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## W.R. Church Computer Center Newsletter / 1974-04-19

Monterey, California, Naval Postgraduate School

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# W. R. CHURCH

## *Computer Center*

### NEWSLETTER

April 19, 1974  
Volume 6, Number 3

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#### APL IS HERE!

The APL/360 language is now available for general use under the School's time-sharing system, CP/CMS. It has been added to the programming facilities already accessible from the remote terminals. APL/360 is based on a symbolic notation first specified by Dr. K. E. Iverson (IBM) in his book, "A Programming Language", (Wiley, 1962). First available to the IBM user in 1968, it is now finding increasing use in scientific, engineering and business applications. It is particularly well suited to work involving vectors, matrices, arrays, etc.

#### Special Type Ball

The extensive APL character set requires the use of a special type ball different from that presently attached to all of our IBM 2741 typewriter terminals. The Center has a limited number of these

APL balls available for checkout at the Dispatch Counter in In-146. We are asking for a deposit of \$5.00 when a user checks one out. Heavy APL users may wish to purchase their own type ball. Please call Mrs. Sue Feuerman (X2573) for ordering information. The balls cost approximately \$18.00.

The typewriter keys have a different meaning in APL. Soon all of the terminals will have white stickers with the appropriate APL symbols attached on the front vertical surface of the keys.

### Information

APL/360 is an interpretive language that can be used in either direct computational or stored-program mode. Introductory information on the language and the specific features of APL/CMS is available in the following 2 handouts; copies are available in In-147.

- 1) Technical Memorandum, "An Introduction to the APL/360 Language", intended to acquaint beginning users with the special operators and other features of the APL language.
- 2) Technical Memorandum, "APL/CMS - An Introduction", covers the special features of the APL system running on the School's CMS time-sharing system. Describes facilities, e.g., file input/output, workspace exchange, etc., extensions of the APL-DOS language. The language and "standard" features of APL are described in:
- 3) IBM GH-20-0906, "APL/360-DOS User's Manual". Copies are available in the reference sets in In-146 and 148.

Additional References which may be of interest include:

- 1) Pakin, S., "APL/360 Reference Manual", (2nd edition) SRA, Palo Alto, CA, 1972.
- 2) Gilman, L., and Rose, A. J., "APL/360 - An Interactive Approach", Wiley, 1970.
- 3) Katzan, H., "APL Programming and Computer Techniques", Van Nostrand Reinhold, N. Y., 1970.

Copies of these books can be consulted in the Reference Library, In-162.

### SOME CAUTIONARY WORDS TO THESIS STUDENTS

Each quarter we are confronted by a few thesis students who get bogged down in their computer work and are really sweating the deadline. We present below some of the commonest pitfalls in thesis computations for your information and guidance.

1. The "No Experience" Trap

If you have never used a computer before or your total experience is that gained in a basic programming class several quarters back, you will have the added burden of learning how to program before completing your research project. Be sure you include this start-up time in your planning.

2. The "Somebody Else's Program" Trap

Quite often your proposed research work may involve using or extending a program previously written by somebody else and, allegedly, all checked-out. Such programs may have been written here at the School or are available from other installations. Before undertaking this type of project it is wise to get answers to the following questions:

- a. If the computer is different from ours is the program written in a compatible programming language, such as Fortran? Are the language versions truly compatible? (IBM Fortran IV can differ significantly from the versions of other manufacturers). Are differences in hardware configuration important?
- b. How long will it take to get a copy of the program and verify its usefulness? Will it be transferred on tape or cards or as a listing requiring repunching? If tape, what are the tape formats and recording characteristics? Do you have enough time if tape incompatibility problems arise as they often do?
- c. What are the computer resource requirements? If the job falls into Class K (lowest priority) here, will you be able to get enough runs to complete your thesis?

3. The "Somebody Else's Data" Trap

In many instances data collected by others will be just what you are looking for. In some cases data is collected at another installation on recording equipment different from that at the School. Given enough time we can find a way to introduce almost any recorded data into the School computers. Questions that require answers are:

- a. Do you have the time to wait for the transmittal of the data and to find a way of using it as input to a program?
- b. What are the characteristics of the data? Can you organize the data in such a way that your program will run during normal production periods or will it require special handling and therefore receive poorer turnaround time?

- c. Is a complete description of the tape format, recording characteristics and data formats available? A lot of time can be wasted if you have to determine such parameters for yourself.

#### 4. Where to Go for Help

After all these warnings, don't despair! If you think you may become caught in any of these pitfalls, please consult with one of the Programming Managers, Mr. R. Hilleary (In-133, X2752), or Mr. E. Ward (In-132, X2796) for advice and to get an assessment of the magnitude of your problem. It will pay you to do this as early as possible in your project.

#### ANOTHER WAY TO SAVE TIME AND PAPER

Here is another suggestion for those who want to save time and paper. At the same time you can usually improve your turn-around time.

Take all of your checked out routines and process them with the FORTCD procedure (instead of FORTCLG). Also remove all "//GO" JCL cards and data. Such a run will provide you with a complete listing of these routines (hopefully for the last time) and a punched object deck of the compiled routines. Subsequently use your FORTCLG job control language with the following modifications.

```
// (Standard green JOB card)
// EXEC FORTCLG (etc. as before)
//FORT.SYSIN DD *
```

(YOUR MAIN PROGRAM AND ANY ROUTINES NOT YET CHECKED OUT)

```
/*
//LINK.SYSIN DD *
```

(YOUR OBJECT DECKS OF CHECKED OUT ROUTINES FROM THE ABOVE FORTCD RUN)

```
/*
//GO.SYSIN DD *
(YOUR DATA AS USUAL) } Optional
```

```
/*
```

#### STAFF MOVES

Several members of the programming staff have moved their offices recently. At the same time, In-102 has been partitioned to create private offices. For those concerned, the new locations and telephone numbers are given below.

Hans Doelman (In-102B, X2042), Rich Donat (In-103, X2696), Gerry Learmonth (In-102C, X2102), Lloyd Nolan (In-151, X2606), Sharon Raney (102A, X2672) and Kathy Strutynski (In-107, X2631).

#### USER'S MANUAL UPDATES

Updated versions of Chapters 1, 2, and 3 were recently distributed to all registered holders of the User's Manual. These are designated updates A, B, and C, respectively. If you did not receive one or more of them, copies are available at the Information Service Office, In-147.

#### PROJECT NUMBER CHANGES

Effective 1 April class project numbers in the series 1400-1499 became invalid. Class project numbers which are in the 1600 series must now be used. Individual research project numbers are valid until the end of the fiscal year, 30 June 1974. Users who will continue individual research projects will be requested to renew their numbers for FY 75 between 15 and 30 June 74.

#### COBOL CATALOGED PROCEDURES

In order to facilitate usage of the ANS (American National Standard) COBOL at NPS the following changes in the OS cataloged procedures have been made.

The following catalog procedures have been scratched: COBC, COBCD, COBCL, COBCLG, COBLG, COBACLG.

The following catalog procedures for use of ANS COBOL now exist and are recommended:

- COBUC (Compile)
- COBUCD (Compile, punch object deck)
- COBUCL (Compile, linkedit)
- COBUCLG (Compile, linkedit and execute)
- COBULG (Linkedit and execute)

The following COBOL F catalog procedures still exist at this time, but the Center recommends that all continuing COBOL F programs be converted to ANS COBOL:

- COBFG, COBFCD, COBFCLG, COBFLG

#### WATFOR AND PL/C TECHNICAL NOTES

Technical Note 0211-26, User's Guide to the WATFOR (WATFIV) Compiler by Lois Brunner, and TN 0211-27, User's Guide to PL/C, by Gerard Learmonth, are now available in In-146. TN 0211-26 replaces Appendix B of the User's Manual and contains significant changes. TN 0211-27 replaces Appendix E of the User's Manual, but old copies of Appendix E are still valid.

### THREE-D PLOTTING TECHNICAL MEMORANDUM

Also available now is The Technical Memorandum noted in the last issue of the Newsletter, PLT3D1: Three Dimensional Isometric or Perspective Off-Line Plotting Sub-Program with Hidden-Line Elimination, by Sharon Raney.

### CHANGES IN SUBROUTINE LIBRARY

Since the previous issue of the Newsletter, changes in the documentation of the following two routines have been made:

J5 - OSPLOT      Plot on Printer, Multiple Curves and Common Abscissa  
J5 - W4PLOT      WATFOR Version of OSPLOT

### YOUR PERSONAL COPY OF THE SOURCE LIBRARY DIRECTORY

The Directory for the IBM System/360 Source Library (Appendix C of the User's Manual) resides as a data set in the OS system. Any user may obtain a personal copy by submitting the following OS job:

```
// (Standard green JOB card - See Section 3.3.2.1 of User's Manual)  
// EXEC LIBDIR  
/* (orange)
```

NOTE: A copy of the Directory to the International Mathematical and Statistical Library (IMSL) will be automatically appended to the above directory.

### UTILIZATION OF IBM 360/67 DURING MARCH 1974

#### I) SOME OS/MVT STATISTICS

Total Number of OS Jobs	29,188
QUICKRUN: Number of Jobs	9,700
% all Jobs	33.2%
% total CPU Time	1.1%

a) Utilization by Programming System: (% of total number of jobs, % of total CPU time in category)

<u>Programming System</u>	<u>All Jobs</u>	<u>QUICKRUN Only</u>
FORTTRAN G	(38.9, 45.8)	(32.4, 78.4)
WATFOR G	(16.7, 0.2)	(50.2, 8.9)
COBOL	(8.8, 2.1)	
ALGOLW	(3.3, 0.2)	
BASIC	(1.8, 0.5)	(4.3, 2.8)
WATBOL	(1.7, 0.2)	
SPSS	(1.6, 1.2)	
WATFORC	(1.5, 0.2)	
SNAP/IEDA	(1.3, 0.2)	
FORTTRAN H	(1.2, 9.6)	
GPSS	(0.7, 0.8)	

b) Turnaround Time (in mins.) by Job Class

Job Class	A	B	C	D	E	F	G	H	I	J	K	M	Q	Non-Q	ALL
% of Total Jobs	12.4	13.6	13.6	5.1	6.8	4.0	4.6	1.0	0.8	1.2	0.7	2.8	33.2	66.8	100
Turnaround Time (Min.)															
Average	24	12	24	30	40	42	77	62	105	154	758	206	5	46	33
Median	4	6	10	9	13	9	14	12	18	30	662	67	5	8	6

c) Turnaround Time (Mins.) by Core Size

Core Size (K bytes)	NUMBER OF JOBS	AVERAGE	MEDIAN
0-100	20,579	17	5
101-150	5,848	41	11
151-250	2,020	100	14
251-350	521	192	46
351-450	165	212	38
451-550	2	1458	
551-	43	740	709

II) TIME-SHARING STATISTICS ON CP/CMS

Number of Different Users = 193

Number of Sessions = 1445

Average Session Length = 39 minutes

Average CPU Time Used Per Session = 53 seconds

RECENT ADDITIONS TO COMPUTER CENTER LIBRARY

Books

Author	Title
Wickelgren	How to Solve Problems
Wooldridge & London	Computer Survival Handbook
Chan, Chan, & Chan	Analysis of Linear Networks and Systems
Clifton, Helgeson, Eds.	Computers in Information Data Centers
Bauer	Introduction to ALGOL W Programming
Department of Health, Education & Welfare	Records, Computers and the Rights of Citizens
Henrici	Discrete Variable Methods in Differential Equations
Martin	Design of Man-Computer Dialogues
NTIS	Directory of Computerized Data Files and Related Software



RECENT ADDITIONS TO COMPUTER CENTER LIBRARY (Continued)

National Technical Information Service (NTIS)

		<u>Author/Organization</u>
AD 224810	Large Sparse Matrix Problems Based on the Arc-Graph Structure	Rheinboldt
743937	Computer Technology for Simulation	McDowell, etc.
764737	TSAP - Time Series Analysis Package for Terminal Use	Singers
770129	Improved Solutions to Large-Scale Computer Simulation Problems	Mandelbaum & Jorgensen
769864	Patterns in Program References	Freiberger & Grenander
223572	Review of Structured Programming	Knuth
770966	Topics in Model Building - Part II - Non-linear Least Squares	Box and Kanemasu
770967	Topics in Model Building - Part III - Posterior Probabilities	Kanemasu
225215	Computer Synthesis of Surface Geometry	Lieberman
770768	Secure Computer Systems: Mathematical Foundations	Bell, et al.
769112	Convergence of a Parallel Analogue of the Bisection Method	Lam & Poole, Jr.
769624	Large Scale Transportation and Transshipment Computer Codes	Charnes, et al.
769625	Computational Studies for Solving Transportation Problems	Glover, et al.
224857	Caper: Computer Aided Perspective	May
769231	Use of Access Frequencies in Data Base Organization	Kennedy
225294	Simufort Language	Fulscher, Nielsen
769889	Multiple-Computer and Multiple-Console Data Processing Systems	Irani, et al.
760024	Natural Communication With Computers IV	Bolt Beranek & Newman, Inc.

Reports

<u>Number</u>	<u>Title</u>	<u>Author/Organization</u>
1070	Computing with Multiple Microprocessors	Levy
1071	Interactive Graphics System for Simulating Dynamic Systems	Rand Corp.
1072	Computer Center Planning	Masson
1073	PDP11 Assembler and PDP11 Simulator to Run on IBM 360	Cox
1074	AEJCL - A JCL Syntax Checking Facility	Hayes
1060	An Evaluation of Four Pseudo-Random Number Generators	Gilbert
1075	PROJ - Hidden Line 3D Graphs	Lintner

RECENT ADDITIONS TO COMPUTER CENTER LIBRARY (Continued)

Reports (Continued)

<u>Number</u>		<u>Author/Organization</u>
1076	ACL-NOVA - Interpreter for the Nova Computer	Sanger
1077	Survey of Compiler Optimization Techniques	Schneck
1078	Guide to Documentation	U.B.C., Canada
1079	Scientific Computer Programs	U. S. Air Force
1080	Gaussian Elimination with Pivoting is Optimal	Kamath

Proceedings

<u>Author</u>	<u>Title</u>
ACM	Annual Conference - 1973
SCI	Simulation Councils Proceedings, Vol. 1, Number 1
NATO	Design of Electronic Data Processing Systems
Cambridge Univ.	Curved Surfaces in Engineering
SMIS	Wharton Conference on Research on Computers in Organizations

The Newsletter is written by members of the staff, W. R. Church Computer Center (Code 0211), Naval Postgraduate School, Monterey, California 93940. Requests for further information or suggestions on articles for the Newsletter may be addressed to the User Services Manager, Code 0211, (In-133). Telephone: X2752 (or 2573 and leave message).

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