American Journal of Computational Linguistics

the FINITE STRING

George E. Heidorn has accepted appointment as Associate
Editor of AJCL. He was appointed by Paul Chapin, President
of ACL, on the nomination or a committee chaired by Jerry R.
Hobbs. Heidorn is on the staff of the IBM Thomas J. Watson
Research Center, Yorktown Heights, New York 10598 The
Associate Editor will design a bulletin, to, be issued in
print between mailings of AJCL, and will work to raise the
number of manuscripts submitted for consideration.

Current issues of The Finite String were prepared by William
Benzon.

CONTENTS

CALL FOR P A P E R'S:

C O L I N 6 7 8

WHEN: AUGUST 14 - 18, 1978

WHERE: BERGEN, NORWAY

WHAT: Theories, methods, and problems of computational linguistics, interdisciplinary relations -

Models for natural language processing -

Applications of natural language processing, MT, MAT, man-machine communication, QA, database query, speech understanding and speech synthesis, information retrieval, etc.

Automated processing of linguistic data collection, lexicology and lexicography, textual and statistical processing, archives and banks of texts and lexical information, etc.

HOW: The selection of papers and themes for panel discussion will be made by a' board of consultants coordinated by A. Zampolli. Forty minutes will be reserved for each paper. Working languages: ENGLISH and FRENCH.

ABSTRACTS (1000)WORDS MINIMUM) OR THE COMPLETE TEXT MUST BE

SUBMITTED BY FEBRUARY 1, 1978 TO:

> Prof. A. Zampolli
> Chairman of the Scientific Program Committee
> COLING 7 8
> Via S. Maria 36
> 56100 Pisa, ITALY
> Tel. (050) 45245 - Telex: 50371 - CNUCE

Selection will be announced before April 1, 197 8 and completed

versions of accepted papers must be submitted by June 15, 197 8.

Those intending to submit an abstract should RETURN THE ENCLOSED CARD

AS SOON AS POSSIBLE.

A C O N F E R E N C E ON:

Metaphor and Thought

SEPTEMBER 26-29, 1977
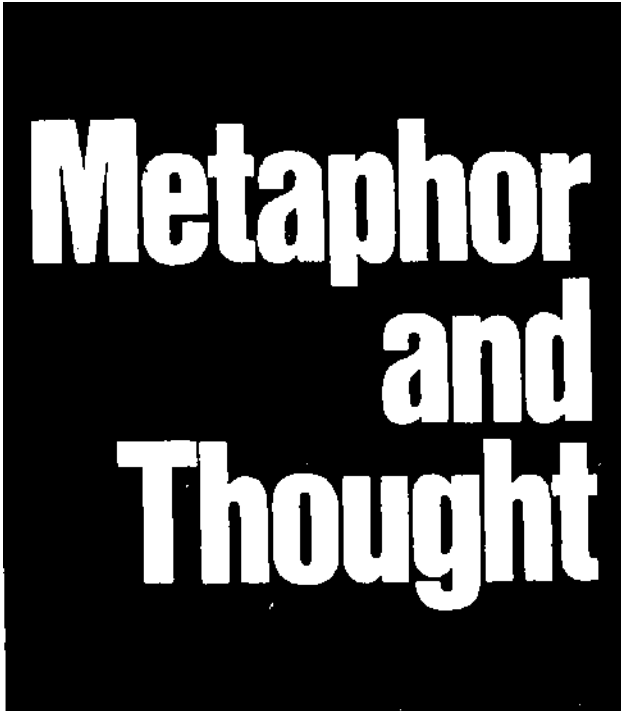
UNIVERSITY OF ILLINOIS AT

URBANA-CHAMPAIGN

Center for the Study of Reading
1005 West Nevada Street Urbana.
IL 61801

****

MONDAY SEPT. 26

Keynote Address: Max Black
SESSION I - METAPHOR & LINGUISTIC
            THEORY
Chairperson:Ladislav Zgusta
Presenter: Charles J. Fillmore
Discussants:L. Jonathan Cohen
            David E. Rumelhart

TUESDAY SEPT. 27

SESSION II - METAPHOR AND
            PRAGMATICS

Chairperson: William Alston
Presenter: John R. Searle
Discussants: Jerome Bruner
            Jerry L. Morgan

SESSION III - PSYCHOLOGICAL PRO-
METAPHOR AND THE EDU-
            CESSES IN THE COMP-HENSION OF
            METAPHOR

Chairperson: Charles Osgood Allan
Presenter: Paivio Andrew Ortony
Discussants: Bruce Fraser,

THURSDAY SEPT. 29

SESSION VI - METAPHOR AND THE
            SOCIAL CONSCIENCE

Chairperson: Daniel Alpert
Presenter: Donald A. Schon.
Discussants: Donald T. Campbell
Michael J. Reddy

WEDNESDAY SEPT. 28

SESSION IV - THE ROLE OF METAPHOR
            IN CONCEPTUAL CHANGE

Chairperson: David S. Shwayder
Presenter: Richard Boyd Zenon
Discussants: Pylyshyn Thomas S
              Kuhn

SESSION V -
            CATIONAL PROCESS

            Harry Broudy
Chairperson: Hugh G. Petrie
Presenter: Thomas F. Green
Discussants; Thomas Sticht

Keynote Address:
George A. Miller

CONFERENCE: ALGORITHMS FOR IMAGE AND SCENE ANALYSIS

WHAT: Segmentation   Analysis of multi-images

                              Properties

                                     Structural Analysis

                                                 Software

               Application Surveys

WHO: Sponsor — Engineering Foundation

               Co-chairmen — K.S. FU, Purdue University
                           A.S. ROSENFELD, University of Maryland

WHEN: FEBRUARY 19-24, 1973 WHERE:

ASILOMAR CONFERENCE GROUNDS PACIFIC GROVE/

CALIFORNIA

HOW: For further information contact:

                    ENGINEERING FOUNDATION CONFERENCES
                    345 East 47th Street New -York, New
                    York 10017

R E C E N T   A N D   R E L E V A N T

ICCH 3:   THIRD INTERNATIONAL CONFERENCE ON COMPUTING IN THE HUMANITIES

    AUGUST 2-5, 1977

    University of Waterloo, Waterloo, Ontario, CANADA

    CLASSICS   GRAPHICS   INFORMATION RETRIEVAL

        LANGUAGE AND LITERATURE   LEXICOGRAPHY   SEMANTICS

          LITERARY STYLISTICS   MUSIC   ARCHAEOLOGY

1FIP CONGRESS *77* (August 8 - 12) included the following:

    August 8: A Feature Concentration Method for Character
          Recognition. K.Komori, T.Kawatani, K.Ishi,
          Y.Iida (japan)

          Recognition System for Handprinted Characters.
            K.Iwata, M.Yoshida, E.Yanamoto, T.Masui,
            Y. Kabuyama, S . Shimzu (Japan)

    August 9; Using Knowledge of a Data Base World in Interpreting
          Natural Language-Queries. P.Dell'orco (Italy), M.
          King (Switzerland), V.N.Spadavecchia (Italy)

          An Interactive Geometrical Design System with Hand-
          writing Input. M.Hosaka, F.Kimura (Japan)

    August 10: UNDERSTANDING NATURAL LANGUAGES (Panel)

            Chairman: A.P.Ershov (USSR)
            Discussants: D. Hays (USA), J.Thorne (UK),
                   E.Sandewall (Sweden) M.Boitet (France)

    August 11: Computational Learning of Semantic Lexical Relations
          for the Generation and Automatic Analysis of Content.
          A.Andreewsky, F.Debili, C.Fluhr (France)

RECENT AND RELEVANT

4TH LACUS FORUM (August 13-17) included:

>A Calculus of Cohesion. Brian Phillips (U. of Illinois at
>>Chicago Circle)

>Some Formal Theorems about Stratificational Grammars and Their
>>Significance to Linguistic Theory and Practice. Alexander
>>Borgida (U. of Toronto)

>Linguistic Data Processing with an Associative Memory. Sydney
>>M. Lamb (now of Semionics Associates, The Claremont, Tunnel
>>Road, Berkeley CA 94705)

NFAIS: Indexing in Perspective Seminar

>June 14-16

>Marvell Hall, Auditorium
>American Chemical Society
>1155 Sixteenth Street, N.W.
>Washington, D.C. 20036

>Lecturers: Everett H. Brenner (American Petroleum Institute)
>>Toni Carbo Bearman (NFAIS) Tefko Saracevic (Case
>>Western Reserve University)

>Presenters of Case Histories:

>>Robyn Frank (Food & Nutrition Information Center, NA
>>David Batty (University of Maryland)

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SCIENCE LITERATURE INDICATORS; 1975 is now available. Author affiliations of U.S. authors in U.S. primary journals for 1975 are divided into four categories: Academic, Industry, Government, and not-for-profit. This report updates the earlier SCIENCE LITERATURE INDICATORS STUDY (Report No. 9) which covered affiliation patterns from 1960 to 1974. In addition to author affiliation data the report includes data on funding sources. The report is available from the Federation as NFAIS-77/2 for $10.00 prepaid.

ON-LINE COMMANDS: A USER'S QUICK GUIDE FOR BIBLIOGRAPHIC RETRIEVAL SYSTEMS: On-line commands are provided in a compact, easy-to-read chart using the ORBIT, ELHILL, DIALOG, and RECON IV computer search-ing systems. The chart now includes information on the NEW YORK TIMES INFORMATION BANK and BIBLIOGRAPHIC RETRIEVAL SYSTEMS. The chart measures 81/2" by 11", is printed on heavy stock, and is available from NFAIS for $2.00 prepaid.

NFAIS NEWSLETTER contains summary news articles about: NFAIS members and affiliates, related activities in other organizations (abstracting and indexing services, research, serials, thesauri, net-works, conferences, information retrieval, etc.), NFAIS activities. The NEWSLETTER is published every two months (two) issues are special issues) and costs $35.00 per calendar year.

N O R T H W E S T E R N   M E R G E S   EE AND CS

In order effectively to expand its educational and research programs in the fields of computer science, computer hardware-software inter-action, electronics and electrical engineering Northwestern University has merged faculties and facilities of its electrical engineering and computer science departments. The merger is effective 1 Sept. 1977

The new Department of Electrical Engineering and Computer Science will be headed by Stephen S. Yau, professor of computer science and of electrical engineering, and chairman of the computer science department since 1972. Yau is a director of the Institute of Electrical and Electronic Engineers and of the American Federation of Information Processing Societies. He was President of the IEEE Computer Society (1974-75) and is a Fellow of the IEEE and a Life Fellow of the Franklin Institute.

The new combined department will have 42 faculty members including three new members to be added to the current faculties. Seven current faculty members hold joint appointments in electrical engineering and computer science.

NATIONAL HISTORICAL PUBLICATIONS AND RECORDS COMMISSION (NHPRC)

RECORDS PROGRAM: Grants are available for a variety of projects,
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ARCHIVAL TECHNIQUES PROJECTS - experimental techniques related to
the preservation and use of records and normally resulting in
publications or prototypes which can be distributed to other
institutions and organizations. FEASIBILITY PROJECTS —
feasibility study for more extensive projects in above areas.
GRANT TYPES;   Outright Grants, Matching Grants, Combined Grants
ELIGIBILITY: Nonprofit organizations and institutions and State
                and local government agencies.
FOR MORE INFORMATION CONTACT: NHPRC

                     National Archives and Records Service
                     National Archives Building
                     Washington, DC 20408

CCP CERTIFICATE IN COMPUTER PROGRAMMING

The INSTITUTE FOR CERTIFICATION OF COMPUTER PROFESSIONALS has established examinations for the CERTIFICATE IN COMPUTER PROGRAMMING, which are being offered for the first time in 1977. The examinations are intended for senior-level computer programmers and are being offered in three areas:

BUSINESS PROGRAMMING

SCIENTIFIC PROGRAMMING

SYSTEMS PROGRAMMING

For more information contact:

Institute for Certification of
  Computer Professionals
304 E. 45th Street New
York, New York 10017

E M P L O Y M E N T   R E G l S T E R

WHEN: FEBRUARY 21-23, 1978

WHERE: ACM COMPUTER SCIENCE CONFERENCE

DETROIT PLAZA HOTEL - DETROIT, MICHIGAN

The purpose of the Register is to provide a mechanism for establishing contact between applicant and employer in a professional manner. The Register operates as follows, the applicant completes a form giving identifying informa- tion, education, publications, experience, interests, references, position and salarv desired. Provision is made for submission of anonymous form if desired. The employer completes a similar form giving identifying information ; position available along with starting date, salary and benefits and education, experience and specialization requirements for the position. This information enables the applicant and employer to determine the desirability for follow up.

Following the pattern of past years, the policies and the procedures listed below, will be in effect:

1   Both applicants and employers must file their registration on official forms. Three different forms will be used (1) applicant (2) academic and (3) business/industry and government.These forms may be obtained from and completed forms, should be returned, to

> Orrin E. Taulbee
> ACM Computer Science Employment Register
> Department of Computer Science.
> University of Pittsburgh
> Pittsburgh. Pennsylvania 15260

Your request should specify which of the three forms is desired. Employers should request one form for each type of position available (only one form is needed in the case of several identical positions). Employers may use this opportunity to list summer or temporary positions. A typewriter must be used in completing forms since they will be reproduced exactly as submitted Photocopies will not he accepted.

2.   Closing date for acceptance of forms is February 1, 1978. The inclusion of a late form cannot he guaranteed.

3.   The completed forms will be compiled to form the applicant and employer books of listings. Multiple copies of these books will be available at the confer-ence for review. As in previous years, wide distribution of these books will occur after the conference.

4.   Charges: Applicant

> (a)   Student - No charge(must be certified as student at time of
>   filing by signature of Department Chairman).
> (b)   Non-student -$5,00
> (c)   Anonymous listing - $5,00 additional charge

> Employer:-$20,00 per form submitted

A check for the appropriate amount (payable to "Computer Science, Employment Register) must be sent with the completed form.

5   The Employment Register Staff will operate a message desk and maintain employer sign-up sheets at the conference to facilitate makinq contacts. Actual arrangements for interviews will be the responsibility of the employer and the applicant

6   Information on the availability and the cost of copies of employer and applicant books after the conference may be obtained by writing to the above address.

EMPLOYMENT REGISTER STAFF CANNOT ASSUME RESPONSIBILITY FOR THE ACCURACY,COMPLETE-
NESS,TIMELINESS,OR GOOD FAITH SHOWN IN THE APPLICANT OR EMPLOYER LISTINGS.

MARSHA, THE DAUGHTER OF ELIZA —

A SIMPLE PROGRAM FOR INFORMATION RETRIEVAL IN NATURAL LANGUAGE

JOHN K, CIPOLARO* & NICHOLAS V. FINDLER

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ABSTRACT

We present a program which can retrieve information, using natural language for the questions and answers. The operational basis is a combination of the keyword-oriented algorithms of ELIZA and relational database design. Even the novice user can specify in an easy manner, through the preprocessor HIGGINS, scripts, simple responses, synonyms, substitutions and relations, all dealing with a particular topic of conversation. MARSHA has proven to be a powerful and flexible system, usable in practical applications. Currently, we attempt to extend it to become a mode of communication between a human teacher and a machine student on the topic of static and learning strategies of Poker. The interaction is in the Advice Taker/Inquirer style.

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                   41100, Plymouth Road
                   Plymouth, Michigan 4817 0

We have wanted to create a conversational information retrieval system whose database can be extended and charged inexpensively, i.e. at the user level and without "systems proqramming" effort. Also, we have decided to use as little semantic information processing as possible. Our natural choice for a starting point was Weizenbaun's ELIZA [12], programs related to which have been used for impressive man-machine communications in various projects [3,5]• Its keyword oriented algorithm was then augmented by the relational model of databases. Different topics of conversation can be specified in the form of scripts (normalized and unnormalized relations), through the preprocessor HIGGINS. The pattern matching by decomposition templates and the implicit semantics of the relations between keywords enable MARSHA to "understand" both the global context and the specific questions in the user's statement;

We note that the issues being debated concerning ELIZA's understanding capabilities and the ethics of its use in certain areas [3,4,5] are of little relevance to the present project. Our objective was, as will be seen later, to provide an on-line consultant for the novice user of a complex programming system (the "Poker project") , under continual development over the past several years [6,7,8], and to serve as a guide about one of the sophisticated strategies [9] in the above work.

A MINI-BACKGROUND

In order to contrast with MARSHA, we first describe how ELIZA processes keywords. The scripts contains entry lists which in turn have a keyword followed by a series of decomposition and reassembly rules. When a keyword is recognized, the decomposition rules are tried, one after the other. Upon finding a match, the reassembly rules are cycled through and an output sentence is generated. The script also allows for pronoun substitution, synonyms, tagging of keywords, and checking of phrases. The associated memory segment contains a copy of transformed texts.

Out of the many applications of this program, we single out the interactive consultant about a programming manual, written by Shapiro and Kwasny [10], in view of its area of application being similar to ours. The script in their CAL SNOBOL version of ELIZA provided information about permanent file commands for use by novice system users. Keywords were chosen from a repertory of commands and the reassembly rules were quotes from an operating system reference manual. This represents an important difference between this work and ELIZA, whose prime objective was to carry on an intelligent-looking conversation. Therefore, ELIZA's reassembly rules always used part of the input statement in composing the output. The script of Shapiro and Kwasny, however, consists mainly of factual information and almost nothing of the type "Why do you..." or "Tell me more about...".

MARSHA, on the other hand, does not need reassembly rules. It actually searches relations between keywords and, upon finding a tuple which matches, outputs the accompanying information suitably modified. And if necessary, it can still keep the conversation going by quoting some neutral cliches.

ON RELATIONAL DATABASES

We have indicated before that MARSHA's well-structured script is in the form of relations, both normalized and unnormalized, where, the name of the relation and the values of each domain are all keywords. The keywords are recognized from the user's input text and put in a stack. The order is according to the user-supplied rank. (See for detail the description of - the subroutine MAKSTK in the level 2 documentation of MARSHA in the Appendix.) Let us look into these terms more formally.

Suppose we are given n, not necessarily distinct, sets of items, $\underline{D1,}$ $\underline{D2,}$ ... $\underline{Dn}$ A $\underline{relation}$, R, on these sets consists of a set of ordered n-tuples, $\underline{d1,}$ $\underline{d2,}$ $\underline{....}$ $\underline{dn}$, such that $d1\_$ belongs to $\underline{Dl,}$ $\underline{d2}$ to $\underline{D2}$, ..., and $\underline{dn}$ to $\underline{Dn}$. Sets $\underline{D1}$, D2,... $\underline{Dn}$ are called the $\underline{domains}$ of $\underline{R}$, and the value $\underline{n}$ is called the $\underline{degree}$ of $\underline{R}$ [11 , 12].

A relation is said to be $\underline{normalized}$ if each domain value in each tuple is non-decomposable; otherwise it is $\underline{unnormalized}$. We shall view the database as if the columns of a table representing a relation corresponded to domains and the rows to tuples as in Figure 1 below.

In the following simple example, there are two domains, Last Name and First Name: The relation of degrees 2. is Persons Name, in both normalized and unnormalized form;

Last Name	First Name	Last Name	First Name
Smith	Tom	Smith	Tom
Smith	Dick		Dick
Jones	Harry	Jones	Harry
Jones	| Fred		Fred

Normalized and Unnormalized Relations

FIGURE 1

ON MARSHA

MARSHA and the preprocessor HIGGINS are described in detail in the Appendix. The level 1 documentation is user oriented (and system-dependent) while the level 2 documentation is systems programmer oriented. Some important points are, however, discussed here.

Besides the relational format, MARSHA also accepts script entries similar to those in ELIZA. Synonyms can he easily defined for any keyword and, upon encountering a synonym rather than an established keyword, MARSHA locates the latter on the basis of the former. Substitutions can also be specified for a keyword. These are then used in the input string being scanned in order to change the persons of pronouns and verbs, and the conjugated form of verbs when a

user's question is to be echoed in a modified form for lack of a "real" answer.

The majority of information is stored in the form of relations. However, keywords and its associated responses in English can also be recorded as a single unit, Once such a single unit answer has been given in a session, MARSHA marks it and refuses to respond to the same keyword again.

We also note that MARSHA is able to keep track of the conversation by storing the immediate past relation and the immediate past values of the domains ('keys' in the following). Thus, when the user specifies in a statement a new keyword relation which involves keys used before, the answer will make use of such keys as well. Further, if a relation has been established as the topic of conversation and it has, for example, three keys, the user can retrieve information by supplying one, two or three keys.

The so-called transparent key, "$$$", will match anything. It is useful in allowing MARSHA to prompt the user for more information, whether it is really needed to determine the answer or just to keep the conversation going. The following simple example involves the normalized relation LIVE. (We note that this example could be made a more "powerful" conversationalist but it suffices in its present form for the explanation.)

Last Name	First Name	Response
Smith	Tom	Canton
Smith	Dick	Staten Island
Smith	$$$	Tom or Dick?
Jones	Harry	Flatbush
Jones	Fred	Fisher's Eddy
Jones	$$$	Harry or Fred?
$$$	$$$	Can you be more specific?

FIGURE 2

The conversation concerning this relation goes, rather freely and ostensibly, in an intelligent manner.

Q: Where does he live?

A: Can you be more specific?

Q: Sure, Mr. Smith.

A: Tom or Dick?

Q: Ah...I guess I want to know about Dick.

A: Staten Island,

Figure 3 contains an actual conversation with MARSHA, using the script of the Poker -consultant.

Insert Figure 3 about here

ON HIGGINS

HIGGINS allows a novice user to generate or to add to a script in a high level and easy manner. He can input simple

HIYA...THIS IS MARSHA...EXCUSE ME WHILE I SLIP INTO
SOMETHING MORE COMFORTABLE...
THANK YOU FOR WAITING...TO TERMINATE OUR
CONVERSATION TYPE IN 'BYE'...TO SPEAK TO
PROFESSOR HIGGINS TYPE IN 'EDIT'...NOW, WHAT CAN
I TELL YOU ABOUT THE ZADEH STRATEGY FOR PLAYING
POKER ? ALLOW ME TO SAY HELLO
 I ALREADY SAID
HELLO ? OH, I'M
SORRY.
THERE'S NO NEED FOR THAT! ? GOOD. NOW,
WHAT'S A ZADEH STRATEGY? A TABLE-DRIVEN
STRATEGY WITH LEARNING COMPONENTS BASED ON
SEVERAL CONCEPTS ? WHAT CONCEPTS THE POSITION
OF THE OPENER AND HIS PROBABLE WORST OPENING
HAND ? CAN YOU TELL ME SOME MORE
 WHICH ROUND ARE YOU INTERESTED
IN ? WHAT'S A ROUND
 PRE-DRAW OR POST-DRAW OR DRAW OR POST-
GAME ? TELL ME ABOUT DRAW
IT WILL USE THE SYSTEM DRAW EXCEP WHEN
BLUFFING IS INDICATED IN SELECT HANDS ?
AND THE POST-GAME ROUND... WHAT DOCS IT DO
THEM?
 THIS IS THE ZADEH PLAYER'S LEARNING
STATE V OH. WELL, LET'S HEAR ABOUT
PRE-DRAW . OPENING OR BETTING ?
OPENING
 THE PLAYER ONLY CONSIDERS "JACKPOTS"
GAMES ? AND IN THE BETTING ROUND
ITS DESCISIONS ARE BASED ON ITS
OWN HAND AND THE OPENER'S WORST HAND ?
HOW ABOUT POST-DRAW BETTING IT
CONSIDERS, THE POT OFFERINGS ALONG WITH
HOW THE OTHER PLAYERS PLAY ? AND THE
OPENING ROUND OF POST-DRAW ALL
DECISIONS ARE BASED ON WHAT THE POT
IS OFFERING ? GEE, I LEARNED A
LOT SO FAR
I HAD A ROUGH EVENING. .. COULD YOU PLEASE
REPHRASE YOUR QUESTION ? YEAH. HOW DOES IT
VIEW THE POT? THE TOTAL POT IS CONSIDERED A
MULTIPLE OF THE MAXIMUM BET ? AND WHAT IS
ITS BET BASED ON IT WILL ONLY MAKE A BET
THAT IS MAXIMUM IN A BETTING SITUATION ?
GOOD. CAN YOU TELL ME ABOUT THOSE CONCEPTS
AGAIN? WEREN'T YOU LISTENING BEFORE ? SORRY
WEREN'T YOU LISTENING
BEFORE ? JUST WHO ARE YOU
ANYWAY WHAT DO YOU MEAN...
JUST WHO AM I ANYWAY ?
OH OH. TIME TO GO.
BYE GOODBYE..SEE YA
     1.915 CP SECONDS EXECUTION TIME

FIGURE 3

A Sample Session With MARSHA

responses, synonyms, substitutions and relations. In processing an entry, HIGGINS determines whenever a keyword has already been defined (a new entry would then be rejected) , whether a synonym has already been defined, and whether a key for a relation has been previously defined as a non-key or in a different domain. (The last two are not allowed; also, if an entry equates a keyword with a synonym undefined so far, the entry is rejected.)

The user may create single unit keywords and responses by entering the keyword followed by the response, a synonym, a substitution, or various combinations of these. Reserved characters (= and «-) indicate that a synonym or substitution follows. A relation may be input by entering the number of domains, followed by the name of the relation. HIGGINS will then prompt the use for the keys and their associated responses. These keys may either be a single keyword, or may be one of the above mentioned forms for synonyms and substitutions. The exact syntax of the User Language is given in HIGGINS,' level 1 documentation.

The user can be completely ignorant of the internal format of scripts. HIGGINS creates the script entries in core and then transfers them to the appropriate output file. This renders MARSHA a readily available, flexible and powerful tool in any practical application.

Figure 4 illustrates how a script is entered in a sample session and the resultant script. (It nay be advisable to read first the level 2 documentation of MARSHA and the level 1 of HIGGINS in the Appendix.)

- -

Insert Figure 4 about here

- -

IMPLEMENTATION DETAILS AND FUTURE WORK POSSIBLE

MARSHA and HIGGINS were implemented in the SLIP/AIIPPL-II [13] package embedded in Extended FORTRAN (TTN) on a COC Cyber 173. It occupies 30k 60-bit words plus whatever is needed for the scripts. The latter are stored in the form of SLIP list structures. Although the control structures of the languaqe chosen do not lend themselves to structured programming, we have followed the many valuable coding techniques found in [14].

The following ideas appear worth pursuing in trying to extend the scope and the power of the system currently available for use.

At present, only the value of one domain, the response domain, is retrieved — as consultants are usually asked to do. This can be generalized so that the value of any domain should be obtainable.

MARSHA now stores complete English sentences. These responses could be replaced by pointers to a dictionary of phrases, saving core storage and making longer and more versatile responses possible.

MARSHA could also be enabled to manipulate relations in obeying natural language commands. If could then dynamically change the database by modifying existing relations and creating new ones. For example, the operator

HELLO...THIS   IS PROFESSOR HIGGINS . . . ENTER   'ADD'   IF YOU WISH TO MAKE
ADDITIONS   TO   A   SCRIPT   OR   'CREATE'   TO START A NEW ONE...TYPE   IN
'BYE'   TO   TERMINATE OUR CONVERSATION ?
? CREATE
     WHAT IS THE TOPIC OF CONVERSATION
? THE ZADEH STRATEGY FOR PLAYING POKER
PLEASE ENTER NEXT KEYWORD
?   HELLO I ALREADY SAID HELLO
WHAT IS THE RANK OF THE KEYWORD
? 300
PLEASE ENTER NEXT KEYWORD
?   HI = HELLO
WHAT IS THE RANK OF THE KEYWORD
?   300
PLEASE ENTER NEXT KEYWORD
? SORRY THERE'S NO NEED FOR THAT
WHAT IS THE RANK OF THE KEYWORD
?   300
PLEASE ENTER NEXT KEYWORD
?   APOLOGIZE   = SORRY
WHAT IS THE RANK OF THE KEYWORD
?   300
PLEASE ENTER NEXT KEYWORD
?   YOU <— I
WHAT IS THE RANK OF THE KEYWORD
?   100
PLEASE ENTER NEXT KEYWORD
? ARE <— AM
WHAT IS THE RANK OF THE KEYWORD
?   100
PLEASE ENTER NEXT KEYWORD
?   I <— YOU
WHAT IS THE RANK OF THE KEYWORD
?   100
PLEASE ENTER NEXT KEYWORD
?   AM <— ARE
WHAT IS THE RANK OF THE KEYWORD
?   100
PLEASE ENTER NEXT KEYWORD
?   ZADEH A TABLE-DRIVEN STRATEGY WITH LEPING COMPONENTS BASED ON   SEVERA L
CONCEPTS
WHAT IS THE RANK OF THE KEYWORD
? 500
PLEASE ENTER NEXT KEYWORD
?   ZADEH'S = ZADEH
WHAT IS THE RANK OF THE KEYWORD
?   500
PLEASE ENTER NEXT KEYWORD
? CONCEPTS THE POSITION OF THE OPENER AND HIS PROBABLE WORST OPENING
HAND
WHAT IS THE RANK OF THE KEYWORD
?   500

                        FIGURE 4/1
             A Sample Session With HIGGINS

```
   PLEASE ENTER NEXT KEYWORD
?  CONCEPT = CONCEPTS
  WHAT IS THE RANK OF THE NEXT KEYWORD
? 500
  PLEASE ENTER NEXT KEYWORD
? BET   IT WILL ONLY MAKE A BET THAT   IS MAXIMUM  IN A BETTING
  SITUATION
  WHAT IS THE RANK OF THE KEYWORD
?   500
  PLEASE ENTER KEYWORD
?    BETS = BET
  WHAT IS THE RANK OF THE KEYWORD
?   500
    PLEASE ENTER NEXT KEYWORD
?  POT THE TOTAL POT IS CONSIDERED A MULTIPLE OF THE MAXIMUM BET
   WHAT IS THE RANK OF THE KEYWORD
?     500
   PLEASE ENTER NEXT KEYWORD
?  2  STRATEGY
  WHAT IS THE RANK OF THE KEYWORD
?    400
   PLEASE ENTER KEYS ONE PER LINE
?   PRE-DRAW
?   BETTING
   PLEASE ENTER RESPONSE
?   ITS DECISIONS ARE BASED ON ITS OWN HAND AND THE OPENER'S WORST
HAND
   PLEASE ENTER KEYS ONE PER LINE OR '*' TO END RELATION
?   PRE-DRAW
?   SSS
   PLEASE ENTER RESPONSE
?  OPENING OR BETTING
   PLEASE ENTER KEYS ONE PER LINE OR '*' TO END RELATION
?   DRAW
?   SSS
   PLEASE ENTER RESPONSE
?   IT WILL USE THE SYSTEM DRAW EXCEPT WHEN BLUFFING IS INDICATED IN
SELEC
T HANDS
   PLEASE ENTER KEYS ONE PER LINE OR '*' TO END RELATION
?   POST-DRAW
?   OPENING
   PLEASE ENTER RESPONSE
?   ALL DECISIONS ARE BASED ON WHAT THE POT IS OFFERING
```

FIGURE 4/2

A Sample Session With

HIGGINS

     PLEASE ENTER KEYS ONE   PER LINE   OR   '*'   TO   END   RELATION
?   POST-DRAW
?   BETTING
PLEASE ENTER RESPONSE
? IT   CONSIDERS   THE   POT   OFFERINGS   ALONG   WITH   HOW   THE   OTHER   PLAYE
PLEASE ENTER KEYS ONE PER LINE OR '*' ᴛᴏ END RELATION
?   POST-DRAW
?   SSS
PLEASE ENTER RESPONSE
? OPENING OR   BETTING
PLEASE ENTER   KEYS ONE PER LINE   OR '*'   TO END   RELATION
?   SSS
 PLEASE ENTER RESPONSE ? THIS IS THE ZADEH PLAYER'S LEARNING STATE
 PLEASE   ENTER KEYS ONE   PER   LINE   OR   '*'   TO   END   RELATION ?   SSS
?   SSS
   PLEASE ENTER RESPONSE
? WHICH ROUND ARE YOU INTERESTED IN PLEASE ENTER KEYS ONE PER LINE OR '*' TO END RELATION
  ?   *
 PLEASE ENTER NEXT KEYWORD
?DECIDE   =   STRATEGY
 WHAT IS THE RANK OF THE KEYWORD
 ?   400
 PLEASE   ENTER NEXT   KEYWORD
 ?   DECISIONS   =   STRATEGY
 WHAT IS THE RANK OF THE KEYWORD
 ?   400
  PLEASE ENTER NEXT   KEYWORD
 ?   MORE   =   STRATEGY
 WHAT   IS THE RANK OF THE KEYWORD
 ?   400
PLEASE ENTER NEXT KEYWORD
?   ADDITIONAL   =   STRATEGY
 WHAT IS THE RANK OF   THE   KEYW0RD
? 400
  PLEASE   ENTER NEXT   KEYWORD
?   ROUND PRE-DRAW OR POST-DRAW OR   DRAW OR POST-GAME
 WHAT IS THE RANK   OF   THE   KEYWORD
   ?   500
PLEASE   ENTER NEXT   KEYWORD
?   ROUNDS   =   R0UND
WHAT   IS   THE RANK   OF   THE   KEYWORD ?   500
PLEASE   ENTER NEXT   KEYWORD
 ?   STATE =   ROUND
     WHAT   IS   THE RANK OF   THE   KEYWORD
?   500
.PLEASE   ENTER NEXT   KEYWORD
?   BYE
3.450   CP SECONDS EXECUTION   TIME

FIGURE   4/3
A Sample Session With HIGGINS

project selects a subset of domains of a relation and defines a new relation with them. The operator join concatenates two relations over a common domain to form a third relation. Instead of relying on relational algebra or relational calculus [11], one would instruct MARSHA in conversational English to perform such operations.

The most interesting extension of MARSHA, currently under development, would enable us to use it in an Advice Taker/Inquirer mode between a human teacher and a machine student. The domain of discourse is static and learning strategies of Poker. The teaching is effected via examples given in natural language of game situations and recommended actions. The student checks the information conveyed for consistency and completeness, and asks appropriate questions.

SUMMARY

We have given some powerful extensions to Weizenbaum's ELIZA by using the relational database design and by adding a sophisticate script preprocessor. These modifications allow MARSHA. to "understand" better, to retrieve useful information, and to give the novice user the opportunity to write intelligent scripts.

ACKNOWLEDGEMENTS

helped make those long nights at the university's Computer Center pass a little more quickly, and who understands him without a script.

Both authors thank several people for "their advice, in particular Dave Ziffer, Ton Graham, Tom Booth and Trotzl Lillo.

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APPENDIX

MARSHA - Level 1 Documentation

MARSHA is the natural language Poker System User Consultant. To talk to her, the user must GET and CALL the JCL procedure file MARSHA, substituting for the name of the script file (the topic of conversation). The JCL procedure file is as follows:

```
SET(R1=0)
GET,MARBIN,HIGBIN.
ATTACH,SLIPAMP/UN=CSLIBRY.
RFL,50000.
MODE,0.
REDUCE,-.
LDSET,LIB=SLIPAMP.
MARBIN(,,OLDSCB)
REWIND,OLDSCB.
*R1=0  STOP
*R1=1  CALL'HIGGINS
IF(R1=0) GOTO,1.
LDSET", LIB-SLIPAMP.
HIGBIN(,,OLDSCP,NEWSCP,NEWSCB)
1,RETURN,MARBIN,HIGBIN,SLIPAMP.
RFL,20000.
```

OLDSCB is the script in binary format as produced by the preprocessor HIGGINS. To talk to MARSHA, simply

```
GET,MARSHA.
CALL,MARSHA(OLDSCB=script)
```

Of course, script must be gotten' previously. The program will respond with 'Hiya...this is Marsha...' and from this point on the user can talk to and receive answers from MARSHA in conversational English. To talk to Professor HIGGINS also, consult his Level 1 Documentation.
There currently exist two prepared script files for MARSHA, one about the Poker System (SYSSCB) and one about the Zadeh strategy for playing Poker (ZADSCB) Both of these are available on the account for users to see how MARSHA works or for consultation.

A sample session with MARSHA is shown in Figure 3.

MARSHA - Level 2 Documentation

This level of documentation is geared towards the more than casual user. It contains a description of the internal format of the script and a verbal description of each subroutine and function used.

The Script

The script is a file of keyword entries which provides MARSHA'S vocabulary. These entries are in the form of SLIP lists,   Common to every entry are the following:

Keyword   - the defined keyword
Substitution - an optional substitution word
Rank   - the rank (three characters) of the keyword

Indicator   - a flag indicating the type of entry:

A,X,=,S,Rn,Kn

The script allows for the following types of entries:

Simple Responses

(Keyword (Substitution,Rank,A(Response)))* Ex.

Define a simple response for the keyword 'tournament'.

(tournament (0 , 100, A (A tournament, is,...))) *

Synonyms

(Keyword (Substitution,Rank,= (Synonym))) *

Ex.   Define the keyword   'Zadeh's'   as

equal to   'Zadeh'.

(Zadeh's (0, 200,*= (Zadeh))) *

Keys for Relations

(Keyword (Substitution,Rank,Kn (Actual Key))
)* where n is the domain which contains
the keyword.

Ex.   Define   'bluffing' as a key in the second
domain and   let 'bluff be the key that is
actually searched for.(bluffing (0,999 K2
(bluff))) *

Relations (Normalized)

```
(Keyword(Substitution,Rank,Rn  (Domain 1
(Domain 2(...Domain n(Response 1)...) Domain
1(Domain.2(...Domain n(Response 2)...)



      Domain 1(Domain 2 (..Domain n(Response m) ...))))*
```

where n = the number of domains m
= the number of rows.

Ex. Define the relation 'strategy' with two domains! 'player'
and 'type of strategy'.

```
(strategy(0,100,R2  (Zadeh
(bluff(response)) Player
1(sandbag(response))
   .          .  .
   .          .   .
   .          .   .
Player6(bluff (response)))))*
```

Relations (Unnormalized)

```
(Keyword(Substitution,Rank,Rn,
(Domain 1 (Domain 2 (...Domain n (Response 1 )...)
 Domain 2 (.. .. Domain n (Response 2)...)) Domain
1(Domain 2 (... Domain n(Response 3)...) Domain 2
(.. .Domain n (Response 4)...))
     .        .        .    .      .


  Domain 1(Domain 2(...Domain n(Response m-1)...)
        Domain 2 (...Domain n(Response m)..))))) *
                     where n
= number of domains m =
number of rows.
```

<u>**Substitutions Only**</u>

```
(Keyword(Substitution,Rank,S))*
```

Ex. Replace the word 'you' with the word 'I' whenever it
appears in the input string.

```
(you(I,555,S))*
```

The user need not be concerned about the time necessary
to generate a script in this format, since it can be done in
a very high level manner via the preprocessor HIGGINS.

Subroutines and Functions

Function HASH

This function is used when initially storing keywords into the array 'KEYLST' and also when searching for keywords in the input string. The English word is first folded on itself, i.e. the leftmost 30 bits are added to the rightmost 30 bits. This result is then hashed using the MOD function with a prime divisor of 199, the result yielding the index, into the array for that particular English word.

Subroutine PACK

This subroutine takes a seven word array of English words and packs them into a seventy character output line. If more than one blank exists between the English words, they are removed. A blank is added after every ten character word and the hyphenated words produced by GETQST are rejoined.

The entire purpose of the routine is to create a legible print line.

Subroutine ANSWER

This subroutine creates a sequence reader for a SLIP list, reads it and then prints it. It is used to generate responses and to echo the input question when the keyword search fails. If necessary it calls PACK to first create the output line.

Subroutine RANDOM

This subroutine generates responses when the keyword search fails. One of five possible answers is chosen using the random number generator RANF.

Subroutine SUBLST (Sublist)

This subroutine creates a list from a sublist without altering the original list which contained the sublist. It merely uses a sequence reader to traverse and read the list, placing each datum on the bottom of a new list.

Subroutine ENG101 (English 101)

This subroutine provides MARSHA'S vocabulary,A key list (keyword together with substitution,rank indicator and possibly response) is read and the keyword is hashed. If the element of 'KEYLST' yielded by the hash is not a list alias,then an empty list is created and the entire entry is placed on it.

If the element is already a list alias, then the keyword entry is placed on the bottom of it. By using this method the entire problem of collisions in hashing is neatly sidestepped; an address can theoretically contain an infinite number of keywords on its list.

Subroutine <u>PUNCHR</u> (Punctuation Characters)
  This subroutine scans the input text for punctuation characters and replaces, them with blanks.

Subroutine GETQST (Get Question)
  This subroutine processes the user's question. The text is scanned character by character, using blanks as delimiters. As blanks are encountered, the characters of the English word are packed into a computer word. If a word is longer than ten characters, then each computer word needed to hold the English word has a hyphen as its first character.
  These English words are placed on the list 'QKYLST' which is used by the other subroutines. If the English words 'bye', 'edit' or an EOF is detected, program execution is halted and an appropriate output message is sent to the user.

Subroutine MAKSTK (Make Stack)
  This subroutine takes the 'QRYLST' generated by GETQST and searches for keywords in the input string. Each datum on the 'QRYLST' is read and hashed. If the element of the array yielded by the hash is not a list alias or a search of the list fails to find the input word on it, then the next word is checked.
  If the input word is indeed a keyword, the keyword entry is read to see if there is a substitution word and to obtain the rank and the indicator. If necessary, substitutions in the input string are made.
  A sequence- reader pointing to the indicator of the keyword entry is placed on a stack according to its rank (not the keyword itself) If the rank is greater than or equal to the rank, of the previous keyword, the new keyword is placed on the top of 'KEYSTK'; else it is placed on the bottom. The output of this subroutine is thus a stack of semi-ordered sequence readers.

Subroutine PROKEY (Process Key)
  This subroutine processes the stack of sequence readers produced by MAKSTK.' If the keyword requires a simple response (indicator of 'A'), then the response is put on a list via SUBLST and outputted via ANSWER. (The 'A', is then replaced by an 'X', an indicator to MARSHA that she has already answered the question.
  If the indicator is an 'X', MARSHA randomly chooses one of two responses which let the user know that he has repeated his question.
  If the indicator is 'K1'-'K9', this indicates that the keyword is a key for a relation and the key pertaining to that domain is set and the stack of sequence readers is popped.
  If the indicator is '=', the synonym for the keyword is obtained and the top of the 'KEYSTK' is, in effect, replaced by a sequence reader for the synonym and processing begins all over again.

Finally, if the indicator is 'R1'-'R9' the relation is searched over the appropriate number of domains and a response is given via <u>SUBLST</u> and <u>ANSWER</u>.

Subroutine ERROR
This subroutine writes error messages about errors found in the script. Program execution is halted.

HIGGINS - Level 1 Documentation.

HIGGINS is the preprocessor for MARSHA. It enables the user to input a script in a high and relatively easy manner. HIGGINS may be invoked using the same JCL procedure file (MARSHA) that MARSHA herself uses. It is repeated here for convenience:

```
SET(R1=0)
GET,MARBIN,HIGBIN.
ATTACH,SLIPAMP/UN=CSLIBRY.
RFL,50000.
MODE,0,
REDUCE,-.
LDSET,LIB=SLIPAMP.
MARBIN(,,OLDSCB)
REWIND,OLDSCB.
*R1=0 STOP
*R1=1  CALL HIGGINS
IF(R1=0) GOTO,1.
LDSET , LIB=SLIPAMP .
HIGBIN(,,OLDSCP,NEWSCP NEWSCB)
1 ,RETURN,MARBIN,HIGBIN,SLIPAMP.
RFL,20000.
```

OLDSCP is the old display code script file, NEWSCP is the new display code script file, and NEWSCB is the new binary script file. It is up to the user to GET OLDSCP (if one exists) and to SAVE/REPLACE NEWSCP and NEWSCB. All files are rewound at program termination.

To talk to HIGGINS, simply

```
GET,MARSHA.
CALL,MARSHA (OLDSCB=script1,OLDSCP=script2)
```

It is necessary to GET the old binary script file for. MARSHA HIGGINS may be operated in two modes: 'add' or 'create'. To create a completely new script file, the user responds 'create' to HIGGINS' sign-on question. To make additions to an old script, type in 'add' and HIGGINS will automatically copy the old display code script file to the new one. All new entries will then go to the new file.

Please note that no provision is provided for editing old display code script files. This unpleasant task has been left up to the system text editor.

There currently exist two display code script files on the account, one about the Poker System (SYSSCP) and one about the Zadeh strategy for playing Poker (ZADSCP). Both are available for user additions.

The User Language

All of the script entries described in the Level 2 Documentation for MARSHA (with the exception of unnormalized

relations) may be input via HIGGINS' user language. Its error checking is very sophisticated; it can determine whether a word has already been defined, whether a synonym has already been defined, and whether a key for a relation has been previously defined as a non-key or in a different domain (both of which are not allowed).

Statement ,parsing depends upon blanks for delimiters; hence where shown in the examples, at least one blank is required.

Simple Responses (with possible substitution)

    Keyword Response

    Keyword «- Substitution Response

Ex. Define a simple reponse for the keyword 'tournament'

    tournament A tournament is defined to be ...

Synonyms (with possible substitution)

    Keyword = Synonym
    Keyword «- Substitution = Synonym

Ex. Define the keyword 'Zadeh's' as equal to 'Zadeh'.

    Zadeh's = Zadeh

Substitutions Only

    Keyword <- Substitution

Ex. Replace the word 'you' with the word 'I' whenever it appears
    in the input string.

    You «- I

Relations (and their keys)

    1-9 (number of domains) Keyword

    HIGGINS will then ask for each row, one key at a time, or for an '*' to end the relation. These keys may simply be a single keyword, or the forms for synonyms and substitutions shown above.
    They may also be the transparent key '$$$'; this key Will match any keyword and is useful for allowing MARSHA to ask for more information. If MARSHA cannot find a match for the current keys in a relation and cannot find a match using the transparent key, it will flag that relation as an error (No 'escape clause' for relation).

Ex. Define the relation   'type' with one domain: 'player

    1   type
    Zadeh
    He's a learning player
    Player6
    Player6 is a static player

    $$$
    Which player did you have in mind???

Ex. Define the relation 'strategy' with two domains; 'player' and
     'type of strategy'.

    2 strategy
    Zadeh
    bluffing = bluff
    Zadeh bluffs whenever ....
    Player5
    sandbags = sandbag
    Player5 will sandbag when ...

    $$$
    $$$
    Which player and which type of strategy?
    *

    Please note that in between the lines of the above two
examples HIGGINS will prompt the user for the correct
information, and also note that no more than 200 domains
(including responses) are allowed per relation.

    After each entry, HIGGINS will ask the user for the
rank of the keyword (with the exception of keys, which by
default have the highest rank). This rank is a three
character entry; ranks are compared on the basis of their
display code representations. The highest rank in the
current CDC character set collating sequence is the three
semicolons (;;;).

    A sample session with HIGGINS, together with a sample
of the output script, is shown in Figures 4/1-4/4

This level of documentation ±s geared towards the more than casual user. It contain a verbal description of each subroutine and function used.

Subroutines and Functions

Function HASH

This function is used for storing keywords into the array 'KEYLST' and when testing to see if a keyword has already been defined. It is the same hash function as described in the Level 2 Documentation for MARSHA.

Subroutine COPY

This subroutine is called when the user wishes to add to a script file. The old display code script file is copied to the new display code script file; as it is, each keyword is hashed. If the index into 'KEYLST' yielded by the hash is not a list alias, then a list is created and the keyword is placed on the bottom of it. If it is a list alias, the keyword is placed on the bottom of the existing list.

If a keyword is a key for a relation, then that keyword and its indicator are placed on a description list. 'DOMLST'. This list is used to determine whether a key has been previously defined as a non-key or in a different domain.

Subroutine SUBLST (Sublist)

This subroutine creates a sublist from a list by reading the list with a sequence reader and placing each datum on a separate list.

Subroutine STRLST (Start List)

This subroutine creates the first part of every script entry, It takes the keyword, substitution, rank and indicator and places "them in the proper list sublist orientation.

Subroutine GETINF (Get Information)

This subroutine is exactly the same as. GETQST which is used by MARSHA and described in her Level 2 Documentation. Exceptions are that it creates the list 'INFLST' instead of the list 'QRYLST' and that it associates no special meaning with the English word 'edit'.

Subroutine FINISH

This subroutine creates a new binary script file (NEWSCB) from the new display code script file (NEWSCP) and rewinds all the files used by. HIGGINS. It terminates the program.

Function CHECK

This function serves a dual role. It checks to see whether or not a keyword has already been defined and, if it has not, adds it to the dictionary 'KEYLST' and, if it is a key for a relation, also adds it to the description list 'DOMLST'.

CHECK returns three values, indicating the following:

1--The word has already been defined. If it was a key for a relation, it has been defined previously as a non-key or in a different domain.
2--A key for a relation has been previously defined, but in the same domain as the new entry.
3--The word has not been defined.

Various flags are set when calling CHECK, indicating whether or not the word to be checked is a key or a synonym, and whether or not it should be added to the dictionary if it is undefined.

Subroutine NONREL (Non Relation)

This subroutine processes all entries which are not relations and the individual key entries for relations. It detects syntax errors for the input and calls CHECK to determine the status of the keyword.

The keyword entries as described in the Level 2 Documentation for MARSHA are created by NONREL as a list and, after they are completed, they are written out to the new display code script file using OUTLIST. NONREL returns a flag indicating success or failure.

Subroutine PROINF (Process Information)

This subroutine determines whether or not the user entry is a relation. If it is not, it merely calls NONREL and returns. If it is a relation, it calls NONREL once for each of the domains the user has specified.

It then elicits the response and asks the user to either terminate the relation with an '*' or to enter another row. Upon termination of the relation, PROINF creates a relation entry in the form of a list and writes it out to the new display code script file using OUTLIST. Entries for the individual keys have already been taken care of by NONREL.

Subroutine GETRNK (Get Rank)

This subroutine elicits the rank of the keyword from the user.

PRESIDENTIAL ADDRESS

DR. ANTHONY RALSTON

AMERICAN FEDERATION OF INFORMATION PROCESSING SOCIETIES

PRESENTED JUNE 8

1976 NATIONAL COMPUTER CONFERENCE

NEW YORK, NEW YORK

In giving the annual address this year as president of the American Association for the Advancement of Science, Margaret Mead noted that its ceremonial character made it impossible for her to dissociate herself as a person from the office she held. She must, she noted, be wary-because her remarks would reflect not only on herself but on the members of the AAAS.

My situation today is quite different. Tradition in AFIPS and in computing is a tenuous thing at best. Mine is the third such AFIPS presidential address at a National Computer-Conference and, although three of anything may be considered a tradition in computing, it is not one which inhibits me particularly. I shall, therefore, make some quite personal remarks today, which are not necessarily indicative of opinions within AFIPS or any of its member societies. My remarks relate to topics about which you will hear relatively little at this National Computer Conference since it is largely devoted to the scientific and technical aspects of our trade and hardly at all to the more amorphous and intangible legal, moral social and political issues with which 1 shall deal.

My topic simply put, is the interfaces between our profession and society at large, about our obligations in this arena and the obligations of our professional' societies. 1 shall not consider today such well known and aired topics as privacy and electronic funds transfer systems. These are subjects of NCC sessions. Moreover, they have been discussed in recent years in a variety of media and contexts by many more competent that I. Instead, I shall focus on some equally important issues which are not discussed as much as they should be in forums like this.

We are the aristocracy of science and technology. Like physicists 30 years ago, we sit astride the most important technology of our day, a technology with the science behind it, is the flyv controlling advances in a myriad of ai the determiner of what can and cannot done in other scientific and technology pursuits. Our position of unique imp

in our technocratic world is by no means universally recognized, but the time is not far off when it will be.

With the growing importance of our craft comes a growing responsibility, a growing obligation to recognize and be sensitive to issues beyond our everyday concerns with hardware and software. Are we measuring up to that obligation? I think not

Our very success has enabled us to avoid larger issues. We are sleek and fat, relatively untroubled by the recent recession and looking confidently forward to new and increased prosperity. No one who visits the exhibits at this NCC could doubt this. We deal with fascinating, intriguing problems. As George Glaser noted in his presidential address two years ago, we not only have challenging and interesting problems; we also have fun. It is and has been too easy to ignore larger human and social questions, too easy sometimes to pursue narrow and petty personal motivations and ambitions. Of course, this stricture does, not apply to-all of us. We have among us eminent people who have shown a social awareness from the earliest days of computing. Unfortunately, there are too few. Many of us have been content in our professional careers and in our professional societies to ignore these seemingly peripheral matters; we avoid the controversial and the difficult. The problems I shall discuss today are only partly technical; they do not submit to proofs of correctness or debugging. They are. therefore, often disturbing and upsetting. My theme today will be how or whether you can, and perhaps should, become involved with attempts to solve such problems.

My first example of an issue which is an exemplar of one in which more of us should be involved is the United States government v. IBM antitrust suit. No, for those of you who have perked up your ears, I am not going to take a position on that suit or the issues underlying it. Even for a retiring AFIPS president, that would be asking for more trouble than I need. However, I do want to consider briefly how

unfortunate it is that none of the technical expertise within AFIPS and its Constituent Societies is being utilized in this most important legal action, one oh which most of you would not feel as inhibited as I do about expressing an opinion. Whatever that opinion, almost all would agree that the result of this legal action is likely to have profound impact on the future of our profession and our industry.

About three years ago, when I was president of ACM and the court phase of suit had not yet started, it occurred to me that here was an example of an issue on which the technical expertise of ACM could be brought to bear. Sandwiched as I was between two ACM presidents who are employees of IBM, this was perhaps an easier conclusion for me than it would have been for my predecessor or successor. And yet I think neither would have seriously disagreed with my premise.

I did not understand then, and make no claim to understanding now, the legal issues involved in this suit, By the same token, it seemed then, and still seems now, unlikely that Judge Edelstein can fully understand the scientific and technical issues which underlie this suit and which must influence his final interpretation of the law. So I reasoned, could not ACM, most of whose members are neither employees of the government nor IBM, put together a group of senior computer scientists and technologists, as unbiased and objective as it is possible to be, to provide technical expertise, perhaps as requested by the court or as a friend of the court. How naive I was! My legal colleagues in ACM which, by the way, has a Committee on Legal Issues, quickly drove me from my ivory tower. Didn't I understand that the American system of jurisprudence was an adversary one? —in fact I did —and that even *amicus curiae* briefs were virtually always partisan briefs on one side of a case or another ? Indeed, I hadn't realized this. And it seemed—and seems— so unfortunate that competent nonpartisan input is not possible in such cases. And the IBM v. U.S. government suit

is but one of a large and increasing number in which science and technology are inextricably intertwined with the law. So I slunk away convinced for the moment at least, that this was not a possible forum for our professional societies.

Since then, the case has come to trial and we have been and will be treated to the not-very-edifying spectacle of eminent computer scientists and technologists being subpoenaed by one side or the other to give evidence: evidence which you and 1 may be sure is given honestly and straight-forwardlv, but evidence whose effect is inevitably weakened by seeming to come from one side or the other. This seems to be a long way from the best method of obtaining the relevant technical evidence Why should it not be possible, even within an adversary system, to enable the courts to hear those untainted by their sponsors? Can we expect sound decisions from judges, whose technical knowledge is inevitably limited, when their only technical input is a buffeting from partisans of both sides of the issue?

Recently there has been some real progress in a closely related area. Plans are being formulated which may lead to the establishment of a science court to assist federal regulatory agencies in making decisions with substantial scientific components This 'court' would not have legal standing but would try to achieve recognition as an institution upon which regulatory decision-makers could rely through the quality and thoroughness of its deliberations. This idea, advocated by Arthur Kantrowitz, a long time government science adviser, is finally gaming support because of the increasing level of scientific and technical controversy over regulatory issues If such an idea has merit regarding regulatory issues might not a similar mechanism be found to provide input to the legal process when scientific issues are invoked? My legal listeners may be shaking their heads at the naivete of such a suggestion. But this idea is not without support. For example, in a speech to the American Bar Association last summer Judge

Harold Leventhal of the Court of Appeals noted that independent, unbiased technological advise would be of great benefit to the courts.

Cases like the IBM v. U.S. government suit pose a major challenge to the workings of our legal system and such cases will be increasingly common. Sooner or later the current legal system will be seen to be unable to cope adequately with such matters. Our professional societies should be ready and willing to contribute to a solution to this problem by proposing possible models for a solution and by expressing a willingness to participate in a solution.

The second interface between our profession and society which I wish to consider is that of professional ethics. In recent years, DPMA, ACM, ICCP and the British Computer Society have published codes of ethics or related documents. However, in this country there is virtually no attempt to enforce these codes. Almost no one seems satisfied with the current state of affairs. On the one hand, there are those who say that codes without enforcement are a sham and that the public will not believe we are really committed to ethical behavior until we are willing to enforce our codes of ethics. On the other hand, there are those who oppose enforcement as impossible or unprofitable and, therefore, think the development of such codes is a waste of time. I am one of the few who appears to be satisfied with the current situation. Let me tell you why

First of all I think the development of codes of ethics has been a useful exercise. In computing, we suffer not only from unethical behavior but from a limited understanding of what constitutes ethical behavior. Too many of us do not understand the meanings of integrity and responsibility—and that is hardly surprising. We have too many practitioners who know little besides computing; people whose educational base is very narrow. As an old seducer of undergraduates away from their studies to become systems programmers at university computing centers, I know whereof I speak and share the blame for the current situation

Thus, publication of codes of ethics and hopefully, their reading by many may have had, at least, the salutary effect of indicating to some what proper standards of ethical behavior are.

But how about enforcement? Unquestionably unethical and dishonest practices exist in our profession. Donn Parker and his associates in then studies of computer crime and fraud have amply documented one aspect of this And few of you, I suspect, have not seen examples of such behavior. Still. I am strongly opposed to attempts to enforce codes of ethics

One reason is that such codes are very close to being inherently unenforcable Tests of ethics just do not lend themselves to an algorithmic approach No matter how carefully such codes are written, deciding whether or not a provision has been violated is almost always a matter of judgment on which reasonable people may disagree

More importantly, at least for the present, we have no sanctions. Or, to be more accurate our only sanction is expulsion from the society whose code has been adjudged to be violated. Now I am a strong supporter of professional societies in computing My activities in them have been a large and rewarding part of my life for almost a decade. And beyond my direct involvement, the benefits I receive, all those pieces of paper and journals which come across my desk, are professionally important to me But realism compels me to conclude that the possibility of being read out of the tribe is not likely to pose much of a deterrent to someone contemplating an unethical act, Should licensing ever come to our profession, the possibility of real sanctions might exist but such an eventuality is, at best, years away.

Most important, is the clear evidence that codes of ethics, even when supposedly enforced, do not significantly promote ethical behavior Perhaps the two most notable professions which attempt to enforce such codes are law and medicine,

where the potential sanctions are very real indeed Neither have higher standards of ethical behavior than we do. Although no doubt an exaggeration suggested by Watergate it would almost appear as if lawyers are only disbarred after being convicted of a criminal offense. As for doctors losing the right to practice is very rare. It is noteworthy that the current debate on malpractice is hardy concerned with whether it exists or what can be done to prevent it, but focuses instead only on what the insurance will cost.

What then can be done about ethics in computing by professional societies or anyone else? Not much, I am afraid. My academic background forces me to believe that well-educated professionals, educated not only in their profession but broadly in the arts, humanities and sciences, will at least better understand what ethical behavior is than is now the case

In the long run, the level of ethics in our profession or any other will be, at most, slightly perturbed by publishing and or enforcing a code of ethics The real determiner will be the ethical standards of the society in which we exist. And here I must be pessimistic. So long as that society effectively condones or ignores a variety of unethical behavior in government business and industry, it is unlikely that we will ever come close to the desired goal of eliminating such behavior in our profession. My advice to the societies in computing is to maintain and update your codes of ethics but stop worrying about enforcement; you won't accomplish anything useful

My last and most significant example of an interface between our profession and society concerns our relationship to politics and political questions. On one level there is little or no controversy. This level is epitomized by the AFIPS Washington Office. This office provides a mechanism by which AFIPS can inform its Constituent Societies of relevant federal government activities in computing. In particular, in the areas of legislation and regulation, the Washington Office can also provide, when

requested expertise in computing to Congress and agencies of the executive branch

The idea for this Office was first broached by Keith Uncapher in his AFIPS presidential address four years ago although it was not until last June that the Office was finally established Unquestionably this Office has been the main success story for AFIPS during the past year. Under the able and dynamic leadership of the Director of the Washington Office, Phil Nyborg and with the counsel of the AFIPS Washington Activities Committee chaired by Keith Uncapher, the Washington Office has been invoked in arranging congressional testimony and briefings to federal agency officials, has arranged a White House briefing by federal officials for AFIPS and most importantly has established a myriad of contacts in the federal establishment so that AFIPS is now recognized by many in Washington as the place to go for computer expertise outside the federal government

Despite the. first year of success. however, the real tests lie ahead. To play a permanent, effective role in Washington as the only computing organization without an axe to grind will require much hard work and support from all of you through your societies. The greatest test perhaps will be whether the Office will receive the resources to enable it to grow to meet the already rapidly increasing-demands on it. Currently AFIPS does not have the wherewithall to finance this growth. Indeed, the only likely source of funds for such growth is from the three major societies in computing —ACM. DPMA and the IEEE Computer Society— who, between them, divide almost 50 percent of the surplus from the National Computer Conferences. Will they judge the importance of the AFIPS Washington Office to be great enough to invest some of this surplus in the growth of AFIPS activities in Washington? I think they should But, given that the prevailing attitude of the AFIPS Constituent Societies has most

often been concerned with what they could take from AFIPS rather than what they could give to it, a positive answer to this question is not probable.

One of the continuing tests of AFIPS activity in Washington will be its ability to provide unbiased advice. On essentially technical issues, it should be possible to articulate an AFIPS position. Many Washington-type issues have both computing and noncomputing components. Often these are inseparable, in the sense than an informed opinion on the noncomputing component of an issue requires understanding of the technical component.

A recent example concerns a request to AFIPS to provide testimony to a Congressional committee on the export of computers to the OPEC countries. Appropriately, we provided two eminent witnesses, one pro and one con. On such issues I think this is the only way for AFIPS to proceed if it is to retain credibility and effectiveness in Washington. In addition, any attempt by AFIPS to express partisan positions on issues with noncomputing components would probably be self-defeating. The members of AFIPS are societies, not people, and these societies span a broad spectrum of technical interests and general outlook. Overall-agreement on controversial issues among these societies is most unlikely any lack of consensus on a controversial issue would create dissension internally and probably, therefore, loss of credibility externally.

If partisan positions on issues with both computing and noncomputing,components cannot be the province of AFIPS are there such issues on which, if not AFIPS, at least its Constituent Societies, can and should be willing and able to take stands? I think so.

First, let me note the obvious. This is a complicated and difficult matter, easily made more controversial than it is inherently by a failure to consider it in an appropriate framework. In order for me to specify my framework, it will be useful to present some history. This history will focus on ACM, partly because I have more

knowledge of ACM than of any of the other societies in computing, but mainly because, as far as 1 know, only ACM among the AFIPS Constituent Societies has even been willing to address itself to controversial political and social issues

In 1969, a Question of Importance was submitted to the ACM membership asking whether lit wished to amend the ACM Constitution to allow comment by the ACM Council on "deeply political and social Questions " The event which led to this question was a resolution which had been presented to the ACM Council advocating an official ACM position opposing the war in Vietnam. This resolution was overwhelmingly defeated by the ACM Council The membership then voted 4 to 1 against ACM involvement in "deeply political and social questions " Given the context in which this was presented to the ACM membership, I believe" the vote was clearly on the side of good sense. Despite the wide use of computing technology by the military, only by the wildest stretch of the imagination could the war in Vietnam be said to have had any computing component. If it did not, what possible interest could there be in whether or not the governing body of a professional society in computing was for or against the war? Indeed, it would have been clearly presumptuous for a body elected by the ACM membership to take a stand on any such unrelated issue Professional societies in other disciplines did pass such resolutions and did neither their cause nor themselves any good

So it is obvious —or should be —that issues, political, social or otherwise, with no significant computing component, are just not fit fare for computing societies. The sticky problem has to do with those issues which have both significant computing components *and* political or social components or overtones. I am going to consider some examples of these, but before I do, one more point needs to be emphasized. Any public pronouncement made by officers or governing bodies of professional societies can represent nothing

more than the considered opinion of the person or body that makes it. It cannot be, and never should be, represented as the opinion of the society membership. True, this will often be misunderstood by those who hear the pronouncement despite all appropriate disclaimers. But that is *the* risk that must be taken, If societies have sound procedures for choosing their leaders, their members should have some confidence that, while they may not always agree with the resolutions passed by the leadership on balance these will be well studied carefully articulated positions on important questions.

To be unwilling to take this risk is to consign the society to ineffectiveness and inactivity even on important, purely technical questions. For example, if the AFIPS Board of Directors felt strongly that it was a good thing to further the cause of structured programming by publicly advocating that, henceforth no one should write programs in Fortran, then surely, it should do so. My example is facetious but my point should be clear It is not only permissible for leaders of professional societies to speak out on technical and partly technical issues of direct concern to them it is obligatory that they be willing to stand up and be counted on important issues. In fact I suspect that on the kinds of issues I am about to discuss, the leadership of our societies trails behind the members, most of whom would probably welcome public stands on these matters

With that preamble, let me now consider some examples of issues with political or social as well as computing components. The first concerns the use of universal identifiers. UIDs, in computerized files and data bases and, in particular, the use of Social Security numbers for this purpose. In November of. 1974, the ACM Council passed by an overwhelming majority, a resolution calling attention to the possible misuse of UIDs in computerized files, to the particular problem of the Social Security number becoming a *de' facto* UID and to the need for legislative safeguards to

protect against-such misuse of UIDs. This issue is a good illustration of my previous point that informed opinion on the nontechnical part of a question may require Understanding of the technical part. The need —or lack of it —for legislation concerning UIDs is not a technical issue but, without a knowledge of the capabilities of modem information systems, you cannot have an informed opinion about it.

The AGM resolution was particularly timely because it coincided very closely with the passage of the Privacy Act of 1974 As many of you will know, one result of this act was the establishment of a Commission on Privacy to oversee and make recommendations on the implementation of the provisions of the act. Indeed, the Commission is currently studying various aspects of the use of the Social Security number in computerized files.

I would be misleading you if I indicated that the action of the ACM Council m November of 1974 was an important factor in initiating the current study of the Privacy Commission. I don't think it was, partly because there were many other pressures on the Commission to study this problem and partly because, having passed the resolution, ACM did little or nothing to pursue this issue further. It is clear, I think, that such resolutions can only be effective if the leadership of the society actively and aggressively supports them.

In any case, whether or not you agree with the content of the ACM resolution, passage of the resolution was an appropriate action. In order for judgments to be made on whether or not there should be a UID, there are technical computing questions which need to be understood. If professional societies in-computing do not address these questions, there is a very real danger that decisions will be made without the benefit of informed technical input. Moreover, it is not sufficient for our societies to wait until they are asked by Congress or a federal agency for input. If they did, too often we would be bypassed in the decision-making process and too

often, uninformed decisions would be made where we could have provided important technical input. Our technology is becoming too involved in the social and political fabric to justify a passive attitude on the part of those societies which are the repositories of much of the technical expertise in our profession. These issues are messy, amorphous, ill-structured and distracting from more traditional scientific and technical pursuits, but they are too important to ignore.

My next two examples have much more sensitive political implications than the UID issue. They both concern the question of scientific freedom; namely, the ability of scientists to carry on their professional pursuits without political interference. Because problems caused by the lack of scientific freedom occur almost entirely outside the United States, consideration of this issue immediately raises the questions:

—should American professional societies concern themselves with such matters, particularly because these issues impinge on foreign policy matters?

—and, can such intervention be effective?

Let me consider the second question first. Almost all of you would agree that if we cannot be effective, there is just no point in making gestures no matter how much they may ease our consciences. Can we be effective?

I think we can be. In a recent address, Edward E. David, former science adviser to the President, noted that with the possible exception of food, technology is probably the most sought after commodity in the world and that it will become a powerful foreign policy tool. Not only is there no technology more important than ours — there is no technology in which we exercise greater world leadership. In this context it is interesting to note that a considerable percentage of the export licenses denied by the Department of Commerce are for computer technology. Whether or not the United States should be exporting computers various countries is probably

not within the province of professional societies, although some of us may influence such questions individually, But whether we should be exporting our intellectual resources is within our province and competence. Insofar as such export is to developing countries and to other countries whose economic and technological advancement is in our own long term interest, we can and should continue our historical generosity. For countries which do not fall in this category, we have a right — even a duty —to insist on a two-way flow of information and on reasonable standards of behavior Because we represent so much of the computing expertise in the world and because we can be influential in affecting government policy concerning computers, I believe that we have sufficient clout to be effective in the areas I am about to discuss.

The ability to be effective does not necessarily imply the desirability of involvement in matters with political components. Indeed, even though the atomic bomb and subsequent events have awakened scientists to the social and political implications of their work, most scientists and technologists would prefer not to be involved with such matters Science is after all, the international endeavor, *par excellence.* Any involvement in international politics so the traditional belief goes, is inevitably harmful to scientific cooperation. And so it is. Unfortunately, the choice of whether or not to involve science in politics is not ours to make; it has been made for us by others and not to recognize this is "ostrich-ism" at its worst.

The obvious example of a country in which science and politics axe inextricably intertwined is the Soviet Union. This is exemplified by the report of Peter Osnos of the *Washington Post* from Moscow last October at the celebration of the 250th anniversary of the Soviet Academy of Science. He noted that the Academy has been integrated "...into the Soviet political mainstream, making it as much a part of the party's will as governmental ministries

or the police. "All scientific dealings with the Soviet Union, as with some other countries, are certain to have political implications. If American scientific societies refuse to involve themselves in these matters, then by default, they will have affected political matters but perhaps not in the way they would wish I believe that our societies must be willing to concern themselves with the computing-politics Interface.

So far my remarks have been abstract Let me now consider two concrete examples, the first of which concerns international conferences The International Council of Scientific Unions of which the International federation for Information Processing is a scientific affiliate, has various rules related to international scientific congresses One of these requires the timely granting of visas to all *bona fide* attendees at such congresses A number of countries are persistent violators of this rule. Perhaps the most flagrant of these is the Soviet Union

A recent example of particular interest to computer scientists was the 4th International Joint Conference on Artificial Intelligence held in Tbilisi last September. Before the meeting, there were strenuous but unsuccessful attempts by some American Artificial Intelligence researchers most of whom are active in the ACM Special Interest Group on Artificial Intelligence to have the meeting moved from the Soviet Union to a country in which scientific freedom exists events at the meeting proved their fears of violations of scientific freedom to be well-founded Members of the Soviet organizing committee had agreed, albeit reluctantly to the appearance of Alexander Lerner at the meeting. Lerner an eminent Soviet scientist but also a dissident had no sooner received his invitation than the KGB informed him he would not be able to attend Only intense pressure from leading American computer scientists on the day the conference was to start, including the threat of a formal protest persuaded the Soviets to relent and permit Lerner to attend the

meeting. Another incident concerned the refusal to issue a visa to an Israeli scientist who was presenting a paper, even though two years before the conference there had been Soviet agreement to permit Israeli scientists to attend. Only when the organizing committee arrived in Tbilisi and informed the Soviets that there would be no conference if the visa was not issued was a "mistake" acknowledged and the visa finally issued, by this time it was too late for the scientist to attend

Problems of the kind I have just described are the rule rather than the exception at conferences in the Soviet Union and elsewhere Still American scientists often participate in such meetings. As an old feeder at the trough of federal travel funds. I know how tempting such trips *can* be. One even rationalizes that one is helping one's colleagues who are in difficult circumstances by attending such meetings. But the most common result is the free export of intellectual resources with little or nothing gained in return

Because of the difficulty and sensitivity, of such matters the International Council of Scientific Unions does little to enforce its rules by for example, refusing to sponsor congresses in such countries American professional societies are. however in an excellent position to influence the locations of conferences few international congresses, particularly in computing, could survive without American support and,participation I believe American societies should not sponsor or cooperate with conferences in countries where there have been consistent, well-documented violations of reasonable standards of scientific behavior until there is an unequivocal commitment from a source able to keep that commitment that such problems will not recur.

My final example does not have a technical computing component at all. Still it raises professional and moral issues of deep importance for all of us. It concerns the case of Valentin Turchin a Russian, originally a theoretical physicist who migrated to computer science in the

mid-60s He is the designer of a computer language and the author of a book about it. He is also a member of ACM but that is less important to us than the fact that he is a professional computer scientist. He also is a Soviet dissident. In 1973, five days after making a public statement in opposition to the official campaign against Sakharov, Turchin was demoted. In July 1974, he was dismissed from his job He has been jobless since then In the spring of 1975 he was offered a visiting position at Columbia University 1ike a number of others, I wrote letters to various people in Soviet officialdom, urging that Turchin be allowed to accept the proffered position. Such letters from individuals are-predictably ineffectual in influencing such matters.

The Turchin matter was also brought to the ACM Council which, last October, passed a resolution urging that Turchin be permitted to accept the position offered him in this country. As far as 1 know, this action by ACM has been no more effective than the individual letters, Turchin remains in Russia, jobless and, persecuted

Some of you perhaps are thinking that my words are hardly in the spirit of detente. Detente is, of course, a word which should be easily understood by computer scientists and technologists. After all, any group responsible for inventing such amorphous terms with multi-faceted meanings as "systems analysis" and "software engineering-" and "structured programming" should find it easy to understand a word like detente which has almost has many meanings as it has users. I submit that if detente is to work, then equality and reciprocity must be at the heart of it in science as elsewhere.

The Turchin matter-was the dominant issue at the ACM Council meeting at which the resolution was passed. It consumed more paper and took up more time than any other issue. Unquestionably, it prevented some traditional business from being handled. Although the final vote on the resolution supporting Turchin was 18 for, 0 opposed and 5 abstentions, this issue was essentially a divisive one with even a

number of those who voted for the resolution unhappy that the issue was ever brought to Council at all. Was it, in fact, an appropriate issue for Council to discuss? If so, was it worth the effort involved and the diversion from other business? I think the answer to both questions is "yes"

ACM' s action has not yet been effective in helping Turchin. However, as far as Soviet dissidents are concerned, when pressure is applied in the right way, whether on behalf of dancers like the Panovs or a mathematician like Plyusheh, it can be effective. An interesting example of this occurred earlier this year when the American Mathematical Society voted to express its concern about the harassment of Soviet mathematicians who applied for exit visas. Shortly after this protest, two of the mathematicians mentioned in the protest were released. Although we can never know just why such people arc released, it is clear that the Soviet government is considerably embarassed by public -protests from prestigious scientific societies To exercise our influence, we need only to be less fastidious on such issues than scientists and engineers have traditionally been

Still there seem to be many opponents of such action. It is undeniably distasteful and distracting, for professional societies to engage in the kinds of political activity implied in what I have just said. Perhaps if the issue were merely one of tit for tat or *quid pro quo*, I might agree that our societies should not involve themselves in these matters. Ultimately the issue is a moral one; an issue of conscience which I do not believe we should be allowed to avoid.

In a letter in Science not long ago, the Nobel prize-winning biologist George Wald noted that Soviet dissidents, both scientists and others."...set standards of responsibility and civic courage of the highest order and are suffering for it. The least we can do is to try and help them." Helping them through our professional societies means not only passing resolutions but aggressive action by the society leadership to follow up such resolutions in all appropriate

channels. Toward this end, the American Physical Society has recently formed a committee to study how they can aid Soviet dissident physicists.

Even if you accept our moral responsibility in such matters, a serious argument concerns where to draw the line. One of my most respected colleagues on the ACM Council has noted that "…injustices and untenable situations occur all over the world," and that we can hardly expect to be involved in all of them. True, this implies that the issues we choose to act on must, because of the limited time and resources available, be carefully chosen to be those of greatest importance and where success be most beneficial. There are few issues which should be as important to American scientists and technologists as the harsh, often brutal treatment given to our colleagues in the Soviet Union.

'The Soviet Union is not the only offender in this respect, although it may well be the worst. More important is the fact that the Soviet Union, by virtue of its power and influence in the world, should be held, as we should be also, to higher standards than countries of lesser importance. By our words and actions we should make it clear that reasonable behavior on the international scene in scientific and technical matters should be a price that must be paid for American technology and American wheat. Acting as if such things don't matter or don't happen or shouldn't be our concern, means that we are willing to consign our colleagues-to a continuation of intolerable conditions.

It is sometimes argued that there are better forums than professional societies to pursue such aims. Some favor individual action just because issues like that of Turchin are matters of conscience. But such individual action, no matter how widespread, just cannot carry the same weight as action by leadership of a society of 30,000 or 100,000 members.

Others have argued that there already exist organisations whose mission is to address themselves to Turchin-like cases.

There such is the Federation of American dentists (FAS) which styles itself as a public interest science lobby and is interested only in the science-politics interface FAS is, in fact active on the question of the Soviet dissidents. But the existence of other organizations does not excuse unwillingness to act on the part of our societies. It is just because ACM, DPMA, the Computer Society and the other AFIPS Constituent Societies focus almost all their activities on technical and professional problems, that they can be especially effective when, on suitably rare occasions, they speak out on the issues 1 have been discussing today

Surely, it would be easiest for all of us in our society activities to concentrate on journals, conferences and chapter activities No one can doubt that there are a surfeit of important tasks to keep us busy. I would emphasize that the issues I have been discussing today should form a small part of the activities of any AFIPS society. For any society to do otherwise would be to assure that it would lose its way first and its members next

Nevertheless we cannot use any of the many rationalizations available to abdicate our responsibility to tackle difficult issues with social or political components, as long as there is a technical or human component relevant to us. In my estimation, we in computing are lagging seriously behind our colleagues in other scientific disciplines in living up to our obligations in this area We do so at great risk. To paraphrase the prophet Hillel, if our professional societies do not attend their scientific, technical and professional business, who else will do so? But, if they attend *only* to that business, what good are they? In concluding, I would argue that one aim of all our professional societies in computing should be to convince the larger society in which they exist that their members are in fact hot computers but feeling human beings.

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Its prime objectives are:

1 To represent U.S. Information Processing Societies in International organizations.

2. To provide leadership and coordinate joint activities among AFIPS constituent societies.

3. To promote Information exchange In the Information Processing Field.

4 To conduct research and development activities in the Information Processing Field

5 To provide the general public with reliable information *do* information processing and Its progress.

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By Pender M. McCarter, Editor/Research Associate

Vol. III, No. 5   May, 1977

WASHINGTON DEVELOPMENTS

USPS SHOULD IMPLEMENT ELECTRONIC COMMUNICATIONS SYSTEMS WITH PRIVATE SECTOR: COMMISSION ON POSTAL SERVICE

An electronic communications system regulated by the Federal government and operated in conjunction with private enterprise has been advanced as a method of preserving both the public interest and the U.S. Postal Service (USPS), in a report made last month by the Commission on Postal Service.

Origin, of the Report.   The Commission on Postal Service was created by Congress in September, 1976, to study problems and make recommendations concerning the .USPS. Specifically, the Commission was directed to determine the effect of electronic funds transfer systems (EFTS) on USPS, and to consider the operation of an electronic communications system by USPS.   The report incorporates the Committee on Telecommunications/National Research Council .study on *Electronic Message Systems for the U.S. Postal. Service (Washington Report,* 3/77, p 3), which endorsed demonstration projects in electronic communications to be undertaken by the Federal government and private enterprise. The Postal Sendee Commission study was presented to the President and Congress April I8th by Commission Chairman Gaylord Freeman, former chairman of the First National Bank of Chicago.

Findings and Conclusions.   Advances in electronic communications since the 1960s suggest "disastrous consequences" for the USPS, according to the study.   The effect of electronic communications is substantial, the Commission said, and will be more pronounced in the future.   According to the report, the most profitable class of mail for the USES, first class mail, is also the most likely to be diverted by electronic communications media.   A study, performed for the Commission by Arthur D. Little, Inc. (ADL), suggested that by 1985 23 per cent of all first class-mail could be processed through-electronic communications..   The study adds that it is already technically feasible to transmit more than SO per cent of all mail electronically

Financial transactions are cited as the most likely to be exploited by the new technology: For example, 15 per cent of all Department of Treasury payments are deposited automatically into bank accounts under Treasury's direct deposit/EFT program.   These payments include Social Security checks, supplementary security, income, civil service retirement

payments, railroad retirement checks, as well as-revenue-sharing payments to city and stale governments. ADL predicts that the percentage of Federal government direct deposits will rise to 45 per cent of all Government payments in 1980 and 75 per cent *of* all Government payments in 1985.

Recommendations..   The Commission criticizes the Postal Service's planning for entry into electronic communications. It cites low priorities; little money, and lack of "organizational stature." The Commission recommends establishing long-term and short-term objectives in electronic communications as part of an "integrated overall, long range plan."

As a long,term objective, it suggests development of a "nationwide, Federally-regulated electronic communication enterprise [which] would most likely succeed in, achieving the major economics of scale necessary to support a system to manage both hard copy and electronic communications. An electronic communications system which transmits and delivers mail must be regulated-by Government to assure privacy, equity, universality; reasonable changes,and a Variety of-services." The Commission recommended April 1 1979, as a target date for Congress to make a final decision on implementation of a USPS electronic message system.

As a short-term objective, it suggested that USPS begin immediate participation in "cooperative test programs" with industry. The Commission held, that such joint ventures "minimize capital investment, reduce risk, and utilize the unique collection and development, network and trained, work force of the Postal Service." Finally, it recommended careful analysis of the composition of the "mailstream" as a means "to adjust to the diversion caused by electronic advances."

The complete report is available in three volumes from the Commission on Postal Service, 1750 K Street, N.W.; Suite 801; Washington, D.C. 20006, Telephone is (202) 634-4174.

NEW 'PRIVACY ACT' SUPPORTED BY PRIVACY PROTECTION, STUDY COMMISSION

The .Privacy Protection Study Commission in June will recommend to the President and Congress passage of a new *Privacy Act* which will complement the *Privacy Act of 1974,* members of the Privacy Commission stated in a March meeting in Washington: According to an article in *Computerworld,* the Commission will distinguish between the *Privacy Act* and the *Freedom, of Information Act*   *(FOIA) ,*   rendering the, former "the sole vehicle for an individual seeking access to his own information.

New 'Privacy Act' Provisions.   For example, the Commission is reported to be recommending that the new *Privacy Act* exempt from access information obtained in the pursuit of national security, foreign policy and law enforcement. The new legislation would also substitute a more rigid test for determining what constitutes secure conditions for protection of personal data. In addition, the Commission is recommending a legal requirement that data subjects be notified of all reasons for which data is collected. Finally, it suggests; a provision in the new legislation requiring an institution to reconsider a decision later shown to be based on "erroneous" or "disputed" information.

Costs of Implementing Privacy Act of 1974. '   Also in March.; the Office of Management find Budget {OMB) noted that total operating costs for implementation of the *Privacy Act of 1974* from 1975 to 1976 amounted to $36.6 million, substantially lower than OMB's 1974 -projection of $200, million to $300 million. Compliance with the *Act's* publication requirements constituted almost one-half of the start-up costs associated with fair recordkeeping practices, OMB said.

In April,"OMB Director Bert Lance advised Federal agencies to further limit data collection on individuals. The action was described by,OMB as a reemphasis of previous policy. The Federal government maintains some 6,700 personal data,systems, consisting of an estimated, 3.9 billion records.

Other Privacy Commission Recomendations, The Privacy Commission is also expected to recommend abolition of the practice of requiring insurance or job applicants to give blanket authorizations to institutions for data gathered over an indefinite time period. It suggests limiting data gathering to a specified amount of time, such as 90 days. An individual should also be informedof what types of information is being collected, *e.g.*, regarding character or general deputation, the Commission said. Insurance companies;-under the recommendations, would be required to 4elete all information obtained on an individual; not previously specified to him. According, to the Commission, an individual should be able to obtain access, to information on which an institution's adverse decision concerning him is based.

The Commission will publish the results of its two-year investigation next month. It is expected to release a single volume outlining its recommendations followed by supplementary volumes detailing findings, in each area of personal recordkeeping.

COPYRIGHTS FOR SOFTWARE, AUTOMATED DATA BASES FAVORED BY CONTU SUBCOMMITTEES

Uniform legal protection of software is desirable, and can be provided through copyrights with minor changes in the new *Copyright Act*, according to preliminary findings of a three-member software subcommittee of the National Commission on New Technological Uses of Copyrighted Works (CONTU)

According to articles in the trade press, CONTU staff members at a March meeting of the Computer Law Association in Washington, stated that uniform protection of the law is best afforded for software through the *Copyright Act.* The staff members added that patents axe an unsatisfactory form of protection because recent court decisions (*Washington Report*, 1/77, p. 3) have held that software *must* be new and "unobvious" to be patentable. In addition, copyright protection for computer data bases is preferred by the CONTU data base subcommittee in its preliminary findings.

Trade secret claims and contractually based licensing agreements are presently used to protect software. The U.S. Copyright 0ffice also registers works derived from computer applications in which is "substantial" human effort is exerted.

A bill to extend the term of CONTU seven months was introduced in the House in March. CONTU was established by Congress in 1974.

MINIMUM EDUCATIONAL REQUIREMENTS ESTABLISHED FOR COMPUTER SCIENTISTS
BY U.S. CIVIL SERVICE COMMISSION

Minimum educational requirements for the U.S. Civil Service Commission's
new "Computer Science Series, GS-1550" were promulgated by the Civil
Service Commission (CSC) last month (#)

Minimum-educational requirements for computer scientists in pay grades
GS-5 through GS-15 include completion of a bachelor's degree consisting
of 30 semester hours of course work in math, statistics and computer
science. No less than IS of the semester hours in math and statistics
are specified in differential and integral calculus.

Duties of the computer scientist category are defined as requiring: "(a)
professional competence in applying the theoretical foundations of
computer science,,.;(b)specialized knowledge of broad areas of appli-
cations of computing...; and (c) knowledge of relevant mathematical and
statistical sciences."

The requirements appeared in the *Federal Register*, April 15, 1977, p. 19896,
and are effective as of April 15th. Further information is available from
Mr. Raymond R. Yinger, personnel management specialist, Bureau of Policies
and Standards; U.S. CSC; 1900 E Street, N.W.; Washington, D.C. 20415.
Telephone is (202) 632-5612.

HOUSE ADMINISTRATION COMMITEE ADOPTS POLICY STATEMENT ON INFORMATION
PROCESSING AND COMPUTER SERVICE ACTIVITIES

The Committee on House Administration has assumed responsibility for all
information processing matters in the House of Representatives concerned,
with mechanization, automation, computerization and related functions,
according to a policy statement on "Information Processing and Computer
Services Activities," adopted in March. The Committee has designated a
Policy Group on Information to establish and evaluate policy on the
operation of new services and systems in the House.

The Policy Group is empowered to oversee the activities of House Information
Systems (HIS). It can direct HIS to develop statements of requirements,
justifications, and cost analyses of new services and systems. The Group
can then evaluate all requests for new services and systems and recommend
action to the Committee.

AFIPS IN WASHINGTON

OMB TENTATIVELY ADOPTS AFIPS' PROPOSED PROGRAMMER CATEGORIES

A Technical Working Group of the White House Office of Management and
Budget (OMB) has tentatively adopted an AFIPS proposal for programmer
occupational classifications to be used in the OMB *Standard Occupational
Classification Manual (SOCM)*. (See *Washington Report*, 10/76, p. 3.) The *SOCM*
will be used as the basis for all Federal data collection efforts related
to the U.S. Work Force; recent Bureau of Labor Statistics figures indicate
that the U.S. programmer population was approximately 195,000 an ,1974.

The AFIPS proposal (see *Washington Report,* 3/77, p.6) was developed by a panel consisting of Dr. Bruce Gilchrist, Mr. Donn Parker and Dr. Raymond Berger. Essentially, the proposal recommended deletion of several programmer categories (some of which were outdated or not in common usage) from the draft SOCM in favor of three broad classifications for business, scientific and systems programmers. The final SOCM will also have a separate category for computer systems analysts.

<div align="right">--P. Nyborg</div>

AFIPS PARTICIPATES IN PANEL STUDYING ANSI Z-39 COMMITTEE

At the request of the National Science Foundation (NSF) and the National Commission on Libraries and Information Science (NCLIS), AFIPS has provided one member of a 13-person Task Force which is studying the activities and charter of the American National Standards Institute (ANSI) Z-39 Committee. Mr. Melvin Day, deputy director of the National Library of Medicine and a former president of the American Society for Information Science, will participate on the Task Force in affiliation with AFIPS.

The ANSI Z-39 Committee it elf deals with standards related to libraries and information science; of particular interest to AFIPS, it deals with matters such as information system user protocols and data base formats. The Task Force, formally known as the "Task Force on ANSI Committee Z-39, Activities and Future Directions, is under the sponsorship of NSF and NCLIS; under the present plan; the Task Force will: (1) recommend an organization to sponsor the Z-39 Committee and provide its secretariat; and (2) assess the Committee's charter and present mode of operation.

At its initial meeting, the Task Force organised into six working groups on: (1) the domain of the Task Force Study; (2) the scope and mission of 2-39; (3) the selection of a secretariat(s); (4) the Z-39 planning approach; (5) Z-39 operations and physical location; and (6) Task Force reporting and liaison to the Z-39 Committee, Mr. Day will chair the working group on "scope and mission of Z-39."

The Task Force is scheduled for two subsequent meetings in Washington, on May 25-27 and June 29-30.

<div align="right">--P. Nyborg</div>

AFIPS TO BE CONSULTED ON PCST MEMBERSHIP

AFIPS recently received a request to provide names of past AFIPS officers to assist in evaluating candidates for the President's, Committee on Science and Technology(PCST); the request related specifically to the evaluation of candidates for a PCST member in the field of "information dissemination."

PCST was created under the same legislation which established the White House Office of Science and Technology Policy and the position of the Presidential Science Adviser (now held by Dr. Frank Press). The Committee is chartered to analyze the overall "Federal science, engineering and

technology effort" including its organization and objectives. PCST is required by statute to have one member qualified and distinguished in the "information dissemination" area, and to consider needs for "improve-ments in existing systems for handling scientific and technical information on a government-wide basis, including consideration of the appropriate role to be played by the private sector in the dissemination of such information."

The request to AFIPS (among others) was made by Dr. Lee Burchinal of the National Science Foundation Division of Science Information, pursuant to a direct request from OSTP.

--P. Nyborg

NEWS BRIEFS

The *Second Computer Inquiry* of the Federal Communications Commission (FCC) was expanded in March, to include in its definition of "data processing, processing activities outside of the CPU; the new definition also distinguishes between what data processing devices (such as terminals) do and how they are used; initial comments on the new definition have been requested through May 16th, with final comments due June 30th.

Committees in the House and Senate last month approved bills to extend for 30 months U.S. export controls on strategic products; under the legislation, embargoes would proceed on a country-by-country basis.

A bill which would computerize data on Federal grants and loans for state and local government, titled the *Federal Program Information Act,* has been introduced in the Senate by Sen. Edward M. Kennedy (D-Mass.) and Sen.William V. Roth, Jr. (R-Del); the bill designates the Office of Management and Budget (0MB) as administrator of the system, and would transfer the computerized Federal Assistance Program Retrieval System (FAPRS) from the Department of Agriculture to the 0MB

Resolutions concerning studies of the telecommunications policies of the Federal government as they concern regulation and competition were introduced in the House and Senate in March.

Sen. Adlai E. Stevenson III (D-lll.) has been appointed chairman of the Senate Subcommittee on Science band Space; Rep. Richardson Preyer (D-N.C.) is heading the House Subcommittee on Government Information and Individual Rights.Production assistance for the *Washington Report* is provided by Linda Martin. AFIPS societies have permission to use material in the newsletter for their own publications; however, when an article appears with an asterisk, clearance must first be obtained from the AFIPS Washington Office. Documents indicated by the symbol "(#)" are available on request to the Washington Office. Requests should specify the date(s) of the *Washington Report* in which the document(s) appeared. Where price is noted, make checks payable to "AFIPS."

Pender M. McCarter, Editor

Vol. III, No. 6   June, 1977

WASHINGTON DEVELOPMENTS

OPTIONS PAPERS RELEASED BY HOUSE SUBCOMMITTEE ON COMMUNICATIONS: GENESIS OP 'BASEMENT-TO-ATTIC' REVIEW OF '1934 COMMUNICATIONS ACT'

As part of its "basement-to-attic" review of the *1934 Federal Communications Act,* *(Washington-Report,* 11/76, p.3), the staff of the House Subcommittee on Communications has prepared its *Options Papers,* described by *Broadcasting* magazine as the "seed" of a new *Communications Act.* Released by the House Subcommittee on Communications in late April and now available through the Government Printing Office (GPO) (and AFIPS—sec below), the *Options Papers* offer an overview (in contrast to a recommendation) of policies that might be pursued in restructuring the telecommunications industry. The study is divided into nine sections, including four sections related to digital communications: (1) Domestic Communications Common Carrier Policy; (2) Inter-national Telecommunications; (3) Impact of Communications Technology on the Right to Privacy; and (4) Structural and Procedural Options for Regulation of Telecommunications.

Domestic Communications Common Carrier Policy. In the "Domestic Communications Common Carrier Policy" section, the staff suggests that "[o]nly if Congress ultimately decides that it wishes to preserve current rate structure goals and methods [in which telephone costs are distributed among all users, thus providing universal service] does the 'adverse impact of competition' debate [raised by AT&T in the *Consumer Communications Reform Act*] become central." In this section, the staff notes various conflicting goals established by Congress which it said must be balanced, i.e., universal service, rapid and efficient service, and reasonable charges. According to the staff., technological changes such as the juxtaposition of computers and communications necessitate a "reexamination of the methods by which Congressional goals are met."

International Telecommunications . In the section on "International" Telecommu-nications,""the staff indicates that international policy issues in telecommu-nications are also complicated by the combination of computer and communications technologies. The central issue in international telecommunications is given as "facilities planning," *i.e.,* "[h]ow does the U.S. plan future global telecommunications facilities with its foreign partners who might have totally different policy goals and interests?"

*

Impact on the Right to Privacy.   In the section on the "Impact of Communications Technology on the Right to Privacy," the staff notes that the use of computer terminals in the home provides "innumerable opportunities for unauthorized invasions of privacy." It suggests that one of the options available to the Subcommittee to prevent unauthorized interception and disclosures of wire communications is to return control of illegal interception of wire communications to the Federal Communica-tions Commission (FCC).

Options for Regulation.   In the section on "Structural and Procedural Options for Regulation of Telecommunications," the staff presents several sets of "institutional" options for reorganization and coordination of telecommunications regulation in the Federal government. A "Department of Telecommunications" is suggested as one option, given a requirement for "broad policy approaches." An interagency council is another alterna-tive presented in the absence of any requirement for a broad policy approach. Transfer of the FCC's adjudicatory functions to an "Administra-tive Court" or division of the FCC into "Common Carrier" and "Broadcast" entities are suggested as improvements on the *status quo,* assuming a coordinated national telecommunications policy is not a priority.

Ordering Informaticn.   Copies of the *Options Papers,* Stock Number 052-070-04043-2, are available for $5.25 through the GPO at (202) 783-3238; or through the AF1PS Washington Office (enclose $5.25).

NCEFT WORKING PAPER STRESSES   "POLICY ALTERNATIVE"   OF MINIMUM REGULATION AND COMPETITIVE MARKETPLACE   IN EFTS DEVELOPMENT: COMMENTS REQUESTED

A working paper prepared by the staff of the National Commission on Electronic Fund Transfers (NCEFT) in conjunction with the NCEFT Suppliers Committee has indicated that a "policy alternative" of minimum regulation and a competitive marketplace in electronic funds transfer systems (EFTS) might be a "desirable approach" to the development of EFTS. The NCEFT is seeking, comment by June 20, 1977, on the trial recomendations in its discussion paper, *Internal Working and the Competition Among EFT Vendors,* released last month.

Minimum Regulation.   The staff states that EFTS does not possess the characteristics of a natural monopoly, and as such EFT terminals aid components *(i.e.,* concentrators, multiplexers, modems, switches) should not be subject to regulation or tariffs at the state or Federal level. It adds that Congress should "exempt offerers of EFT systems and services from FCC [Federal Communications Commission] regulations as value added resellers." The paper suggests that it is "beyond the scope" of the NCEFT to determine whether leased circuits should be regulated. However, it indicates that since circuits are already regulated, EFTS components should *not* be regulated.

According to the staff, EFT terminals and components should be certified under the FCC registration program to insure that they do not damage the public telephone network. With respect to terminals and components, it is suggested that protective interfaces should be provided when equipment does not comply with standards prescribed in the registration program.

Competitive Marketplace. All common carriers should be free to offer EFT terminals and components through the same or separate "arms-length, unregulated subsidiaries," the paper stated. The staff also indicated that Congress should modify the *1956 Consent Decree* permitting AT&T to provide data processing services through an unregulated subsidiary Otherwise, the paper continued, the "EFT market could be deprived of [the Bell System's Transaction Network Service (TNS),] a significant source of innovation." In addition, the staff suggested, no one should be precluded from offering EFT services whether resale or shared. Finally, the paper noted that leased circuits, as an infrastructure of EFTS, "should be available on an equitable basis, under the same terms and conditions to all providers and suppliers of EFT systems."

EFT Standards. The staff stated that mandatory standards are not desirable because they may discourage innovation in the early stages of EFTS development. To minimize the anticompetitive aspects of *de facto* standards, the paper suggested that interface and protocol standards, which are in conflict with ANSI standards, should be published. Similary, the staff stated that any changes in standards should be published as soon as they are certified.

Comments Requested. Written statements and supporting documentation concerting *Competition Among EFT Vendors* should be submitted by June 20 to the Executive Director; NCEFT; 1000 Connecticut Avenue, N.W.; Suite 900; Washington, D.C. 20036. Further information is available from Mr. John J. McDonnell, Jr. or Ms. Diana L. Jones at (202) 634-1823.

SUPREME COURT UPHOLDS PATIENT IDENTIFICATION REQUIREMENT IN N.Y.
COMPUTERIZED DRUG TRACKING SYSTEM

Use of hospital patients names in New York's computerized drug tracking system has been upheld in a recent unanimous decision by the U.S. Supreme Court. According to an article in the May 2nd issue of *Computerworld,* the computerized system, operated by the state's Department of Health, is Resigned to prevent drug abuse through the issuance of multiple prescriptions. The system's" data base allows access to patients' records for up to five years.

In the Supreme Court's opinion, rendered by Justice John Paul Stevens, the requirement for "patient identifiers," coupled with prescription forms processed by computer, is a reasonable application of the state's broad police powers. However, Justice William J. Brennan, Jr noted that computerized access to such data may require a "curb" on the technology in the future. According to Justice Brennan, the Fourth Amendment of the Constitution imposes "limits, not only on the type of information the state may gather, but also on the means it may use to gather it."

<u>AFIPS IN WASHINGTON</u>

<u>AFIPS PARTICIPATES IN OTA PLANNING STUDY FOR TECHNOLOGY ASSESSMENTS</u>

At the request of the Congressional Office of Technology Assessment (OTA), AFIPS is participating in an OTA planning study designed to examine the basis for establishing a scries of OTA technology assessments in the area of telecommunications, computers and information policies. OTA has established a Working Group to describe issues, identify policy options, and define research strategy to be considered in the proposed assessments.

History of the Study. Sen. "Edward M. Kennedy (D-Mass) in January *(Washington) Report,* 3/77, p. 4) recommended an OTA technology assessment analyzing the development and application of information technology from 1977-1990. Sen. Kennedy's recommendation was rejected by the Congressional Board of OTA in favor of an alternate proposal recommending the planning study.

Outline of the Study. The first of three meetings of the Working Group was held May 2-3, 1977, in Arlington, Virginia, to compile a consensus issues list. Separate meetings will be convened to identify policy options and to define research strategy. A proposal for a permanent program of assessments in telecommunications, computers and information policies will be submitted for approval in September to the Congressional Board of OTA. In addition to AFIPS, other members of the Working Group "include such organizations as AT&T and IBM Corp.; Rand Corp. and Arthur D. Little, Inc.; as well as the Federal Communications Commission and the White House Office Telecommunications Policy.

AFIPS Participation. Through liaisons to the AFIPS Washington Office, all AFIPS societies were invited to participate in the activities surrounding the Working Group. Washington Office Director Philip S. Nyborg coordinated the development of an issues statement with interested representatives of the Constituent Societies comprising a panel. Mr. Nyborg presented the issues statement at the May 2-3 meeting of the Working Group.

Participants on the AFIPS[1] panel included: for AlAA, Mr. Bruce Wilson; for ACM, Prof. Peter Lykos; for AEDS, Dr. Judy Edwards; for DPMA, Mr. Bruce Spiro; for IECE-Computer Society, Mr. Lynn Hopewell; for IIA, Mr. William E. Perry; and for SIAM, Dr. Hans Oser. Also participating were Prof.Vinton Cerf of the Defense Advanced Research Projects Agency/IPTO; and Mr. Alex Curran of Bell-Northern Research, Inc.

AFIPS Issues Statement. The AFIPS panel outlined seven issues groups and 16 issues for consideration of the OTA Working Group as follows:

I. Formulation of a coherent National Information Policy
   A. What process and institutional structure is needed to formulate and maintain a coherent National Information Policy?
   B. What areas should be considered in the substance of a coherent National Information Policy?
   C. How can information policy /deal with the "uncertainty" inherent in new technology [*i.e.,* in the technology itself and in Federal government responses]?

II.   Non-regulatory approaches to implementing National Information Policy
    A.   What policy should the Federal government implement relating to
rights in software (computer programs) and computer-readable information
(data bases)?
    B.   Should the system of Federal taxation give special consideration to the
development of an information economy?
    C.   What should be the Federal role regarding private sector standards in
information technology?
    D.   What is the appropriate U.S. trade policy for information technology?

III,   Coherent regulation of communications-related activities,   in areas where
there is a demonstrable need for regulation (possibly including electronic
mail, and EFTS)
    A.   What process and institutional structure is needed for coherent regula
tion of those communications services where regulation is demonstrably neces
sary?
    B.   As it becomes technically feasible to deliver a wide variety of servi-
ces over digital communications networks, how will the regulatory structure
execute its responsibilities with respect to regulated services while at the
same time refraining from inhibiting non-regulated services?
    C.   What economies-of-scale exist in telecommunications and information
systems?

IV. Protecting individual rights
    A. What is the proper Federal policy relating to privacy and personal data systems in the private
sector?   In particular, what is the appropriate Federal policy r e l a t i n g to privacy in electronic fund
transfer systems?
    B. What Federal steps, if any,   are necessary and appropriate to ensure pri-vacy and security in data
communications?

V. Government actions for the "public good"
    A.   In what areas and to what extent should t h e Federal government ensure,
that services are universally available?
    B.   Should the Federal government encourage the a p p l i c a t i o n of information
technology to further specific national programs?   What programs may be
appropriate?

VI.   Issues r e l a t e d to t h e *Consumer Communications Reform Act*

What subsidies, if any, exist between the various type of service provided. by domestic common
carriers?   What subsidies,   if any, are desirablele? By whom should they be determined?

VII.   Significant technologies to be addressed in the OTA-study
    A. Large   scale integration (LSI)
    B.   Software control
    C.   Digital technology
    D.   Radio

10-CSTB MEMBERS APPOINTED BY NATIONAL RESEARCH COUNCIL

The National Research Council (NRC), Assembly of Mathematical and Physical Sciences (AMPS) has named 10 members to serve on the Computer Science and Technology Board (CSTB). The announcement follows the appointment of Dr. Victor Vyssotsky of Bell Laboratories as chairman of the CSTB (see *Washington Report*, 4/77, p. 2}.

The 10 members are: Dr. Frederick P. Brooks, Jr., University of North Carolina; Dr. George G. Dodd, General Motors Research Laboratories; Dr. Bernard A. Galler, Universityof Michigan; Dr. Jerrier A. Haddad, IBM Corp.; Dr. Richard M. Karp, University of California; Dr. Joshua Lederberg, Stanford University; Dr. Arthur J. Levenson, Silver Spring, Maryland; Dr. Anthony Ralston, State University of New York; Dr. Jacob T. Schwartz, New York University; and Dr. Ivan E. Suther-land, California Institute of Technology,

Dr. Ralston's name was submitted as one of three AFIPS candidates for CSTB, in response to a request by NRC {*Washington Report*, 2/77, p.6).

AFIPS/IFIP OFFICIALS TO REVIEW SOCIETIES PARTICIPATION IN INTERNATIONAL ACTIVITIES WITH NAS COMMITTEE ON INTERNATIONAL SCIENTIFIC AND TECHNICAL INFORMATION PROGRAMS

Officials of AFIPS and the International Federation for Information Processing (IFIP) will review AFIPS participation in IFIP and other international activities, such as the U.S.A./Japan Computer Conference, with the National Academy of Sciences (NAS) Committee on International Scientific and Technical Information Programs (CISTIP)

Meeting with CISTIP in Washington on July 11, 1977, will be: Dr. Theodore J. Williams, AFIPS president; Dr. Richard I. Tanaka, AFIPS International Relations Committee chairman and IFIP president; Dr. Robert W, Rector, AFIPS executive director; and Mr. Philip S. Nyborg, AFIPS Washington Office director.

L I N G U I S T I C   I N S T I T U T E   1978

UNIVERSITY OF ILLINOIS AT URBANA CHAMPAIGN

PRELIMINARY ANNOUNCEMENT

MAIN SESSION   June 12 - August 5

LSA MEETING   July 28-30

CO-ORDINATION   Department of Linguistics
          Division of Applied Linguistics
          Office of Continuing Education and Public Service

Focus   Language Form and Language Function:
          A Western and Non-Western Perspective

          Theory - Application - Areas (African,
          West Asian, South Asian)

COLLITZ CHAIR   George Cardona, University of Pennsylvania

LSA CHAIR   Charles Osgood, University of Illinois

VISITING FACULTY Ayo Bamgbose, University of Nigeria
          Bernard Comrie, Cambridge University W. O.
          Dingwall, University of Maryland Joshua Fishman,
          Yeshiva University Jonathan Kaye, University of
          Quebec, Montreal Edward Keenan, University of
          California, Los Angeles Bh. Krishnamurti, Osmania
          University. Robert B, Lees, Tel-Aviv University
          Jerrold Sadock, University of Chicago Peter
          Trudgill, University of Reading

ILLINOIS FACULTY-William P. Alston, Philosophy
          Elmer Antonsen, German W. Curtiss
          Blaylock, Spanish Eylmba G. Bokamba,
          Linguistics Lawrence Bouton. English as a
          Second Language

                                        MORE

                    *

Charles E. Caton, Philosophy

Chin-chaun Cheng, Linguistics

Peter Cole, Linguistics

J. Ronayne Cowan, English as a Second Language

Paul Gaeng, French

Georgia M. Green, Linguistics

Hans Henrich Hock, Linguistics

Braj B. Kachru, Linguistics

Yamuna Kachru, Linguistics and English

Henry Kahane, Linguistics

Michael J. Kenstowicz, Linguistics

Chin-W. Kim, Linguistics

Charles W. Kisseberth; Linguistics

F. K. Lehman, Anthropology

 Howard Maclay, Linguistics & Speech Communication

James Marchand, German

Jerry Morgan, Linguistics

 Irmengard Ruach, German

Mario Saltarelli, Spanish

  G. L. Tikku, Linguistics & Comparative Literature

Henry T. Trueba, Secondary and Continuing Educ.

Dieter Wanner, Spanish

Ladislav Zgusta, Linguistics

COURSES

Introductory Courses:
       Introduction to Linguistics
       Introduction to Phonetics
       Introduction to Applied Linguistics

Phonology:
       Tonology
       Introduction to Phonology Phonological
       Analysis and Description Practice in
       Phonological Analysis Functional
       Phonology

Phonetics:
       Introduction to Phonetics Seminar in
       Experimental Phonetics

Syntax:
       Introduction to Syntax and Semantics
       Problems of Reference
       Pragmatics and Syntax
       Linguistics and the Study of Meaning
       Speech Acts
       Syntactic Argumentation
       Functional Approaches to Syntax

Historical Linguistics.
       Diachronic Phonology
       Diachronic Syntax
       Sociolinguistics and Language Change
       Seminar in Indo-European Linguistics

Sociolinguistics:
       Introduction to Sociolinguistics
       Seminar in Third World Englishes
       Sociology of Bilingual Education
       Seminar in Bilingual/Bicultural Education
       Sociology of Language
       Sex-related Differences in Language

Psycholinguistics:
       Introduction to Psycholinguistics
       Cognizing and Sentencing: Toward an Abstract Performance Grammar
       Neurolinguistics
       Evolution of Human Communication Systems

Mathematical and Computational Linguistics:
       Introduction to Computational Linguistics
       Introduction to Mathematical Linguistics
       Computers in Linguistics and Literary Style

Multilingualism, Language Policy, and Bilingual Education:
Language Policy and African Education Multilingualism: An
Historical Perspective Language in South Asian Education

Linguistics and Reading:
Linguistic Aspects of Reading
Theoretical Issues in Reading Comprehension
Independent Studies in Reading Research

Stylistics:
Seminar in Analysis of Oral Literature

Typology:
Language Typology
Introduction to Languages of the World
Universal Grammars

Lexicography:
Seminar in Lexicography

Indian Grammarians:
Seminar in Indian Grammatical Traditions

Area-Oriented Courses:
Intr6duction to African Linguistics Language
in African Culture and Society Introduction
to Dravidian Linguistics Seminar in South
Asian Linguistics Language in Persian
Culture and Society Introduction to Tibeto -
Burman Linguistics

Structure Courses:
It is proposed to offer a wide variety of courses on specific
languages, especially those of Africa, South Asia, and West Asia. The
following courses have been proposed so far
Structure of Algonquian Languages
Structure of Arabic Structure of
Bantu Structure of Biblical Hebrew
Structure of English Structure of
Hindi Structure of Modern Hebrew
Structure of Sanskrit

Intensive Language Courses:
We propose, if there is enough interest to have intensive
instruction in several nonwestern languages, especially the following:

Arabic	Modern Hebrew
Hausa	Sanskrit
Hindi	Swahili
Marathi	Wolof

WORKSHOPS AND CONFERENCES:

A number of workshops are being planned at this point. We expect to have conferences and workshops in the following areas. This is a tentative and partial listing.

Conference on English in the Third World
Conference on Language Policy and Education in the Third World
Conference on Origin of Language
Conference on South Asian Languages and Linguistics
Seminar on Bilingual Lexicography
Symposium on Pragmatics
Symposium on Romance Linguistics
Workshop on Language Policy and Planning

FORUM LECTURES:

There will be sixteen forum lectures devoted to eight topics. The main theme is: *Linguistics in the Seventies: Directions and Prospects.* The Coordinating Committee comprises:

William Dingwall
Georgia Green
Braj B. Kachru
Henry Kahane (Chairman)
Michael Kenstowicz

LINGUISTICS IN AFRICA AND ASIA:

In addition there will be a series of lectures on current trends in research on linguistics and the state of the linguistic sciences in Africa, South Asia and West Asia.

AMERICAN INDIAN LANGUAGES AND LINGUISTICS:

We are planning to include a component on American Indian languages and linguistics as part of the 1973 Institute. The details are currently being worked out. If it materializes we shall include full particulars in the LSA Bulletin, October. 1977,

VISITING SCHOLAR PRIVILEGES:

Scholars with Ph. D. degree or rank of Associate Professor (or equivalent) are encouraged to participate in the Institute. The fee is $200.00 if paid after April 1, 1978, and $150.00 if before.

INSTITUTE ADMINISTRATION:

The Institute will be administered by the following team:

Director:

Braj B, Kachru (Head, Department of Linguistics, University of Illinois)

Associate Directors:

William Orr Dingwall (Director, Program in Linguistics, University of Maryland) Henry Kahane (Department of Linguistics, University of Illinois)

Assistant Director

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The details about scholarship and other financial aid will appear in the LSA Bulletin, October, 1977. For application forms and admission write to:

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