:15 for frequency of proposal dispositions by processing year.

At the beginning of the study period, 111 classifiable documents were active. During 1973 the PLC received 178 documents which have been identified by type of document. They included one-third of all working papers and unmodified proposals in the study. Considerable variation occurred from year to year in the number and distribution of documents received (16).

As with the preceding discussion of votes, proposal disposition by type of originating organization will be discussed based on the three groups. PLC/CC and subunit originated proposals had the greatest probability of passage, 85% and 49% respectively. Proposals originating from users fared noticeably better than those from implementors. Standards groups were about average with respect to acceptance, rejection, and completion while professional societies had the worst acceptance-rejection ratio, 3% accepted to 25% rejected (17).

Proposals with a low level of impact, corrections and editorial changes, were seldom rejected but frequently referenced to another proposal (18). Less than one-third of the proposed additions to and deletions from the language

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(16) See Appendix D:22 for frequency of type of document originated by year received.

(17) See Appendix D:12 for frequency of proposal dispositions by organization type.

(18) See Appendix D:16 for frequency of proposal dispositions by level of action proposed.

were accepted while over two-thirds of the changes and corrections were passed (19).

Over 97% of proposals which were modified during discussion were passed compared to 10% of the unmodified proposals. Only 2% of the modified proposals were rejected compared to 41% of the unmodified ones. Almost two-thirds of the unmodified proposals were rejected or withdrawn (20).

Originators

All of the classifiable proposals originated by the PLC/CC were editorial. In contrast over 80% of the subunit proposals were judged to have a major impact on the COBOL language. Over 80% of the proposals from standards groups were editorial or correction. All of the classifiable proposals from professional societies would cause a major impact on the language (21). The eight major hardware implementors (22) originated more proposals with a major impact than the remaining two-thirds of the committee (23).

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(19) See Appendix D:17 for frequency of proposal dispositions by type of action proposed.

(20) See Appendix D:18 for frequency of proposal dispositions by document type.

(21) See Appendix D:23 for frequency of level of action by PLC/CC membership groups.

(22) BUR, CDC, DEC, HISI, IBM, ICL, NCR, UNI.

(23) See Appendix D:23 for frequency of level of action by PLC/CC membership groups.

Votes

There is no significant difference in the proportion of unanimous votes during the terms of office for the two chairmen (24). However, there is a difference (chi-square at the .0008 level) in the proportion of unanimous votes during the various years. Two-thirds of all proposal votes were unanimous. During 1976 and 1978, however, there was a significant difference with a majority of the votes being split (25).

There are large differences between the proportions of split and unanimous votes depending on the type of organization submitting the proposal. These types are considered under three groups: 1) the PLC/CC and its subunits, 2) current and previous members of the PLC/CC, and 3) non-members. Over 80% of the proposals originated on the floor during PLC/CC meetings received unanimous votes while a majority of proposals from PLC/CC subunits produced split votes. Proposals from implementor members of the PLC/CC resulted in split votes for 42% of the proposals compared to a 21% split vote rate for user members of the committee.

(24) See Appendix D:3 for frequency of split and unanimous votes by committee chairman.

(25) See Appendix D:7 for frequency of split and unanimous votes by year.

Proposals from standards groups and organizations produced 73% unanimous votes, while only 50% of the proposals from professional groups resulted in unanimous votes (26).

One of the categorizations was an attempt to classify proposals by the level and type of language impact proposed. These codes could be applied to only about one-fourth of the voted proposals because it was not possible to determine the impact of all proposals from the minutes, nor was there any way to objectively categorize many proposals which varied from minor to less than major. The excluded proposals closely approximate the split unanimous vote ratio of the total voted proposal population (27, 28, 29).

Proposals with a major impact on the language resulted in split votes in almost 80% of the proposals while corrections and editorial changes resulted in unanimous votes for over 90% of the proposals (30). Only 20-30% of the

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(26) See Appendix D:4 for frequency of split and unanimous votes by type of organization which originated the proposal.

(27) See Appendix D:4 for frequency of split and unanimous votes by type of organization which originated the proposal.

(28) See Appendix D:8 for frequency of split and unanimous votes by the level of action proposed.

(29) See Appendix D:9 for frequency of split and unanimous votes by the type of action proposed.

(30) See Appendix D:4 for frequency of split and unanimous votes by type of organization which originated the proposal.

additions or deletions were processed unanimously. However, over 60% of the changes were voted unanimously (31).

About 55% of working paper and unmodified proposal votes were unanimous. However, proposals which were modified were processed unanimously in more than 70% of the cases (32).

Members

User and implementor membership limits exist to help prevent imbalance. The number of users during this study varied from 8 to 13 while the number of implementors varied from 8 to 11. Appendix D:50 indicates that users have outnumbered implementors on the committee for 55% of the proposals processed. Implementors dominated committee membership for only 17% of the proposals (33).

Tests of Differences in Populations and Statistical Parameters

Yes, No, and Abstain votes were coded 1, -1, and 0 respectively based on an assumption that there is an underlying continuum of attitude. The mean vote is an indication of the degree to which a member supports motions

(31) See Appendix D:4 for frequency of split and unanimous votes by type of organization which originated the proposal.

(32) See Appendix D:10 for frequency of proposal dispositions by document type.

(33) See Appendix D-50 for frequency of proposals processed by number of implementor members versus the number of user members.

to accept or reject proposals. Table 4 below is a list of the vote means for all members.

All PLC/CC members were contrasted using the t-test to evaluate mean votes and the Sign test [SPSS Update, 1979:78-80] and the Wilcoxon Matched-Pairs Ranked-Signs test [SPSS Update, 1979:80-81] to evaluate vote rank differences. Table 5 below is a cross tabulation of 34 pairs of PLC/CC members whose mutual votes are significantly different from another at the .01 level for one or more of the three tests. Three or four significant differences per test are expected from the 325 unique pairs of members due to random fluctuations with a .01 critical level. A total of nine or ten pairs of members should show one or more significant differences.

Two lines are provided for each significant pair. The first contains a code showing which tests indicated a difference with at least a .01 significance level. The codes are sequenced from least significant to most significant to show the ranking of test significance levels. The second line for each entry indicates the least significant level above the .01 level.

Table 4

Vote Means for All Votes

Member	Number of Votes	Vote Mean
FLA	64	.9531
VPI	72	.9306
DSA	146	.9178
UNI	425	.8871
CSC	237	.8819
AMS	16	.8750
WES	285	.8737
CDC	407	.8722
ATT	350	.8514
USN	366	.8497
CSI	93	.8495
SRS	398	.8467
USAF	422	.8460
DCA	117	.8376
XRX	181	.8343
DEC	375	.8240
BUR	352	.8153
CFG	423	.8132
NBS	296	.8074
ICL	296	.7973
HISI	408	.7770
USA	376	.7766
NCR	411	.7713
RI	61	.7541
ADR	181	.7238
IBM	327	.7064

Source:
Appendix F:4.

Table 5

Cross-tabulation of Members Having a Significant Difference Between Their Mean or Ranked Votes

	ADR	BUR	CFG	CSI	HISI	IBM	ICL	NCR	RI	USA	XRX
BUR						tS .008					
CDC					tS .007	tWS .000		W .009	t .010		
CSC					St .004	WtS .006					
DSA		t .009				St .007	t .005				
SRS						SWt .006			St .008		
UNI	S .007	S .010	S .006	St .008	tWS .000	tWS .000		SWt .002		WtS .006	
USAF						tS .006					
USN					tW .007	WSt .001	Wt .007	WSt .008		tS .005	
VPI									St .008		
WES	SWt .010		St .009		SWt .001	SWt .001		t .007		t .007	tS .007

Sources:
Appendix E:3-65.
Appendix I:90-176.
Appendix I:2-89.

Significant Difference Test Codes:
t - Student's t-test
W - Wilcoxin Matched-Pairs Ranked-Signs test
S - Sign test

Correlation

Votes

If a significant amount of paired or bloc voting exists, it should be revealed by a correlation between the votes cast by the members. No, Abstain, and Yes votes may be viewed as discrete points on an interval scale. The discrete nature of the data, however, hinders the use of Pearson product-moment correlation. Therefore, the best measure of correlation is one of the non-parametric ordinal scaled techniques. Kendall's tau was chosen as the measurement vehicle because a number of ties in the ordinal ranks was expected [SPSS, 1975:289]. No and Yes votes were analyzed as interval scale continuous variable using Pearson product-moment correlation. Unless otherwise indicated all of the correlation data in this section is based on Appendices F:2-23 and F:44-53, which contain the Pearson and Kendall correlations of member voting data (34, 35).

The significance level was set at .01 in order to reduce the probability of spurious correlations. Three or four significant correlations due to random fluctuations at the .01 critical level were expected for each of the correlation methods. A total of six or seven member pairs would be expected to exhibit one or two significant

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(34) See Appendix F:2-23 for Pearson Correlation of Yes and No votes cast by PLC/CC members on split votes.

(35) See Appendix F:44-53 for Kendall Correlation of Yes, Abstain, and No votes cast by PLC/CC members on split votes.

correlation coefficients. Of the 325 unique pairs of members there were 18 pairs with a significant Kendall correlation and 17 pairs with a significant Pearson correlation. Twelve of the pairs appeared in both Pearson and Kendall correlations resulting in 23 pairs of members whose votes were correlated at the .01 significance level. These correlations are shown in Table 6 below. The first line for each member pair is the Pearson correlation; the second line is the Kendall tau correlation.

The Kendall and Pearson correlation data in Table 6 has been ordered by coefficient value in Table 7. The range of the Pearson coefficients is larger than the range of the Kendall coefficients. The median significance level for the Pearson correlations was .001 while the median for Kendall's tau was .003. Correlations tend to exist between two implementors or two users rather than between a user and an implementor. Except for the HISI-DCA-IBM correlations, the coefficients for a user and an implementor tend to be smaller and less significant.

Table 6

Cross-tabulation of Selected PLC/CC Members Having a Kendall or Pearson Correlation at the .01 Significance Level for Split Votes

r tau	ATT	CDC	CSC	DEC	HISI	IBM	SRS	USA	USAF	USN	WES
BUR	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	.218	-	-	-	-	-	-
CDC	-	-	.466	-	-	-	-	-	-	-	-
	-	-	.393	-	-	-	-	-	-	-	-
CFG	-	-	-	.269	-	-	-	-	-	-	.402
	-	-	-	-	-	-	-	-	-	-	.267
DCA	-	-	-	-	.526	.733	-	-	-	-	-
	-	-	-	-	-	.461	-	-	-	-	-
DEC	-	-	-	-	-	-	-	-	-	-	.310
	-	-	.305	-	-	-	-	-	-	-	.261
DSA	-	-	-	-	-	-	.464	-	-	.548	-
	-	-	-	-	-	-	.424	-	.431	.473	-
NBS	.542	-	-	-	-	-	-	-	.535	.716	-
	-	-	-	-	-	-	-	.286	.279	.400	-
NCR	-	-	.412	-	-	-	-	.413	-	-	-
	-	.248	.381	-	-	-	-	.297	-	-	-
SRS	.400	-	-	-	-	-	-	-	-	-	.338
	-	.286	-	-	-	-	-	-	-	-	-
UNI	-	-	.446	-	-	-	-	-	-	-	-
	-	-	.376	-	-	-	-	-	-	-	-
USAF	-	-	-	-	-	-	-	-	-	.328	-
	-	-	-	-	-	-	-	-	-	.323	-

Table 7

List of Pearson and Kendall Coefficients
at the .01 Significance Level
for Split Votes

Pearson				Kendall			
r	Members	Sig	Type	tau	Members	Sig	Type
.733	DCA-IBM	.000	U-I	.473	DSA-USN	.003	U-U
.716	NBS-USN	.000	U-U	.461	DCA-IBM	.005	U-I
.548	DSA-USN	.010	U-U	.431	DSA-USAF	.004	U-U
.542	ATT-NBS	.000	U-U	.424	DSA-SRS	.005	U-U
.535	NBS-USAF	.000	U-U	.400	NBS-USN	.001	U-U
.526	DCA-HISI	.005	U-I	.393	CDC-CSC	.001	I-I
.466	CDC-CSC	.000	I-I	.381	CSC-NCR	.001	I-I
.464	DSA-SRS	.010	U-U	.375	CSC-UNI	.001	I-I
.446	CSC-UNI	.000	I-I	.323	USAF-USN	.001	U-U
.413	NCR-USA	.000	I-U	.305	CSC-DEC	.008	I-I
.412	CSC-NCR	.001	I-I	.297	NCR-USA	.001	I-U
.402	CFG-WES	.001	U-U	.286	NBS-USA	.003	U-U
.400	ATT-SRS	.001	U-U	.286	CDC-SRS	.001	I-U
.338	SRS-WES	.005	U-U	.279	NBS-USAF	.002	U-U
.328	USAF-USN	.002	U-U	.267	CFG-WES	.004	U-U
.310	DEC-WES	.007	I-U	.261	DEC-WES	.007	I-U
.269	CFG-DEC	.007	U-I	.248	CDC-NCR	.003	I-I
				.218	BUR-HISI	.007	I-I

The voting correlations are diagrammed in Figure 2. Eight members of the committee did not show a voting correlation with another member and are not shown on the diagram. These eight are ADR, AMS, CSI, FLA, ICL, RI, VPI, and XRX. The correlation map has two distinct groups of members. The strong correlation in the smaller group between DCA and IBM is striking, especially because it is a user-implementor correlation. The larger group can be divided into two sub-groups by partitioning between NBS and USA, SRS and CDC, and SRS and WES. The subgroup composed of ATT, DSA, NBS, SRS, USAF, and USN exhibits an unusually high level of correlation. Four of the six subgroup members are U. S. government organizations with multiple, medium to strong correlations with other U. S. government agencies.

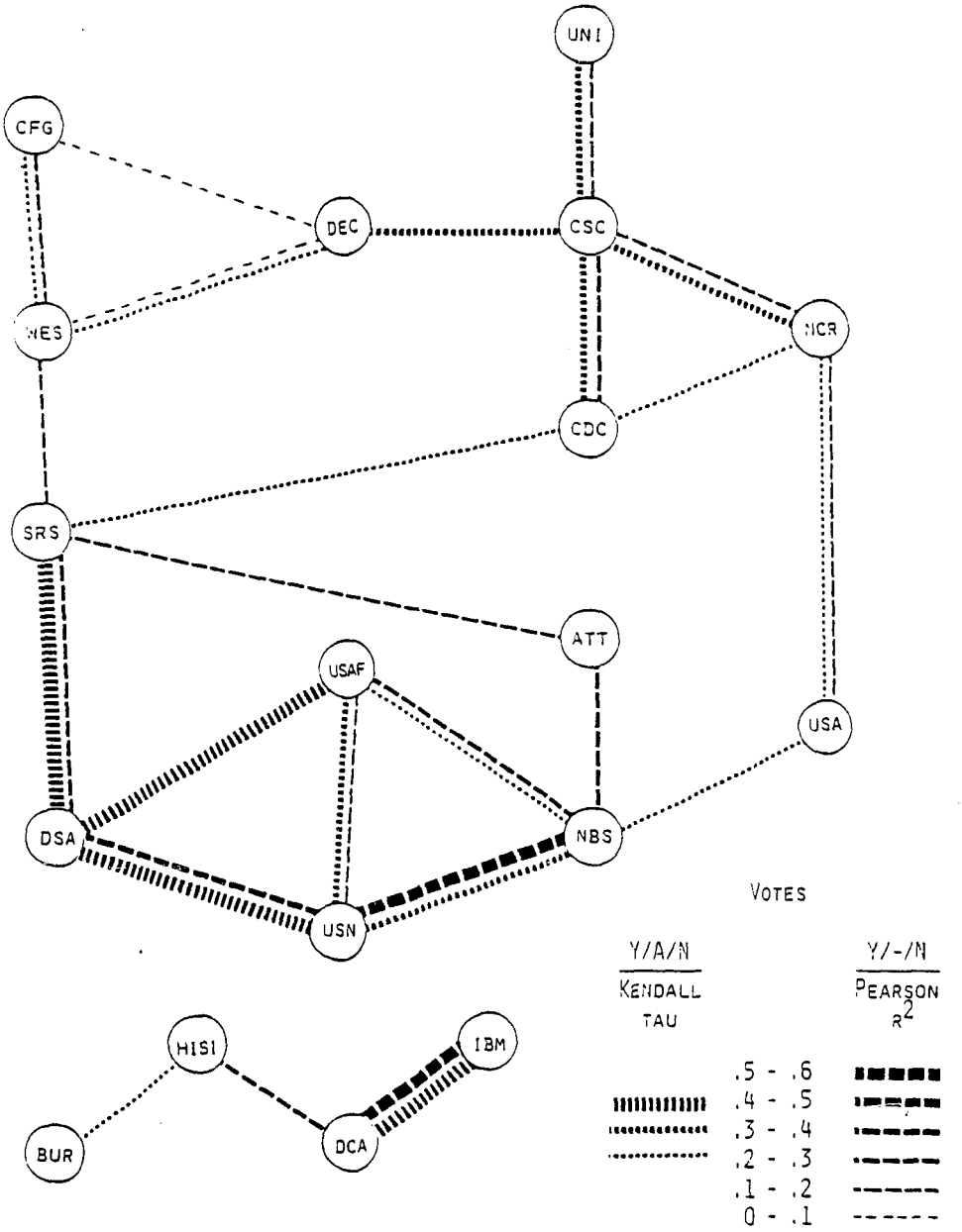

FIGURE 2

CORRELATION MAP OF
SPLIT VOTES

Proposals

The acceptance or rejection of proposals was significantly related to the voting records of six committee members. Table 8 below includes the correlation coefficients and significance levels for these six members. It should be noted that CDC, CSC, and NCR are implementors while SRS, USA, and XRX are users. The Pearson correlation is for the two dichotomies, Accept-Reject and No-Yes. The Kendall correlation uses the ordinal relationship No-Abstain-Yes.

Table 8

Correlation and Significance Level of Member Votes with Proposal Disposition

Member	Pearson r r	Pearson r level	Kendall tau tau	Kendall tau level
CDC	-.324	.000	-.289	.001
CSC			-.337	.002
NCR	-.402	.000	-.382	.001
SRS	-.259	.005		
USA	-.548	.000	-.447	.001
XRX	-.444	.007	-.343	.001

Sources:
Appendix F:2-23.
Appendix F:44-53.

Negative values indicate that Yes votes correlate positively with acceptance of proposals while No votes correlate with rejection of proposals. The negative values result from the variable coding scheme.

Proposal Survival

Survival analysis of proposals is used to analyze the time interval between the receipt of a proposal by the PLC/CC and its acceptance or rejection [SPSS Update, 1979:38]. The time variable selected was number of meetings active. Proposals which were still active at the end of the study period were included in the analysis but subject to censoring (36). Proposals which were active at the beginning of the study were excluded because the date of receipt of the proposal is not known.

Proposals which were cross-referenced or which were classified as complete were not included because the terminal event cannot usually be dated satisfactorily. Proposals which were withdrawn were also excluded because there were relatively few proposals in this category and because it is uncertain whether withdrawal is a terminal event or whether the proposal should be censored.

The SPSS procedure SURVIVAL provides a life table (which summarizes data events by interval, provides certain actuarial type function values, and selected statistics),

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(36) Censoring is a categorization used when the lifetime of the proposal is not known, but it is at least a certain duration [SPSS Update, 1979:39-40].

selected function plots, and subgroup survival comparison statistics [SPSS Update, 1979:40-44].

Proposals

Documents which were preprocessed by the PETG (Proposal Editing Task Group) had a median survival time of approximately two meetings more than those which were not preprocessed. Over 20% of the edited documents terminated at the eleventh meeting. All of the edited proposals were finished by the thirteenth meeting while over 20% of the unedited proposals survived the thirteenth meeting (37).

Although only a small proportion of the proposals could be categorized as to type of proposal, there are significant differences in survival among those which were categorized. Additions survived a median of 10.67 meetings while the median correction and change survival time was only 2.07 and 1.55 meetings respectively. The survival of deletions (5.34 meetings) is not significantly different than any of the other types at the .01 level (38, 39).

Originators

Proposals originated by the PLC/CC itself were processed more quickly than those from other types of originating organizations. The significance levels for the

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(37) See Appendix G:30-31 for proposal life table for edited and unedited documents.

(38) See Appendix G:26-29 for life table for type of action proposed.

(39) See Appendix G:86 for comparison of survival experience for type of action proposed.

differences varied from .0068 to .0002 (40). Proposals from the PLC/CC and its subunits were processed significantly faster (.01 level) than those from either PLC/CC members or non-members. There is no significant difference in proposal survival between members and non-members (41). Proposals originated by federal government members of the committee were processed significantly quicker than those from the major hardware implementors or business users on the committee (42).

Votes

Proposals which received unanimous votes were finished more quickly than those which produced a split vote. The survival experience is significant at the .0000 level (43).

Regression

Two topics seem suitable for analysis using multiple linear regression. Two models are concerned with determining the final disposition of a proposal. The third model analyzes the number of meetings a proposal will remain active.

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(40) See Appendix G:76-78 for comparison of survival experience by type of originating organization.

(41) See Appendix G:79-80 for comparison of survival experience by PLC/CC membership status.

(42) See Appendix G:81-83 for proposal survival experience by PLC/CC member group.

(43) See Appendix G:89 for proposal survival experience by type of vote.

Dummy variables were created to determine the importance of selected nominal categories. SPSS procedures REGRESSION and NEW REGRESSION were used to enter variables using a forward stepwise method. Preliminary runs were used to eliminate some variables which were not useful and which restricted the number of cases available for analysis because of missing data.

Proposal Status

The initial set of variables for pass/fail votes included the six member votes (Table 8 above) which correlated significantly with proposal disposition. CSC and XRX were dropped from the model to increase the number of cases available for analysis (44).

The first model (45) is based on information available immediately prior to the roll call vote. It is assumed that the voting intentions of a few key members can be determined prior to the vote. Certain meeting dependent data was included in addition to the basic proposal attributes. The following eight variables were included in the stepwise equation generated by NEW REGRESSION.

DOCMOD	Dummy for DOCTYPE = 4. Proposal was modified before the vote.
ORGCC	Dummy for ORGTYPE = 1. Proposal was originated by the PLC/CC.

(44) Initial runs with less than 50 cases available for analysis indicated that the votes by XRX would produce little, if any, effect on the final regression equation.

(45) Multiple Regression Equation 1 for Variable List 1.

DOCWP	Dummy for DOCTYPE = 1. Document was a Working Paper.
VOTE22	Vote cast by SRS.
ORGPROF	Dummy for ORGTYPE = 9. Proposal was originated by a Professional, Scientific, or Technical Society.
CCYR	Year that Proposal was received by PLC/CC.
MTGMBRI	Number of PLC/CC Implementor Members.
MTGNDAYS	Length of PLC/CC meeting in days.

The addition of the first six terms was statistically significant at the .01 level. The variables entered the equation in the order listed above. The multiple R-squared value increased to a final value of .7191 as each variable entered the equation. However, the rate of increase was less than .02 after ORGCC entered. The standard error of the prediction equation decreased monotonically to .23074 for all eight terms.

Only two terms contributed substantially to explaining the variation in CCSTATUS. The equation

(1) CCSTATUS = 4.77 - .77 ORGCC - .75 DOCMOD

(which has a multiple R-squared value of .64) accounts for almost two-thirds of the variation in CCSTATUS.

The second model (46) is based only on the information available when a proposal was received by the PLC/CC. The following variables were included in the equation generated by NEW REGRESSION.

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(46) Multiple Regression Equation 2 for Variable List 2.

DOCWP	Dummy for DOCTYPE = 1. Document was a Working Paper.
ORGPROF	Dummy for ORGTYPE = 9. Proposal was originated by a Professional, Scientific, or Technical Society.
CCYR	Year that Proposal was received by PLC/CC.
DOCPETG	Document was edited by the Proposal Editing Task Group.
ORGCC	Dummy for ORGTYPE = 1. Proposal was originated by the PLC/CC.
ORGUSER	Dummy for ORGTYPE = 5. Proposal was originated by a User type organization.

The first four variables entering the equation in the order above produced R-squared changes whose F values were significant at the .01 level. The R-squared value with all six terms was 0.48. The rate of increase for R-squared is less than 0.02 after the third variable is entered. The standard error of the equation for all six terms is 0.41087.

At most three, and probably only two, variables should be included in the model equation,

(2) CCSTATUS = 4.26 + .62 ORGPROF + .70 DOCWP

which explains about one-fifth of the variation in CCSTATUS. The R-squared value was 0.19260.

The same set of data was used for a backward analysis in which variables were removed from the equation one at a time (47). In the resulting equation with nine variables, only the relative importance (measured by the

(47) Multiple Regression Equation 3 for Variable List 2.

magnitude of the standardized coefficients) of DOCWP and ORGPROF are unchanged.

Proposal Survival

The third model addresses the question of whether the lifetime of a proposal can be predicted at the time the proposal is received by the PLC/CC. The dependent variable was MTGACT which measured the number of meetings a document was active. The following four variables were included in the equation generated by NEW REGRESSION (48).

ORGPROF	Dummy for ORGTYPE = 9. Proposal was originated by a Professional, Scientific, or Technical Society.
ORGCC	Dummy for ORGTYPE = 1. Proposal was originated by the PLC/CC.
DOCPETG	Document was edited by the Proposal Editing Task Group.
DOCWP	Dummy for DOCTYPE = 1. Document was a Working Paper.

The four variables above entered the equation in the order listed. Only the first variable produced an R-squared change with an F value significant at the .01 level. The final equation explained only 5% of the variation in MTGACT. The only possible equation is

(3) MTGACT = 4.61 + 5.70 ORGPROF

which has a standard error of 6.71.

(48) Multiple Regression Equation 5 for Variable List 4.

Chapter 3

INTERPRETING THE COMMITTEE DATA

This interpretation of the data is based on the areas identified in the Purpose of Study. They are restated here for convenience:

1. Attendance and voting participation of members
2. Voting tendencies of members and the existence of aligned voting groups
3. Differences in the acceptance or processing of member and non-member proposals.

PLC/CC Member Attendance

Some of the variation in attendance was due to members which were withdrawing from committee participation shortly before resigning from the committee. Other causes, including financial constraints, probably affected some members.

The worst absence rates during the meeting are much more difficult to explain. A rate of over 20% absence by long-term members indicates a lack of participation in the deliberations or votes. It also implies a lack of interest with many documents.

Lack of attendance may be interpreted as a lack of corporate committment. Voting absences may reflect a lack of

interest by the representative. When both failures occurred for the same member, as for FLA and VPI, the implication is a total lack of involvement in the PLC/CC. The result will usually be resignation from the committee as occurred with both FLA and VPI.

Participation

Although meeting involvement by members is important, proposals must be created and reviewed outside the committee meetings. It is not apparent how to measure member involvement in reviewing proposals. However, proposal origination can be used to measure the willingness of a member to originate problem solutions. The eight major hardware implementors (BUR, CDC, DEC, HISI, IBM, ICL, NCR, and UNI) clearly dominated the formal origination of new concepts by the committee membership. They originated the majority of the major proposals coming from the committee.

The type of proposals submitted from outside the CODASYL organization seems to relate to the originator's function. Classifiable proposals from professional groups involved major changes to the language. Standards groups (e.g. ANSI, ECMA, JAPAN) were usually more involved with resolving relatively minor points or inconsistencies in the language definition. This is not surprising. These patterns indicate a healthy flow of new concepts from outside the committee and are consistent with the work of standardization (e.g. removing inconsistencies).

Voting Tendencies

Many different causes may produce tendency patterns. Some tendencies may be normal because of differences with respect to the implementation of the committee's objective (1).

The correlation between proposal acceptance or rejection and the votes of six members implies that for several votes either 1) their attitudes and ideas significantly influenced other members or 2) they were sometimes swayed by an accurate assessment of the majority position. The votes of three implementors, CDC, CSC, and NCR, were correlated with each other. The implication is that these three implementors, as a group, significantly affected the disposition of some proposals by either influencing other members or being influenced by an expressed majority opinion.

The frequently unanimous votes on PLC/CC originated proposals are attributed to their being created to remedy an obvious, minor problem. Task group proposals, however, addressed large problems which admitted many viable solutions, thus producing a large proportion of split votes. The differences in the proportion of unanimous votes are not related to who was chairman.

The committee may be partitioned into two halves based on their vote average. In Table 5 of Chapter 2 those

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(1) See Basic Assumptions in Chapter 1.

members with lower vote means are listed on the top of the table; those members with higher vote means are listed down the left side. It is unclear in which half BUR should be placed. HISI and IBM have vote means that are significantly less than the majority of the group with higher vote means. UNI and WES vote means are significantly greater than a majority of those members with lower averages. Based on these differences, UNI and WES were more likely to vote Yes on proposals while HISI and IBM were significantly less likely to vote Yes. The inference is that UNI and WES were more receptive to changes, while HISI and IBM were less receptive to language changes. Implementors, as a group, do not seem to exhibit any tendencies with respect to vote means.

Voting Alignments

It is clear from Figure 2 of Chapter 2 that no large blocs exist. However, it is evident that three small voting blocs do exist:

(1)	CDC - CSC - NCR	Implementor
(2)	CFG - DEC - WES	Mixed
(3)	DSA - NBS - USAF - USN	User

While it is evident that bloc 3 does not always act in concert, it is apparent that these four representatives from the U. S. federal government frequently voted together. Nevertheless, it is clear from DCA and USA positions that the U. S. federal government representatives are not a solid

bloc. The identity of the sets is unknown. The lack of blocs with more than four members indicates that there were apparently no major power groups influencing votes. Most of the pairing of votes, as seen in Table 7 of Chapter 2, is either between two users or two implementors. The implication is the existence of dynamic alignments of one member with one of two or three other members based on the specific point being voted.

Proposal Acceptance

The acceptance of proposals was somewhat dependent on their source. Much of the variation in acceptance rate can be attributed to differences in the type of proposals produced by different groups. The first two regression equations for model 1 in Chapter 2 relate to proposal acceptance. Equation (1) (which is based on information available immediately before the vote) states that the best indications of a proposal's acceptance were if it was a PLC/CC proposal or if it was modified on floor. The R-squared level and intuition indicate that this is reasonable. Equation (2) is a model of proposal acceptance at the time of receipt by the committee. It indicates that submission by a professional group or its identification as a working paper prejudiced the committee to reject it. The low R-squared level of this equation indicates that neither attribute was likely to have been a real cause of proposal rejection. The two equations are consistent if interpreted

as indicating that no successful predictors exist until the committee has debated the proposal.

Proposal Processing

The speed with which proposals are processed varies widely. There was no significance between the processing time for member and non-member documents which indicates that there was no preference for either document source. The shorter processing time for federal government documents probably reflected a higher proportion of editorial and correction documents compared to the implementors and business users. Regression model 2 indicates that professional society proposals require five to six more meetings for processing. However, the low R-squared value makes this interpretation unreliable. It would be much safer to interpret this difference as being attributable to some other aspect, perhaps the major changes often characteristic of such proposals.

Chapter 4

COMMITTEE PROBLEMS AND OPPORTUNITIES

Summary

COBOL was developed in 1959 [Sammet, 1978:130] in response to the need for a common, high-level language for business data processing. The original CODASYL work with COBOL has now enlarged to include operating systems and the definition and shared use of data with multiple languages.

The annual investment in COBOL programs exceeds five billion dollars. Consequently, the impact of minor language changes may be relatively large. The problem of selecting the best technical capability consistent with the human factors is complicated further by the economic impact on implementors of the proposed changes. The motivation for commercial bias by the implementors is apparent. Institutional bias against outside ideas is also a distinct possibility. The goal of this study is to explore whether certain factors adversely affect the continued development of COBOL.

This study includes data extracted from the meeting minutes from January 1973 through June 1978. The primary data variables are based on votes and on proposal attributes. Univariate and multivariate analyses were used to produce descriptive information. Exploratory data

analysis included tests of significant differences, voting correlations, and development of regression equations.

Worksheets for each proposal vote were prepared from the meeting minutes. Multiple error detection methods were used to safeguard the data which were subsequently analyzed using SPSS.

The 980 documents included in the study were submitted by ninety organizations categorized as implementors, business users, federal government users, standards bodies, and the PLC/CC and its subunits. Almost 40% of the proposals originated outside the circle of direct PLC/CC influence. The eight major hardware implementors on the committee were a major source of proposals. This study focuses primarily on the 444 documents which were formally voted by the committee. The correlation studies, in particular, focus on the one-third of the formal votes which were not unanimous. An average committee vote represented only 80% of the membership because of suspensions, absences, and lack of attendance.

There are 34 significant differences in vote means when tested at a .01 critical level instead of the expected 9 or 10. WES and UNI voted Yes significantly more often than a large proportion of the committee, while HISI and IBM voted No significantly more often.

There are 23 significant vote correlations instead of the expected 6 or 7 at a .01 critical level. The stronger correlations tend to involve either two users or two

implementors. Three blocs of three or four members were found, an implementor bloc, a mixed implementor and user bloc, and a government user bloc. The three members of the implementor bloc also exhibit a significant correlation with proposal disposition. Three regression equations were developed to determine the ability to predict proposal life and proposal disposition. The only important result indicates that proposal disposition can be predicted for some proposals immediately prior to the vote.

Conclusions

Approximately one-fourth of the proposals to modify the COBOL language since 1960 have been analyzed for factors that might adversely affect COBOL development. The analysis was successful in identifying what appears to be a case of commercial bias instanced as voting collusion by three implementors. Bloc voting by four U. S. government agencies was also identified. Several members appear to be only partially supportive of the committee based on their lack of attendance or frequent absence from the meeting room. There is no indication of institutional bias toward non-member proposals or documents. It must be remembered that this study examines only one set of committee data. Confirmatory analysis for adjacent periods based on Assumption 2 in Chapter 1 or the jackknife [Tukey, 1969:84] technique should be used to confirm the findings of this study.

One way to verify the hypothesis that PLC/CC members do not act independently is to identify member voting blocs or significant variations in member committee activities. There were two important blocs, CDC-CSC-NCR and DSA-NBS-USAF-USN. The first group's votes are correlated with proposal status implying that they significantly influenced the outcome of some votes or they were frequently convinced to support a majority opinion. This may be commercial bias. The second bloc apparently existed because of their government association. Therefore, this study provides evidence that some PLC/CC members do not vote independently.

If implementor members are influenced by common economic or technical needs or problems, it should be evidenced by bloc voting and clustering of implementor vote means. The only instance of implementor bloc voting is CDC-CSC-NCR. The vote means of implementors are widely dispersed. The data in this study does not indicate that any substantial number of implementors act in concert.

If a substantial predictive model for proposal acceptance or rejection could be developed, it would substantiate the idea that certain non-technical factors influence the disposition of a proposal. The regression equations developed to test this hypothesis used certain categorical information about a document. While the model indicates a certain amount of predictive ability just prior

to the committee vote, it indicates that proposal disposition is not prejudiced by non-technical factors.

Institutional bias could be demonstrated by preferential acceptance or processing of member originated proposals. No significant difference in acceptance or processing was found. This study indicates that institutional bias is not a problem.

The hypothesis that the attitude toward change varies among members would be supported by a finding of wide variations in the Yes votes of members. Such variations do exist; however, other causes may also exist. Therefore, the study provides only an indication that significantly different change attitudes may exist.

Member absence and attendance variations would support the idea that member involvement varied based on factors external to the committee. The significant failure of CSC and DSA to attend meetings indicates a lack of corporate support for CODASYL by these organizations. The high absence rates for CSC, DSA, and NBS are surprising. The absence rates for DEC and IBM indicate a lack of interest in or support for committee actions. Therefore, this study supports the idea that there are significant variations in the levels of corporate support to CODASYL by its members.

Needs and Opportunities

Further Investigation

Numerous opportunities exist for both exploratory and confirmatory analysis [Tukey, 1969:83]. The present study has investigated less than one-fourth of the available data.

Data. Additional data should be added to the file. The identity of members who moved and seconded proposals should be available for analysis. The vote margin for each document should be calculated based on the voting rules in effect for the meeting. The criteria used to categorize documents should be refined, and based on the proposal source documents the percentage of proposals coded for type of proposal and level of action proposed should be expanded. The country and continent of origin should be coded. The revision number of the final document should be added to the file. Based on the source documents many proposals could be related to a specific functional area (e.g. functions, arithmetic, structured programming) and/or ANSI module (e.g. Nucleus, Table Handling, Report Writer, Inter-program Communication).

Confirmation. Confirmatory analysis should proceed by examining similar periods of time prior to and following this study. Jackknife studies should be carried out for subperiods and for identifiable subareas such as database or inter-program communication. Member identity confirmation

should be sought using higher critical levels (e.g. .0002) to reduce expected significant occurences due to random fluctuation below .20 in order to identify specific members with a small chance of error.

Exploration. Many questions are available for exploration. The survival and activity of several new members who have joined since 1975 should be contrasted with an earlier period and other members. Lack of attendance and absence patterns and member correlations should be studied. The results should be compared with voting data from this study to determine whether member relationships extend beyond the voting area. Significant variations in the number of motions made or seconded by the members should be determined, and this should be related to other data about member involvement.

Proposals where the CDC-CSC-NCR and DSA-NBS-USAF-USN blocs cast bloc votes and where the CDC-CSC-NCR bloc vote agrees with the majority vote should be studied. It should be determined whether a specific member moving or seconding a motion has any effect on other member votes or the disposition of the proposal. Any member differences or patterns based on the subject of the proposal (e.g. structured programming or database) should be analyzed. Proposals whose disposition could have been changed by votes of members which were suspended or absent and the significance of suspension on committee decisions should be identified. Proposal survival and disposition based on the

country of origin should be studied. Members whose vote means are significantly different for member versus non-member proposals should be identified. An attempt should be made to model member voting records, especially by subject area (e.g. IBM for database proposals).

CODASYL Actions

Certain actions with regard to membership participation appear desirable if this study is validated by further investigation. Means to reduce chronic absence or suspension problems should be investigated. Changes to reduce long term, chronic participation failures should be developed. One step in awareness might be the publication in the minutes of suspension and non-attendance rates based on meeting days and absence rates based on recorded votes.

The COBOL Committee could enhance the availability and usefulness of data for researchers by providing certain information. One helpful item would be the specific date proposals were passed instead of only the first or last day of the meeting. This would help verify voting suspensions which began or expired during a meeting. The date a proposal is referenced to another or the date it is marked as complete is needed. When a revision number is specified for a proposal, it should be added to the information in the minutes. Microform copies of all proposals should be available to qualified researchers. CODASYL should seek to promote solid long-term (at least five years) membership

involvement from academic institutions with a special interest in business data processing.

Other Actions

Individuals and organizations outside of CODASYL need to maintain their level of suggestions, ideas, and proposals on the development of COBOL. An academic institution should, in cooperation with the COBOL Committee, build and maintain a proposal database.

Study Limitations

The apparent lack of previous research in this area led to a number of false starts with regard to both inclusion and exclusion of data elements. Much of this should be avoidable in future studies. Some categorization data was very difficult to obtain. Editorial and correction documents are easily identifiable; however, the proposal level is very difficult to define for most documents. The lack of the proposal text on rejected proposals severely hampered this kind of analysis.

Interactive retrieval and correction of the file would be of great assistance. An inconsistency involving a single proposal often required over an hour of manual search time or a special batch run to identify the specific proposal.

Proposals (which were apparent entities) sometimes divided into pieces carrying only the original document number but being voted on separately at different meetings.

Therefore, some organizations have what appear to be an excessive number of proposals (cf. NCR).

More discussions and contact with members of the COBOL committee should help refine questions of interest and also suggest new problems for study. Many of the insights of long-term members or officers can be quite revealing.

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APPENDIX A

Files and Documentation

List of Proposals Included in Study

PLC/CC Number	Originator Number		Proposal Title
68001	BUR	003	MASS STORAGE LOCKOUT
68030			IBM USASI COMMENTS-RANDOM PROC
68035			USASI 7/26/67 COMMENT 78
68043	PHILL		WP-RANDOM PROCESSING
68053	USS	6708	FILE CONTROL PRIORITY
68055A			USASI 10/20/67
68055B			COMMENT 106
68085	ECMA	67056	SWITCHES
68116			ISO-5 DEC 67 JAPAN COMMENTS
68117			USASI 02/20/68 COMMENT 202
68120A			COMMENT 253
68120B			USASI 03/25/68
69024	USS	69011	COPY
69031	USAF	WP	BIT MANIPULATION
69049	NI	69001	USAGE CLAUSE
69109	HON	69028	THE USE PROCEDURE
70036	JAPAN	69098	LABEL RECORD CLAUSE
70050	ATG	70001	ASYNCHRONOUS PROCESSING CAPABILITY
70051	ATG	70002	I/O OVERLAP
70092	CSC	WP	MERGE
70119	SAN	70007	THE STOP STATEMENT
70120B	ANS	WP	COMMENT 2 (LABEL PROCESSING)
70120C	ANS	WP	COMMENT 3 (MULTIPLE FILE TAPE)
70126	IBM	WP	FUNCTION FACILITY IN COBOL
70135A	ECMA	WP	COMMENT 1 - MASS STORAGE
70135B	ECMA	WP	COMMENT 2 - LIBRARY
70139	SAN	WP	OPERATING SYSTEM INTERFACE
70154	USS	WP	SUSPEND PROCESSING FUNCTION
70173	HISI	71016	RUN UNIT CONTROL
71015	CSC	71001	QUALIFICATION
71043	ECMA	71002	BIT MANIPULATION IN COBOL
71052	DBTG	71001	DATA BASE
71053	ATG	71001	ASYNCHRONOUS PROCESSING
71055	HISI	71024	COMPUTATIONAL-N
71056	HISI	71025	NUMERIC/ALPHANUMERIC PAIR
71060	RCA	71001	COMMUNICATION FACILITY
71069	SIG	71007	COMMENT J
71070	USS	71004	VARIABLE BLOCK SIZE
71074	BUR	71004	CALLS ON FUNCTIONS
71087	ISO	71001	ISO RECOMMENDATIONS 1 THRU 11 COMMENTS

71132	IOTG	68003	COBOL LABELING CONVENTIONS
71133	USS	71031	DEFINITION OF 'ITEM, NONCONTIGOUS'
71138	USN	71003	OCCURS WITH DEPENDING OPTION
71139	TG-9	71001	THE DATA RECORDS CLAUSE
71140	CFG	71001	FIGURATIVE CONSTANTS ZERO, ZEROES
71141	CFG	71002	FIGURATIVE CONSTANTS UPPER/LOWER BOUNDS
71142	CFG	71003	FIGURATIVE CONSTANTS IN THE VALUE CLAUSE
71143	CFG	71004	FIGURATIVE CONSTANTS IN CONDITIONS
71144	CFG	71005	FIGURATIVE CONSTANTS IN DISPLAY
71145	CFG	71006	FIGURATIVE CONSTANTS IN MOVE
71146	CFG	71007	FIGURATIVE CONSTANTS IN STOP
71147	USC	71001	EXTENSION OF CONDITIONAL PARENTHESES
71148	ECMA	71012	ANY FIXED OR FLOATING CHARACTER IN PIC
71149	USS	71034	SIZE OF NUMERIC LITERAL
71152	ECMA	71015	DBTG FIND FORMAT 1
71153	ECMA	71016	DBTG FIND FORMAT 2
71154	ECMA	71017	DBTG FIND FORMAT 3
71155	ECMA	71018	DBTG MODIFY
71156	ECMA	71019	DBTG INSERT
71160	ECMA	71023	DBTG FORMAT 3 OF SET SECTION
71161	ECMA	71024	DBTG FORMAT 1 OF AREA SECTION
71162	ECMA	71025	DBTG SUPPRESS PHRASE IN DML
71165	USS	71035	INTRODUCTION TO SECTION III
71166	USS	71036	SECTION III, CHAPTER 1
71167	USS	71037	FIGURATIVE CONSTANTS
71168	USS	71038	FIGURATIVE CONSTANTS
72004	BUR	72001	THE CORRESPONDING OPTION
72005	IOTG-	68005	THE CONTROL DIVISION
72006	BUR	72002	RECORD LEVEL OCCURS
72007	HOF	72001	THE USE FOR DEBUGGING STATEMENT
72010	SAN	71007	THE MERGE STATEMENT
72011	AUS	72001	CLARIFICATION (COMMENTS 3 THRU END)
72017	ANSI	71025	UNSTRING
72018	SAN	71011	REPORT WRITER
72019	SAN	72012	THE VALUE CLAUSE
72020	USAF	71002	CORRECTIONS
72021	USS	71005	THE SEND STATEMENT
72022	USS	71008	CLARIFICATION OF LINKAGE SECTION
72023	USS	71010	THE OPEN STATEMENT
72024	NCR	71002	ARITHMETIC STATEMENTS
72025	USS	71016	THE RENAMES CLAUSE
72026	USS	71019	SEPARATE SIGNS FOR NUMERIC DISPLAY
72027	USS	71020	SPECIAL NAMES FORMAT PUNCTUATION
72028	USS	71021	MSC DEFINITION
72029	USS	71022	OUTPUT CD
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72031	USS	71026	REPORT RECORD DESCRIPTIONS
72032	USS	71028	NONCONTIGUOUS DATA ITEMS
72033	USS	71029	SORT/MERGE
72034	USS	71030	EDITORIAL CORRECTIONS, SECTION 1

72035	USS	71014	PERFORM STATEMENT
72036	USS	67009	SOURCE-COMPUTER PARAGRAPH
72037	USS	67010	OBJECT-COMPUTER PARAGRAPH
72038	USS	69014	FILE-CONTROL PARAGRAPH
72040	JAPAN	68030	APPLY CLAUSE
72041	HISI	71024	COMPUTATIONAL-N
72047	BUR	72003	SEGMENTATION
72050	HOF	72002	CORRECTIONS
72059	UNI	72001	SPECIAL-NAMES FORMAT
72060	UNI	72002	THE RERUN CLAUSE
72061	IOTG	WP	ALPHABET PARAGRAPH AND COLLATING SEQUENCE
72065	ECMA	72004	SUB-SCHEMA DATA DIVISION
72066	USAF	72003	ED ENTRY-REDEFINITION
72067	USAF	72004	LEVEL NUMBER
72069	HISI	WP	COLLATING SEQUENCE
72070	HISI	72001	EQUAL SORT KEYS
72071	HISI	72002	THE READ INTO STATEMENT
72072	HISI	72003	THE DATA RECORD CLAUSE
72073	HISI	72004	FREE FORM COBOL
72074	HISI	72005	QUALIFICATION AND DEBUGGING
72075	HISI	72006	DEBUGGING OF SORT FILES
72076	HISI	72007	THE PICTURE CLAUSE, FLOATING EDITING
72077	HISI	72008	VARIABLE-LENGTH SORT RECORDS
72078	HISI	72009	PICTURE ABA
72079	HISI	72010	THE MOVE STATEMENT, DE-EDITING
72080	HISI	72011	DEFINITION OF RUN UNIT
72081	HISI	72012	EXPONENTIATION
72082	HISI	72013	THE STOP STATEMENT
72083	HISI	72014	COMMENTS IN IDENTIFICATION DIVISION
72084	HISI	72015	THE MERGE AND SORT STATEMENTS
72085	HISI	72016	VALUE OF ESI, EMI, EGI
72086	HISI	72017	THE PURGE STATEMENT
72087	HISI	72018	THE CORR AND RENAMES CLAUSES
72088	USAF	72006	DATA DIVISION STRUCTURE
72089	USAF	72007	THE RERUN CLAUSE
72090	USAF	72008	THE SORT STATEMENT
72091	USAF	72009	THE MERGE STATEMENT
72092	USAF	72010	THE ACCEPT STATEMENT
72093	USAF	72011	THE OPEN STATEMENT
72094	USAF	72012	THE REPORT CLAUSE
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72096	CDC	WP	LABEL PROCESSING SECTION
72097A	CDC	WP	LABEL PROCESSING SECTION
72097B	CDC	WP	MULTI-FILE SECTION
72098	NBS	72001	REWRITE OF IBM-71002
72099	ECMA	72005	RENAMING SECTION
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72101	ECMA	72007	THE SUBSCHEMA PRIVACY LOCK CLAUSES
72102	ECMA	72008	THE COPY ENTRIES
72103	ECMA	72009	THE SET SELECTION CLAUSE

72104	ECMA	72010	SUPPORT FUNCTIONS OF SUBSCHEMA
72105	ECMA	72011	THE OCCURS CLAUSE
72107	ATT	72004	WRITE STATEMENT
72109	UNI	72011	THE EXIT STATEMENT
72110	UNI	72003	VALUE CLAUSE
72111	UNI	72004	PIC L DEPENDING
72113	SHARE	72001	SEQUENCE NUMBER
72114	SHARE	72002	OCCURS DEPENDING ON
72115	XRX	72001	THE GROUP CLAUSE
72116	HISI	72019	LOGICAL RECORD DIFFERENTIATION
72117	USN	72001	THE MOVE STATEMENT
72118	USN	72002	THE SORT STATEMENT
72119	USN	72003	THE CLOSE STATEMENT
72120	USN	72004	THE SORT STATEMENT
72121	USN	72005	THE REDEFINES CLAUSE
72123	ATT	72006	MERGE STATEMENT
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72128	BUR	72005	VARIABLE LENGTH FIELDS
72129	ATG	WP	FUNCTION FACILITY IN COBOL
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72134	UMEA	72001	DECISION TABLES
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72137	ECMA	72012	TRANSFER OF CONTROL IN SEGMENTS
72138	VU	72001	RELATIVE ADDRESSING
72139	USAF	72016	COLLATING SEQUENCE AND CHARACTER SET DECLARATION
72141	NBS	72003	COLLATING SEQUENCE AND CODE CONVERSION
72143	ANSI	72014	SEGMENTATION
72144	ANSI	72015	INSPECT
72145	CFG	72003	DEFINITION OF COMPILER DIRECTING STATEMENT
72146	SCDP	001	REPORT WRITER AND OTHER COMMENTS
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72148	UKM	72013	MEANING OF ENCODING/DECODING
72149	BCS	72001	THE DML IF STATEMENT
72150	BCS	72002	TRANSFER OF ENCODING/DECODING CLAUSE
72151	BCS	72003	TRANSFER OF TEMPORARY AREA SPECIFICATION
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72153	BCS	72004	EXTENSION OF ERROR REGISTERS
72154	ANSI	72022	MINOR CORRECTIONS
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72156	UNI	72006	COMMUNICATIONS-MESSAGE CONDITION AND MES
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72158	UNI	72012	THE CLOSE STATEMENT
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73001	ANSI	72019	MINOR CORRECTIONS
73002	ANSI	72021	CONTINUATION OF PROCEDURE DIVISION HEADER
73003	ANSI	72023	LITERALS IN CONDITIONS
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73013	ANSI	73003	COMMENT LINES
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73021	IBM	73002	BIT MANIPULATION IN COBOL
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73023	DBLTG	WP	SCHEMA/SUB-SCHEMA EXTENSION
73024	HISI	WP	COBOL CONTROL DIVISION
73025	DEC	73001	PICTURE $***,***.**
73026	USN	73002	CATEGORY ALPHABETIC
73027	USS	73001	SPECIAL CHARACTERS IN FORMATS
73028	USS	73002	COMMENT LINES
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73030	CDC	73001	DATA DIVISION STRUCTURE
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73033	CDC	73004	THE SORT-MERGE FILE DESCRIPTION ENTRY
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73035	CDC	73006	THE SOURCE-COMPUTER PARAGRAPH
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73037	CDC	73008	THE PICTURE CLAUSE
73038	USAF	73001	MINOR CORRECTIONS
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73049	ECMA	73001	MINOR CORRECTIONS IN INTER-PROGRAM COMMUNICATION
73050	ECMA	73002	OBJECT-PROGRAM-NAMES
73051	ECMA	73003	NON-COBOL OBJECT PROGRAMS
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73063	ECMA	73007	SET SELECTION BASED ON CURRENCY
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73069	ECMA	73013	RELATIONSHIP BETWEEN REALMS AND DATA BASE KEYS
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73151I	NCR	WP	COMMENTS ON DBLTG-73001, ITEM 5
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74033	JAPAN	73014	ERASE STATEMENT
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74045	SHARE	74001	NON-NUMERIC LITERALS IN FORMAT
74046	SHARE	74002	RESERVED WORDS
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74049	SHARE	74005	COPY REPLACING
74050	SHARE	74006	PERFORM TIMES AND UNTIL
74051	SHARE	74007	SEGMENTATION OF DATA DIVISION
74052	SHARE	74008	ALTER STATEMENT
74053	SHARE	74009	RELATIVE SUBSCRIPTING
74054	SHARE	74010	OUTPUT PICTURE
74055	ECMA	74002	COBOL CHARACTER SET
74056	ECMA	74003	ALPHABET NAME
74057	UNI	74007	REDEFINES CLAUSE
74058	UNI	74008	DEBUGGING ITEM
74059	UNI	74009	ATG-71001 CONCEPTS
74060	HISI	WP	LABEL PROCESSING
74061	ICL	74002	RELATIONSHIP BETWEEN TASKS
74062	FPTG	74001	SUPPLEMENTARY FILE INFORMATION

74063	XRX	WP	ORGANIZATION FOR SORT/MERGE
74064	SHARE	74011	PICTURE DEPENDING ON
74065	BUR	74001	EDITORIAL CORRECTION
74066	BUR	74002	ELEMENTARY RENAMES
74067	BUR	74003	FILLER ENTRY
74068	ATT	74002	EXTENSION TO PERFORM
74069	ATT	74003	EDITORIAL CONSISTENCY
74070	ICL	74003	INTER-PROGRAM COMMUNICATION
74071	ICL	74004	ASYNCHRONOUS PROCESSING
74072	SS	74001	ASYNCHRONOUS PROCESSING
74073	FPTG	74003	I/O STATUS
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74076	CSI	WP	NULL DATA ITEMS
74077	FPTG	74002	RELATIVE MULTI-FILE TAPES
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74080	ECMA	74004	CONDITIONAL STATEMENTS
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74083	FPTG	74006	MULTIPLE GIVING FILES
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74086	SHARE	74012	ALTER VERB
74087	JUL	WP	CLOSE WITH RELEASING
74088	HISI	74001	ARITHMETIC OPERATIONS
74089	ANSI	74001	SET STATEMENT
74090	NBS	WP	THE COMPUTE STATEMENT
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74099	ICL	74006	LEVEL NUMBER OF PARAMETERS
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74105	ANSI	74004	READ INTO
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74107	FPTG	74009	RESOURCE MANAGEMENT
74108	NCR	74003	AMBIGUITY IN STRING
74109	NCR	74005	AND, OR, EXOR
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75005	BUR	75001	PROCEDURE NAMES
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75007	HISI	75001	EDITORIAL CORRECTIONS
75008	HISI	75002	THE PERFORM AND SET STATEMENTS
75009	HISI	75003	NUMERIC/ALPHANUMERIC CATEGORY
75010	HISI	75004	PADDING CHARACTER CLAUSE
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75012	FPTG	75001	RECORD POINTER SEMANTICS
75013	NCR	75001	MINORITY REPORT ON FPTG-75001
75014	NCR	75002	ALPHABET IN PICTURE
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75021	NI	75004	THE PICTURE CLAUSE
75022	NI	75005	DATA MANIPULATION
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75026	CFG	75001	MINOR CORRECTIONS DBTG-73001
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75028	DEC	WP	COMMENTS ON CFG-75001
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75031	BCS	75101	MAKING FILLER OPTIONAL
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75033	BCS	75103	PROPOSAL FOR VALIDATE VERB
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75036	NCR	75006	CHARACTER REPRESENTATION
75037	USAF	75002	THE AT END CONDITION
75038	PETG	75001	MAKING FILLER OPTIONAL
75039	FPTG	75006	LABEL PROPOSAL
75040	HISI	75005	REFERENCE MODIFICATION
75041	ICL	75010	SCHEMA/SUBSCHEMA FOR FILE/LABEL
75042	HISI	75006	SUBSCRIPTED PARAGRAPH-NAMES
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75044	HISI	75007	BASED CAPABILITY
75045	ANSI	WP	THE CLOSE WITH REEL/UNIT
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75048	FPTG	75008	THE FROM AND INTO OPTIONS
75049	USN	75001	PSEUDO-TEXT IN AREA A
75050	USN	75002	GENERALIZED FILE PROCESSING
75051	ANSI	75002	ENABLE/DISABLE CLARIFICATION
75052	ANSI	75003	SEND CLARIFICATION
75053	ANSI	75004	ERROR AND STATUS KEY IN CD
75054	USAF	75003	THE SORT STATEMENT
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75056	USAF	75005	PUBLICATION CHANGES FOR JOURNAL
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75058	NCR	75003	DEBUGGING SECTION AMBIGUITIES
75059	NCR	75004	DEBUG OBJECT TIME SWITCH
75060	NCR	75005	MORE DEBUGGING AMBIGUITIES
75061	NCR	75009	OCCURS DEPENDING ON
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75063	CFG	75002	THE WRITE STATEMENT
75064	CFG	75003	CROSS REFERENCES
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75066	NCR	75008	STRING DELIMITED BY SIZE
75067	NCR	WP	DYNAMIC STORAGE AND POINTERS
75068	FPTG	75009	EDITORIAL CORRECTIONS
75069	ICL	75002	EDITORIAL CORRECTIONS
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75078	ADR	75002	CONDITIONAL STATEMENT
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75084	ICL	75003	TITLE PRIVACY, ACCESS CONTROL
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76007	ICL	75005	EXAMPLES FOR INTER-PROGRAM COMMUNICATION
76008	BUR	76001	STATUS KEY VALUE
76009	ARIZ	76001	STRUCTURED PROGRAMMING
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76021	ARIZ	76003	USER CREATED SYNONYMS AND NOISE WORDS
76022	IAB	76001	RESPECTIVELY
76023	COMP	76001	EDITORIAL CHANGES
76024	DEL	76001	VALUE FOR EDITED ITEMS
76025	CDC	76001	UNSTRING POWER
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76027	DEC	75001	STRUCTURED PROGRAMMING
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76031	ICL	76001	NULL DATA REPEATING GROUPS
76032	ICL	76002	MOVE CLARIFICATION
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76034	USN	76001	GENERALIZED FILE PROCESSING FACILITY
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76036	USAF	76001	CORRECTIONS
76037	USAF	WP	DELETION OF LINKAGE SECTION
76038	USAF		THE SYNCHRONIZED CLAUSE
76039	WJM	WP	RESERVED WORD IT
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76041	NBS	76002	LINAGE CLAUSE
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76044	HISI	76002	MAINTAINING POSITION DURING UPDATE
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76048	CFG	76003	SYMBOLIC-CHARACTERS
76049	ICL	76005	ACCESS TO CURRENCY INDICATORS
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76051	ANSI	75004	INCOMPATIBLE EVOLUTION/ ERROR,STATUS KEY - CD
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76053	NET	76001	SWITCH-SETTING
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76055	ARIZ	76005	FORBIDDEN-WORD AND DO-THRU-EXIT
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76064	UNI	76002	DATA BASE SECURITY
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76067	AEC	WP	MISCELLANEOUS CHANGES
76068	PLC	76002	MISCELLANEOUS CHANGES
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76071	HISI	76003	THE SIGN CLAUSE
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76087	ADR	76004	STRUCTURED PROGRAMMING WORKING PAPER
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76089	DBLTG	WP	(76019) UNI-76001.02 LOCKING FACILITY
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76105	USA	76002	STRUCTURED PROGRAMMING
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77009	ICL	WP	LABELS WITHOUT DECLARATIVES
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77028	NNI	77001	SHARED FILE HANDLING
77029	ADR	77002	EDITORIAL CORRECTION
77030	ADR	77003	CONTINUE STATEMENT
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77033	ANSI	77007	CLARIFICATION OF STRING AND UNSTRING
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77152	ECMA	WP	INCONSISTENCIES-CC AND DDLC
78001	CC	78001	EDITORIAL CORRECTIONS
78002	DGC	78001	PICTURE PRECEDENCE TABLE
78003	CDC	78001	RELATIVE SUBSCRIPTING
78004	CDC	78002	DELETION OF ENTER STATEMENT
78005	ANSI	78001	ACTION OF STOP RUN ON A DATA BASE
78006	TC	WP	DATA BASE RESPONSIBILITIES
78007	DBLTG	78001	DATA MAPPING AND MANIPULATION
78008	BCS	78001	MACROS
78009	DGC	78004	DELETE ABBREVIATIONS COMP, CONP-N
78010	UNI	78001	DELETION OF MEMORY SIZE CLAUSE
78011	UNI	78002	DELETION OF THE SYNCHRONIZED CLAUSE
78012	UNI	78003	USE FOR DEBUGGING - SEARCH STATEMENT
78013	UNI	78004	SIMPLIFICATION OF USE FOR DEBUGGING
78014	UNI	78005	SIMPLIFICATION OF SEARCH STATEMENT
78015	UNI	78006	ELIMINATION OF SYNTAX FROM COPY
78016	DGC	78003	SCREEN MANAGEMENT
78017	NBS	78001	EDITORIAL CHANGES
78018	ANSI	78002	SYNTAX RULE 2, THE INSPECT STATEMENT
78019	DBLTG	78007	DATA TRANSFORMATION
78020	DBLTG	78008	MEMBERSHIP MODIFICATION
78021	DBLTG	78009	CURRENCY CLARIFICATION
78022	DBLTG	78003	STRUCTURAL CONSTRAINT AS SET SELECTION
78023	DBLTG	78004	THE FETCH STATEMENT
78024	FLA	78001	FETCH OF PARTIAL RECORDS
78025	USN	78001	ASYNCHRONOUS PROCESSING
78026	BUR	78001	EDITORIAL CORRECTIONS
78027	ANSI	78003	EVALUATION OF CONDITIONAL EXPRESSIONS
78028	ANSI	78004	RERUN - EVERY INTEGER-1 RECORDS
78029	ANSI	78005	SIZE ERROR CONDITION
78030	ANSI	78006	PROCEDURE DIVISION HEADER
78031	ANSI	78007	ACCESS CONTROL LOCKS
78032	ANSI	78008	QUALIFICATION OF DATA-NAME
78033	CDC	78001	COMMON ERROR PROCESSING
78034	CDC	78002	ASYNCHRONOUS PROCESSING
78035	FPTG	78002	RESOURCE MANAGEMENT
78036	FPTG	78003	BLOCK CLAUSE
78037	PHB	78001	SUGGESTED COBOL EXTENSIONS
78038	CDC	78003	FLOATING POINT LITERAL
78039	CDC	78004	THE SET STATEMENT

Input Record Format

and

Computed Variables

Field ID	Card Cols	A/N	Field Name
CCYR	1- 2		PLC/CC Year of Receipt
CCNUM	3- 5		PLC/CC Sequence Number
CCPART	6- 7	(A)	Part Number for Multiple Vote Proposals
ORGCODE1	8-11	(A)	
ORGCDNUM	8-11	(A)	
ORGCODE2	12-14	(A)	
ORGTYPE	15	(A)	Type of Originating Organization
ORGCCMBR	16		Organizational PLC/CC Membership Status
ORGCCMGP	17		Organizational PLC/CC Membership Groups
ORGYR	18-19	(A)	Originator Year
ORGNUM	20-22		Originator Sequence Number
ORGSEQ	23	(A)	
MTGNADD	27-29		PLC/CC Meeting Number -- Document Added
MTGADDYR	30-31		Year Document was Added to PLC/CC List
MTGADDMO	32-33		Month Document was Added to PLC/CC List
MTGADDDA	34-35		Day Document was Added to PLC/CC List
MTGNFIN	38-40		PLC/CC Meeting Number -- Document Added
VOTEYR	41-42		Year Document was Voted
VOTEMO	43-44		Month Docunent was Voted
VOTEDA	45-46		Day Document was Voted
CHAIRCD	47		PLC/CC Chairman Code
MTGNDAYS	48		Length of Meeting -- Days
QUORUM	49-50		Quorum for Committee to Conduct Business
HOST	51-54	(A)	Organization Hosting the Meeting
MTGZIP	56-60		ZIP Code for Meeting Location
MTGSTATE	61-62	(A)	State Code for Meeting Location
MTGMBRI	63-64		Number of PLC/CC Implementor Members
MTGMBRU	65-66		Number of PLC/CC User Members
MBRNOTAT	67-68		Number of Members Not Attending Meeting
MBRSUSP	69-70		Number of Members Suspended for Meeting
SYR	73-74		PLC/CC Year of Referred to Document
SNUM	75-77		PLC/CC CCNUM of Referred to Document
SPART	78-79	(A)	
REC1ID	80		
Card 2			Record 2 Contained the Proposal Title
CC2Y	1- 2		
CC2N	3- 5		
CC2P	6- 7	(A)	
REC2ID	80		

Card 3

CC3Y	1- 2		
CC3N	3- 5		
CC3P	6- 7	(A)	
CCMINPG	26-28		Page of PLC/CC Minutes Showing Disposition
CCSTATUS	29	(A)	Status or Disposition of Document
DOCTYPE	30	(A)	Type of Document
DOCPETG	31	(A)	Indicator for P E T G Preprocessing
PLEVEL	33	(A)	Proposal Level
PTYPE	34	(A)	Proposal Type
NUMXREF	36-38		Number of Proposals Referred to this Document
VOTE01	41	(A)	Vote Cast by ADR Applied Data Res
VOTE02	42	(A)	Vote Cast by AMS American Mgmt Sys
VOTE03	43	(A)	Vote Cast by ATT American Tel and Tel
VOTE04	44	(A)	Vote Cast by BTI B T I Inc
VOTE05	45	(A)	Vote Cast by BUR Burroughs Corp
VOTE06	46	(A)	Vote Cast by CDC Control Data Corp
VOTE07	47	(A)	Vote Cast by CFG Canadian Federal Gov
VOTE08	48	(A)	Vote Cast by CSC Computer Science
VOTE09	49	(A)	Vote Cast by CSI Cincom Systems Inc
VOTE10	50	(A)	Vote Cast by DCA Defense Comm Agency
VOTE11	51	(A)	Vote Cast by DEC Digital Equip Corp
VOTE12	52	(A)	Vote Cast by DGC Data General Corp
VOTE13	53	(A)	Vote Cast by DPT Datapoint Corp
VOTE14	54	(A)	Vote Cast by DSA Defense Supply Agency
VOTE15	55	(A)	Vote Cast by FLA University Florida
VOTE16	56	(A)	Vote Cast by HISI Honeywell Systems
VOTE17	57	(A)	Vote Cast by IBM I B M Corp
VOTE18	58	(A)	Vote Cast by ICL I C L Ltd
VOTE19	59	(A)	Vote Cast by NBS National Bur Stds
VOTE20	60	(A)	Vote Cast by NCR N C R Corp
VOTE21	61	(A)	Vote Cast by RI Rockwell
VOTE22	62	(A)	Vote Cast by SRS Southern Railway Sys
VOTE23	63	(A)	Vote Cast by UNI Sperry Univac
VOTE24	64	(A)	Vote Cast by USA U S Army
VOTE25	65	(A)	Vote Cast by USAF U S Air Force
VOTE26	66	(A)	Vote Cast by USN U S Navy
VOTE27	67	(A)	Vote Cast by USS United States Steel
VOTE28	68	(A)	Vote Cast by VPE Virginia Polytech
VOTE29	69	(A)	Vote Cast by WES Westinghouse Elec
VOTE30	70	(A)	Vote Cast by XRX Xerox Corp
VOTEU	78	(A)	Indicator for Unanimous PLC/CC Vote
PFAIL	79	(A)	Indicator that Disposition Motion Failed
REC3ID	80		

Computed Variables	Variable Name
VCN	NO VOTES
VCA	ABSTENTIONS
VCY	YES VOTES
VCABSENT	NUM ABSENT
VCNOTATT	NUM MEMBERS NOT ATTENDING
VCSUSPND	NUM MEMBERS SUSPENDED
VCI1N	NO VOTES - IMPLEMENTOR GROUP 1
VCI1A	ABSTENTIONS - IMPLEMENTOR GROUP 1
VCI1Y	YES VOTES - IMPLEMENTOR GROUP 1
VCI1	TOT VOTERS - IMPLEMENTOR GROUP 1
VCI2N	NO VOTES - IMPLEMENTOR GROUP 2
VCI2A	ABSTENTIONS - IMPLEMENTOR GROUP 2
VCI2Y	YES VOTES - IMPLEMENTOR GROUP 2
VCI2	TOT VOTERS - IMPLEMENTOR GROUP 2
VCU1N	NO VOTES - USER GROUP 1
VCU1A	ABSTENTIONS - USER GROUP 1
VCU1Y	YES VOTES - USER GROUP 1
VCU1	TOT VOTERS - USER GROUP 1
VCU2N	NO VOTES - USER GROUP 2
VCU2A	ABSTENTIONS - USER GROUP 2
VCU2Y	YES VOTES - USER GROUP 2
VCU2	TOT VOTERS - USER GROUP 2
VCU3N	NO VOTES - USER GROUP 3
VCU3A	ABSTENTIONS - USER GROUP 3
VCU3Y	YES VOTES - USER GROUP 3
VCU3	TOT VOTERS - USER GROUP 3
DECINDEX	INDEX OF VOTING DECISIVENESS
ABSTAINI	PROPORTION OF ABSTENTION
MTGACT	NUM OF MEETINGS DOCUMENT ACTIVE

List of Organizations Submitting Proposals

Org Code	Type Org	Num Doc	Organization Name
ACC	O	1	AMERICAN CYANAMID CO
ADR	U/I	11	APPLIED DATA RESEARCH
AEC	O	1	
AECL	O	4	ATOMIC ENERGY OF CANADA LTD
AETNA	O	1	AETNA LIFE AND CASUALTY CO
AFNOR	S	1	ASSOCIATION FRANCAISE DE NORMALISATION
AMS	U	2	AMERICAN MANAGEMENT SYSTEMS
ANSI	S	67	AMERICAN NATIONAL STANDARDS INSTITUTE
ARIZ	O	7	STATE OF ARIZONA
ATG	T	4	ASYNCHRONOUS PROCESSING TASK GROUP
ATT	U	12	AMERICAN TELEPHONE & TELEGRAPH
AUS	O	2	AUSTRALIA (MR. PETER JONES)
BCS	P	24	BRITISH COMPUTER SOCIETY
BUR	I	24	BURROUGHS CORP
BW	O	2	BRUCE WILLIAMS
CC	C	2	CODASYL COBOL COMMITTEE
CDC	I	35	CONTROL DATA CORP
CFG	U	25	CANADIAN FEDERAL GOVERNMENT
CI	O	1	COMPUTERISTICS INC
COMP	O	1	
CSC	I	2	COMPUTER SCIENCE CORP
CSI	I/U	1	CINCOM SYSTEMS
DBLTG	T	30	DATA BASE LANGUAGE TASK GROUP
DBMG	O	3	DATA BASE MANAGEMENT GROUP
DBTG	T	1	DATA BASE TASK GROUP
DCA	U	17	DEFENSE COMMUNICATIONS AGENCY
DDLC	T	1	DATA DEFINITION LANGUAGE COMMITTEE
DEC	U	22	DIGITAL EQUIPMENT CORP
DEL	O	1	
DGC	O/I	10	DATA GENERAL CORP
DND	O	1	CANADIAN DEPT OF NATIONAL DEFENCE
DNRT	O	4	DEPT OF NATIONAL REVENUE, TAXATION
DSA	U	1	DEFENSE SUPPLY AGENCY
ECMA	S	119	EUROPEAN COMPUTER MANUFACTURERS ASSOCIATION
ERCC	O	1	EDINBURGH REGIONAL COMPUTING CENTRE
FLA	U	1	UNIVERSITY OF SOUTH FLORIDA
FPTG	T	34	FILE PROCESSING TASK GROUP
GMD	O	3	
GUIDE	P	1	GUIDE USERS GROUP
HISI	I	52	HONEYWELL INFORMATION SYSTEMS INC
HOF	O	2	HOFFMANN
HON	I	1	HONEYWELL
IAB	O	2	
IBM	I	20	INTERNATIONAL BUSINESS MACHINES
IBRD	O	3	INTERNATIONAL BANK FOR RECONSTRUCTION ...
ICL	I	56	INTERNATIONAL COMPUTERS LIMITED
IOTG	T	3	INPUT-OUTPUT TASK GROUP
ISO	S	1	INTERNATIONAL ORGANIZATION FOR STANDARD...
JAPAN	S	30	JAPANESE COBOL STANDARDS COMMITTEE
JUL	O	1	JOINT UNIVERSITY LIBRARIES

NBS	U	10	NATIONAL BUREAU OF STANDARDS
NCR	I	59	N C R CORP
NET	P	5	NETHERLANDS COBOL COMMITTEE
NI	O	7	NATIONALIZED INDUSTRIES
NNI		1	NETHERLANDS ...
PETG	T	6	PROPOSAL EDITING TASK GROUP
PHB	O	1	
PHILIPS	O	1	PHILIPS ELECTROLOGICA B V
PLC	C	12	PROGRAMMING LANGUAGE COMMITTEE
QU	O	1	QUEENS UNIVERSITY (KINGSTON, ONTARIO)
RBB	O	2	R BEATTIE
RCA	I	1	R C A CORP
RI	U	5	ROCKWELL INTERNATIONAL
SAN	O	5	SANDERS CORP
SCDP	S	1	SOCIETY OF CERTIFIED DATA PROCESSORS
SHARE	P	21	SHARE USERS GROUP
SIG	P	1	HONEYWELL COBOL SPECIAL INTEREST GROUP
SPARC	S	1	ANSI STANDARDS PLANNING & REQUIREMENTS COMM
SRS	U	7	SOUTHERN RAILWAY SYSTEM
SS	O	3	SOFTWARE SYSTEMS (PTY) LTD
SYC	O	1	
TC		1	
TDPH	O	1	TENNESSEE DEPT OF PUBLIC HEALTH
TG-9	O	1	FIPS TASK GROUP 9
TNGS	O	1	TENNESSEE DEPT OF GENERAL SERVICES
UDC	O	1	UNITED DATA CENTERS OF ALABAMA
UKM	P	3	UNITED KINGDOM (BCS)
UMEA	O	1	UMEA DATAMASKINCENTRAL
UNI	I	43	SPERRY UNIVAC
USA	U	3	UNITED STATES ARMY
USAF	U	39	UNITED STATES AIR FORCE
USC	O	1	UNICORN SYSTEMS CO
USLC	O	1	
USN	U	16	UNITED STATES NAVY
USS	U	36	UNITED STATES STEEL
UW	O	1	UNIVERSITY OF WISCONSIN
VU	O	1	VANDERBILT UNIVERSITY
WJM	O	1	
X3L5	S	3	ANSI TECHNICAL COMMITTEE X3L5
XRX	U	16	XEROX

Type Codes:

blank --	Unknown
C	CODASYL Committee
I	Implementor Member of PLC/CC
O	Other
P	Professional or Technical
S	Standardization
T	Task Group
U	User Member of PLC/CC

List of Organizations Holding Membership
on the CODASYL COBOL Committee
January 1973 - June 1978

Org Code	Type Org	Organization Name
ADR	I/U	Applied Data Research
AMS	U	American Management Systems
ATT	U	American Telephone & Telegraph
BUR	I	Burroughs Corp
CDC	I	Control Data Corp
CFG	U	Canadian Federal Government
CSC	I	Computer Science Corp
CSI	I/U	Cincom Systems
DCA	U	Defense Communications Agency
DEC	U	Digital Equipment Corp
DSA	U	Defense Supply Agency
FLA	U	University of South Florida
HISI	I	Honeywell Information Systems Inc
IBM	I	International Business Machines Corp
ICL	I	International Computers Limited
NBS	U	National Bureau of Standards
NCR	I	N C R Corp
RI	U	Rockwell International
SRS	U	Southern Railway System
UNI	I	Sperry Univac
USA	U	United States Army
USAF	U	United States Air Force
USN	U	United States Navy
VPI	U	Virginia Polytechnic Institute
WES	U	Westinghouse Electric Corp
XRX	U	Xerox

Type Codes:

I	Implementor Member of PLC/CC
U	User Member of PLC/CC

List of PLC/CC Meetings
January 1973 - June 1978

.....Meeting..... Date	Num	Host	Location	Chairman
9-12 JAN 73	101	WES	Ft. Lauderdale FL	Ham
13-15 FEB 73	102	IBM	New Orleans LA	Ham
3- 5 APR 73	103	USN	San Deigo CA	Ham
7-10 MAY 73	104	SRS	Atlanta GA	Ham
19-21 JUN 73	105	NBS	Cocoa Beach FL	Ham
7-10 AUG 73	106	UNI	Minneapolis MN	Ham
25-28 SEP 73	107	XRX	Rochester NY	Ham
6- 8 NOV 73	108	VPI	Blacksburg VA	Ham
4- 7 DEC 73	109	USAF	Ft. Lauderdale FL	Ham
8-10 JAN 74	110	CDC	San Francisco CA	Ham
19-22 FEB 74	111	ATT	Phoenix AZ	Ham
2- 4 APR 74	112	USA	Arlington VA	Ham
14-17 MAY 74	113	DEC	Cambridge MA	Ham
18-20 JUN 74	114	DSA	Columbus OH	Ham
6- 9 AUG 74	115	BUR	Pasadena CA	Ham
17-19 SEP 74	116	CFG	Ottawa Ontario	Ham
5- 8 NOV 74	117	WES	Ft. Lauderdale FL	Ham
7- 9 JAN 75	118	NCR	San Deigo FL	Ham
25-28 FEB 75	119	HISI	Boston MA	Ham
8-10 APR 75	120	CSC	Los Angeles CA	Ham
13-15 MAY 75	121	IBM	San Francisco CA	Ham
24-27 JUN 75	122	ICL	London England	Ham
5- 7 AUG 75	123	UNI	Minneapolis MN	Ham
16-18 SEP 75	124	SRS	Atlanta GA	Ham
4- 6 NOV 75	125	WES	Ft. Lauderdale FL	Ham
6- 8 JAN 76	126	NBS	Cocoa Beach FL	Ham
17-19 FEB 76	127	USAF	Scottsdale AZ	Ham
23-25 MAR 76	128	USN	Norfolk VA	Ham
11-13 MAY 76	129	ATT	Philadelphia PA	Ham
15-17 JUN 76	130	CDC	San Francisco CA	Ham
27-29 JUL 76	131	BUR	Los Angeles CA	Ham
21-23 SEP 76	132	IBM	San Francisco CA	Ham
19-21 OCT 76	133	USA	Arlington VA	Ham
7- 9 DEC 76	134	WES	Ft. Lauderdale FL	Ham
18-20 JAN 77	135	NCR	San Deigo CA	Nelson
1- 3 MAR 77	136	HISI	Scottsdale AZ	Nelson
12-15 APR 77	137	ADR	Princeton NJ	Nelson
24-26 MAY 77	138	DEC	Boston MA	Nelson
11-14 JUL 77	139	CSC	Los Angeles CA	Nelson
23-25 AUG 77	140	UNI	Minneapolis MN	Nelson
11-13 OCT 77	141	CFG	Ottawa Ontario	Nelson
6- 9 DEC 77	142	WES	Ft. Lauderdale FL	Nelson
10-13 JAN 78	143	NBS	Orlando FL	Nelson
28FEB-2MAR78	144	SRS	Atlanta GA	Nelson
18-21 APR 78	145	ICL	London England	Nelson
6- 8 JUN 78	146	USN	Virginia Beach VA	Nelson

APPENDIX B

Proposal Case Listing

MICROFICHE COPIES OF THE APPENDICES

ARE AVAILABLE FROM THE AUTHOR

APPENDIX C

Univariate Tabulations and Statistics

MICROFICHE COPIES OF THE APPENDICES

ARE AVAILABLE FROM THE AUTHOR

APPENDIX D

Multivariate Tabulations and Statistics

MICROFICHE COPIES OF THE APPENDICES

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APPENDIX E

Multivariate Statistic Comparison Tabulations

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APPENDIX F

Correlation Tabulations

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APPENDIX G

Proposal Survival Tabulations

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APPENDIX H

Regression Tabulations

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APPENDIX I

Non-parametric Univariate and
Multivariate Tabulations

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