

Annual Report

November 1973 - October 1974

Phyllis A. Fox

November 5, 1974

Major Effort - the PORT Mathematical Program Library

The main activity for the year has been the study of mathematical program libraries, and the development of desiderata and specifications for the Port library of mathematical programs. The error handling techniques and the automatic memory stack allocation developed by Andy Hall and Norm Schryer have been of fundamental importance to the structure of the library.

A large amount of time has been spent in the documentation of the library using the UNIX phototypesetter; a draft of the initial documentation for the programs currently in the library (see [4] below) has just been distributed to several people for comments.

The source code for the programs now on PORT are under that catalog, and the compiled object library is PORT/library.

Research during the initial development phase was summarized in the unpublished report [1] and in the talk(1).

A study of procedures to be used in testing and validating the programs in PORT was carried out using, as an example, the program for the Associated Legendre Polynomials, and the work was reported in papers [2] and [3]. The latter paper was presented in a talk (2) at Purdue.

Work is currently being done on the initial introductory chapter describing PORT and explaining the error handling, stack allocation, portability (via machine constant specification), and other aspects of the library.

Holmdel has shown interest in the PORT library; in fact at a recent meeting with Fran Henig it was decided not to support the rental for the IBM SL Library but to rely on PORT for numerical routines.

During the course of the work a number of mathematical program libraries have been acquired at Murray Hill. These are described in an article in the forthcoming computing center newsletter.

Other activities

At the request of Mark Rochkind a study was undertaken to compare the performance of the CDC computer with that of the IBM at Holmdel and the Honeywell at Murray Hill. This study, which began in April, involved running a variety of problems on the three computers and comparing times and charges. Several summary sheets on the study have been prepared to facilitate the performance comparison.

NATS, the National Activity to Test Software, based at Argonne National Laboratories asked us to act as a Honeywell testing site for the large package of eigenvalue routines (EISPACK) put out from that center. This work was performed here by Linda Nelson under my supervision and the results reported to NATS.

Similarly we acted as a center to test a set of linear algebra modules produced at the Jet Propulsion Laboratory of California Institute of Technology. This work was performed under my supervision by Elizabeth McMahon, a student from Mount Holyoke working with us this summer. Her report on this work was sent to JPL (appropriately cleared) and to various interested people within Bell Labs.

A sizeable amount of time has been spent developing machine-dependent constants crucial to the portability of PORT. The constants have been put in DATA statements in octal or hexadecimal as appropriate, and tested on the IBM (Holmdel), Honeywell (Murray Hill), UNIVAC (Murray Hill), and CDC (Merimac Valley). *computer*

Besides the departmental program counseling requirement, a certain amount of time has been devoted to advising users on numerical matters. In particular the user J. A. Applebaum required a double precision eigenvalue routine, and this need required adapting one of the EISPACK routines, writing some auxiliary routines and testing the result. The programs were completed and a memo sent to him June 12, 1974. The routines apparently are performing satisfactorily.

On the non-technical side, I am a recruiter for Bell at MIT (BS-MS recruiting)

Outside activities

Have reviewed and referreed papers for computer and numerical journals.

Am secretary-treasurer of the ACM special interest group on numerical software (SIGNUM).

Was asked to chair a session at the October SIAM meeting. Refused due to pressure of work. (Jim Blue took it.)

Have been asked to be a candidate for the ACM Lectureship program.

Have just been on jury duty!

Papers

- [1] "The Bell Laboratories Mathematical Program Library," November 21, 1973. Limited distribution - presented in talk (1)
- [2] "PORT Library Referee's Report" March 13, 1974. Filed as the testing memo for the Associated Legendre Polynomial routine (65 pages, including several tables)
- [3] "Program Analysis and Testing: Associated Legendre Polynomials," with Susan S. Hoffberg, May 23, 1974 TM-74-8231-3/74-1211-4 (Presented in talk (4))
- [4] Draft (51 pages) PORT Library Documentation

Talks

- (1) December 1973 to various members of 823: Initial presentation of the PORT library
- (2) January 25, 1974: talk on computers and programming to a class at St. Elizabeth's
- (3) March 6, 1974: talk at MIT (invited by Robert Karel Weatherall, head of placement) on "Women in Industry"
- (4) Talk at the Second Purdue Conference on Mathematical Software, May 29,30,31 (paper[3] above)

P. A. Fox

MTS

1974 Experience Age: 25

New Employee -- joined Bell Laboratories in September 1973.

P. A. Fox

MTS

1975 Experience Age: ??

- A. PORT Library -- Development of specifications, study of other libraries, determining end-user needs. Portable error handling and memory management techniques (with Norm Schryer and Andy Hall) incorporated into the basic structure.
- B. PORT Library documentation. Substantial time spent using UNIX and the phototypesetter to develop the initial documentation (see 4. below).
- C. Performed an intensive case study of procedures to be used in testing and validating programs in PORT.
- D. Acquired for Murray Hill a number of mathematical program libraries.
- E. Performance comparison of a CDC computer, the IBM computer at Holmdel, and the Honeywell at Murray Hill.
- F. Arranged for Murray Hill to be a test site for EISPACK. Supervised LHN in the actual testing.
- G. Arranged to test a set of linear algebra modules produced by JPL. Supervised Elizabeth McMahon, summer student from Mt. Holyoke, in the actual work.
- H. Developed appropriate machine-dependent constants crucial to the portability of PORT.
- I. Mathematical program counseling with general users.
- J. Recruiter for BTL at MIT.
- K. Secretary-treasurer for SIGNUM.

Talks and papers: (chronological order)

- 1. "The Bell Laboratories Mathematical Program Library," November 21, 1973. Limited distribution.
- 2. "PORT Library Referee's Report" March 13, 1974. Filed as the testing memo for the Associated Legendre Polynomial routine (65 pages, including several tables)
- 3. "Program Analysis and Testing: Associated Legendre Polynomials," with Susan S. Hoffberg, May 23, 1974 TM-74-8231-3.
- 4. Draft (51 pages) PORT Library Documentation
- 5. Departmental Colloquium, December 1973: Initial presentation of the PORT library
- 6. January 25, 1974: talk on computers and programming to a class at St. Elizabeth's
- 7. March 6, 1974: talk at MIT (invited by Robert Karel Weatherall, head of placement) on "Women in Industry"
- 8. Talk at the Second Purdue Conference on Mathematical Software, May 29,30,31 (paper[3] above)

P. A. Fox MTS 1976 Experience Age: 27

- A. PORT Library implementation: programs written, debugged, adapted, tested, etc. Both BCD and ASCII object libraries compiled.
- B. PORT Library documentation: users' manual written and phototypeset (totally redone twice - once to put in revised error handling, then again to make the troff files into troff/nroff files looking ahead to on-line documentation). Worked with artists on cover design and dividers.
- C. PORT Library distribution: SEDIT source tapes made and sent to Holmdel, Columbia, and Indian Hill. Release and licensing of the PORT Library in progress.
- D. Investigation of other program libraries: EISPACK testing done for Argonne (some testing done by Linda Nelson, and some (the timing tests) by me). SANDIA and HARWELL libraries obtained and under study; IMSL library continued and in use
- E. Supervised Valerie Barr, summer student from Mount Holyoke, in comparative testing of Fast Fourier Transform programs
- F. Referee and reviewer for the Communications of the Association for Computing Machinery, the ACM Transactions on Mathematical Software ('TOMS'), and for release of Bell Labs papers and a book
- G. Counseling and numerical consultation
- H. Benchmark runs for Don Rice of Honeywell (MMR)
- I. Treas/sect'y of SIGNUM (to June 1975)
- J. Recruiter BS/MS M.I.T.
- K. Affirmative Action: March 24,25,26 attended training session for trainers in the Bell Labs 'Women in the Work Environment' workshop and acted as trainer in a workshop July 16,17,18.

TALKS AND REPORTS: (chronological order)

- A. Two-hour talk on PORT to Linda Wright's Fortran class (Nov. 11)
- B. Write-up on libraries for Red Book Volume I (Fran Henig)
- C. Batch Committee write-up on PORT, BCN No. 205.
- D. Talk on Port to Depts. 1214 and 1215 (Dec. 17)
- E. Talked to visiting high-school students (March 11, April 9)
- F. Talk on PORT to Batch Committee (June 17)
- G. Career-day talk on computer science, New Providence High School (October 29)
- H. Wrote memo on PORT for CCMG (MMR)
- I. The following papers were submitted to TOMS: P. A. Fox, A. D. Hall, and N. L. Schryer, "Machine Constants for Portable FORTRAN Libraries"
Phyllis Fox, "The PORT Mathematical Subroutine Library"

P. A. Fox

MTS

1976 Experience Age: 27

Received Dec 9 '75 from
Roper - somewhat revised version

- A. PORT Library implementation: programs written, debugged, adapted, tested, etc. Both BCD and ASCII object libraries compiled.
- B. PORT Library documentation: users' manual written and phototypeset. Worked with artists on cover design and dividers.
- C. PORT Library distribution: SEDIT (IBM) source tapes made and sent to Holmdel, Columbia, and Indian Hill. Release and licensing of the PORT Library in progress.
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- E. Supervised Valerie Barr, summer student from Mount Holyoke, in comparative testing of Fast Fourier Transform programs.
- F. Referee and reviewer for the Communications of the Association for Computing Machinery, the ACM Transactions on Mathematical Software ('TOMS'), and for release of Bell Labs papers and a book.
- G. Counseling and numerical consultation. INCEP Instructor - 6X101 (with JCB, NPN, RJW).
- H. Benchmark runs for Don Rice of Honeywell (MMR).
- I. Treasurer/Secretary of SIGNUM (to Jun 1975).
- J. Recruiter BS/MS M.I.T.
- K. Affirmative Action: Mar 24, 25, 26 attended training session for trainers in the Bell Labs 'Women in the Work Environment' workshop and acted as trainer in a workshop Jul 16, 17, 18.

Talks and Reports: (chronological order)

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- C. Batch Committee write-up on PORT, BCN No. 205.
- D. Talk on PORT to Depts. 1214 and 1215 (Dec 1974).
- E. Talked to visiting high-school students (Mar, Apr 1975).
- F. Talk on PORT to Batch Committee (Jun 1975)
- G. Career-day talk on computer science, New Providence High School (Oct 1975).
- H. Designed flyer on PORT for broad distribution.
- I. The following papers were submitted to TOMS: P. A. Fox, A. D. Hall, and N. L. Schryer, "Machine Constants for Portable FORTRAN Libraries" and Phyllis Fox, "The PORT Mathematical Subroutine Library."

P. A. Fox

MTS

1977 Experience Age: 28

- A. PORT Library 1: 'outside' version released for licensing April 1976. Installed at MH, HO, IH, COL, WH(Univac), Ohio Bell, Bldg 5(UNIVAC), PDP (6th fl.), SEL, Data General Eclipse, and elsewhere.
- B. PORT flyer designed, typeset, and distributed.
- C. PORT Library 2: new programs (PORT 1 has 150 sub-programs, PORT 2 currently (not finished) 494 sub-programs), written or acquired or adapted, verified, compiled, tested, documented, etc. Due out Dec. 1976.
- D. Acquired and studied other program libraries such as EISPACK, SANDIA, IMSL, HARWELL.
- E. EISPACK Testing Site: I did accuracy and timing tests as specified for these sites.
- F. Referee and reviewer for the Comm. of the ACM, Comp. Rev., and TOMS.
- G. Numerical and other counseling.
- H. Recruiter for MIT (BS/MS level - very time-consuming).
- I. SIAM National Lecturer.
- J. Affirmative action related items: WRA, PR tours, lecturer for WAM (Women and Mathematics), a project of the Mathematical Association of America: half-day visits and talks at local high schools, e.g. Highland Park, North Arlington (Queen of Peace High School). Bell Labs News interview, "Why I want my daughter to be an engineer", recruiting, etc.

TALKS AND REPORTS: (chronological order)

- A. NJIT (Newark College of Engineering): "Portable Fortran Libraries," (April 26).
- B. W. C. Post College, Long Island, Nassau County Association of Mathematical Supervisors: "Education for a career in computers," (May 4).
- C. Bell-Honeywell User's Group, Chicago: "The PORT Library," (June 1).
- D. SIAM Meeting, Chicago: "PORT and Portability," (June 18).
- E. NSF/ERDA sponsored meeting with Argonne on Portability and Mathematical software: Discussed error handling and stack allocation in PORT, (June 20).
- F. AAUW meeting, Westfield, (October 28).
- G. Paper on PORT library sent to TOMS, Nov. 1975. Rejected for such things as "lack of references."
Paper researched and rewritten (70 references read and cited), 22 pages, 3 appendices, co-authors A. D. Hall and N. L. Schryer, resubmitted to TOMS, July 20, 1976.
- H. Paper written and submitted for the proceedings of the NSF/ERDA conference proceedings. Sent in Aug. 27.
- I. Computing Science Technical Report Number 47: "The PORT Mathematical Library," (essentially same paper - and authors - as TOMS paper above), Sept. 1976.

- A. Second edition of the PORT Library issued: 542 sub-programs (PORT 1 had 151), of which 125 are documented, 399 pages of documentation, and 41,000 lines of Fortran source.
- B. Adapted, tested and documented the FFT package (Singleton's routines), the Jenkins-Traub polynomial root-finders, some arithmetic routines, and other additions to the PORT Library.
- C. The PORT source tape was made into a sequential tape.
- D. PORT 2 has been installed on two UNIVACS, IBM, DATA GENERAL ECLIPSE and HARRIS S220 computers at Bell Labs. Now, from a terminal at Murray Hill, I can test PORT programs on the UNIVAC and IBM computers.
- E. Other library activities have included installing the IMSL library, studying the NCAR, Sandia and NAG libraries, acting as a testing site for the NATS libraries: EISPACK and LINPACK, both of which are installed at MH, and the installation and testing of the Brent multiple-precision Fortran library.
- F. Numerical and other counseling.
- G. Referee and reviewer for books and articles.
- H. MHCC Short Course on mathematical techniques.
- I. Recruiting - M.S. recruiter at MIT, and other recruiting activities (very time consuming).

AFFIRMATIVE ACTION

Member of the Executive Board of WRA and on two committees: (1) Communication with Management, (2) Career Development. (Also see "WAM" below.)

TALKS AND REPORTS

- A. Invited speaker at a conference at Simmons College on Careers in Science for Women, Nov. 6.
- B. WAM (Women and Mathematics, a project sponsored by the Mathematical Association of America) speaker at Dwight-Englewood School, Englewood Cliffs, Nov. 16.
- C. SIAM National Lecturer, Trenton State: "How to implement a dynamic storage stack in Fortran," Dec. 8 (approx).
- D. SIAM National Lecturer, University of North Carolina, Chapel Hill, Feb. 8.
- E. WAM speaker (see above) at Aquinas High School in the Bronx, Feb. 17.
- F. WAM speaker at Oak Knoll School, Summit, Mar. 23.
- G. SIAM National Lecturer, Bucknell, April 19.
- H. Computing Science Technical Report #47: The PORT Mathematical Subroutine Library, revised and reissued, May 1977, (with A. D. Hall and N. L. Schryer).
- I. PORT Flyer redone and produced.
- J. Was asked to record SIAM talk - did so and sent tape with revised slides to SIAM, Aug.
- K. PORT installation guide written, Oct.

Fox, Phyllis A.
NAME

3731
DEPT

MTS
CLASS

L. ROSLER
SUPERVISOR

37.8
CURRENT SALARY

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H
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NEW SALARY

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PRESENT JOB ASSIGNMENT: Responsible for numerical - support librarians in FORTRAN on all large mainframes in Bell Labs Computer Centers.

SUMMARY OF DISCUSSION

Include employee's view of present assignment, discussion of performance, employee's view of raise and salary, employee's desires pertaining to future assignments and other relevant items as appropriate.

Phyllis is satisfied with her salary, which she described as "nice" and was not concerned that her raise was less than the rate of inflation, considering this to be a saturation of the curves at the upper ages.

She is "ford" of her present assignment, which she views as a budget for the Computing Math Research people in Center 127 to the Computer Centers. She would appreciate more support staff for documentation, such as a technical editor (though she said she has had "maneuver" help from Jeanette Rembold).

She would like her work to have broader and more global impact.

I raised the question of supervisory responsibility. She would accept such a position only if it allowed her to use her technical background; she feels she has a broad interest and investment in numerical mathematics which would not be in her interests or the lab's to abandon.

I propose that with the advent of the Cray-1, we can well justify expanding our involvement in the numerical aspects of applications programming, and that Phyllis would be an excellent candidate for supervision of such a group.

Copy to: Director
Executive Assistant

Lawrence Rosler
INTERVIEWER'S SIGNATURE

May 28, 1979
DATE

EXPERIENCE DATE _____

SUPERVISOR _____

1079

JOB RESPONSIBILITIES:

1. Develop and maintain the PORT Mathematical Subroutine Library.
2. Acquire and maintain other mathematical software libraries and numerical programs.
3. Produce the documentation associated with these activities.
4. Numerical (and Fortran) counseling.

LAST YEAR'S WORK SUMMARY AND ACCOMPLISHMENTS: (Include Affirmative Action Activities)

1. PORT Library: maintenance, usage monitoring, documentation and installation of 200 linear algebra programs (not finished). wrote, tested and documented program for finding root of a complex function (TM 79-3731-4), with Mike Lesk memo on macros for producing PORT program reference sheets (TM 78-8231-14), article on PORT for SIGNUM, talks at Merrimac Valley and also to CCMG.
2. Software libraries: IMSL, EISPACK, LINPACK, AUGMENT, and Brent's multiple-precision package installed.
3. With summer AA student rewrite of the linear algebra package HEMP for use on the CRAY-1. (Not yet finished)
4. Assemble card file on programs and general references for special function computation.
5. Benchmarks run on CRAY-1 and IBM.
6. Recruiting: MS level and also CRFP/GRPW/SRP at MIT.
7. Wrote invited article on program libraries for the Encyclopedia of Computer Science.

MOST EFFECTIVE ASPECTS OF CONTRIBUTION:

1. PORT maintenance and counseling; general numerical counseling.
2. Awareness of current numerical research and mathematical software developments; acquisition and evaluation of available programs; projecting and implementing best additions to PORT.

LEAST EFFECTIVE ASPECTS OF CONTRIBUTION:

1. Insufficient publicity of locally available numerical software.
2. More zeal should go into searching out Bell Labs needs in numerical computing (a questionnaire is under development).
3. Lagging in documentation of everything (need help).
4. Have good AA reputation but haven't done much lately.

FOX / HOWGREAT
with m. CROWLEY ✓

P. A. Fox

MTS

1980 Experience Age 31

GENERAL

The PORT Library of Mathematical Subroutines is now installed at 18 sites within Bell Labs, and at 49 sites outside (mainly educational institutions). The computers range from the Data General Eclipse to the CRAY-1. PORT on the Honeywell computer has 110 active users and is accessed from 150 to 200 times per day.

The HEMP library of linear algebra routines is being redone to reside on the CRAY-1. The work was started by a summer student, Donna Auguste, and I have written 24 HEMP routines and 13 test routines. (We will use Donna's MATPK routines.) The testing phase is nearing completion and the project must be documented. Donna made a start on this as well.

Various numerical libraries received from outside have been installed and announced, with a "how-to-use" sheet written. These include IMSL (7th edition), EISPACK (ASCII version), and LINPACK.

The Fortran preprocessor AUGMENI has been debugged and installed, and the description deck enabling it to preprocess Fortran programs targeted for Brent's multiple-precision package has been checked out. The two packages will be documented and announced.

Usage of the PORT Library on the Honeywell computer at Murray Hill has been monitored by putting first-time traps into selected routines. A memo summarizing the results of the study is in preparation.

Considerable time has been devoted to PORT maintenance and counseling. (Cf. TM 1533-42 by Chris Lindsey on relaxation behavior in liquids.)

A program using Muller's method to find a root of a complex function was developed, tested and put into the PORT Library. (Cf. TM 79-3731-4 above.)

Together with Linda Kaufman, produced 200 user reference sheets for the next PORT offering - a set of about 200 programs in linear algebra. (Project not yet completed.)

Assembled from local sources and from the open literature a file of reference cards on routines dealing with special functions. Have been able to answer most inquiries in this field.

Benchmark testing of various CRAY-1 computers has been continued. Also a publicity release for the Bell Labs News was worked on with Jim Blinn and Carl Blesch.

Recruited at MIT at the MS level. Trips: November 1978, March 1979, October 1979. Paperwork and follow up on about 10 candidates.

AFFIRMATIVE ACTION

Advisor to minority female summer student, second half of summer.

Recruiter for the special scholarship programs at MIT: CRFP/GRPW/SRP

Member of nominating committee, WRA.

TALKS AND REPORTS

TM 78-8231-14, October 25, 1978, with M. E. Lesk: Producing PORT Program Reference Sheets.

Report on PORT in the SIGNUM Newsletter 14, #1, March 1979, pages 80-82.

TM 79-3731-4, September 12, 1978: A PORT Module for Finding a Zero Using Muller's Method.

Review of the document, STATLIB. (Internal Bell Labs review.)

Wrote an invited article on program libraries for the second edition of the Encyclopedia of Computer Science (Van Nostrand and Reinhold)

Talk at Merrimac Valley on PORT to an INCEP course, December 4, 1978.

Talk on PORT to CCMG, July 19, 1979.

Invited participant at an IFIP Working Conference on performance evaluation of numerical software, December 9-16, 1979.

- A. Benchmarked various computers using PORT-based number-crunching programs. (With Dan Warner, December-July)
- B. PORT documentation - additions and revisions troffed. 400 out-of-stock PORT Users Manual reprinted.
- C. PORT is now installed on 15 sites within Bell Laboratories, spanning 12 organizations and 5 locations. There are 29 installations "outside." PORT has been installed on 11 different computer types.
- D. General numerical activities including the testing of LINPACK programs, Program Committee for the Texas Meeting on Mathematical Software, and local numerical and other counseling.
- E. With summer employee, Jenny Chen, collected, verified and tested the example programs from PORT, consolidating them into a file now distributed with PORT.
- F. Acted as a reviewer and referee both within the Labs and for outside journals, esp. ACM Trans. on Math Software.
- G. With Irma Biren and Virginia Fortney sought and evaluated programs for the Program Index Supplement. (Cf. the questionnaire in the July 1978 issue of the Computing Information Bulletin, page 5.)
- H. M. S. recruiter at MIT, and also Affirmative Action programs recruiter there, CRFP/GRPW/SRP. (Very time-consuming)

AFFIRMATIVE ACTION

Member of the Executive Board of WRA, AA recruiter.

TALKS AND REPORTS

- A. Speaker at a seminar on careers in mathematics and statistics, Univ. of Pittsburgh, December.
- B. Panelist on Educational Software Exchange at the Detroit meeting of SIGCSE/CSA, February.
- C. Talk on Portability given to an ACM Student Group from Fairleigh-Dickinson University, February.
- D. Article on PORT in the SIGNUM Newsletter, Vol. 13, #1, March 1978, pp.14-15.
- E. Invited "outside observer" at the Second DOE Conference on the Operational Aspects of Mathematical Software Libraries, National Magnetic Fusion Energy Computer Center, Lawrence Livermore Laboratory, August. (Trip report published as MF 78-8231-17.)
- F. Paper (co-authors A.D.Hall and N.L.Schryer) on the PORT Mathematical Subroutine Library, in ACM Trans. Math. Software Vol. 4, #2, pp.104-126, June 1978.
- G. With same authors, Algorithm 528 - Framework for a Portable Library, same issue, pp.177-188. Also wrote users manual for running the algorithm testers.
- H. TM-78-8231-3 (with Dan Warner) - Benchmarks with a Number-Crunching Emphasis, June 16, 1978.
- I. The PORT Installation Manual was revised Fall 1978 to reflect the addition of example programs.
- J. Revised the section on Mathematical and Statistical Software for Volume 1 of the (IBM) Redbooks.
- K. Talk, "Design Principles of the PORT Library," Conference on the Programming Environment for the Development of Numerical Software (SIGNUM and JPL), October.

Σ

		Jan	Feb	March	Apr	May	June	July	Aug	Sept
31%	Documentation	289	20	64	21	33	4	81	21	45
5%	ANSYS	48	2	4	14	3	22		3	
21%	Libraries (New) incl trying to read tapes	193	30	37	33	33	6	18	10	26
16%	Counseling	153	19	18	25	35	21	16	40	9
25%	CRAY incl d.p. s.p	233	40	10	10	52	55	4	47	15
3%	Recruiting	25	1		13		6		3	2
		<u>941</u>								

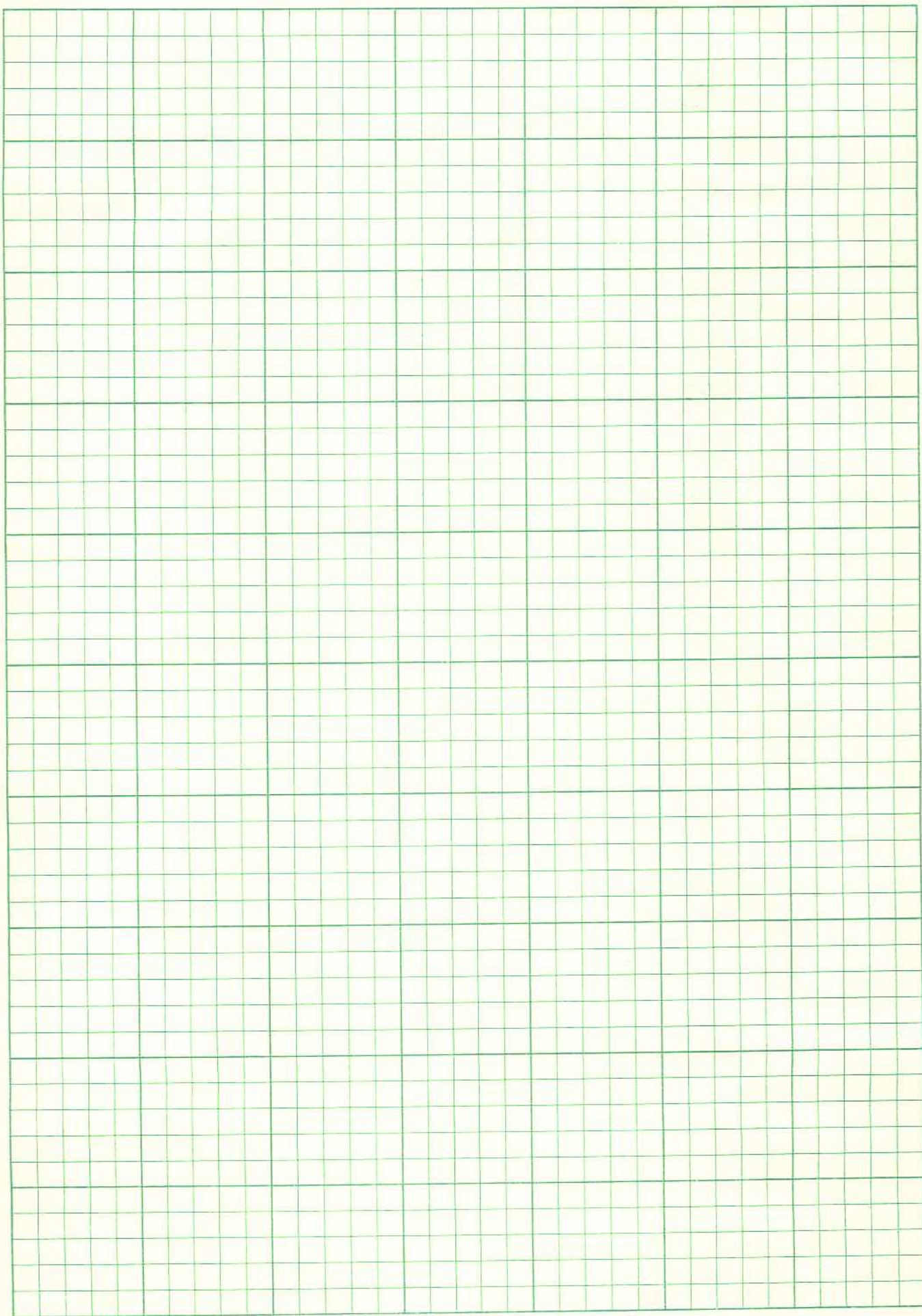
SD

Publications
 TM
 MF

Talks

Libraries
 Counseling
 etc as above

12 SHEETS 5 SQUARE
 12 SHEETS 5 SQUARE
 12 SHEETS 5 SQUARE
 NATIONAL



1. Responsible for PORT and other numerical libraries, especially on the Honeywell and CRAY-1 computers.
2. Responsible for the documentation associated with these activities.
3. Numerical (and Fortran) counseling.

1. Further benchmarks run on the CRAY-1 and other computers. Results published in TM 80-3731-7, and incorporated in the "Cray Roadshow" talks given (with Jim Blinn and Carolyn Harris) at various Bell Labs sites.
2. A study made of PORT Library usage on the Honeywell computer (79-3731-9).
3. Development or acquisition, and various degrees of testing maintenance and counseling for the following numerical packages: IMSL, EISPACK, LINPACK, Harwell Library, TOMS Algorithms, SSCILIB, CUG (Cray Users Group) programs, NCAR Library, POST, PEST, NUMLIB, SLAM, PORT, ELLPACK and HEMP.
4. Acquisition of the commercial finite element package, ANSYS, (following a survey documented in MF 80-3731-5). Usage of the package has already exceeded expectations.
5. Continuing work (with Linda Kaufman) on the linear algebra chapter for PORT 3.
6. In charge of "free CRAY-1" time.
7. Recruit at MIT for the Affirmative Action programs: CRFP/GRPW/SRP.

1. CRAY-1 benchmarking and promotion through TM and talks.
2. General numerical library and counseling work.

1. Lagging in getting PORT 3 out.
2. Behind in installing, documenting and announcing various valuable CRAY-1 packages such as CUG or the Los Alamos vectorized routines.

P.A. Fox

MFS

1981 Experience Age 32

November 1979 - October 1980

TM's etc.

TM 79-3731-9 A study of PORT Mathematical Subroutine Library Usage.

TM 80-3731-7 Some CRAY-1 Benchmark Timings and Costs.

MF 80-3731-1 Numerical Computing and Division 37

MF 80-3731-4 CRAY-1 Acceptance Test (with N-P. Nelson)

MF 80-3731-5 Acquiring the Finite Element Commercial Package ANSYS - Feasibility Study (Survey made of current and potential use; 178 questionnaires sent out)

TALKS

March 26, 1980: Talk at Douglass College on careers for women in mathematics and statistics.

September 4, 1980: Invited talk at the National Bureau of Standards (Maryland) on the PORT program Library.

Fall 1980: With Jim Blinn and Carolyn Harris, series of talks - the "CRAY-1 roadshow" - Dept 3731 (Bldg. 2 and Bldg. 5), WH, HO and MH Auditoriums.

PROJECTS AND PREOCCUPATIONS

Libraries - am responsible for the development (PORT, NUMLIB, HEMP) or acquisition, installation (Honeywell and CRAY-1), and various degrees of testing, maintenance and counseling for the following packages: IMSL, EISPACK, LINPACK, Harwell Library, TOMS Algorithms, SSCILIB, CUG (Cray Users Group) programs, NCAR Library, POST, PEST, NUMLIB, Webb Differentiator, SLAM, PORT, ELLPACK and HEMP.

Various aspects of the ANSYS package (e.g. PIB's) also require some time.

Work on the Linear Algebra Chapter for PORT 3 with Linda Kaufman continues. There are now 158 pages of documentation; about 50 more pages for the sparse matrix routines are in progress.

A program, RNORM, for generating normally distributed (Gaussian) random numbers using Knuth's variant of the Box-Muller method was written by me and tested for the PORT library.

Using the Ratior compiler as a preprocessor (at Howie's suggestion) have set up an automatic USL sequence to permit double-precision programs which call on the PORT Library, to run in single precision on the CRAY-1.

On the committee for the 3731 Vertical Conference.

In charge of "free" CRAY-1 user time.

On the Library Users Committee.

Work with the Computer Information Libraries on acquisitions and documentation.

Have written various EXPLAIN scripts.

Reviewer and referee for ACM Transactions on Mathematical Software, and also for release of papers from the Labs.

AFFIRMATIVE ACTION

Recruiter for the special scholarship programs at MIT: CRFP/GRPW/SRP

(Also see talk at Douglass college above.)

TIME ALLOCATION

In order to see where the working day went, I began in January charging out hours to various projects. Of the larger amounts accounted for, the following percentages apply:

- 37% Libraries and counseling
- 31% Documentation
- 25% CRAY-1 related work
- 5% ANSYS
- 3% Recruiting



Bell Laboratories

P Fox

subject: Work Status

date: August 28, 1980

from: W. C. Johnson

To All Members of Software Systems Group:

I would like to have a group meeting to talk about work status on Wednesday, September 3, 1980 at 9 a.m. in G. L. Baldwin's office, 2F-224. In preparation for that meeting I would like by Tuesday, September 2 a no more than one page informal write-up from each member of the group containing:

- (1) Current work status.
- (2) Work planned for the next one to two months.
- (3) The three most critical problems ^{info} that you see for you and/or the group.

If you spend more than an hour preparing this you have devoted too much time to it.

W. C. Johnson

MH-3731-WCJ-ea

WORK STATUS

Phyllis Fox

September 2, 1980

(1) Current work status

In progress or winding down:

- Launching ANSYS .
- Talk on PORT at the National Bureau of Standards
- CRAY-1 roadshow (and TM on cost-effectiveness)
- Documentation (user reference sheets, etc.) for the nonlinear least squares package, NL2SL, installed by Linda Kaufman.

(2) Next one to two months (or more)

- Vertical conference
- Set up user process to run double-precision programs automatically in single precision on the CRAY-1
- Install the new (Edition 8) version of the IMSL Library
- Obtain, test and install the ELLPACK library (requested by various people in research)
- Produce the new linear algebra chapter of PORT.
Linda Kaufman has written 200 programs covering the solution of general, banded, symmetric, etc. linear systems. The programs have been done for a year or more but I haven't gotten the 190+ pages of documentation finished and distributed.
- Install, document and announce a large package of CAL CRAY-1 programs obtained from Los Alamos.
- Ditto for the Cray Users' Group Tape.

(Continuing preoccupations:

Counseling, - documentation, - library maintenance - MIT (affirmative action) and other recruiting.)

(3) Problems

Understaffing

Lack of information about what is going on in the department and what is planned for the future.

So far as my work goes, the main problem is (as above) lack of help. The projects under (2) above represent only a fraction of the work waiting to be done. Other Cray sites of course have good-sized groups working on numerical consulting, libraries and installation, testing, maintenance and documentation of numerical software.

Many inquire when PORT 3 will be out, but, as things stand, it seems a long time off.

PHYLLIS A. FOX

Workshop and Course Participation
(as of December 12, 1980)

1975

Women in the Work Environment
Workshop - Pilot session and
then another (or two?) as a
"Resource Person."

Spring 1977

Along with other women in 3731
(8231?) attended a special
Personal Effectiveness Workshop.

EMPLOYEE REPORT ON ACTIVITIES AND ACCOMPLISHMENTS

NAME FOX NOV 1981 DEPARTMENT _____

Please indicate in the space below your principal activities and accomplishments during the past 12 months. While you should cover your technical activities, you should also include other activities which bear upon your overall contributions to Bell Labs such as Affirmative Action effort, teaching activities, or special assignments.*

Our (User Support) group is responsible for: numerical analysis, documentation, education, and counseling.

1. Numerical Analysis:
Numerical libraries installed and maintained on the CRAY-1 include: PORT, NUMLIB, EISPACK, ITPACK, LINPACK, MINPACK, HEMP, SLAM. Approximately 250 new linear algebra routines (written in research) have been added to PORT on the Honeywell, CRAY-1, and Holmdel 370's. PORT has been installed on VAX/VMS systems, bringing to 25 the different types of systems on which it is available.
Numerical counseling continues.
2. Documentation:
We have put out three user manuals: Introduction to MHCC Computing, Honeywell Time Sharing Commands, and Programming Tools. My contribution includes a rewrite of the SROFF macros for the EXPLAIN system, indexes for the SROFF and BFOR manuals, a slight rewrite of SROFF, and of several EXPLAIN files.
3. Education:
Two courses on using the Honeywell system have been developed and taught by members of the department.
An auditorium meeting for users interested in numerical computation was held Sept. 8.
4. Counseling and personnel:
Recruited two program counselors, one troff counselor, and one physicist-numerical-cray specialist.
Worked to launch a department MAG to MTS status.
5. Affirmative action:
CRFP/GRPW/SRP recruiter for Bell Labs at MIT.
Our group had a summer employee from Wellesley college.
Am a SIAM representative on the Association of Woman in Mathematics (AMS, MAA, NCTM, SIAM).
6. Other matters:
MHCC ISCC representative.
Was invited attendee or speaker at various numerical software conferences.
Various papers reviewed or refereed.

Please sign

Date

*If more space is needed, please use the reverse side.

EMPLOYEE REPORT ON ACTIVITIES AND ACCOMPLISHMENTSNAME Phyllis FoxDEPARTMENT 45231

Please indicate in the space below your principal activities and accomplishments during the past 12 months. While you should cover your technical activities, you should also include other activities which bear upon your overall contributions to Bell Labs such as Affirmative Action effort, teaching activities, or special assignments.*

1. The PORT Library and Numerical Analysis: PORT is now an official ISCC product for IBM sites, and is available to VAX sites via the 452 Software Stockroom. The library is in general use inside the labs, and is licensed to 85 outside sites. The format and contents targeted for PORT 3 have been set.
Two Fortran packages have been acquired and installed on the Honeywell computer: AUGMENT, a Fortran preprocessor that allows definitions of new data types, and MP, a multiple precision numerical package.
Numerical counseling continues.
2. Documentation: The initial printing (2000 each) of our 1981 manuals ran out and 1000 more COMMANDS, and 500 more TOOLS manuals were reprinted. Similarly the PORT manual supply was exhausted, requiring reprinting 400 more.
3. Colloquia: I have organized a series of MHCC talks, given mainly by MHCC people, about once a month. Seven colloquia have been offered.
4. Reviewer and referee for journals and for BTL document clearance.
5. Affirmative action activities: CRFP/GRPW/SRP recruiter at MIT. SIAM representative, Association of Women in Mathematics.
See also 8. below.
6. Invited talks: Third DOE Workshop on Operational Aspects of Numerical Software; Mathematical Association of America ("Computing in an Industrial Research Setting");
MIT Seminar on Careers and Pathways in the 80's.
7. ISCC: MH representative, arranged and hosted NJ meeting.
8. Personnel: Typesetting counseling and programming job reevaluated to MAG J position. (Carmela l'Hommedieu); reevaluation pending for another clerical position (with newsletter editorship responsibility) to level 7 (Lauren Lee).
Spring and summer employees: Liz Chen, Rutgers Prep (Casual); Terri Laird, Douglass College (University Relations).

Please sign

Phyllis G. Fox

Date

4/14/82

*If more space is needed, please use the reverse side.

~~PRIVATE~~
EMPLOYEE REPORT ON ACTIVITIES AND ACCOMPLISHMENTS

NAME Phyllis Fox

DEPARTMENT 45266

Please indicate in the space below your principal activities and accomplishments during the past 12 months. While you should cover your technical activities, you should also include other activities which bear upon your overall contributions to Bell Labs such as Affirmative Action effort, teaching activities, or special assignments.*

1. PORT 3: There will be eleven chapters in the new edition of PORT. Six chapters have been completed. These chapters contain 633 programs represented by 42,183 lines of Fortran. There are 500 pages of documentation so far. I estimate the work is over half done and should be finished second or third quarter, 1984.

We continue to license PORT 2. There are now 104 copies licensed outside. Patent licensing in Greensboro is interested in licensing PORT 3. Inside the labs PORT is installed on computers from an Apple to the CRAY-1, and is in steady use on UNIX and IBM computers.

2. Other software and counseling: We have installed several software packages, mainly on the CRAY-1, and have provided counseling on them, as well as general program counseling.

To meet the graphical requirements of CRAY-1 users we have purchased (\$500) and installed (Dolores Clark) a package to interface the NCAR graphics package to the DI-3000 package so that the device drivers of the latter can be used. However, there is a steady flow of requests for a movie-making graphical facility on the CRAY-1.

3. Affirmative action activities: CRFP/GRPW/SRP recruiter at MIT. SIAM representative, Association of Women in Mathematics.
4. Talks and articles: Talk on PORT to the Fourth DOE Workshop on Operational Aspects of Numerical Software Libraries, SLAC, Stanford, October 19, 1983.
Article, "Program Libraries, Numerical and Statistical," The Encyclopedia of Computer Science and Engineering, 2nd Edition, Van Nostrand.

Please sign

Phyllis Fox

Date

11/30/83

*If more space is needed, please use the reverse side.

FORM I