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Computerized budget reporting system, August 1975

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FRITZ ENGINEERING LABORATORY

COMPUTERIZED BUDGET REPORTING SYSTEM

by

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ABSTRACT

KEY WORDS: DOCUMENTATION, SYSTEM, COMPUTERIZED, BUDGET

This report contains the systems documentation of the computerized Fritz Laboratory Budget Reporting System. The basic procedures for operating the system are presented. The various programs comprising the system are examined, along with the availability of modifying the present system to adapt more information for future reports.

TABLE OF CONTENTS

TABLE OF ILLUSTRATIONS

ILLUSTRATION

FRITZ ENGINEERING LABORATORY
COMPUTERIZED BUDGET REPORTING SYSTEM

1. INTRODUCTION

This report is to provide written documentation for a series of computer programs used in Fritz Engineering Laboratory. These programs provide a listing of the various research projects and proposals of the lab giving pertinent information used in making budget decisions by the directors of the laboratory.

All processing was accomplished using the facilities of the Lehigh University Computer Center, utilizing the Control Data 6400. All programs are written in ANSI COBOL.

This work was undertaken with the notion of continued use and addition to the system. Every effort was made to make modifications to the system by future users as simple as possible.

2. OBJECTIVES OF THE SYSTEM

1. A budget reporting system for the directors of Fritz Engineering Laboratory.

2. A data base which contains an updated listing of current projects and proposals; their budget, sponsor, personnel, and expected contract period.

3. A report of "Fritz Laboratory Accounts" (List No. 2) to be generated from the data base.

4. The availability of expanding the data base and the reports generated from it.

3. OUTPUTS

1. Fritz Lab List of Active Current Research Projects Funded and Proposals Submitted or in the Final Stages of Submission (Report 1C). This report lists all of the current projects, and proposals near approval, along with their budget, personnel, sponsor and contract period.

2. Fritz Lab List of Research Proposals (REPORT-1B). This report lists all research proposals prepared in Fritz Lab. Included on the report are the number of years the project is expected to run, sponsor, personnel, and the number of research assistants the project will support.

3. Fritz Laboratory Accounts (List No. 2). This report lists the account number of each project, the authorized signature required, and the sponsor of the project.

4. Error Listing of Input Data. Through the data validation program a listing of improperly processed cards is generated. This listing will allow the keypuncher the opportunity to correct errors before they are processed to the master file.

5. Other reports. The master file has been designed to accommodate more data than is presently stored. This will allow for the processing of different future reports from this system.

A detailed outline of the reports can be found in the ILLUSTRATION section of the report (See ILLUSTRATIONS 4.1 & 4.2).

4. PROCESSING

The budget reporting system is centered upon one program (REPORT-1C) to maintain a magnetic tape data base and generate REPORT-1C. From the data base, REPORT-1B and List No. 2 can now be generated by separate programs. In support of this system is a data validation program which edits punched cards before they are merged into the data base.

4.1 Program REPORT-1C

The main objective of program "REPORT-1C" is to perform file maintenance on the old budget master file as depicted on the proportional record layout form (See illustration 3).

File maintenance provides for the folllowing operations:

(a) The addition of records

(b) The deletion of records

(c) The changing of records

The change cards are depicted in the multiple-card layout form and input section (See illustration 5).

The following information is necessary:

(a) The valid card codes are 1 and 2, these must be in card column 80.

(b) Change codes

1 = addition (There must be two cards in order to provide complete information for the new record-card

code 1 followed by card code 2).

2 = deletion (there is only one card and the only field necessary is the project number, complete with division).

3 = change (same procedure as addition, every field on on the record must be included, not only the changed field).

Output will be a merged new master tape and REPORT-1C. The master tape is in ascending sequence by project number (See input section).

This program and every other program supporting the system is written in ANSI COBOL, adapted to the Control Data Corporation 6400 Compiler.

For a more detailed description of the input required for this program see the input section of this report. A detailed flowchart of program "REPORT-1C" may be found in the flowchart section of this report (See illustration 2.1).

4.2 Program REPORT-1B

The main objective of program REPORT-1B is to generate a listing of all research proposals affiliated with Fritz Lab. The program uses the master file maintained by REPORT-1C as input. This program does no processing to the master file.

A description of the expected output of REPORT-1B may be found in the PRINTCHART Section of this report. A flowchart of the program is found in the Flowchart Section (See illustration 2.4).

4.3 Program LIST-TWO

The objective of this program is to access the master file and use it as input to generate List No. 2 of the Fritz Lab Research Manual (237.6A). This program does no processing to the data base. A flowchart showing the details of the program is found in the flowchart section of this report. (See Illustration 2.5). A description of the output is found in the PRINTCHART section (see Illustration 4.2).

4.4 Program DATA VALIDATION

The objective of this program is to perform extensive data validation on a newly created input card file. A description of the input can be found on the multiple-card layout form (Illustration 5). Output is in the form of a printed error listing. For a complete description of output see the PRINTCHART section of this report (see Illustration 4.2). A flowchart of the program is preserved in Illustration 2.6.

The program searches for the following errors in the input file:

a) Improper card codes

b) Improper project number

c) Non-numeric budget field

d) Sequence errors of input file (by project number)

5. INPUT

The basic input to the master file is punched cards, as depicted in the multiple-card layout form. (See Illustration 5) The punch card data form (See Illustration 6) is a guide to be used by the keypuncher when creating a new input to the master file. The accurate keypunching of data is the most crucial step in the maintenance of the master file.

The following is a step by step analysis of the punch card data form. It should be emphasized again that two punched cards are needed when adding or changing information on the master file, but only one card is required when deleting from the file.

5.1 CARD ONE

The following information pertains to the first punched card associated with the particular project or proposal.

To simplify the following section it will follow the outline of Illustration 6, PUNCH CARD DATA FORM. Each step in the following section corresponds to the same number on the PUNCH CARD DATA FORM.

STEP 1

The first step (No. 1 on the punch card data form) is describing the operation you want the program to perform on this specific project or proposal. If the project or proposal is to be added to the report (and also master file) the first punched column (card column one) will contain a numeric 1 (one). If the project or proposal is to be deleted from the report (and master file) card column one contains a numeric

2 (two), if the project or proposal lists information that needs to be changed on the report (master file) card column one contains a numeric 3 (three). NOTE: Even though only one of the items of a particular project or proposal may need to be corrected, all information pertaining to the project or proposal must be repunched onto two new cards following the same procedure as if it were an addition to the report (and master file). Also, if there is an error in the project or proposal number the error must first be treated as a deletion to the report (and master file), and then treated as an addition to the report (and master file).

STEP 2

The next item to be punched on the card is the appropriate division where the project is listed. This is entered in card column two. The appropriated numeral to enter is:

1 for Building System Division

2 for Fatigue & Fracture Division

3 for Geotechnical Engineering Division

4 for Hydraulic & Sanitary Division

5 for Structural Concrete Division

6 for Structural Connections Division

7 for Structural Stability Division

8 for Non-Fritz Lab Projects

9 for Projects of Proposals not assigned to a Division

STEP 3

The third card column (No. 3 on form) contains either of two characters.

If the project is in proposal form, the third card column contains the letter "R". If an approved project the column is left blank.

STEP 4

The fourth through the ninth card columns contain the Fritz Lab project number. Hyphens are permitted; it is not necessary to fill every card column in this field, but the information must be entered left to right, leaving blank spaces to the right. More information on project numbers can be found in the examples which conclude this section of the report.

NOTE: If the project or proposal is being deleted from the report (and master file) this is all the information needed by the program. If the project or proposal is being added to or changed, the report (and master file) continue filling in the following information.

STEP 5

This field lists the title. This information is punched in card columns ten (10) through forty-nine (49). If the title is too long to fit into this field one must abbreviate. It is not necessary to use every card column in this field, blank spaces (columns) are acceptable.

STEP 6

The yearly amount budgeted is contained in card columns fifty (50) through fifty-six (56). This is the most crucial information being entered by the program. The budget field can never contain any blank spaces. If the amount is not known, fill the entire field with zeros. Only numeric data (numbers 0 1 2 3 4 5 6 7 8 9) are acceptable; commas

and decimal points are illegal. The field must be right justified (entered from left to right with unused card columns containing zeros to the right).

Example: The budget amount of $1,400 would be entered as 0001400

The budget amount of $1,400,000 would be entered as 1400000.

Summarizing the budget field - right justified with leading columns filled with zeros, no blank spaces, no commas, no decimal points, only numeric data (numbers 0 1 2 3 4 5 6 7 8 9).

STEP 7

The project or proposal sponsor is contained in card columns fifty-seven (57) through sixty-five (65). This field may contain any information necessary. It may contain blank spaces, all alphanumeric data is acceptable.

STEP 8

The project director and associated personnel information is contained in card columns sixty-six (66) through seventy-four (74). This field may contain any alphanumeric information appropriate.

STEP 9

The number of research assistants a project will support is only found on this report when the project is in proposal form. When the information being entered is describing a project and the field does not specify the number of R. A. slots this field may be left blank. This

information is contained in card columns seventy-five (75) and seventy-six (76).

STEP 10

The number of years a project will run is also reported only on a proposal. It follows the same format and instructions as the number of research workers field. The number of years field is in card columns seventy-seven (77) and seventy-eight (78).

STEP 11

Card column seventy-nine (79) is a blank space reserved for future use.

STEP 12

The last card column (column 80) on the first card must contain the number 1 (one). This completes the first of the two cards necessary. The following information will describe the second card.

5.2 CARD TWO

The following information pertains to the second punched card associated with the particular project or proposal.

Again, to simplify the section it will follow Illustration 6, punch card data form. The second card corresponds to page two (2) of the form.

STEP 1

The first field on the second card starts in column one (1) and ends in column nine (9). It contains the exact same information as the first nine card columns of the first card. They must be exact column for column.

STEP 2

The second field contains the contract period. This information is not available on proposals and may be left blank. It may contain numeric data or any other information desired (it may contain the word indefinite). When dates are entered, the space provides for entering month and year for starting and entering as 09/75 - 08/76.

STEP 3

The project account number is in card columns twenty-one (21) through twenty-six (26). When this information is not available it may be left blank.

STEP 4

The authorized signature associated with the account number is in card columns twenty-seven (27) through thirty-three (33). This field may also be left blank. This field lists the person responsible for expenditure allocations for the project.

STEP 5

Card columns thirty-four (34) through seventy-nine (79) are blank spaces reserved for future use.

STEP 6

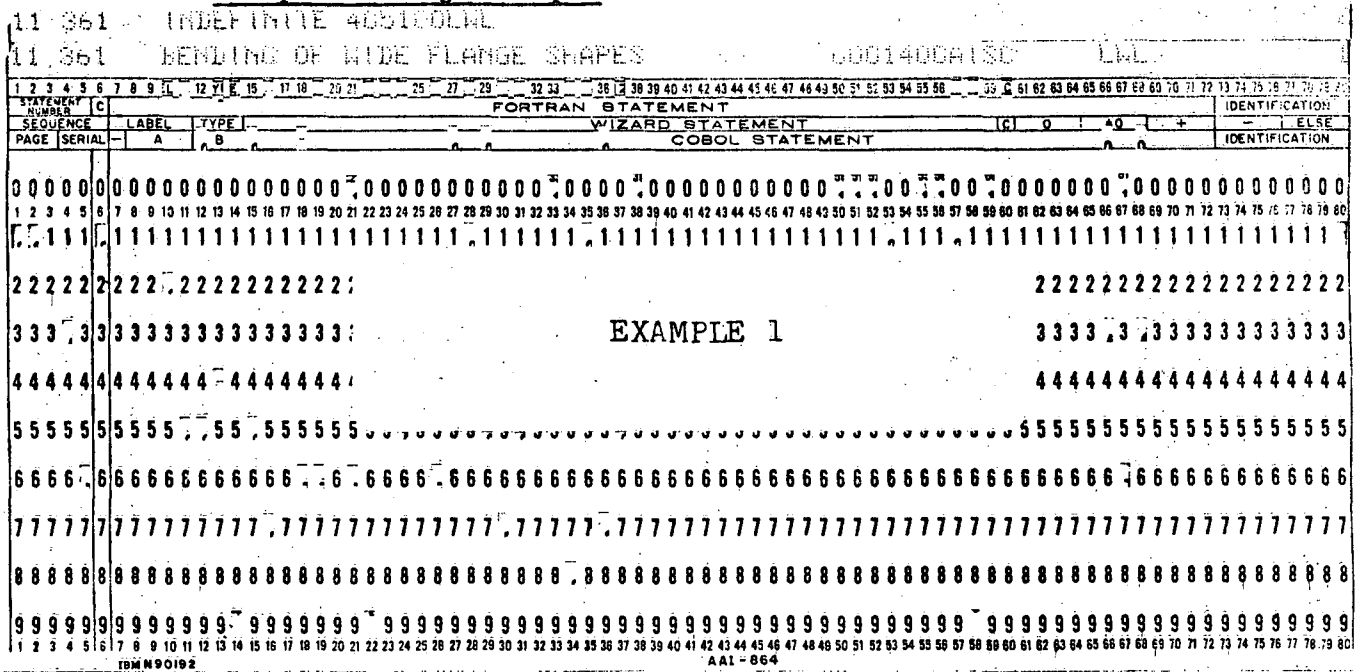
The last card column on the second card, card column eighty (80), must contain the number 2 (two).

This completes the information needed on any one particular project or proposal. Every other project or proposal will be subject to the same processing.

When entering input it must be in ascending sequence by the entire project number, this <u>includes</u> the division number. The division number is recognized as a part of the project number by the program, and will be included in sequence checks. If out of sequence, cards <u>will not</u> be processed thus giving erroneous results to both the report and master file.

The processing of a new project number requires two steps. The proposal number associated with the new project must first be deleted from the report (and master file). Simply follow the deletion routine by inserting a numeric 2 (two) in card column one (1). The second step is adding the new project information to the report (and master file). This routine involves putting a numeric 1 (one) in card column one, and the other necessary information onto the card. Both of these steps can be included in the same input file, they must be inserted into the proper ascending sequence within the input file.

5.3 Example of Project Input



The above two cards are examples of a new project being added to the report (and master file). Card column one of the first card contains a numeric 1 (one) indicating the project is to be added to the list and master file. Card column two contains a numeric 1 (one) indicating the project is part of the Building System Division. Card column three is a blank space indicating a project as opposed to a proposal. Card columns four through nine contain the project number, although only columns four, five and six are used. The other columns are available only for the project number. They are not needed in this particular project so they are left blank.

The title of the project starts in card column ten (10). It may run to and include column forty-nine (49), if the total space allocated is not used it may be left blank. The budget starts in column fifty (50). It must be right justified with leading columns filled with zeros. In this particular case the budgeted amount is $1,400. Commas and decimal points are not permitted; the budget entered starting in column fifty (50) is 0001400. (If the budget was not known the entire field would be, and must be, zeros.)

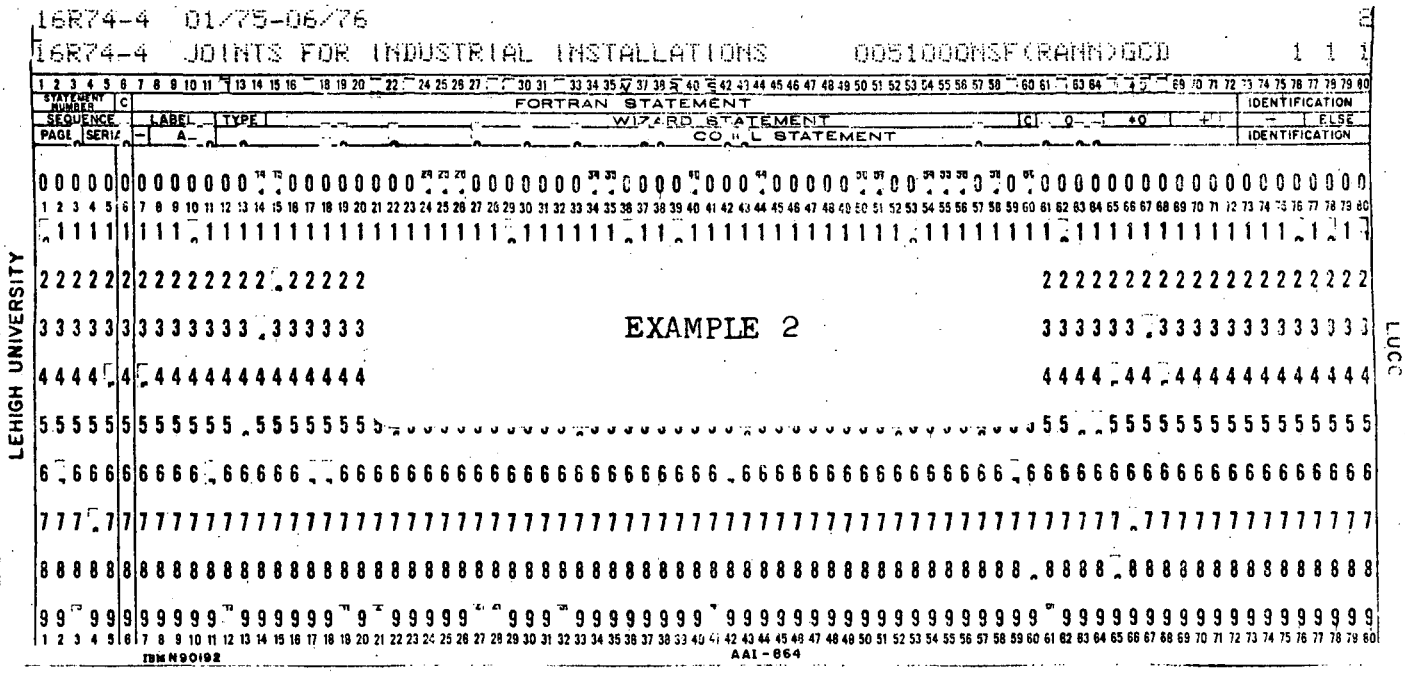
The project sponsor starts in card column fifty-seven (57), but only four spaces are required, so the rest of the field is left blank. The project personnel starts in card column sixty-six (66) and runs through card column seventy-four (74). In this case only three columns are needed so the other columns are left blank. The research assistant slots are not listed on this project so card columns seventy-five (75) and seventy-six (76) are left blank. The number of years the

project is expected to run is not known in this example so columns seventy-seven (77) and seventy-eight (78) are left blank. Column seventy-nine is always a blank space. Card column eighty (80) on the first card describing the project always contains a numeric 1 (one). This completes the first card.

The second card in the example will now be examined. The first nine (9) card columns are exactly the same as the first card. This will always be true when adding or changing a project to the report (and master file).

The contract period, beginning and ending dates, are recorded in card columns ten (10) through twenty (20). In this example the project period is continuous so the period date is entered as INDEFINITE. The project account number is entered in card columns twenty-one (21) through twenty-six (26). If the information is not known the field should be left blank. The authorized signature of the project is entered in card columns twenty-seven (27) through thirty-three (33). This field may contain blank spaces. Card columns thirty-four (34) through seventy-nine (79) are blank. Card column eighty (80) of the second card must contain a numeric 2 (two).

5.4 Example of Proposal Input



This is an example of a research proposal being added to the BUDGET REPORTS 1B and 1C. The first card column has a numeric 1 (one) indicating the proposal is being added to the report (and master file). Card column two contains a numeric 6 (six) indicating the proposal is part of the Structural Connections Division. Column three (3) contains the letter "R" indicating this is a proposal. Columns four (4) through nine (9) contain the proposal number.

Columns ten (10) through forty-nine (49) contain the proposal title. Columns fifty (50) through fifty-six (56) contain the budget, in this case $51,000. This is entered as 0051000, again, the field must be right justified with leading zeros. Card columns fifty-seven (57) through sixty-five (65) contain the proposal's sponsor.

The project director is listed in the field starting in card column sixty-six (66) through seventy-four (74). The research assistants slots are in card columns seventy-five (75) and seventy-six (76). The years the project will run is keypunched in card columns seventy-seven (77) and seventy-eight (78). Card column seventy-nine (79) is always blank. Card column eighty (80) of the first card contains the numeric 1 (one).

Examining the second card will show that the first nine card columns contain the same information as the first card. The contract period is listed in card columns ten (10) through twenty (20). Because the account number and authorized signature are not known these fields are left blank. Card columns thirty-four (34) through seventy-nine (79) are always blank. Card column eighty always contains a numeric 2 (two) on the second card describing a project or proposal.

6. CONTROL (DATA VALIDATION)

The main control feature of the computerized budget reporting system is a data validation program. This program checks key fields of the input file for various errors. A listing of errors is provided so that the proper corrections may be made. After the entire card input file has been processed without any error listing it is ready for processing by the main program, "REPORT-1C".

The data validation program checks for sequence errors in the project number, it checks for non-numeric budget fields, it ensures that card column eighty (80) is either a numeric 1 (one) or 2 (two), and it checks to ensure that card column one is either a numeric 1 (one), 2 (two), or 3 (three), the allowed operation codes.

In no event should the main program, REPORT-1C, be run before processing input cards through the DATA-VALIDATION PROGRAM. Only after all errors have been eliminated from the error listing should the card file be processed by the main program.

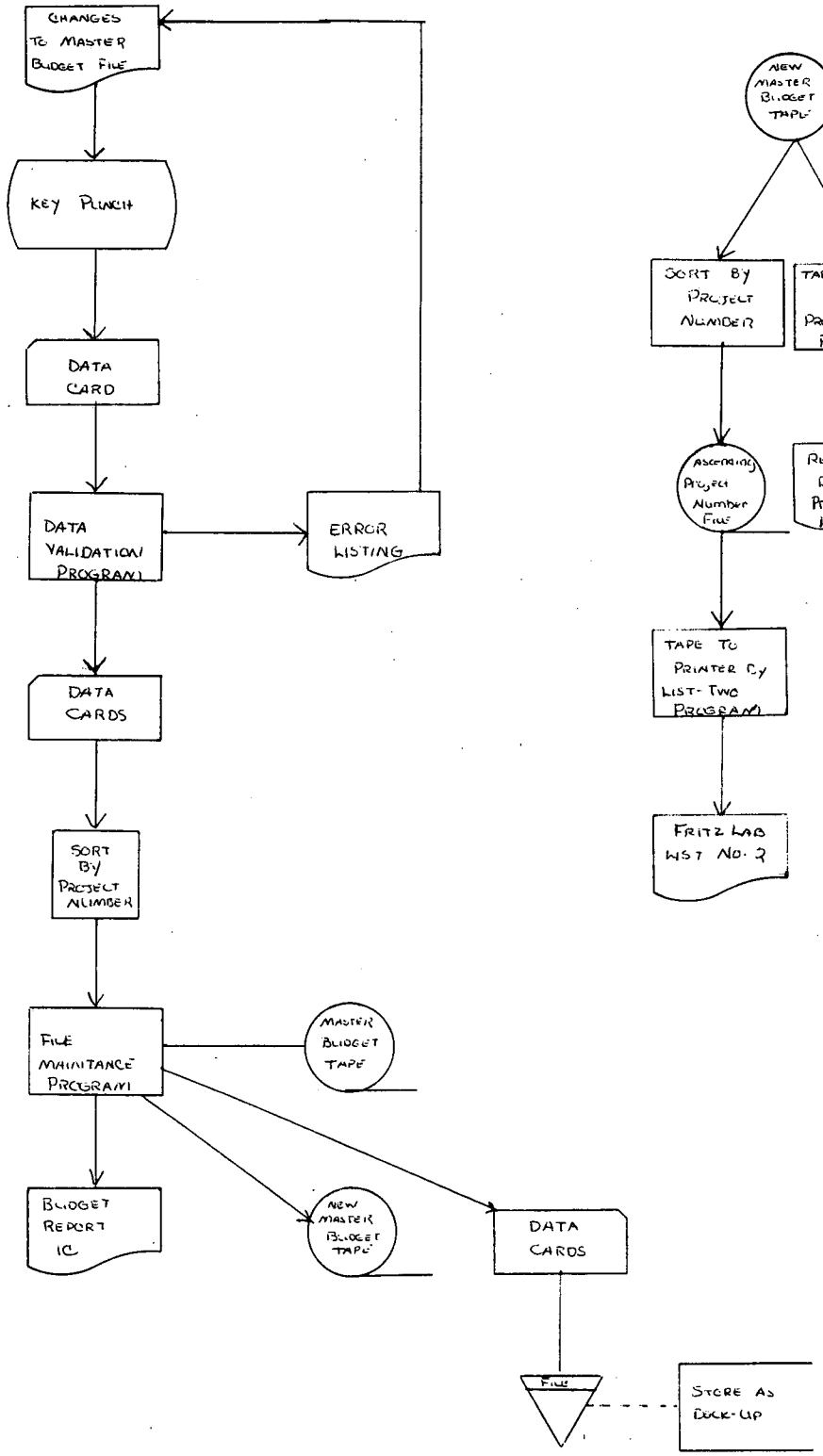
7. ACKNOWLEDGEMENTS

The system reported herein, entitled "Computerized Budget Reporting System" is being used at Fritz Laboratory, Lehigh University, and is financed by them.

Dr. L. S. Beedle, Director of the Laboratory, was instrumental in the initiation of the project.

This work was initiated in June 1975 under the direction of George C. Driscoll, Associate Director of the Laboratory, whose help in solving some of the system difficulties that arose made this project a success. His help in the problem analysis and his academic guidance is gratefully appreciated.

ILLUSTRATIONS



SYSTEM FLOWCHART	Chart Title: TOTAL BUDGET REPORTING SYSTEM	Date: AUG. '75	Chart No.: 1 of 1
System Title: BUDGET REPORTS	Program Title: SYSTEM FLOWCHART	Revision: Letter	Date

RON EVANS

ILLUSTRATION 1

UD1-579

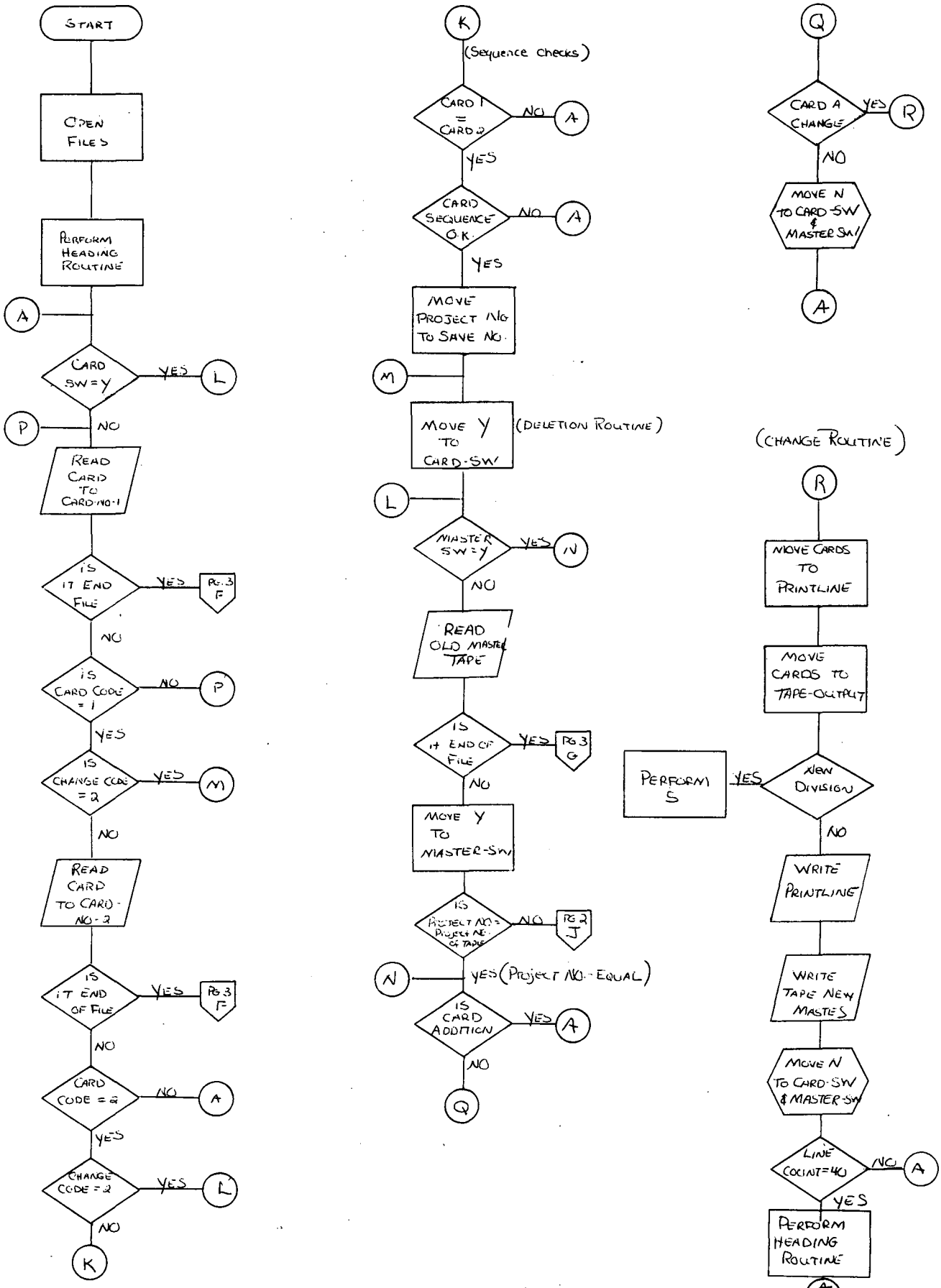


	Chart Title	Date	Chart No.
	FILE MAINTANCE PROGRAM	AUG. '75	1 of 3
System Title	Program Title REPORT - IC	Revision	
BUDGET REPORTS	FILE MAINTANCE & BUDGET REPORT IC	Letter	Date

RON EVANS

UDI-579

ILLUSTRATION 2-1

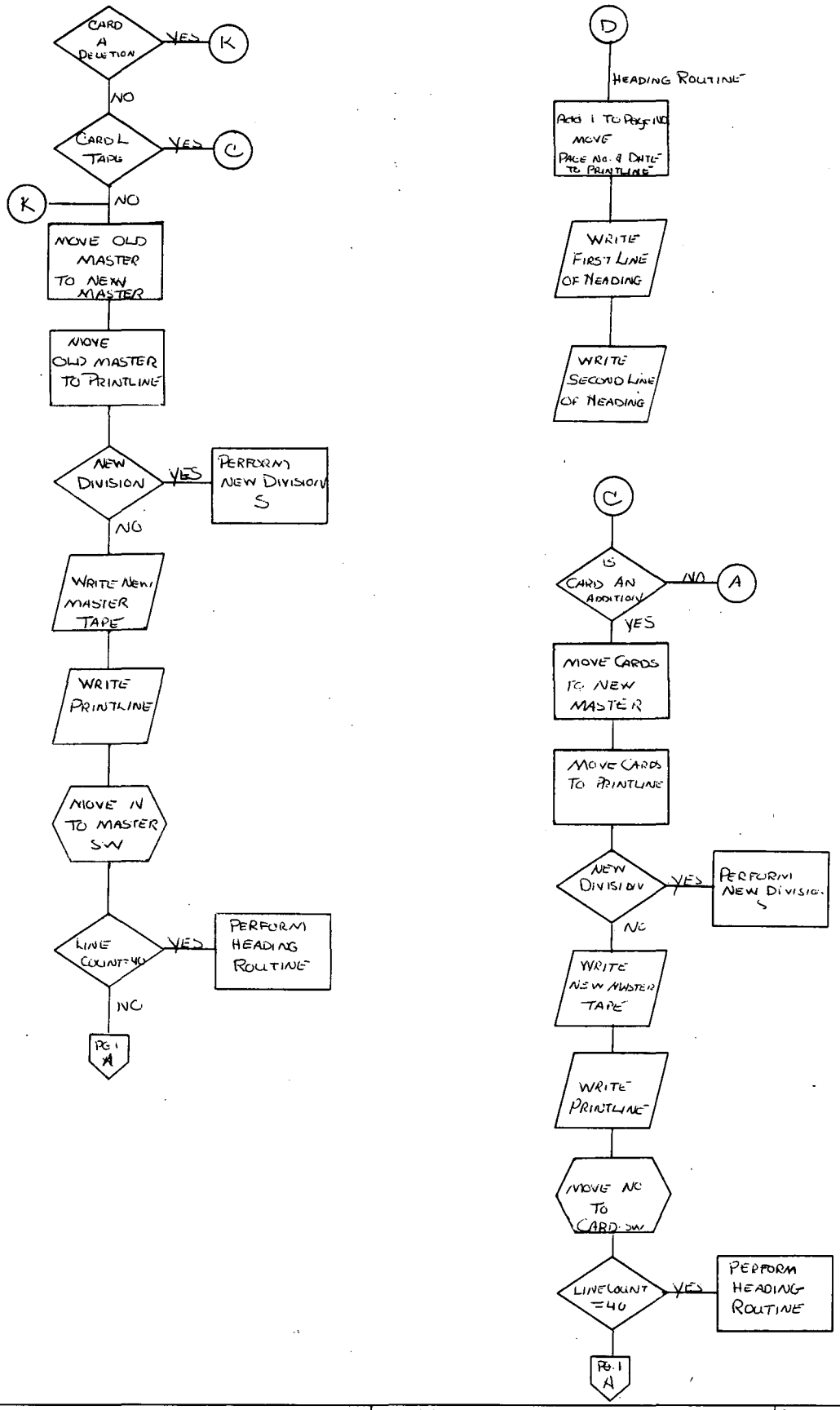


	Chart Title	Date	Chart No.
	FILE MAINTANCE PROGRAM	AUG '75	2 of 3
System Title	Program Title	Revision	
BUDGET REPORTS	REPORT - IC	Letter	Date
RON EVANS	FILE MAINTANCE & BUDGET REPORT IC		

UD1-579

ILLUSTRATION 2-2

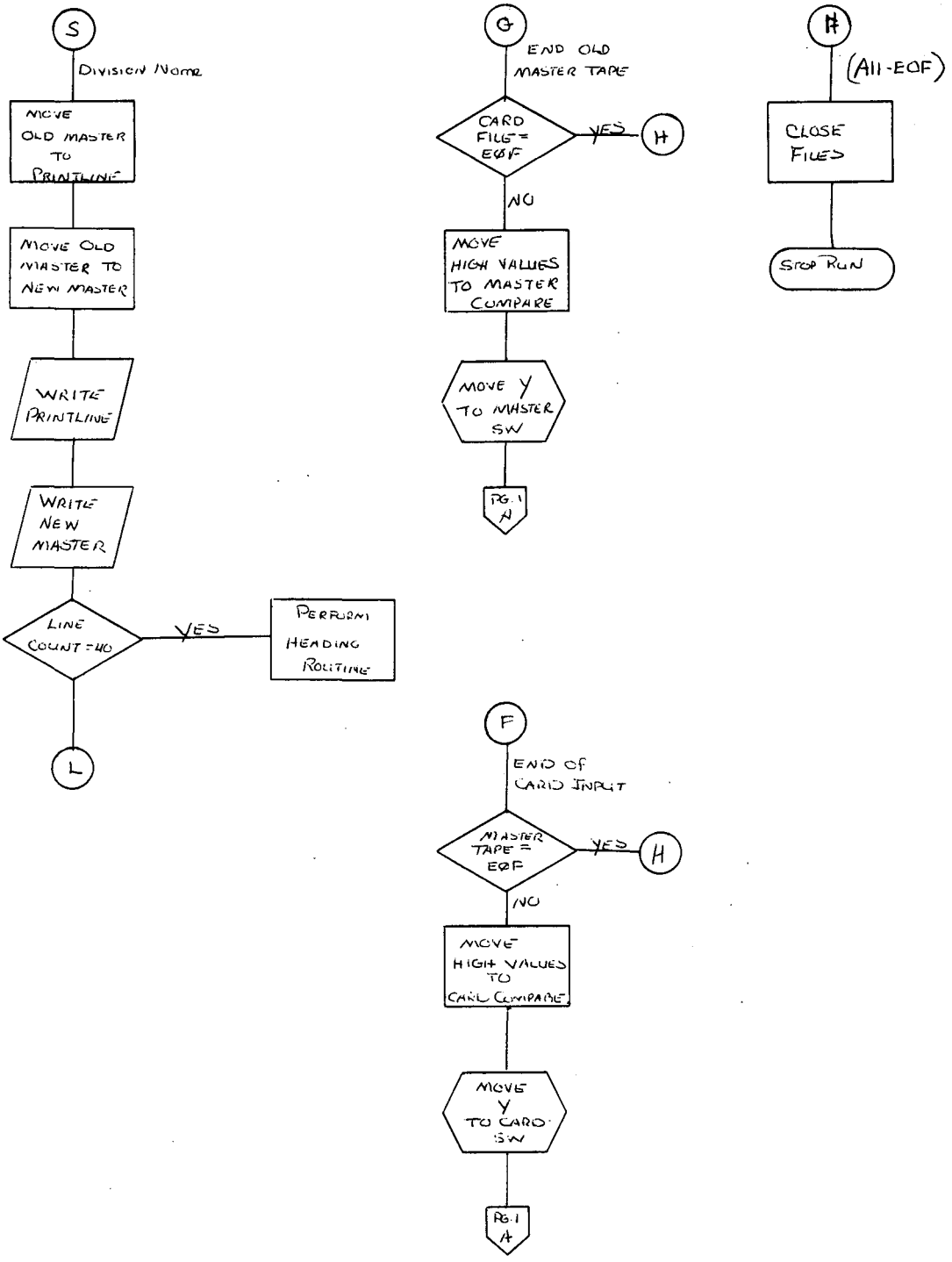


	Chart Title	Date	Chart No.
	FILE MAINTANCE PROGRAM	AUG. '75	3 of 3
System Title	Program Title	Revision	
BUDGET REPORTS	REPORT 1-C FILE MAINTANCE & BUDGET REPORT 1-A	Letter	Date

RON EVANS

UDI-579

ILLUSTRATION 2-3

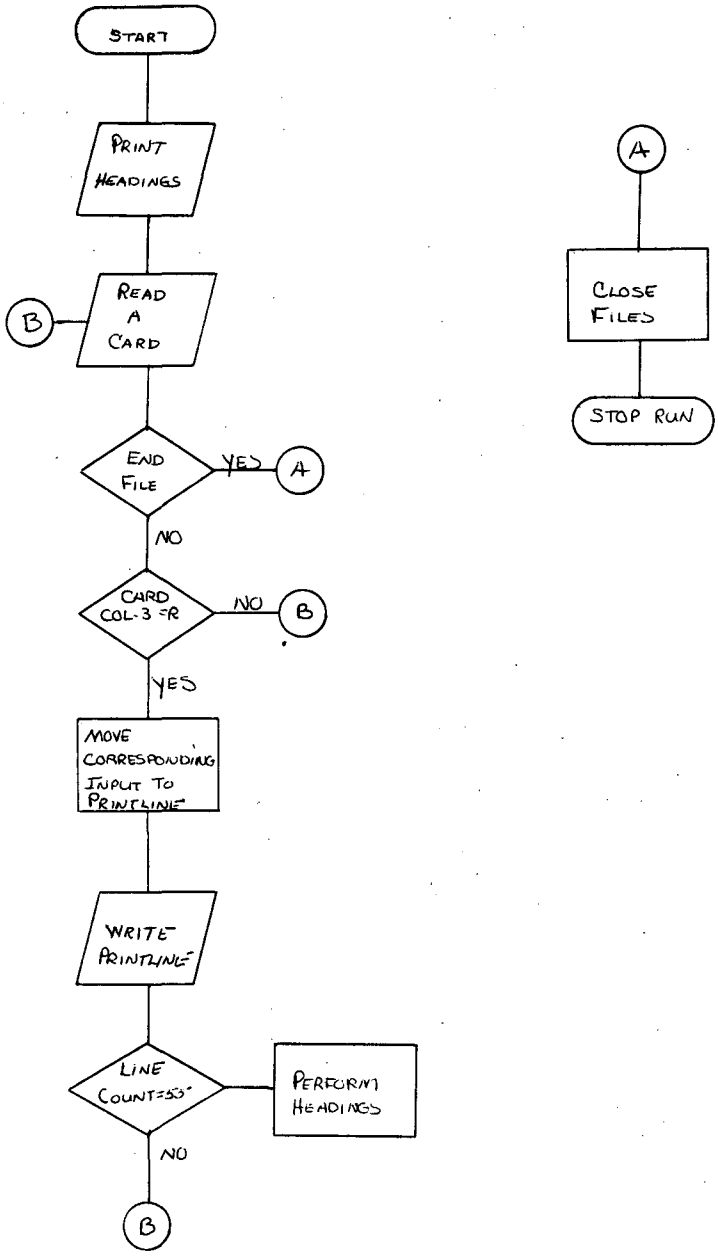


	Chart Title	Date	Chart No.
	REPORT-1B PROGRAM	AUG '75	1 of 1
System Title	Program Title	Revision	
BUDGET REPORTS RON EVANS	REPORT 1B	Letter	Date

UD1-579

ILLUSTRATION 2.4

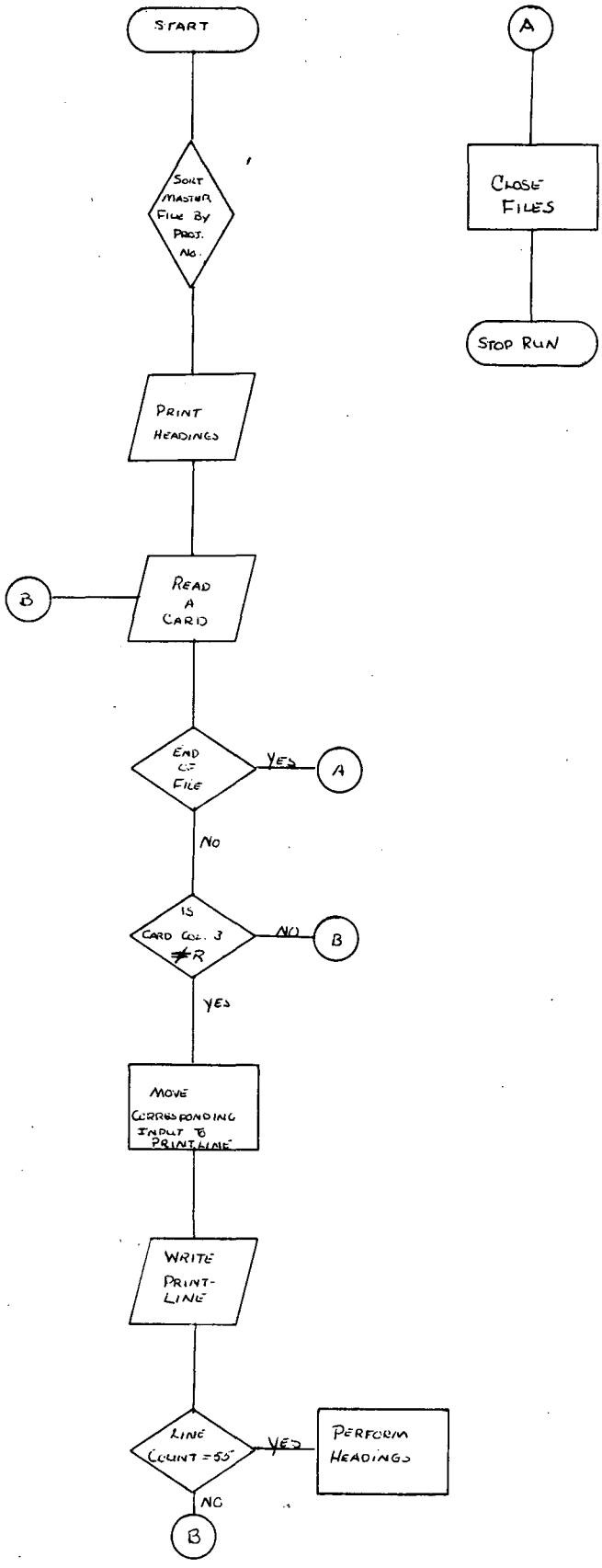


	Chart Title	Date	Chart No.
	FRITZ LAB MANUAL LIST NO. 2	AUG '75	1 of 1
System Title	Program Title	Revision	
BUDGET REPORTS	LIST-TWO	Letter	Date

RON EVANS

ILLUSTRATION 2.5

UD1-579

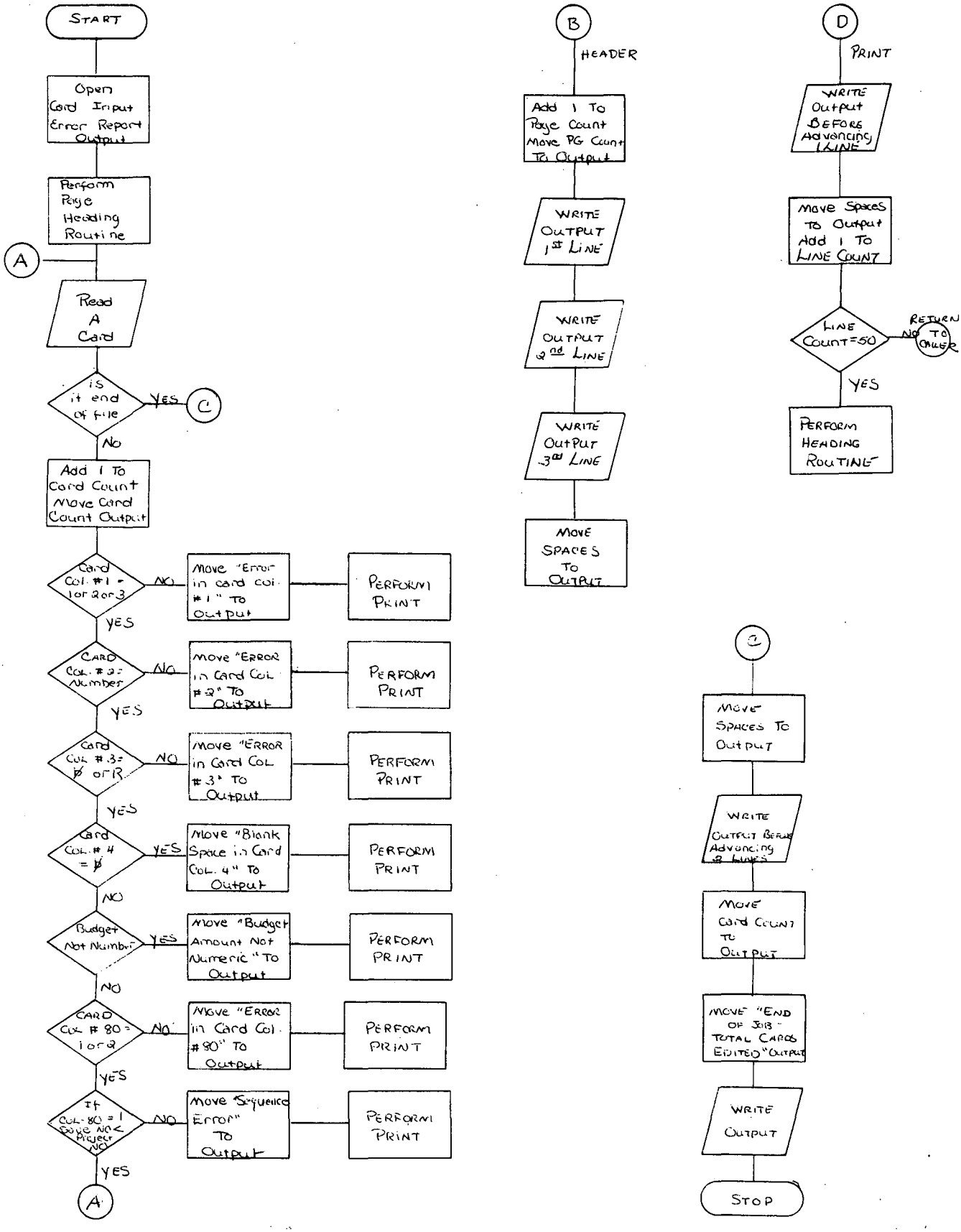


	Chart Title	Date	Chart No.
	DATA VALIDATION PROGRAM	AUG '75	1 of 1
System Title	Program Title	Revision	
BUDGET REPORTS	DATA VALIDATION PROGRAM	Letter	Date

RON EVANS

ILLUSTRATION 2.6

UD1-579

IBM

INTERNATIONAL BUSINESS MACHINES CORPORATION

GX20-1702-1 UM/025 †
Printed in U.S.A.

PROPORTIONAL RECORD LAYOUT FORM

Application FRITZ LAB BUDGET REPORTS   Type of Records MAGNETIC TAPE (UNBLOCKED)   By RON EVANS   Date JAN. 75   Page 1 of 1

RECORD NAME AND REMARK *	Hex. 01–05	06–0A	0B–0F	10–14	15–19	1A–1E	1F–23	24–28	29–2D	2E–32	33–37	38–3C	3D–41	42–46	47–4B	4C–50	51–55	56–5A	5B–5F	60–64
	Dec. 1–5	6–10	11–15	16–20	21–25	26–30	31–35	36–40	41–45	46–50	51–55	56–60	61–65	66–70	71–75	76–80	81–85	86–90	91–95	96–100
MASTER BUDGET	Project or Proposal Number		PROJECT TITLE							AMOUNT BUDGETED		PROJECT SPONSOR		PROJECT PERSONNEL		CONTRACT PERIOD		RA SLOT; [illegible]	ACCOUNT NUMBER	AUTH. SIGN
TAPE RECORD	SPACE FOR FUTURE PROCESSING																			

*	Hex. 00–04	05–09	0A–0E	0F–13	14–18	19–1D	1E–22	23–27	28–2C	2D–31	32–36	37–3B	3C–40	41–45	46–4A	4B–4F	50–54	55–59	5A–5E	5F–63
	Dec. 0–4	5–9	10–14	15–19	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85–89	90–94	95–99

*Two numbering arrangements, each in hexadecimal and decimal notation, are shown. Select the arrangement and notation used by checking the appropriate box to the left.

†The number of forms per pad may vary slightly.

ILLUSTRATION 3

←Fold to Here

DATE 12/05/75

FRITZ LAB LIST OF ACTIVE
CURRENT RESEARCH PROJECT FUNDED
AND PROPOSALS SUBMITTED OR
IN FINAL STAGES OF SUBMISSION

PROJECT NUMBER	TITLE	AMOUNT BUDGETED	SPONSOR	PROJECT PERSONNEL	CONTRACT PERIOD
	BUILDING SYSTEMS DIVISION				
361	BENDING OF WIDE FLANGE SHAPES	1,400	AISC	LWL	INDEFINITE
367	PLASTIC DESIGN OF UNBRACED FRAMES	912	AISI	GCD	09/69-06/74
369-0	TALL BUILDINGS INTERACTIONS	00	NSF	LSB	10/74-10/75
369-01	TALL BUILDINGS STEEL DESIGN	,400	AISI	LSB	INDEFINITE
369-08	TALL BUILDINGS REG. CONF.	00	NSF	LT	10/74-10/75
369-10	TALL BUILDINGS BIBLIOGRAPHY	00	NSF	LT	10/74-10/75
369-11	TALL BUILDINGS RESEARCH NEEDS	,000	NSF	LWL	10/74-10/75
369-12	TALL BUILDINGS MONOGRAPH	00	NSF	GCD	10/74-10/75
369-14	TALL BUILDINGS SURVEYS	00	NSF	GCD	10/74-10/75
369-20	TALL BUILDINGS INFORMATION	00	NSF	LSB,HP	11/74-10/75
369-21	TALL BUILDINGS LIAISON	00	NSF	LSB,RK	10/74-10/75
371	LOAD FACTOR DESIGN OF BLDGS.	,000	AISI	LSB	INDEFINITE
396	FRAME STABILITY	,500	AISI	LWL	07/73-06/76
403	COMPOSITE ASSEMBLAGES EXP.	,700	AISI	JHD	07/74-12/76
R74-13	MASONARY LOW COST HOUSING	,000	NSF	LT	06/75-05/79
R74-27	FLOOR SYSTEMS TO EARTHQUAKE RESISTANCE	,000	NSF(RANN)	TH LWL	01/76-12/78
R75-10	TALL BUILDINGS	,000	NSF	LSBLWLGCD	11/75-10/76
	FATIQUE AND FRACTURE DIVISION				
386	HIGH CYCLE FATIQUE	,000	PDT	JWFBTYJHD	07/74-06/77
398	FATIGUE OF CURVED STEEL BRIDGE ELEMENTS	,000	DOT	JHDJWFBTY	10/73-09/76
399	FLAW IN FULL SIZE BRIDGES	,000	DOT	RR JWFGRI	01/74-06/76
413	RANDOM LOAD FATIGUE TEST SYSTEM	,000	NSF	JWF,RGS	04/75-09/76
	GEOTECHNICAL ENGINEERING DIVISION				
409	ANALY AND DESIGN-FOUNDATI FOR TALL BLDGS	00	LU	HYF	INDEFINITE
411	SEDIMENT TRANSPORT OF COHESIVE SOILS	00	NSF/CCC	HYF,WAM	04/75-09/76
R74-38	ENV. AND PHY. ASSES BLASTING IN U A	00	NSFPEPA	HYFRGSJWF	
R75-4	ASPHALT CEMENT WITH SULFUR	00	DOT	HYFJAMGS	
R75-5	FLY-ASH LITERATURE STUDY	00	DOT	HYF	
R75-6	GARBAGE STABILIZING	00	NSF	HYF	
R75-7	POLYMER CONCRETE SHEET PILING INTERLOCK	00	NSF	HYF	
	HYDRAULIC AND SANITARY ENGINEERING DIVISION				
401	HIGHWAY DRAINAGE INLETS	,000	PDT	AWB,WAM	04/74-03/76
410	RESERVOIR SEDIMENTATION	,000	NSF	WAM	04/75-09/76
R74-35	PHYSICHEMICAL TREATMENT OF SEPTAGE	,000	HUD	PJU	06/75-05/76
R75-12	DEWATER FINE GRAIN DREDGED MATERIAL	,000	COE	RLJ,PJU	09/75-08/76

ILLUSTRATION 4.1

DATE 12/09/75 FRITZ LAB LIST OF REPORT 1B

RESEARCH PROPOSALS

PROPOSAL NUMBER	TITLE	AMOUNT BUDGETED	SPONSOR	PROJECT PERSONNEL	YEARS	R.A. SLOTS
R74-13	MASONARY LOW COST HOUSING	,000	NSF	LT	4	1
R74-27	FLOOR SYSTEMS TO EARTHQUAKE RESISTANCE	,000	NSF(RANN)	TH LWL	3	2
R75-10	TALL BUILDINGS	,000	NSF	LSBLWLGCD	1	2
R74-38	ENV. AND PHY. ASSES BLASTING IN U A	00	NSFPEPA	HYFRGSJWF		
R75-4	ASPHALT CEMENT WITH SULFUR	00	DOT	HYFJAMGS		
R75-5	FLY-ASH LITERATURE STUDY	00	DOT	HYF		
R75-6	GARBAGE STABILIZING	00	NSF	HYF		
R75-7	POLYMER CONCRETE SHEET PILING INTERLOCK	00	NSF	HYF		
R74-35	PHYSICHEMICAL TREATMENT OF SEPTAGE	,000	HUD	PJU	1	1
R75-12	DEWATER FINE GRAIN DREDGED MATERIAL	,000	COE	RLJ,PJU	2	1
R74-4	JOINTS FOR INDUSTRIAL INSTALLATIONS	,000	NSF(RANN)	GCD	1	1
R74-5	OVERLOADING OF COMPOSITE BRIDGES	,000	PDT	CNK JWF		
R72-14	SHIP BOTTOM GRILLAGES	,000	USN	AO	1	2
R74-33	AXIALLY LOADED TUBULAR COLUMNS	,000	NSF	WFC	2	1
R73HUD	BUILDING RESEARCH TOPICS	00		LSB		
R74-11	ENERGY UTILIZA IN TALL BLDGS.(WORKSHOP)	00	NSF	LT		
R74-19	NAT CONF ON TALL BLDG CARIO	00				
R74-20	FAIRNESS OF SHIP PLATING	00	MARITIME	AO		
R74-24	FURTHER DEV FOR BIAX LOAD. BEAM TO COLS.	,600	AISI	WFC	1	1
R74-28	CONCRETE FRAMES IN-FILLED BRICK WALLS	00	NSFEGYPT			
R74-30	WORKSHOP ON CENTRALLY LOADED COLUMNS	00	NSF	LSB		
R74-32	IRAN EXCHANGE	00	IRAN	LSB		
R74-37	CABLE STAYED EMERGENCY BRIDGES	00	NSFRANN	AO		
R74-40	DUPONT PYART STABILIZE SOIL	00	DUPONT	HYF,JAM		
R75-01	PARA STY OVLD RIGHT AND SKEWED BEAM BRDG	00	NSF	CNK		
R75-03	COOPERATION RESEARCH WITH INDONESIA	00		HYF		
R75-08	ESA-USSR JOINT RESEARCH	00		LWL		
R75-09	INELASTIC BEHAVIOR(JY.PROGRAM WITH YU+O)	00		LSBLWLMAR		
R75-23	IMPREGNATION OF BRIDGE DECKS	,000	PDT	WFC,JAM	2	1
R75-25	PRESTRESS LOSSES	,000	RCRC	TH	1	
R75-26	PRESTRESSED CONCRETE BRIDGE MEMBERS	,000	RCRC	DAV	1	

ILLUSTRATION 4.1 (CONT.)

ERROR LISTING-INVALID CARDS DATE 12/10/75 PAGE 01

**********CARD DESCRIPTION**********

CARD NO	COL 123	TITLE	BUDGET AMOUNTSPONSOR PERSONNEL	ERRORS

END OF JOB TOTAL NO OF ERRORS IS 0000 TOTAL CARDS VALIDATED 0012*

ILLUSTRATION 4.2

FRITZ LABORATORY ACCOUNTS

PROJ. NO.	TITLE	ACCT. NO.	SPONSOR	AUTH. SIG.
217	CRC	718000	CRC	LSBFCSM
217	3RD EDITION OF THE CRC GUIDE	492320	NSF	LSBFCSM
333	BEAM-TO-COLUMN CONNECTIONS	411400	AISC/AISI	WFC
339	PRESTRESS LOSSES	404800	RCRC	TH
361	BENDING OF WIDE FLANGE SHAPES	405100	AISC	LWL
367	PLASTIC DESIGN OF UNBRACED FRAMES	405300	AISI	GCD
369-0	TALL BUILDINGS INTERACTIONS	478300	NSF	LSB
369-01	TALL BUILDINGS STEEL DESIGN	405400	AISI	LSB
369-08	TALL BUILDINGS REG. CONF.	478300	NSF	LT
369-10	TALL BUILDINGS BIBLIOGRAPHY	478300	NSF	LT
369-11	TALL BUILDINGS RESEARCH NEEDS	478300	NSF	LWL
369-12	TALL BUILDINGS MONOGRAPH	478300	NSF	GCD
369-14	TALL BUILDINGS SURVEYS	478300	NSF	GCD
369-20	TALL BUILDINGS INFORMATION	478300	NSF	HP
369-21	TALL BUILDINGS LIAISON	478300	NSF	RK
371	LOAD FACTOR DESIGN OF BLDGS.	405500	AISI	LSB
378	OVERLOADING OF HIGHWAY BRIDGES	420900	PDT	CNK
380	BOX GIRDERS	420610	PDT	BTY
381	COMPOSITE BEAMS WITH FORMED METAL DECKS	409100	AISI	JWF,RGS
382	PRESTRESS LOSSES IN IN-SERVICE BRIDGES	420800	PDT	TH
386	HIGH CYCLE FATIQUE	421400	PDT	JWF,JHD
387	LOAD DISTRIBUTION	421100	PDT	DAV
389	COLUMNS UNDER BIAXIAL BENDING	475800	NSF	WFC
390	POLYMERS IN HIGHWAY CONCRETE	487200	NCHRP	JM,WFC
393	TUBULAR COLUMNS	412800	API	WFC
396	FRAME STABILITY	411200	AISI	LWL
397	RIO-NITEROI BOX GIRDER BRIDGE	439100	ECEX	JWF,AO
398	FATIGUE OF CURVED STEEL BRIDGE ELEMENTS	462200	DOT	JHD
399	FLAW IN FULL SIZE BRIDGES	462300	DOT	RR,JWF
401	HIGHWAY DRAINAGE INLETS	421200	PDT	AWB
402	PRESTRESS LOSSES IN POSTTENSIONED MEMB.	421300	NSF	TH
403	COMPOSITE ASSEMBLAGES EXP.	413000	AISI	JHD
405	BEAM-TO-COLUMN WEB CONNECTIONS	412600	AISI	WFC,LSB
406	LOCAL BUCKLING OF HIGH STRENGTH TUBS	412700	AISI	AO
408	DESIGN OF BIAXIALLY LOADED COLUMNS	413200	CSICC	WFC
409	ANALY AND DESIGN-FOUNDATI FOR TALL BLDGS	330298	LU	HYF
410	RESERVOIR SEDIMENTATION	471510	NSF	WAM
411	SEDIMENT TRANSPORT OF COHESIVE SOILS	471410	NSF/CCC	HYF,WAM
412	R.C. COL.-GRID STRUCTURES	471710	NSF	TH,LWL
413	RANDOM LOAD FATIGUE TEST SYSTEM	495000	NSF	JWF,RGS
414	R.C. CONSTITUTIVE RELATIONS	482900	ERDA	WFC
706	HUMANITIES PERSPECTIVE ON TECH.		NEH	
707	SOCIAL FACTORS		NSF	
709	TALL BUILDINGS DECISIONS		NSF	

ILLUSTRATION 4.2 (CONT.)

IBM

INTERNATIONAL BUSINESS MACHINES CORPORATION

MULTIPLE-CARD LAYOUT FORM

Form X24-6599-0
Printed in U. S. A.

Company: FRITZ LAB

Application: BUDGET REPORTING by RON EVANS Date ______ Job No. ______ Sheet No. 1

Columns	Field
1	OPERATION CODE
2	DIVISION NO.
3	BLANK SPACE
4–9	PROJECT NUMBER
10–49	PROJECT TITLE
50–56	AMOUNT BUDGETED
57–65	PROJECT SPONSOR
66–74	PROJECT PERSONNEL
75–79	BLANK SPACES
80	CARD #1

Columns	Field
1	OPERATION CODE
2	DIVISION NO.
3	BLANK SPACE
4–9	PROJECT NUMBER
10–20	CONTRACT PERIOD
21–26	ACCOUNT NUMBER
27–33	AUTHORIZED SIGNATURE
34–79	BLANK SPACES
80	CARD #2

NOTE: The above card formats are used for current Fritz Lab Research projects. For additional information see Budget Reporting System Documentation.

Columns	Field
1	OPERATION CODE
2	DIVISION NO.
3	R
4–9	Proposal Number
10–49	Proposed Project Title
50–56	Amount Budgeted
57–65	POTENTIAL SPONSOR
66–74	PROJECT PERSONNEL
75–76	R.A. Stats
77–78	YEARS
79	BLANK SPACE
80	CARD #1

Columns	Field
1	OPERATION CODE
2	DIVISION NO.
3	R
4–9	Proposal Number
10–20	CONTRACT PERIOD
21–26	ACCOUNT NUMBER
27–33	AUTHORIZED SIGNATURE
34–79	BLANK SPACES
80	CARD #2

NOTE: The above card formats are used for FRITZ LAB RESEARCH proposals. For additional information see BUDGET REPORTING SYSTEM DOCUMENTATION.

ILLUSTRATION 5

PUNCH CARD DATA FORM
BUDGET REPORTING SYSTEM

Each project or proposal requires two keypunched cards; unless it is being deleted.

1. Change-code
   1) if project is an addition to the list
   2) if project is a deletion to the list
   3) if project has items to be changed on the list

Col 1

2. Project Division
   1) Building System
   2) Fatique & Fracture
   3) Geothechnical Engineering
   4) hydraulic & Sanitary
   5) Structural Concrete
   6) Structural Connections
   7) Structural Stability
   8) Non-Fritz Lab
   9) Not assigned a Division

Col 2

3. If project is in proposal form card column 3 is "R"
   If it is an approved project card column 3 is blank.

Col 3

4. Project or proposal number

4 5 6 7 8 9

If project or proposal is being deleted from list stop here.

5. Title

10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49

6. Budget
   (right justified- fill in all leading spaces with zeros- if amount is not known fill in zeros)

50 51 52 53 54 55 56

7. Sponsor 57 58 59 60 61 62 63 64 65

8. Project Director & Personnel 66 67 68 69 70 71 72 73 74

9. R.A. Slots 75 76

10. Years project will run 77 78

11. Blank space (for future use) 79

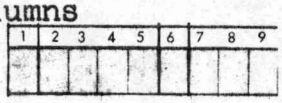
12. Card code 80 **1**

ILLUSTRATION 6

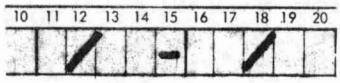
PUNCH CARD DATA FORM
BUDGET REPORTING SYSTEM

The following information must be keypunched on another card.

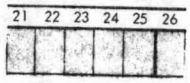
1. Project number information. The first nine card columns are the same as the first card.



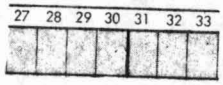
2. Contract period (beginning & ending date).



3. Account number



4. Authorized signature



5. Blank spaces (for future use) Card columns 34 to 79.

6. Card code

ILLUSTRATION 6 (CON'T.)