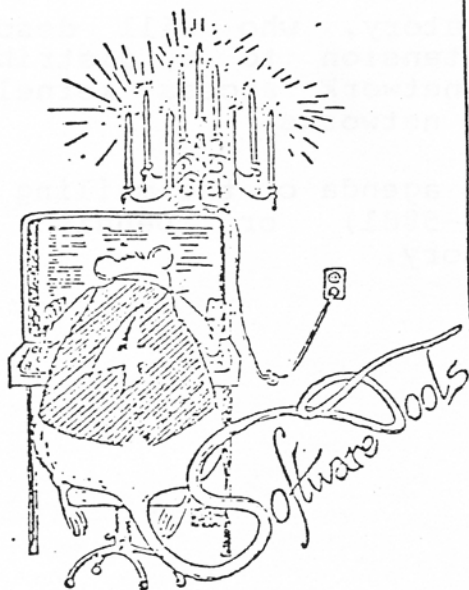


```
#####
#
#   SOFTWARE   TOOLS
#   COMMUNICATIONS
#
#####
```

Vol. 2 Number 1

--- MEETING IN JUNE ---



Response to the software tools developed by Kernighan and Plauger has been excellent. Installations all over the world are both using the tools and enhancing them with everything from improved preprocessors to UNIX-like [1] shells and file systems. To enhance communications among these enthusiasts, an international software tools users group is being formed as a special interest group within the UNIX [1] users group.

The first meeting will be held Tuesday, June 19, 1979 at the University of Toronto Medical Science Auditorium in Toronto, Canada. This is the day before a three-day UNIX [1] users meeting at the same place. We hope to spend the day (9:30 - 5:00) on status reports, new developments, standardization questions, software distribution problems, etc. Brian Kernighan, co-author of the basic package, will be there to answer questions and offer encouragement.

Besides those already on the agenda include:

David Hanson from the University of Arizona, who is working on portable file systems, portable I/O systems, and enhanced versions of the tools and preprocessor.

Douglas Comer of Purdue University, who will describe 'Mouse4', his version of the ratfor preprocessor which he has significantly improved by the addition of a hash table and by rewriting the lexical scanning routines using a standard method based on finite automata.

Philip Enslow from the Georgia Institute of Technology, who has not only implemented all the tools on a PRIME computer, but also developed a powerful shell which allows multiple standard inputs and outputs, supports arbitrary networks of commands, allows command files with arguments and high-level control structures, and includes variables and dynamic command line features. (Not Definite)

Robert Munn of the University of Maryland, who has a version of the

ratfor preprocessor with greatly enhanced macro capabilities which he is using to distribute crystallography codes to 250 end users on a dozen different systems.

Dennis Hall from Lawrence Berkeley Laboratory, who will describe LBL's UNIX-like [1] shell, its extension to a distributed environment, and plans for developing a network access kernel to provide pipelining through heterogeneous networks.

Anyone else interested in being on the agenda or the mailing list should contact Debbie Scherrer (415-486-5881) or Dennis Hall (415-486-6053) at Lawrence Berkeley Laboratory.

Accommodations are being handled by:

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UNIX Users Group Conference  
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## --- SURVEY ---

Dale Wolfe and Todd Kushner at Telenet, Inc. have agreed to compile the results of the software tools survey sent out last December. Their report will be forthcoming either in the next communication or at the June meeting.

In the meantime, here are some preliminary results:

Well over 700 tapes have been sold by Addison-Wesley. Of these we managed to get 225 addresses, most of which were accounting offices of universities and other installations, the rest were book stores. 35 addresses were foreign.

From returned surveys and direct contact with individuals, it appears that current effort with the tools is directed toward:

- Ratfor enhancements
- Shells
- Conquering more operating systems
- Adding more UNIX [1] capabilities
- Performance measurements
- User statistics
- Network tools
- Additional tools such as tape archivers
- Translation of tools to other languages

Topics of special interest include:

- Code exchange
- Standardization
- Security research
- Communication language research
- Network research
- Numerical analysis

Nearly everyone is interested in becoming a member of the software tools users group and sharing their enhancements and ideas.

Contacts have been established with individuals working in the following institutions:

<u>Institution</u>	<u>City</u>	<u>State</u>	<u>Country</u>
Argonne National Lab.	Argonne	Illinois	
Atlantic Richfield Co.	Harvey	Illinois	
Battelle (Pacific Northwest Labs.)	Richland	Washington	
Bedford Institute of Oceanography	Dartmouth	Nova Scotia	Canada
Bradley University	Peoria	Illinois	
British Columbia Telephone	Vancouver	British Columbia	Canada
Bolt Beranek & Newman	Cambridge	Mass	
Central College	Pella	Iowa	
City College of New York	New York	New York	
DataGeneral	Westboro	Massachusetts	
Dunegan/Endevco	San Juan Capistrano	Calif	

Fachhochschule Reutlingen	Bridgeport	Reutlingen	West Ge
General Electric Co.	Atlanta	Connecticut	
Georgia Institute of Tech.	Manhattan	Georgia	
Kansas State University	Berkeley	Kansas	
Lawrence Berkeley Lab.	Sunnyvale	California	
Lockheed Missiles & Space Co.	Flagstaff	California	
Lowell Observatory	Montreal	Arizona	
McGill University	Salt Lake City	Quebec	Canada
Medlab Co.	Hershey	Utah	
Milton S. Hershey Med. Center		Pennsylvania	
(Pennsylvania State U.)			
Ministry of Defense	Haifa		Israel
MJB Computer Associates	Spencerport	New York	
Namur University	Namur		Belgium
Naval Underwater System Center	New London	Connecticut	
Naval Weapons Center	China Lake	California	
New York University	New York	New York	
Pullman Kellogg	Wembley	England	Great B
Purdue University	Lafayette	Indiana	
RCA Labs.	Princeton	New Jersey	
Royal Military College of Science	Shrivenham	England	Great B
Salk Institute	San Diego	California	
San Francisco State U.	San Francisco	California	
Science Applications, Inc.	Arlington	Virginia	
Stanford University	Stanford	California	
Systems Control Inc.	Palo Alto	California	
Telenet Communications Corp.	Vienna	Virginia	
Telesat Canada	Ottawa	Ontario	Canada
Texas A & M	College Station	Texas	
Toshiba Corp.	Kawasaki		Japan
TRW	Mountain View	California	
Union Carbide	Oak Ridge	Tennessee	
United States Air Force	Wright-Patterson	Ohio	
United States Army	Aberdeen Prov	Maryland	
University of Arizona	Tucson	Arizona	
University of California	Berkeley	California	
University of California	Los Angeles	California	
University of California	San Diego	California	
University of California	San Francisco	California	
University of Colorado	Boulder	Colorado	
University of Newcastle upon Tyne		England	Great B
University of Texas	Dallas	Texas	
University of Western Ontario	Stratford	Ontario	Canada
University of Wisconsin	Madison	Wisconsin	

These installations represent the following machines and operating systems:

ACOS 700  
 AMDAHL V6  
 BURROUGHS B1700  
 CDC 1784  
 CDC 6000s

GCOS (similar to HONEYWELL 6000)  
 OS/MVT  
 local  
 local  
 Kronos 2.1  
 local (BKY)  
 Dual Mace  
 Scope 3



## CDC Cyber

DATAGENERAL C300  
DATAGENERAL Eclipse  
DATAGENERAL NOVA  
DATAGENERAL  
HP 3000  
HP MX  
IBM 1130  
IBM 3031, 3033  
IBM 360/65  
IBM 370  
INTEL 8086  
INTEL MD5 (8080)  
INTERDATA 7/16  
LSI /03  
MODCOMP  
PDP 10

## PDP 11s

PDP 11/780 VAX  
PRIME 500->300  
P-400  
004  
TELE N TR 440  
UNIVAC 1110  
XEROX Sigma 3  
8080 & Z80 micro

NOS/TELEX  
NOS/VE  
NOS 1.2  
RDOS  
S200, S230  
RDOS  
AOS  
?  
RTE 3  
?  
OS/360 & one other (unknown)  
OS/360  
CMS  
?  
ISIS II  
OSIGMT2  
RT-11  
MAX  
TENEX  
TOPS-20  
TYMCOM-X  
others (?)  
RT-11  
IAS  
RSX-11M  
DOS-Batch  
RSTS/E  
UNIX [1]  
S (simulating an RC4000)  
VMS  
PRIMOS  
PRIMOS IV  
TST  
BS19  
EXEC 8  
RBM  
CP/M

Todd Kushner and Dale Wolfe of Telenet, Inc. have also agreed to assist in the distribution of software tools. They will help in putting implementors in contact with installations with similar operating systems. Details for taking advantage of this resource will be provided in future communications.

## --- PREPROCESSOR IMPROVEMENTS ---

Many installations have enhanced the ratfor preprocessor, either by adding features or restructuring existing ones. For example, Douglas Comer of Purdue University has improved ratfor's efficiency. Running time was reduced by over 50% by implementing a binary search instead of the linear search previously used by the macro processor. Even more dramatic improvements in running time were obtained by rewriting the lexical scanner using a standard method based on finite automata.

David Hanson of the University of Arizona has enhanced ratfor to be nearly equivalent to the C version used internally within Bell Labs. His version of ratfor has a return statement (return(value)) and accepts several different styles of 'define's. Hanson also uses a hash table for definitions and does not generate unnecessary goto or continue statements.

Kurt Ofer of the Scientific Department, Ministry of Defense in Israel, Robert Munn of the University of Maryland, the folks at Bolt, Beranek, and Newman, Inc., Saisho Toshiaki of the TOSHIBA Corp. in Japan, Richard Kreutzer of Medlab Co., Mitchell J. Bogdanowicz of MJB Computer Associates, and others have enhanced the macro processing capabilities of ratfor by including and enhancing the macro processor provided by Kernighan and Plauger.

A group at Georgia Institute of Technology (led by Philip Enslow) has improved ratfor by adding subroutine trace and profiles, and 'string', 'case', 'andif', and 'orif' constructions. They have also added many new functions to the macro processor and other tools.

Mike Kralej of Bolt, Beranek and Newman and John Riesecker of central College in Pella, Iowa have written cross-refer

Other improvements from a number of installations include expanded "include" statements, improved error reporting, and improved output listings.

Several people have attempted translations from ratfor to other languages including Pascal, C, Algol, BCPL, and Basic (yes, even Basic ...).

At the meeting in June we hope to set up working committees to tackle the problems of standardization, sharing enhancements, and distributing the projects so that duplication of effort will be minimized.

## --- SHELLS ---

A 'shell' is a command interpreter which sits on top of the local operating system and provides a user interface to the various utilities such as the software tools. Most operating systems provide some sort of shell, but each of these is invariably different and most require a significant amount of learning effort. A transportable shell, using a standard syntax would prove to be of great importance as distributed processing becomes more and more popular.

Several installations have developed shells written in ratfor and based on the software tools primitives and concepts. At least two of these shells are patterned after the shell used by the UNIX [1] operating system, just as the original Kernighan and Plauger tools are closely modelled on the equivalent UNIX [1] utilities.

The Lawrence Berkeley Laboratory has developed a UNIX-like [1] shell transportable to any operating system that supports the execution of subtasks. Current effort on LBL's shell includes the addition of process control primitives to allow for the execution of background processes, the inclusion of a UNIX-like transportable file naming system (developed by Dave Hanson of the University of Arizona), and extension of the shell to a network environment.

The Software Tools Development Group at Georgia Institute of Technology (led by Philip Enslow) has developed a powerful shell for their PRIME computer which allows multiple standard inputs and outputs, allows arbitrary networks of commands, supports command files with arguments and high-level control structures, and includes variables and dynamic command line features. They also have complete on-line documentation available.

Michael Levitt at the Salk Institute has implemented a shell which allows any tools to be used in any order. Pipelines are done using switched unit numbers and temporary data sets.

C. R. Snow from University of Newcastle upon Tyne, currently at Xerox in Palo Alto, has also implemented a shell based on the UNIX shell. Snow's shell is written in BCPL and runs on a Burroughs computer.

--- ADDITIONAL NOTES ---

Very special thanks to George Kapus of Lawrence Berkeley Laboratory for designing the illustrations.

George has also suggested the title "RAT INFORMANT" for the software tools communication. Any opinions????

Lawrence Berkeley Laboratory and Telenet, Inc. are currently collaborating in the publication of this communication. Anyone with articles to be included, questions, suggestions, great new ideas, or bones-to-pick can contact:

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Live Long and Prosper

