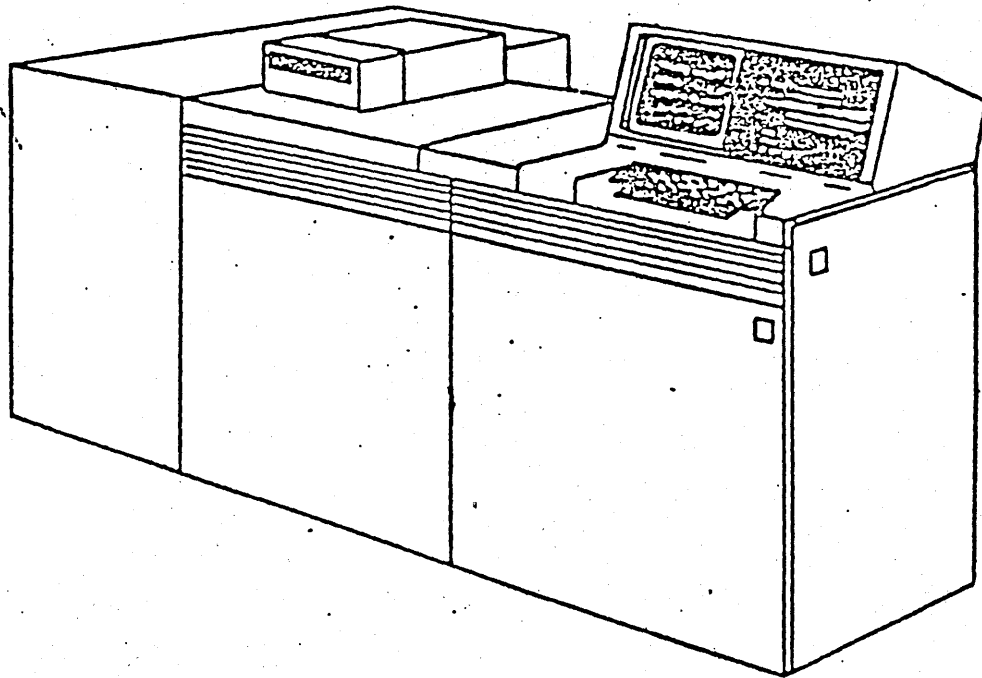


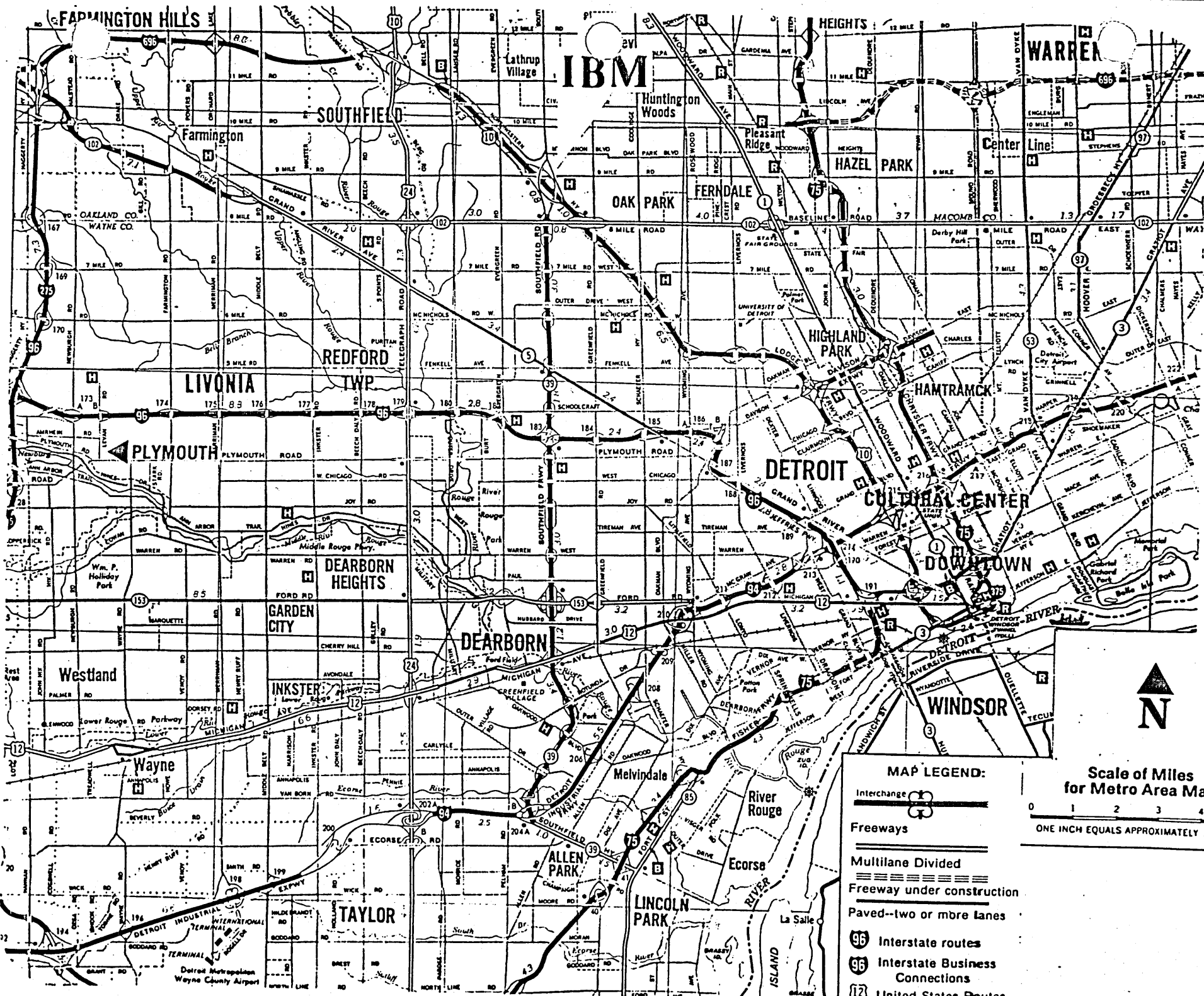
# STUDENT WORKBOOK

## SYSTEM/38 CONCEPTS


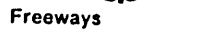
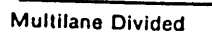
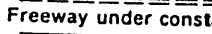
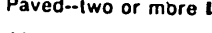





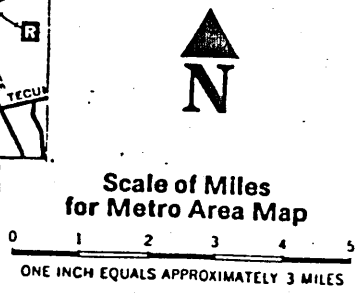
NAME \_\_\_\_\_

INSTRUCTOR \_\_\_\_\_



IBM

- MAP LEGEND:**
- Interchange 
  - Freeways 
  - Multilane Divided 
  - Freeway under construction 
  - Paved--two or more lanes 
  -  Interstate routes
  -  Interstate Business Connections
  -  United States Routes



**RESTAURANTS**

CARLOS MURPHY'S  
VINEYARDS  
HEALTHY JONES  
RAM'S HORN

MARVIN GARDENS  
JAQUES

Long John Silver's  
FARRELS

Elias Big Boy

VICTORIA STATION  
Denny's  
DRAMADA INN  
Waffle House  
HOLIDAY INN

Tel Twelve MALL  
MCL CAFETERIA

HARVARD ROW  
ATHENS  
Esquire Deli  
EMPRESS GARDENS

SUSSEX HOUSE  
BEEF & BIRD

Dino's Pizza

Bonanza

Bob Evans  
MERIWEATHER'S

Elias Big Boy  
PALACE  
Shields Pizza

Arby's

Mr. Tony's

Nathan's Deli

PRUDENTIAL TOWN CENTER  
V.I.P. PLACE  
BRADY'S  
FRIDAY'S  
CHINESE  
GALLERY

GOLDEN MUSHROOM

DRY DOCK  
DENNY'S

- McDonalds
- Arthur Treacher's
- Spiro's Coney Island
- LANDMARK
- ORIENTAL CITY
- Unique Deli
- Burger King
- Arby's

Little Caesar's  
FIGUREHEAD  
Taco Plaza  
RED CEDARS

McDonald's  
Burger King  
CLOCK

Sutton Deli

Burger Chef  
Denny's  
Elias Big Boy

Nosh  
WING HONG  
MAPLE HOUSE  
STEAK and ALE  
BILL KNAPPS

SPIFFY'S



IBM Cafeteria

TELEGRAPH RD.  
RED CEDARS

Wendy's  
McDonald's

Hardee's  
Denny's

BLACK LANTERN

McDonald's  
Onesse Coney Island  
Mama Mia  
Wendy's  
Arthur Treacher's

Sign of the Beefeater

Town Crier

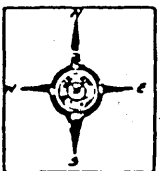
Lamplighter

Burger King

SOUTHFIELD SHERATON  
MICHIGAN INN

All of **SOUTHFIELD** that you take advantage of the many fine dining and entertainment spots found in the Southfield area...  
 May save you from an unnecessary wait... the restaurants listed on this map are not in any way affiliated with IBM nor its employees. IBM does not recommend any particular establishment and this is by no means a complete list of the Southfield restaurants listed in this area.

INNER PLACES  
FAST FOOD



# SYSTEM/38 CONCEPTS

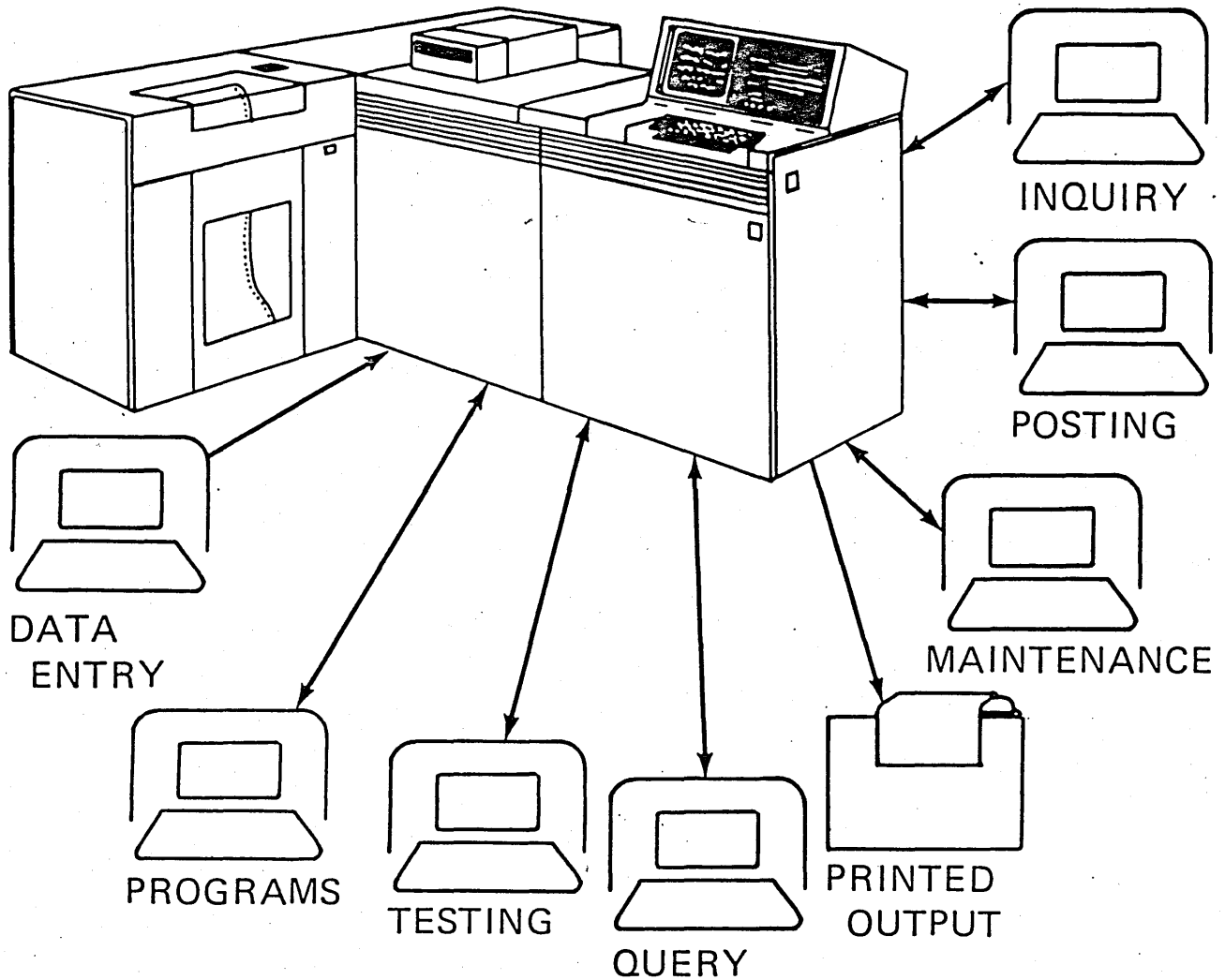
## TIMETABLE

INTRODUCTION	REVIEW	REVIEW
HARDWARE SOFTWARE OVERVIEW	DATA ADMINISTRATION	WORK MANAGEMENT
DATA BASE FACILITIES	PROGRAMMING TOOLS	CONVERSION
LUNCH	LUNCH	LUNCH
DATA BASE FACILITIES (cont.)	PROGRAMMING TOOLS (cont.)	DEMONSTRATION
WORKSTATION FACILITIES	HIGH LEVEL LANGUAGES	
	DEMONSTRATION	

**HARDWARE/SOFTWARE**

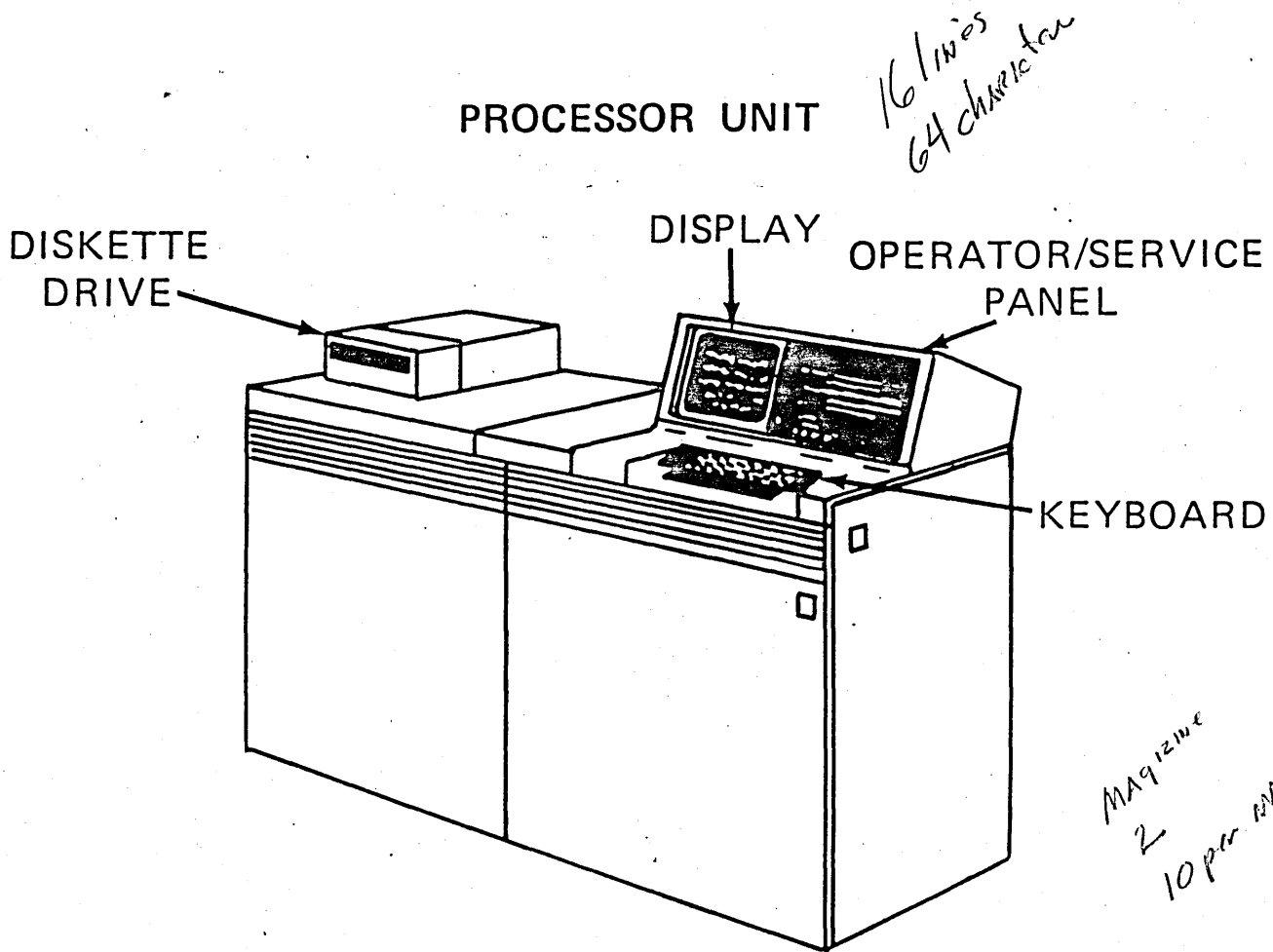
**OVERVIEW**

# A SYSTEM FOR PEOPLE PRODUCTIVITY



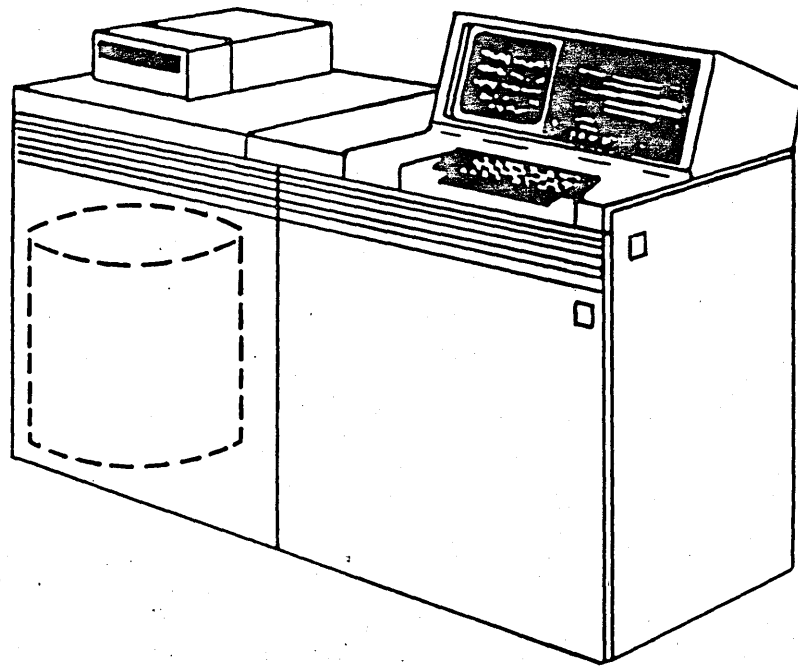
DATA –  
WHERE IT'S NEEDED  
WHEN IT'S NEEDED  
TO WHOM IT'S NEEDED  
IN THE FORM IT'S NEEDED

PROGRAMMER  
CLERK  
MANAGER



	CYCLE (NANOSECOND)	MAIN STORAGE (INCREMENTS. OF 256)
MODEL 3	1100	<sup>16<sup>8</sup></sup> 512 - 1536K
MODEL 4	1100	<sup>16<sup>8</sup></sup> 512 - 2048K
MODEL 5	600	<sup>10<sup>24</sup></sup> 512 - 2048K

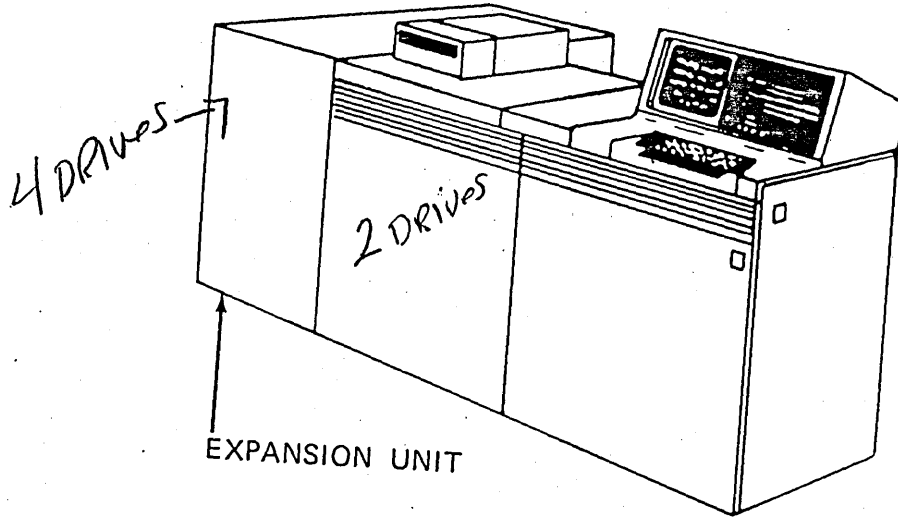
## AUXILIARY STORAGE (FIXED DISK)



64.5 MB — STANDARD — *superVise*  
129 MB — AVAILABLE

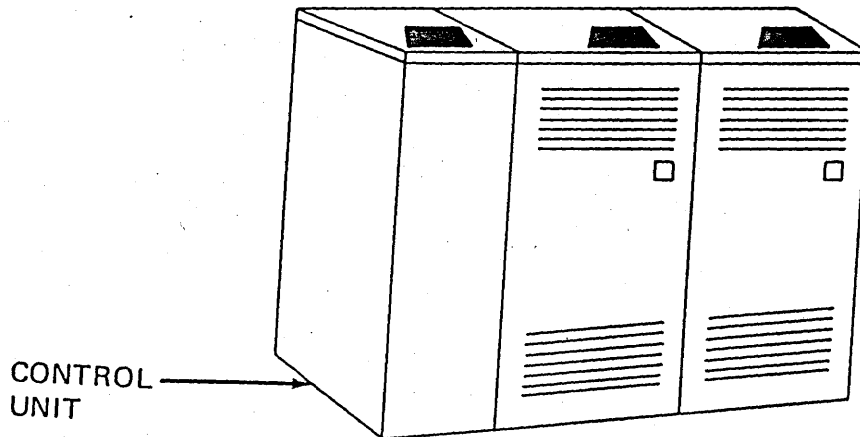


# AUXILIARY STORAGE



MAXIMUM STORAGE - 387 MB  
AVERAGE SEEK TIME - 25 MS  
DATA TRANSFER RATE - 1,031,000 BYTES/SEC

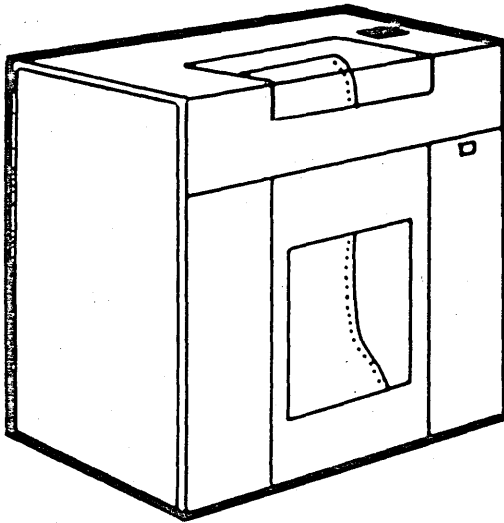
- PLUS -



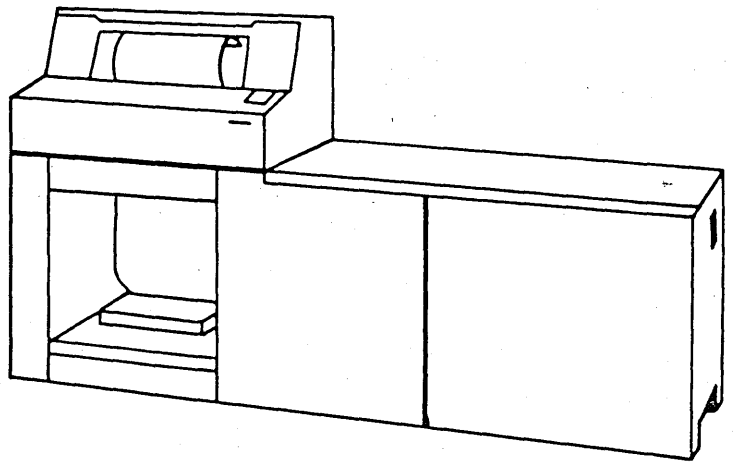
MAXIMUM STORAGE - 2,284 MB  
AVERAGE SEEK TIME - 20 MS  
DATA TRANSFER RATE - 1,859,000 BYTES/SEC

## PRINTERS

5211/3262



3203 MOD 5



5211 300 LPM  
3262 650 LPM

3203 1200 LPM

132 PRINT POSITIONS

6 OR 8 LINES/INCH

INTERCHANGEABLE PRINT BELT OR TRAIN

~~BOLT-ON~~ (3262 A1) OR STANDALONE

### SYSTEM/38 PRINTER OPTIONS

#### BOLT-ON

<u>TYPE</u>	<u>MODEL</u>	<u>LPM</u>
3262	A1	650

#### STANDALONE

<u>TYPE</u>	<u>MODEL</u>	<u>LPM</u>
5211	2	300
3262	B1	650
3203	5	1200

#### MAY HAVE:

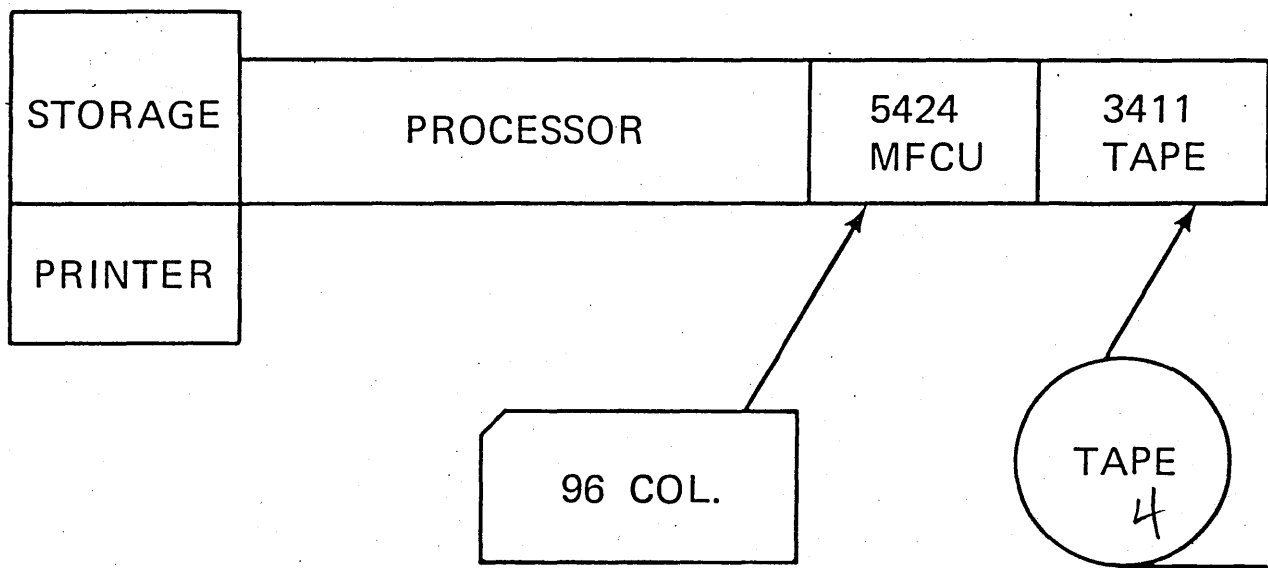
1 BOLT-ON  
OR

1 STANDALONE  
OR

1 BOLT-ON AND 1 STANDALONE  
OR

2 STANDALONE

## ADDITIONAL I/O CAPABILITY



MFCU:

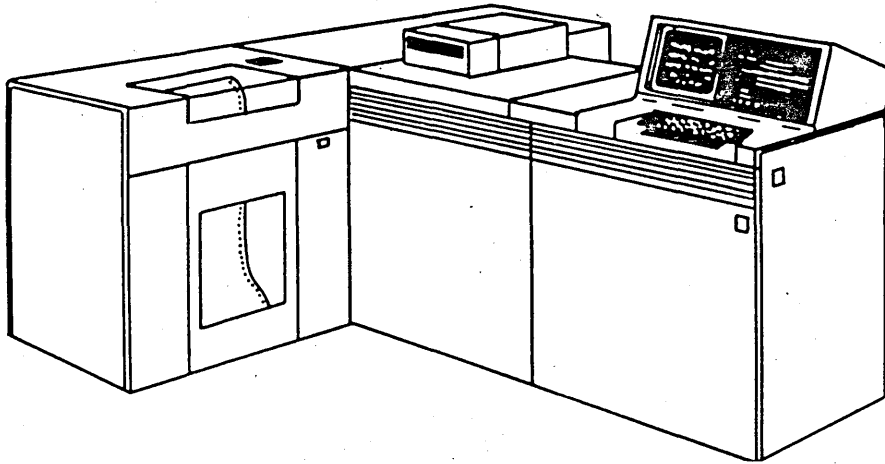
A1 - 250/60/60

A2 - 500/120/120

3410/3411 UNITS

20-80 KB

## COMMUNICATIONS



### WORK STATION CONTROLLER

- STANDARD FEATURE
- 12 DISPLAYS/PRINTERS
- IBM 5250 SYSTEM UNITS (LOCAL)
- UP TO 80 DEVICES (OPTIONAL)
- UP TO 5000 FEET
- SDLC

*20 work stations  
per panel*

### COMMUNICATION ATTACHMENT/S

- UP TO 8 LINES
- SDLC OR BSC

#### SDLC

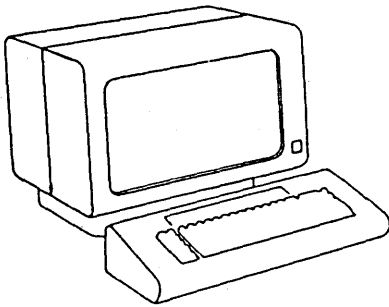
- 600 TO 9600 BPS
- SWITCHED OR NON-SWITCHED
- POINT TO POINT OR MULTIPOINT
- REMOTE WORK STATIONS

#### BSC

- 600 TO 9600 BPS
- SWITCHED OR NON-SWITCHED
- POINT TO POINT
- MOST GSD/DPD SYSTEMS

## 5250 DISPLAY STATIONS

5251



MODELS 1 and 2

960 characters  
12 lines of 80 characters

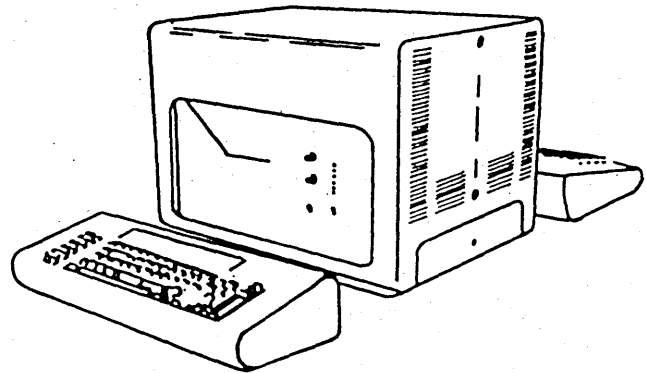
MODELS 11 and 12

1920 characters  
24 lines of 80 characters

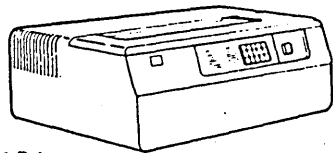
5252

DUAL DISPLAY

960 characters  
12 lines of 80 characters

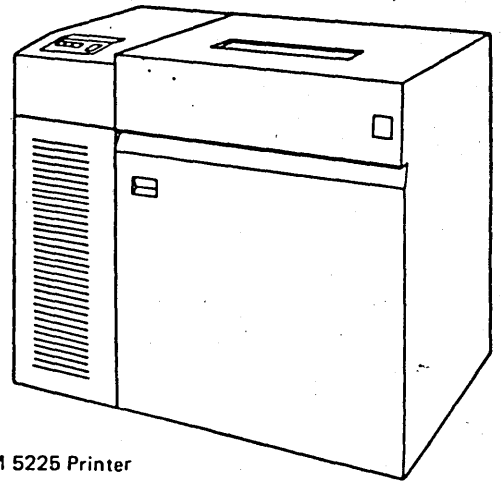


## 5250 WORKSTATION PRINTERS

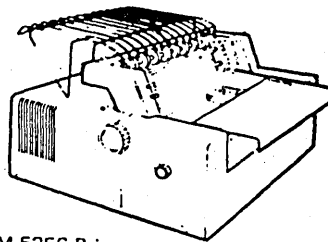


IBM 5224 Printer

*240 lines per min*

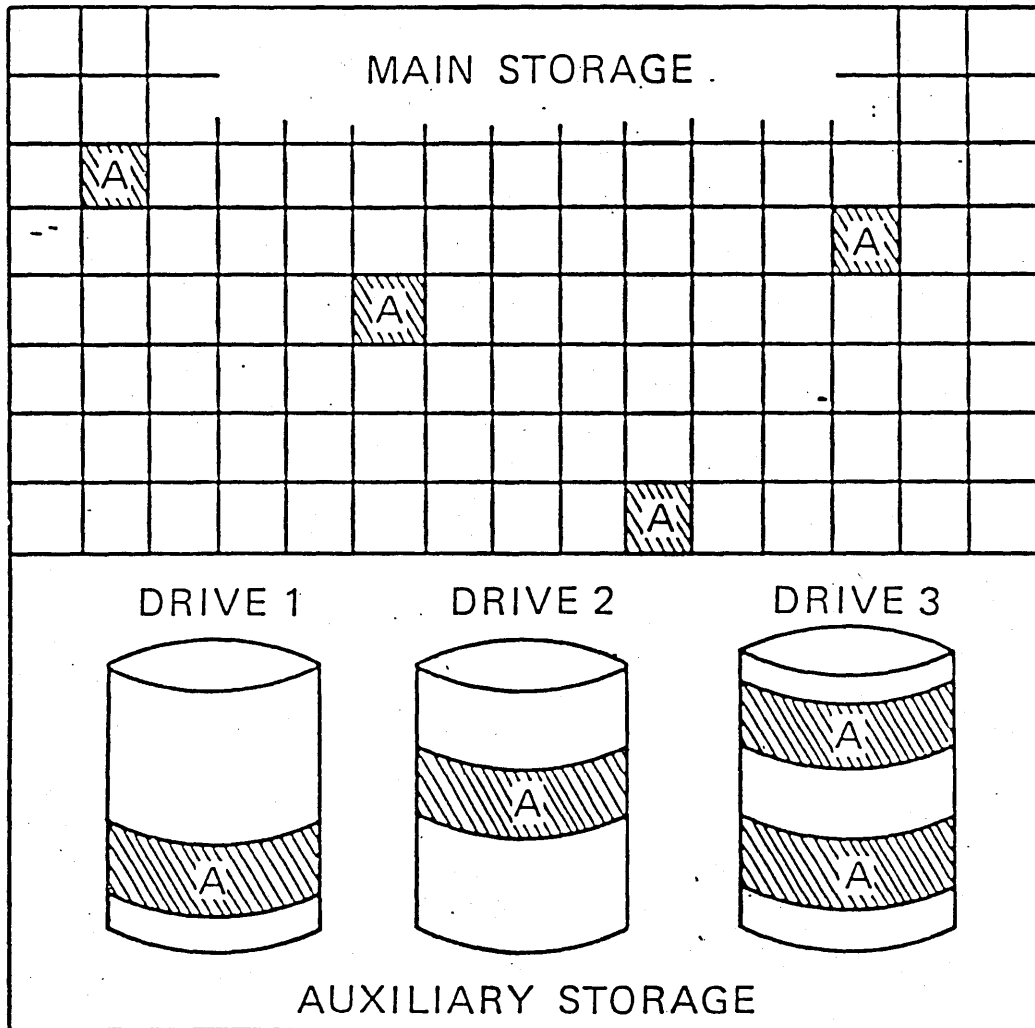


IBM 5225 Printer



IBM 5256 Printer

## SINGLE LEVEL STORAGE



- ALL STORAGE MANAGED AS ONE CONTAINER OF OBJECTS
- AN OBJECT (FILE, PROGRAM, ETC) IS DISTRIBUTED THROUGHOUT
- USER NOT CONCERNED WITH DESIGNING OR SPECIFYING LOCATION OR SPACE REQUIRED

*swap - total program  
page - part of program*



## SOFTWARE

### RPG III

- EXTERNALLY DESCRIBED DATA
- NEW OPERATIONS
- LESS CYCLE DEPENDENCE
- WORK STATION OPERATIONS

### COBOL

- EXTERNALLY DESCRIBED DATA
- TRANSACTION FILE FOR WORK STATIONS
- ANS X3.23-174 STANDARD
- DATA BASE EXTENSIONS

## SOFTWARE (2)

### IDU

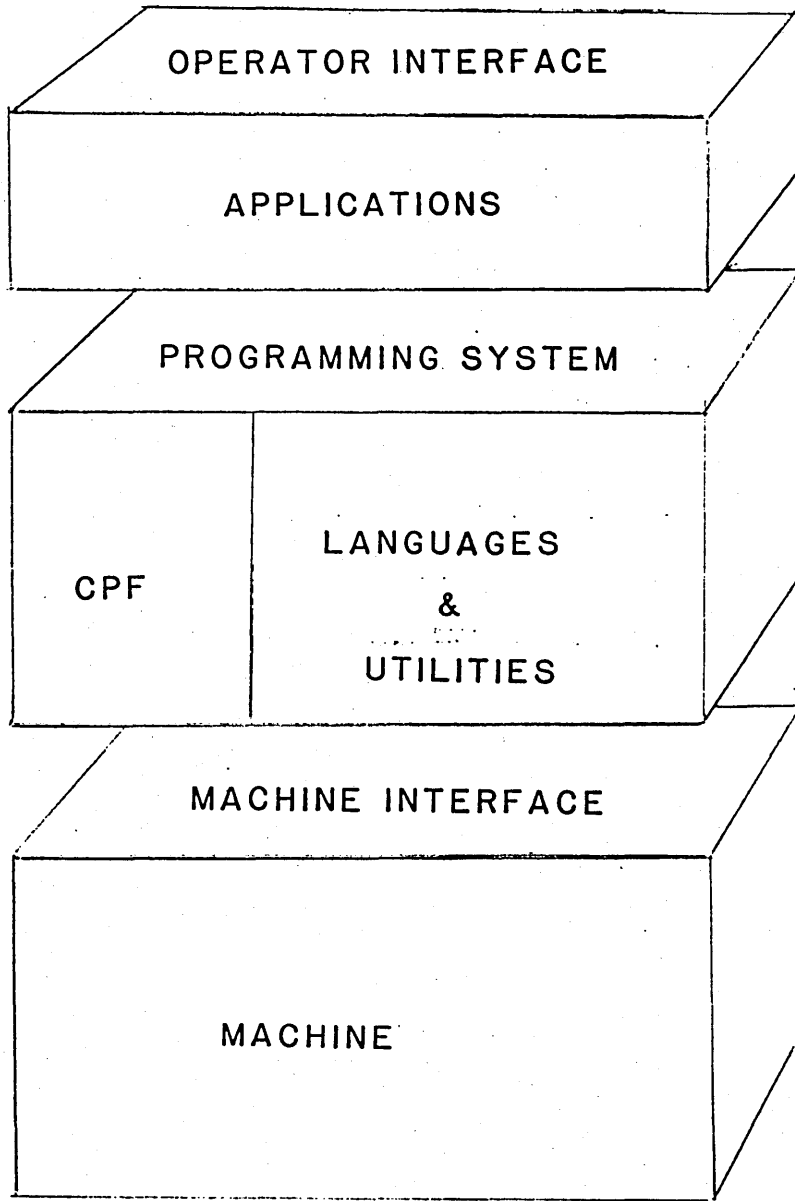
- SOURCE ENTRY UTILITY (SEU)
- DATA FILE UTILITY (DFU)
- QUERY — list
- SCREEN DESIGN AID (SDA)

### CONTROL LANGUAGE (CL)

## CONTROL PROGRAM FACILITY

- REQUIRES NO GENERATION
- ALL FUNCTIONS AVAILABLE AT INSTALLATION
- MAY CHANGE DEFAULT VALUES
- CONFIGURATION CHANGES IMMEDIATELY EFFECTIVE

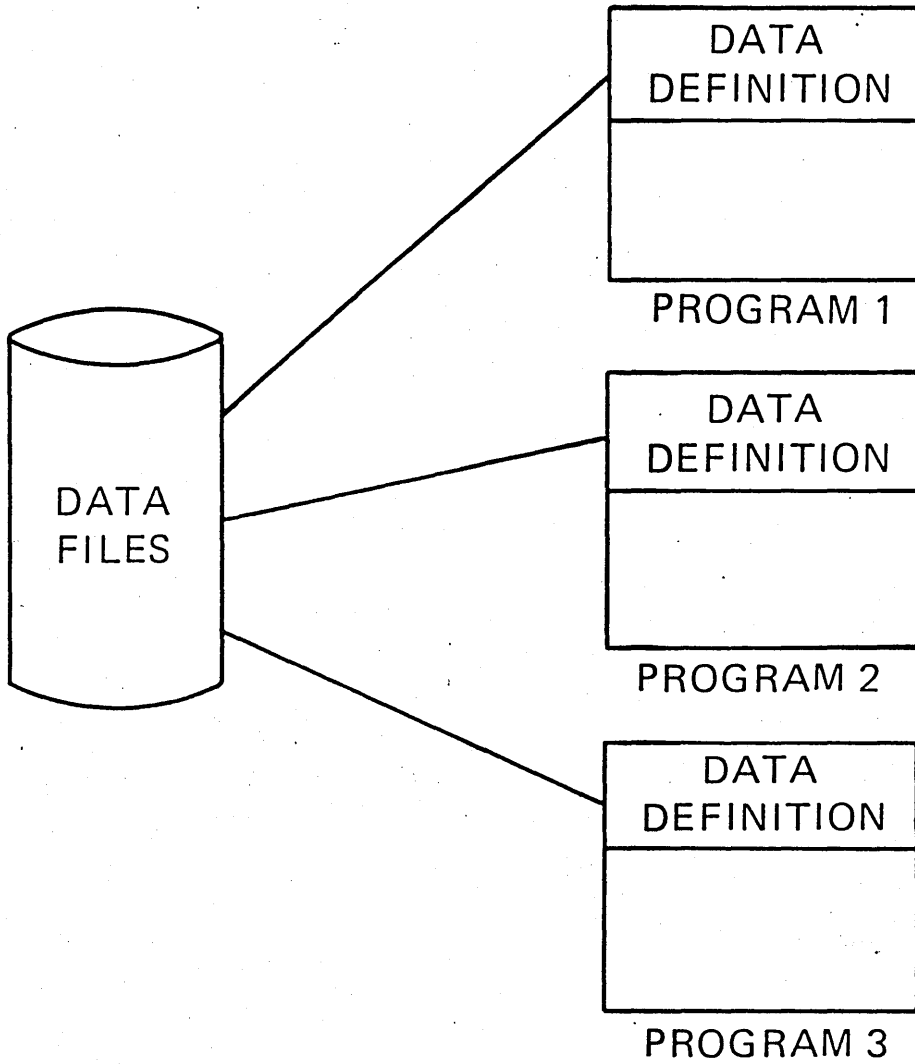
# SYSTEM STRUCTURE



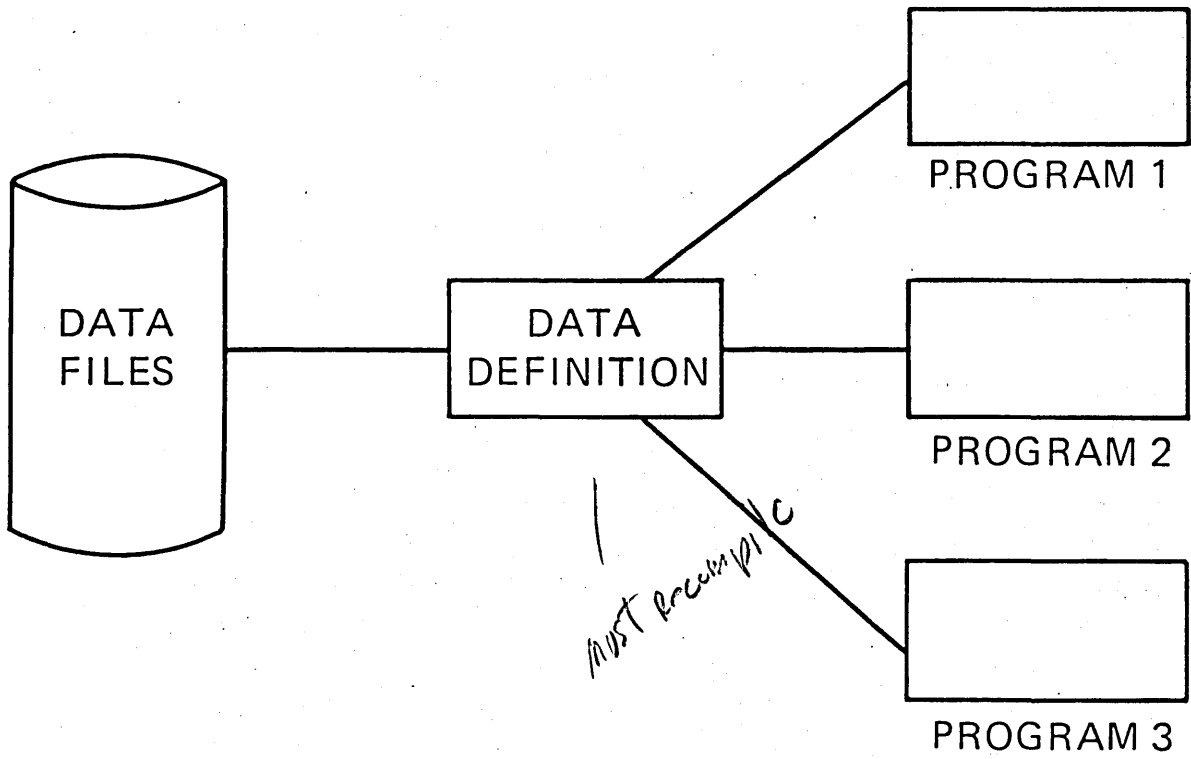
**DATA BASE**

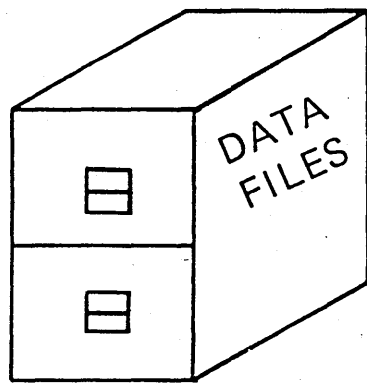
**FACILITIES**

# NON-DATA BASE



DATA BASE





MANAGEMENT  
+ PROCEDURES

---

A DATA BASE SYSTEM

DM-4



## DATA BASE IS ...

A COLLECTION OF INTERRELATED DATA ITEMS  
STORED IN A MANNER THAT REDUCES  
REDUNDANCY.

IT IS DESIGNED TO SERVE ONE OR MORE  
APPLICATIONS IN AN OPTIMAL FASHION,  
WHILE BEING INDEPENDENT OF THE  
PROGRAM(S) IT SERVES.

10/81 14:54:18

TAX LISTING

PAGE

EMP NO	DEP NO	NAME	INIT	M	S	NO	REG HRS	OTIME HRS	RATE	GROSS	TAX
				S	H	EX					
4416	124	ADAMS	WJ	M	H		40.00	5.00	2.00	95.00	
22236	124	BROWN	HY	S	S	2		.00	200.00	200.00	30.00
25781	125	COOPER	IG	S	H	2	40.00	.00	4.50	180.00	26.00
39840	124	DAVIS	TV	M	H	1	40.00	.00	2.50	100.00	
47124	123	EVANS	AS	M	S	2		.00	350.00	350.00	90.00
66031	123	FOX	FL	S	H	3	40.00	3.00	3.50	155.75	8.08
68726	124	GREEN	KR	M	S			.00	400.00	400.00	160.00
73315	125	HOLMES	EB	S	S	1		.00	100.00	100.00	
74249	123	IRVING	UL	M	S	3		.00	250.00	250.00	17.50
80081	125	JONES	CO	S	H		35.00	.00	4.00	140.00	28.00
86789	123	KELLER	ND	M	H	1	40.00	.00	3.00	120.00	
98570	124	LAKE	MP	S	S	4		.00	300.00	300.00	60.00

TOTAL NUMBER OF RECORDS PROCESSED 12

*Select & omit*

# DATA DESCRIPTION SPECIFICATIONS

File	Keying Instruction	Graphic					
Programmer	Date	Key					

Description	Page	of
-------------	------	----

Sequence Number	Form Type	And/Or Comment (A/O/*)	Conditioning					Name	Length	Data Type (B A/P/S/B A/S/X/Y/N/I/W)	Decimal Positions	Usage (B/O/I/B/H/M)	Location		Functions	
			Indicator	Not (N)	Indicator	Not (N)	Indicator						Line	Pos		
1	A						R	FMT1								TEXT ('EMPLOYEE PHYSICAL FILE')
	A							EMPNO	5							COLHDG ('EMP' 'NO') EDTCDE(2)
	A							DEPNO	3							COLHDG ('DEP' 'NO')
	A							NAME	8							COLHDG ('NAME')
	A							INIT	2							COLHDG ('INIT')
	A							MARST	1							COLHDG ('M' 'S')
	A							SALHR	1							COLHDG ('S' 'H')
	A							EXEM	2							COLHDG ('NO' 'EX')
	A							REGHRS	4	2						COLHDG ('REG' 'HRS') EDTCDE(2)
	A							OHRS	4	2						COLHDG ('OTIME' 'HRS') EDTCDE(2)
	A							RATE	5	2						COLHDG ('RATE') EDTCDE(2)
	A							GROSS	6	2						COLHDG ('GROSS') EDTCDE(2)
	A							TAX	4	2						COLHDG ('TAX') EDTCDE(2)
	A															
	A															
	A															
	A															

*Record character*  
*PPG-8*

\* Number of sheets per pad may vary slightly. \* Note: One record format per Physical File

*CRTP file*  
*EMMAST*

06/10/81 14:58:40

TAX LISTING

PAG

EMP NO	NAME	INIT	S H	REG HRS	OTIME HRS
4416	ADAMS	WJ	H	40.00	5.00
22236	BROWN	HY	S		.00
25781	COOPER	IG	H	40.00	.00
39840	DAVIS	TV	H	40.00	.00
47124	EVANS	AS	S		.00
66031	FOX	FL	H	40.00	3.00
68726	GREEN	KR	S		.00
73315	HOLMES	EB	S		.00
74249	IRVING	UL	S		.00
80081	JONES	CO	H	35.00	.00
86789	KELLER	ND	H	40.00	.00
98570	LAKE	MP	S		.00

TOTAL NUMBER OF RECORDS PROCESSED 12

VIEW FOR THE FOREMAN



06/10/81 14:58:40

TAX LISTING

PAL

EMP NO	NAME	INIT	S. H	REG HRS	OTIME HRS	RATE
4416	ADAMS	WJ	H	40.00	5.00	2.00
22236	BROWN	HY	S		.00	200.00
25781	COOPER	IG	H	40.00	.00	4.50
39840	DAVIS	TV	H	40.00	.00	2.50
47124	EVANS	AS	S		.00	350.00
66031	FOX	FL	H	40.00	3.00	3.50
68726	GREEN	KR	S		.00	400.00
73315	HOLMES	EB	S		.00	100.00
74249	IRVING	UL	S		.00	250.00
80081	JONES	CO	H	35.00	.00	4.00
86789	KELLER	ND	H	40.00	.00	3.00
98570	LAKE	MP	S		.00	300.00

TOTAL NUMBER OF RECORDS PROCESSED 12

VIEW FOR ACCOUNTING

# DATA DESCRIPTION SPECIFICATIONS

File	Keying Instruction	Graphic							
Programmer	Date	Key							

Description	Page	of
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Sequence Number	Form Type	And/Or/Comment (A/O/*)	Conditioning					Name Type (W/R/K/S/O)	Name	Reference (R)	Length	Data Type (B A/P/S/B A/S/X/Y/N/I/W)	Decimal Positions	Usage (U/O/I/B/H/M)	Location		Functions
			Indicator	Not (N)	Indicator	Not (N)	Indicator								Line	Pos	
1																	
	A						R	ACCEMT									PF1 FILE(EMPMAS)
	A																TEXT('ACCOUNTING VIEW')
	A							EMPNO									
	A							NAME									
	A							INIT									
	A							MARST									
	A							GROSS									
	A							TAX									
	A						K	EMPNO									
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\*Number of sheets per pad may vary slightly.

CRTRF EMPLACC

06/09/81 16:28:14

TAX LISTING BY EMPNO WITHIN DEPT

PAGE

EMP NO	DEP NO	NAME	INIT	M S	NO	REG HRS	OTIME HRS	RATE	GROSS	TAX
47124	123	EVANS	AS	M S	2		.00	350.00	350.00	90.00
66031	123	FOX	FL	S H	3	40.00	3.00	3.50	155.75	8.08
74249	123	IRVING	UL	M S	3		.00	250.00	250.00	17.50
86789	123	KELLER	ND	M H	1	40.00	.00	3.00	120.00	
4416	124	ADAMS	WJ	M H		40.00	5.00	2.00	95.00	
22236	124	BROWN	HY	S S	2		.00	200.00	200.00	30.00
39840	124	DAVIS	TV	M H	1	40.00	.00	2.50	100.00	
68726	124	GREEN	KR	M S			.00	400.00	400.00	160.00
98570	124	LAKE	MP	S S	4		.00	300.00	300.00	60.00
25781	125	COOPER	IG	S H	2	40.00	.00	4.50	180.00	26.00
73315	125	HOLMES	EB	S S	1		.00	100.00	100.00	
80081	125	JONES	CO	S H		35.00	.00	4.00	140.00	28.00

TOTAL NUMBER OF RECORDS PROCESSED 12





# DATA DESCRIPTION SPECIFICATIONS

File	Keying Instruction	Graphic					
Programmer	Date	Key					

Description	Page	of
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Sequence Number	Form Type	And/Or/Comment (A/O/*)	Conditioning					Name Type (W/R/K/S/O)	Name	Length	Reference (R)	Data Type (A/P/S/B/A/S/X/Y/N/I/W)	Decimal Positions	Usage (B/O/I/B/H/M)	Location		Functions
			Indicator	Not (N)	Indicator	Not (N)	Indicator								Line	Pos	
1																	
2																	
3																	
4																	
5																	
6	A						R	FMT1									
7	A																
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9	A																
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*Good All  
Start in physical file*

*Start first non blank  
- start -*

\*Number of sheets per pad may vary slightly.

CRTLF EMPMSL1

06/09/81 16:27:29

TAX LISTING BY NAME

PAGE

EMP NO	DEP NO	NAME	INIT	M S	NO	REG HRS	OTIME HRS	RATE	GROSS	TAX
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22236	124	BROWN	HY	S S	2		.00	200.00	200.00	30.00
25781	125	COOPER	IG	S H	2	40.00	.00	4.50	180.00	26.00
39840	124	DAVIS	TV	M H	1	40.00	.00	2.50	100.00	
47124	123	EVANS	AS	M S	2		.00	350.00	350.00	90.00
66031	123	FOX	FL	S H	3	40.00	3.00	3.50	155.75	8.08
68726	124	GREEN	KR	M S			.00	400.00	400.00	160.00
73315	125	HOLMES	EB	S S	1		.00	100.00	100.00	
74249	123	IRVING	UL	M S	3		.00	250.00	250.00	17.50
80081	125	JONES	CO	S H		35.00	.00	4.00	140.00	28.00
86789	123	KELLER	ND	M H	1	40.00	.00	3.00	120.00	
98570	124	LAKE	MP	S S	4		.00	300.00	300.00	60.00

TOTAL NUMBER OF RECORDS PROCESSED 12



06/09/81 16:27:50

TAX LISTING BY NAME WITHIN SALHR

PAGE

EMP NO	DEP NO	NAME	INIT	M S	NO	REG HRS	OTIME HRS	RATE	GROSS	TAX
4416	124	ADAMS	WJ	M H		40.00	5.00	2.00	95.00	
25781	125	COOPER	IG	S H	2	40.00	.00	4.50	180.00	26.00
39840	124	DAVIS	TV	M H	1	40.00	.00	2.50	100.00	
66031	123	FOX	FL	S H	3	40.00	3.00	3.50	155.75	8.08
80081	125	JONES	CO	S H		35.00	.00	4.00	140.00	28.00
86789	123	KELLER	ND	M H	1	40.00	.00	3.00	120.00	
22236	124	BROWN	HY	S S	2		.00	200.00	200.00	30.00
47124	123	EVANS	AS	M S	2		.00	350.00	350.00	90.00
68726	124	GREEN	KR	M S			.00	400.00	400.00	160.00
3315	125	HOLMES	EB	S S	1		.00	100.00	100.00	
74249	123	IRVING	UL	M S	3		.00	250.00	250.00	17.50
98570	124	LAKE	MP	S S	4		.00	300.00	300.00	60.00

TOTAL NUMBER OF RECORDS PROCESSED 12



06/09/81 16:27:58

TAX LISTING BY NAME FOR MARRIED

PAGE

EMP NO	DEP NO	NAME	INIT	M S	NO	REG HRS	OTIME HRS	RATE	GROSS	TAX
4416	124	ADAMS	WJ	M	H	40.00	5.00	2.00	95.00	
39840	124	DAVIS	TV	M	H	1 40.00	.00	2.50	100.00	
47124	123	EVANS	AS	M	S	2	.00	350.00	350.00	90.00
68726	124	GREEN	KR	M	S		.00	400.00	400.00	160.00
74249	123	IRVING	UL	M	S	3	.00	250.00	250.00	17.50
86789	123	KELLER	ND	M	H	1 40.00	.00	3.00	120.00	

TOTAL NUMBER OF RECORDS PROCESSED 6

# DATA DESCRIPTION SPECIFICATIONS

File	Keying Instruction	Graphic Key							
Programmer									

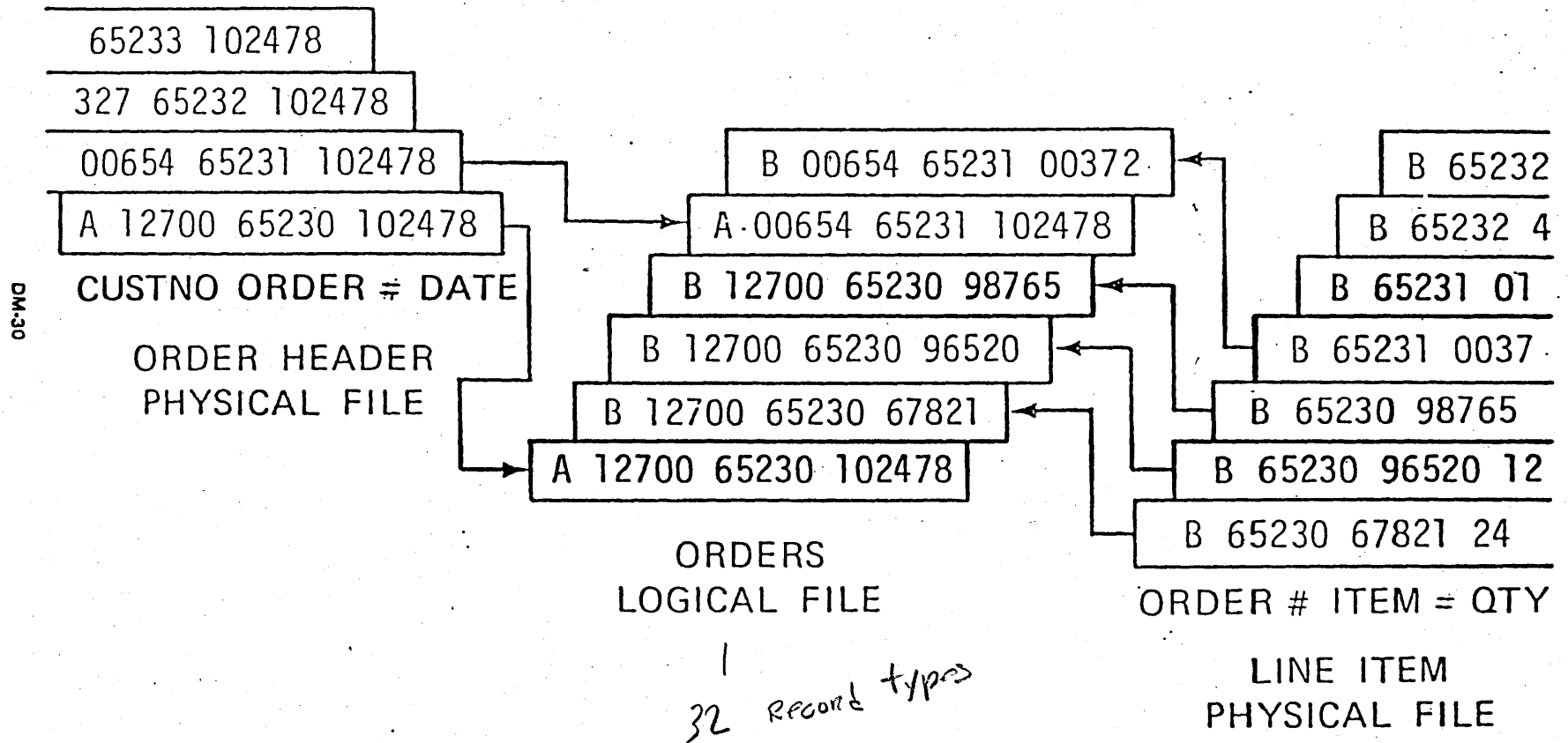
Description	Page	of
-------------	------	----

Sequence Number	Form Type	And/Or/Comment (A/O/*)	Conditioning					Name Type (W/R/K/S/O)	Name	Reference (R)	Length	Data Type (A/P/S/B A/S/X/Y;N/A/W)	Decimal Positions	Usage (B/O/I/B/H/M)	Location		Functions
			Condition Name												Line	Pos	
			Indicator	Not (N)	Indicator	Not (N)	Indicator										
1																	
2																	
3																	
4																	
5																	
6	A						R	EMP1									PF1(EMPMAST)
7	A																TEXT('EMPLOYEE LOGICAL FILE FOR +
8	A																ALL MARRIED IN NAME SEQUENCE')
9	A						K	NAME									
10	A						S	MARST									EMP(EQ 'M')
11	A																
12	A																
13	A																
14	A																
15	A																
16	A																
17	A																
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77	A																
78	A																
79	A																
80	A																

\*Number of sheets per pad may vary slightly.

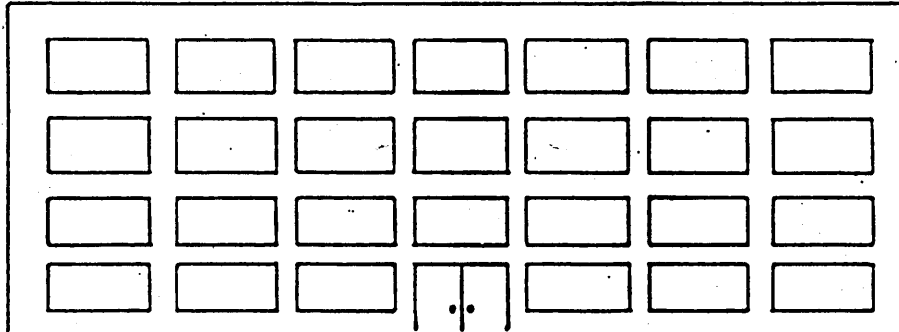
CRTLF EMPMS 4

# LOGICAL FILE USING MULTIPLE PHYSICAL FILES

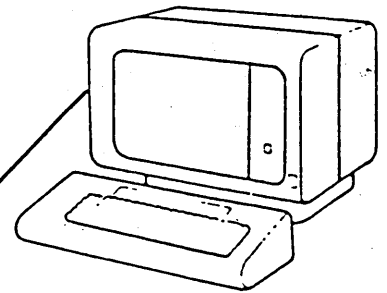




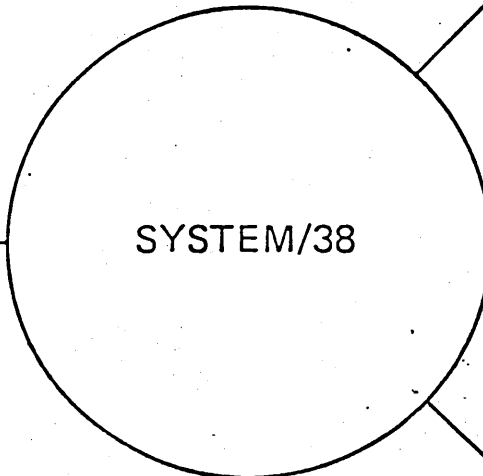
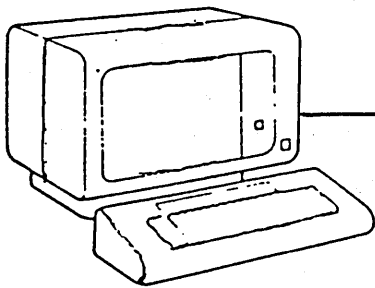
# THE HOTEL APPLICATION



BAR

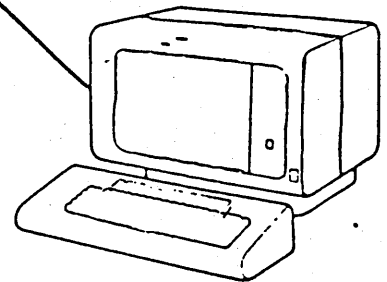


FRONT DESK



SYSTEM/38

RESTAURANT



## ROMFILP PHYSICAL FILE OF ROOMS

(100 ROOMS)

FLOOR	1,0	
ROOM	2,0	
RATE	6,2	Room rate per night
BEDNO	1,0	Number of beds
ALLCTD	1,A	Allocated? (Y=yes, N=no)
FROMDT	6,0	From date
TODT	6,0	To date
TOTCHG	7,2	Total charges to this room

DB2

## GSTFILP PHYSICAL FILE OF GUESTS

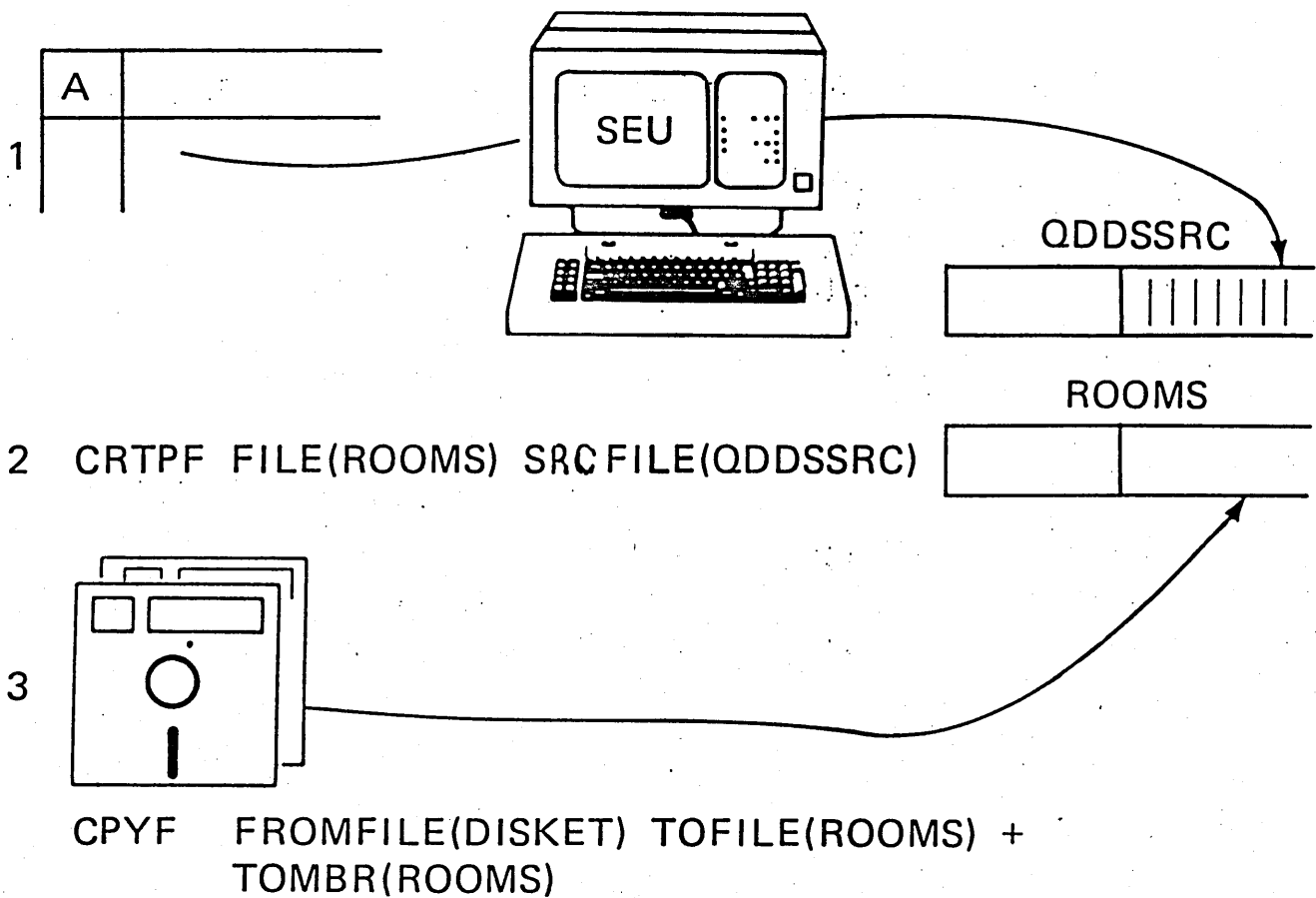
NAME	20,A	
TITLE	1,0	1-Mr 2-Ms 3-Dr
FLOOR	1,0	
ROOM	2,0	
ADDR1	30,A	
ADDR2	30,A	
CNTRY	10,A	
CRDTNO	14,0	Credit card number
CRDTTP	2,A	Credit card type
CMPNY	20,A	Company name
CMPAD1	30,A	address
CMPAD2	30,A	-
CMPCTY	10,A	-

## CHGFILP PHYSICAL FILE OF ROOM CHARGES

FLOOR	1,0	
ROOM	2,0	
CHGDT	6,0	Date of charge
CHGTYP	1,A	B - bar R - restaurant P - phone D - daily room charge O - other
CHGAMT	6,2	Amount
CHGTIM	6,0	Time entered system
BILLNO	6,0	Receipt number

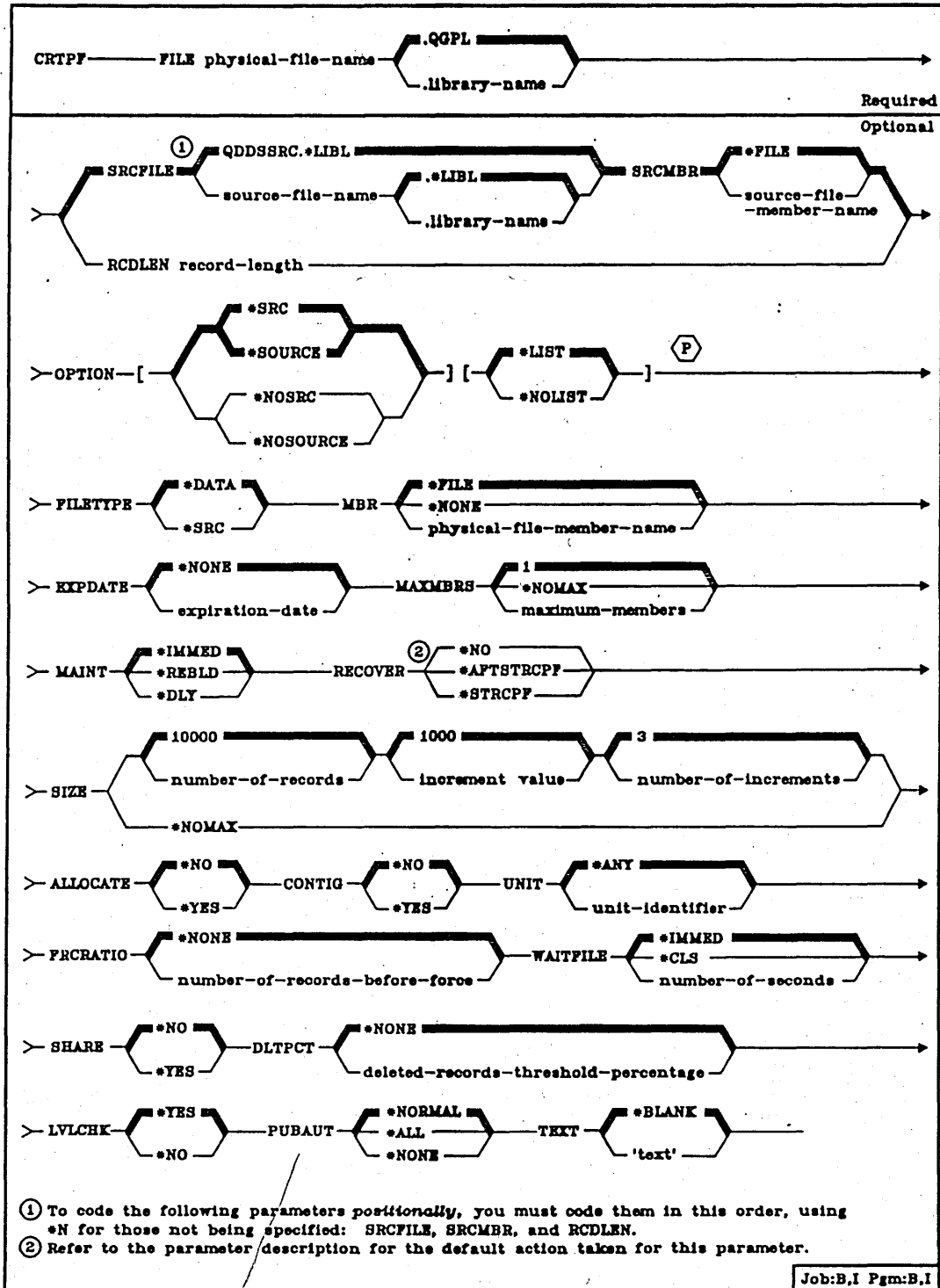
DB4

## CREATING A PHYSICAL FILE



DB5

CRTPF  
(Diagram)

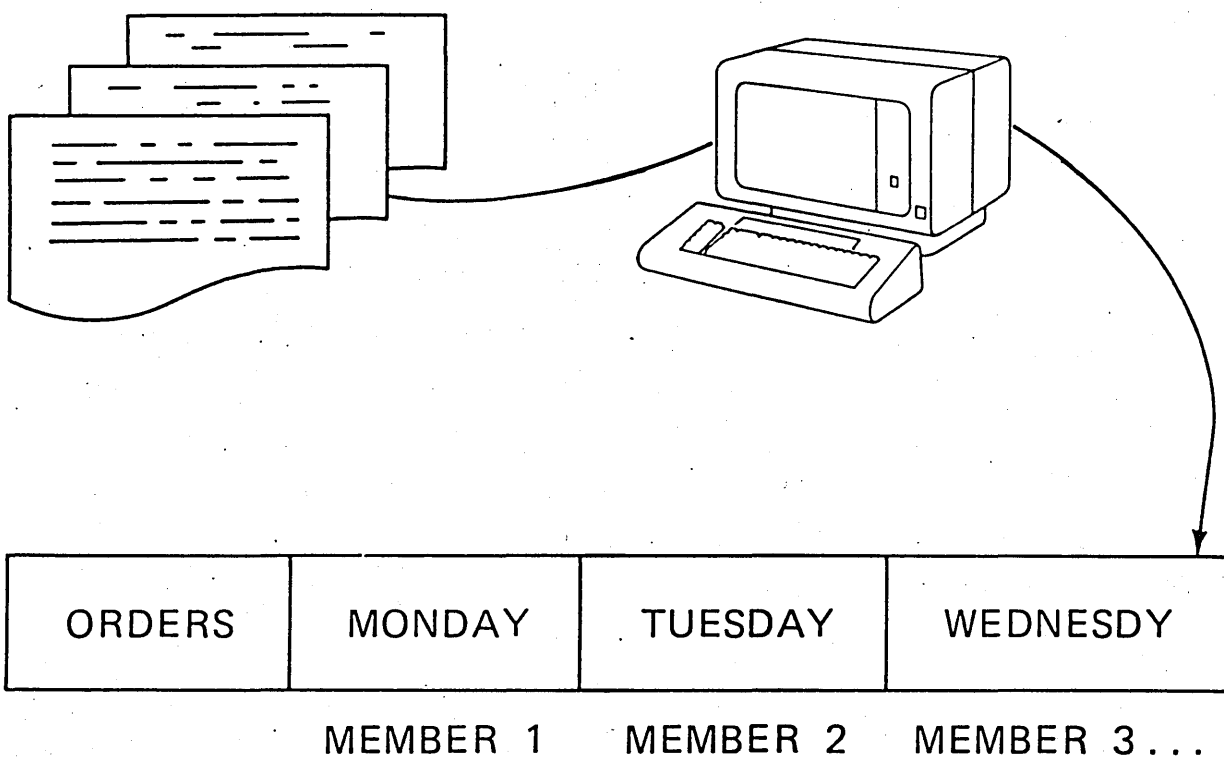


Job:B,I Pgm:B,I

check  
date

Security

## DATA BASE FILE MEMBERS



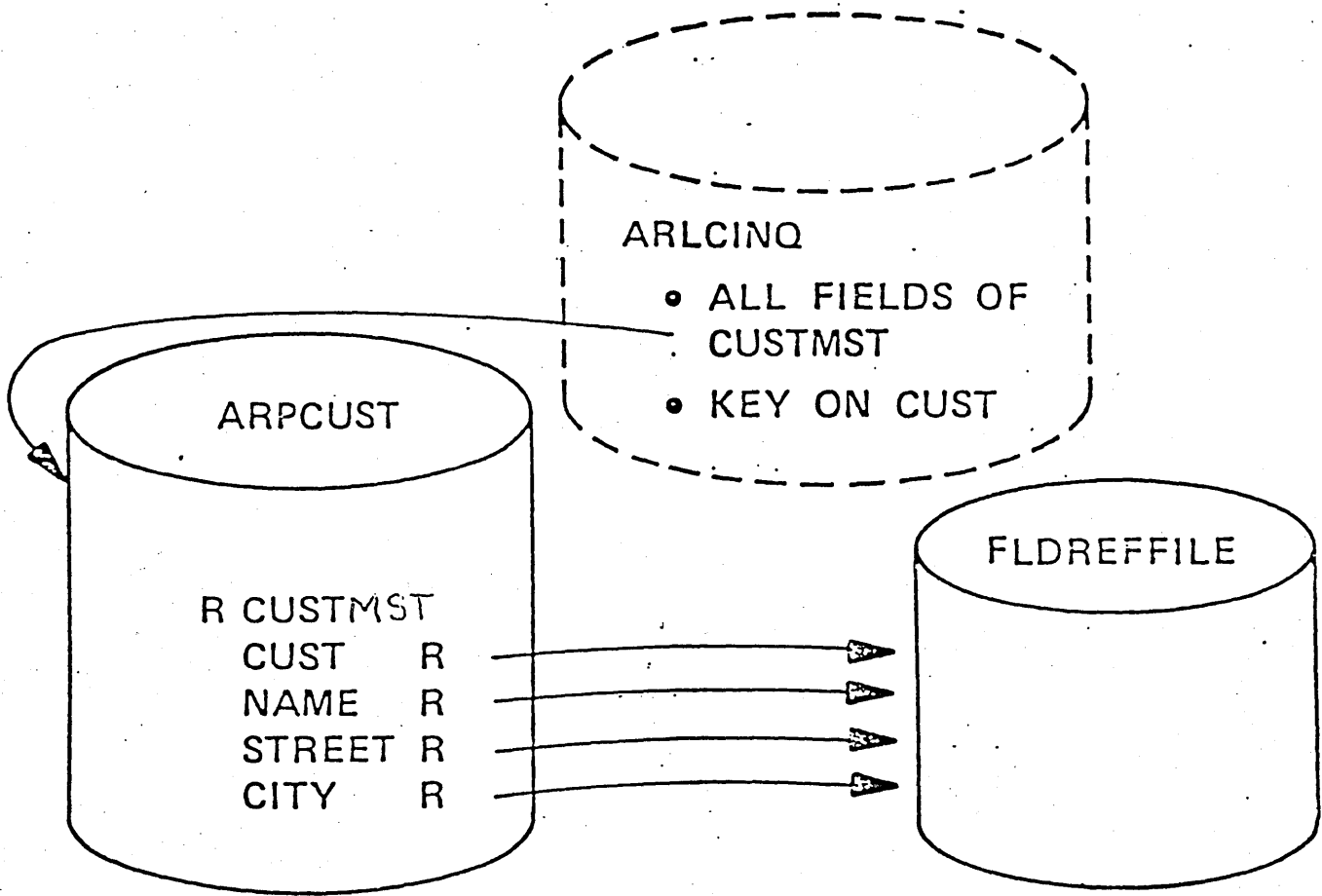








# REFERENCING FIELDS



CRTPF FLDREFFILE

CRTPF ARPCUST

CRTL F ARLCINQ

# DDS SOURCE ENTRY

D	PHYSICAL	DDS	DETAIL	ENTRY	SPEC	RMFTP		
Line	Column	1	2	3	4	5	6	7
000010	A*							
000020	A		ROOM		2	0	COLHDG ('ROOM')	
000030	A		RATE		6	2	COLHDG ('RATE')	
000040	A						EDTCDE (J)	

Line	Record	format	key	Fieldname	Ref	length	dec	type	edit	keyword
000050				BEDNO		1	0			

## COMMAND ENTRY FORMAT

COMMAND ENTRY DISPLAY  
::CPYF PAY TOFILE(PAYCPY) OPTION(REPLACE)  
Member 'STAFF' copied to 'PAYCPY'  
Member 'BRANCH' copied to 'PAYCPY'  
::CRTPF FILE(ROMFILP.GALIB) EXPDATE (790101) PUBAUT(\*NONE)  
TEXT ('Room Master Physical File') \_\_\_\_\_

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PHYSICAL FILE

FILE DESCRIPTION

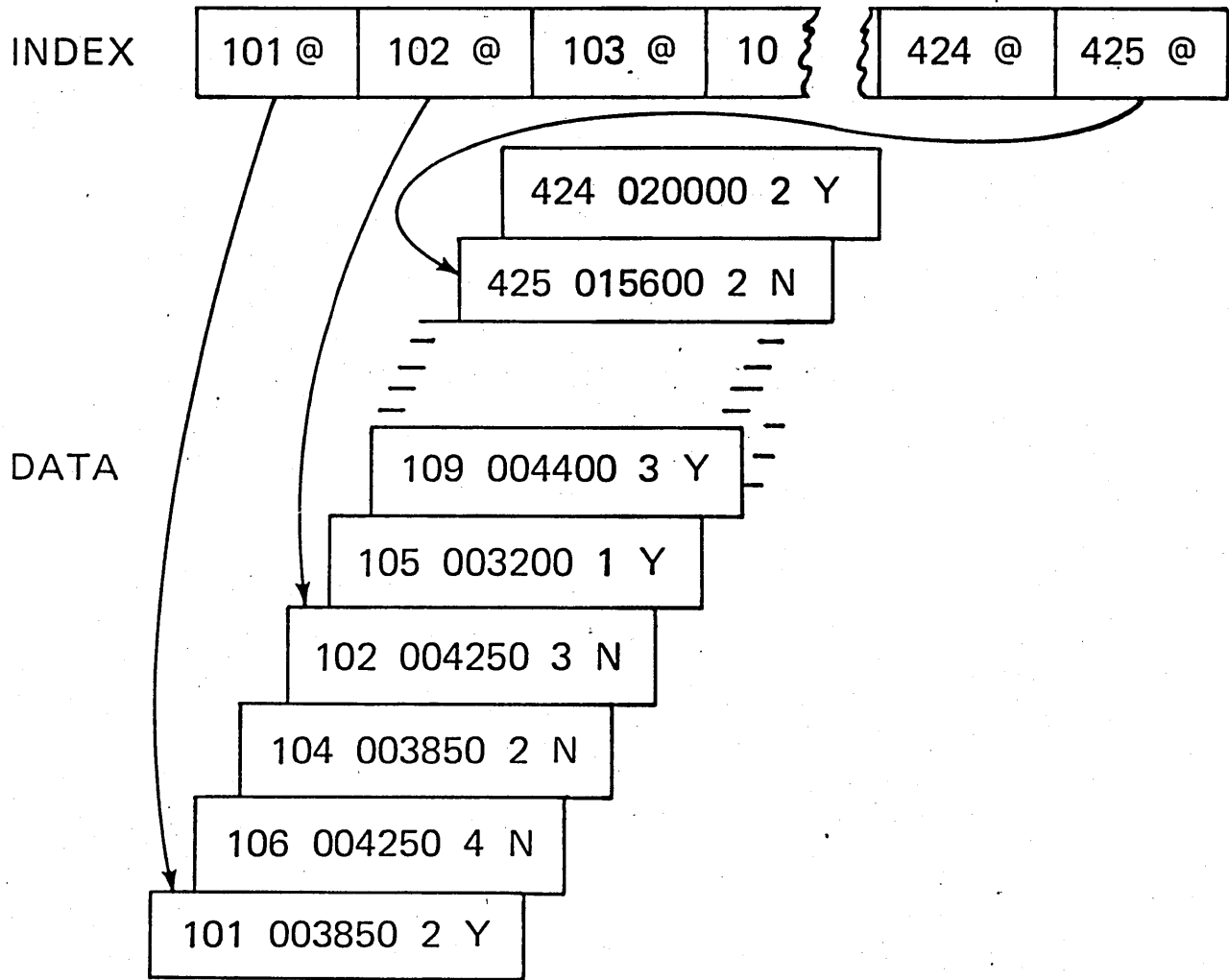
MEMBER

FORMAT ... RMFMTP	101	102	103	104	105		
ACCESS PATH .. ARRIVAL SEQUENCE							

DB11

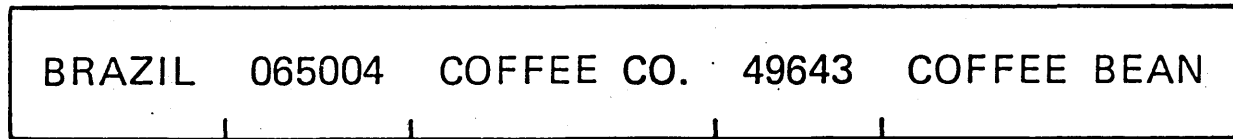
ROMFILP

# INDEXED FILE ORGANIZATION

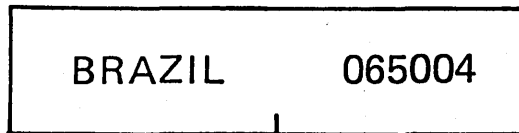


# COMPOSITE KEYS

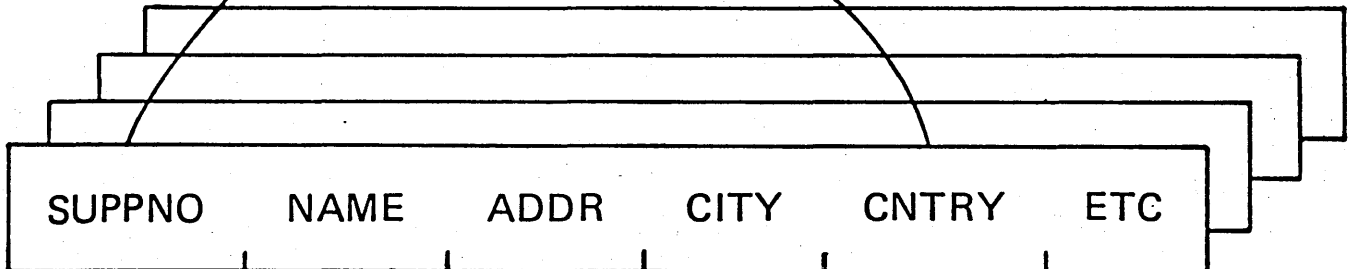
LOGICAL  
FILE



COMPOSITE  
KEY



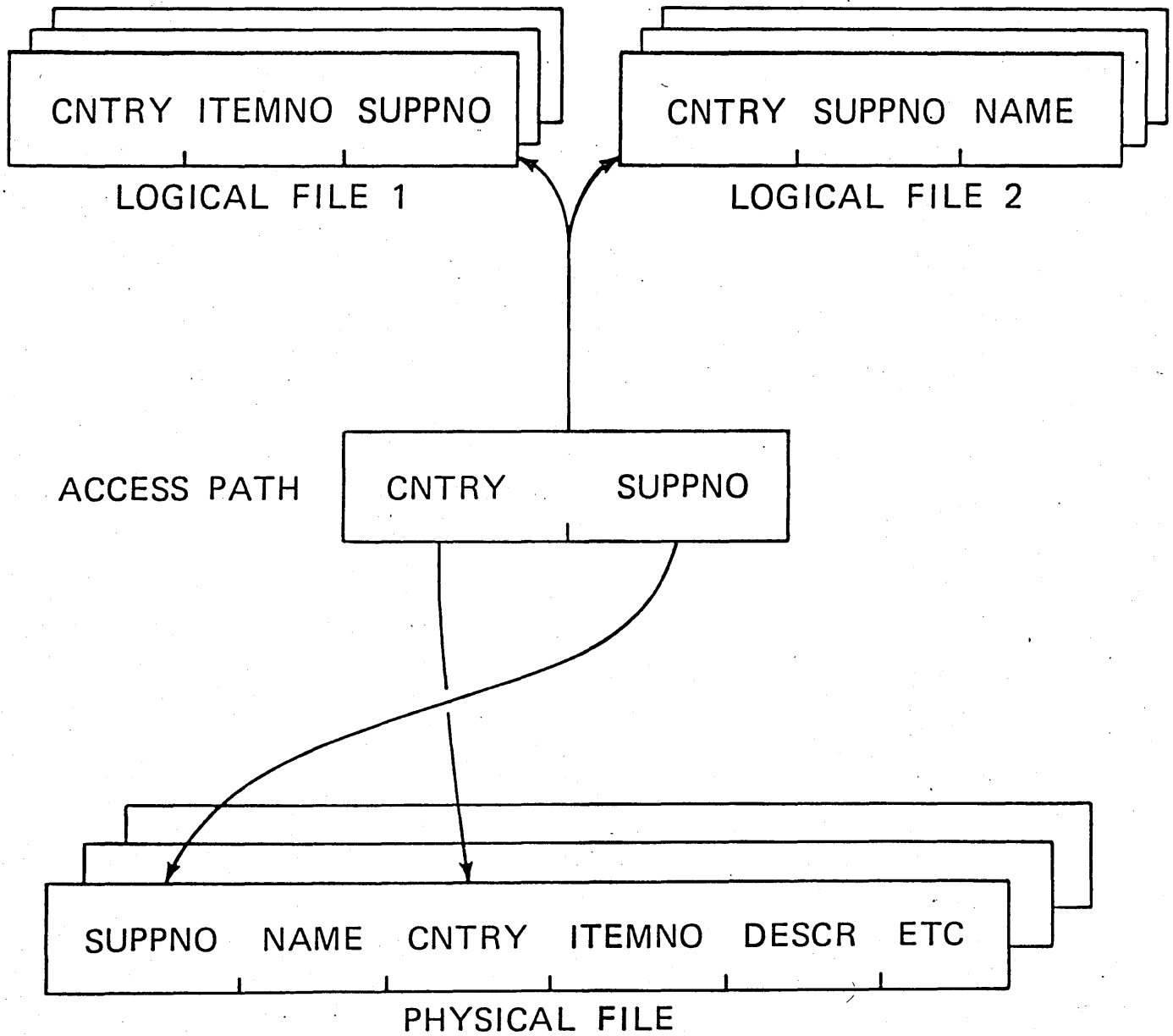
PHYSICAL  
FILE



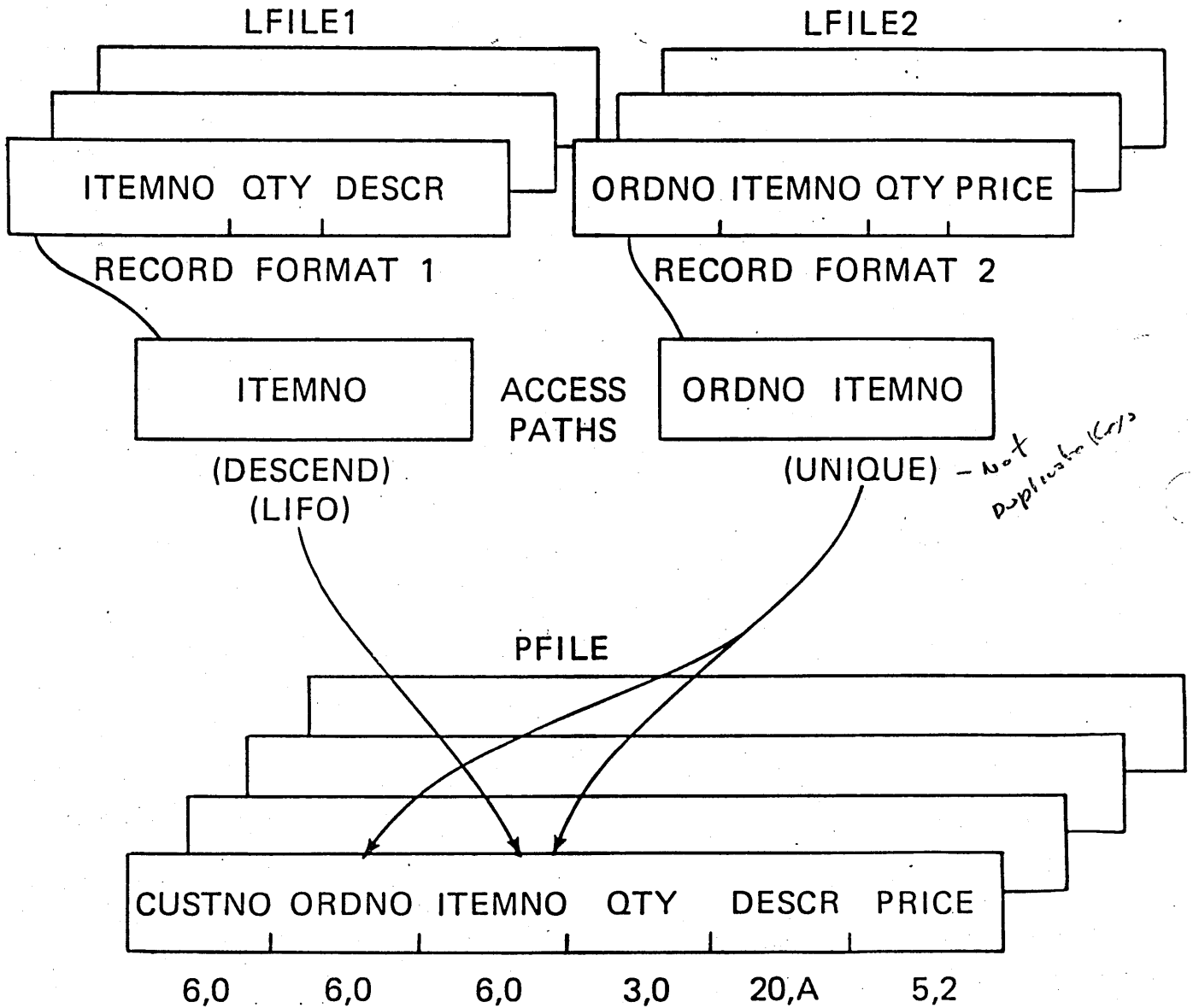




# SHARED ACCESS PATH



# DUPLICATE KEYS



# LOGICAL OVER SEVERAL PHYSICAL FILES

Logical file

ITEM1 DESCR ETC.
WHSE4 AISLE3 BIN6 QTY
SUPPLIER# NAME TERMS ETC
ITEM2 DESCR ETC.
WHSE5 AISLE2 BIN5 QTY
WHSE6 AISLE3 BIN2 QTY
SUPPLIER# NAME TERMS ETC
ITEM3 DESCR ETC.
WHSE2 AISLE1 BIN1 QTY
WHSE3 AISLE1 BIN1 QTY
WHSE4 AISLE3 BIN2 QTY
SUPPLIER# NAME TERMS ETC

Access path

Access by key  
ITEM#  
-include all records

Physical files

ITEM MASTER FILE

ITEM1 DESCR ETC.
ITEM2 DESCR ETC.
ITEM3 DESCR ETC.
ITEM4 DESCR ETC.

WAREHOUSE FILE

ITEM1 WHSE4 AISLE3 BIN6 QTY
ITEM2 WHSE5 AISLE2 BIN5 QTY
ITEM2 WHSE6 AISLE3 BIN2 QTY
ITEM3 WHSE2 AISLE1 BIN1 QTY
ITEM3 WHSE3 AISLE1 BIN1 QTY
ITEM3 WHSE4 AISLE3 BIN2 QTY
ITEM4 WHSE1 AISLE1 BIN6 QTY

SUPPLIERS FILE

ITEM1 SUPPLIER# NAME TERMS ETC.
ITEM2 SUPPLIER# NAME TERMS ETC.
ITEM3 SUPPLIER# NAME TERMS ETC.

DB17

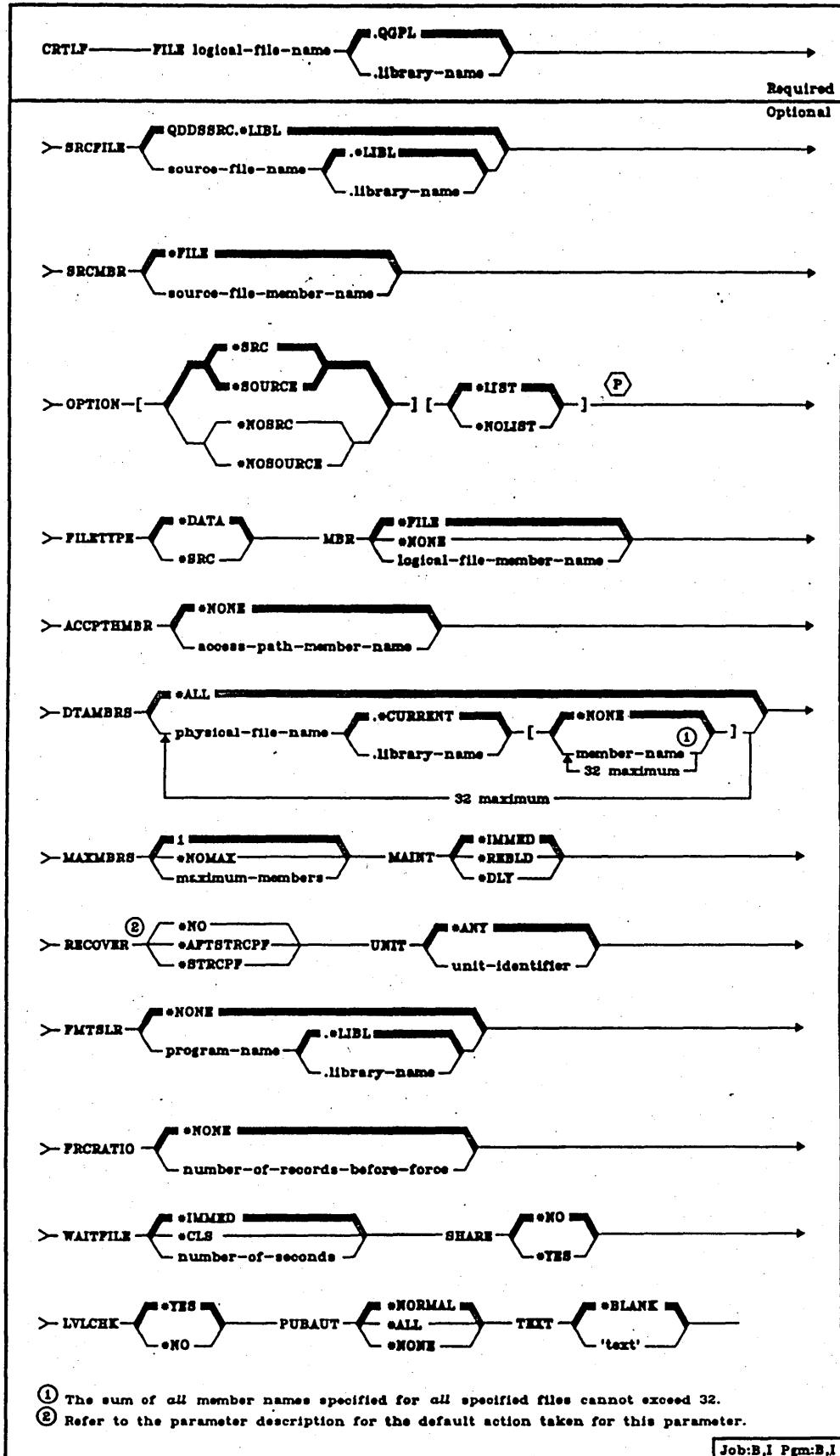


## CREATING A LOGICAL FILE

COMMAND ENTRY DISPLAY

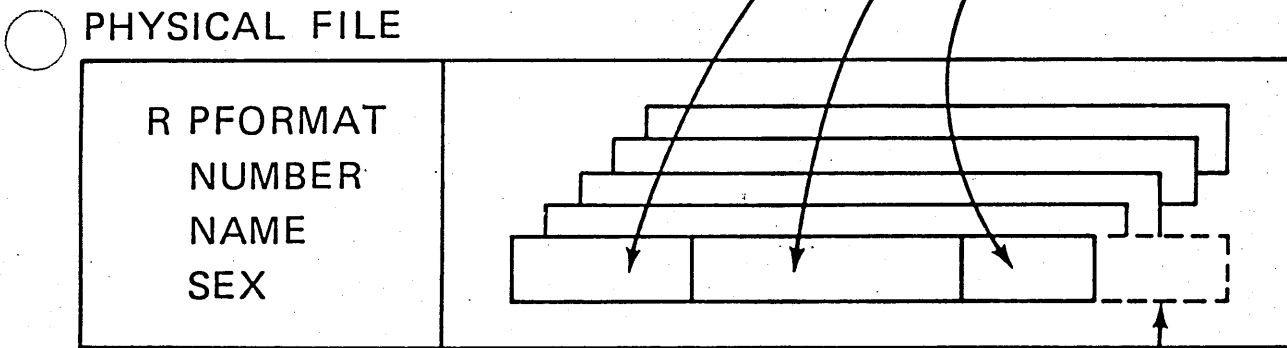
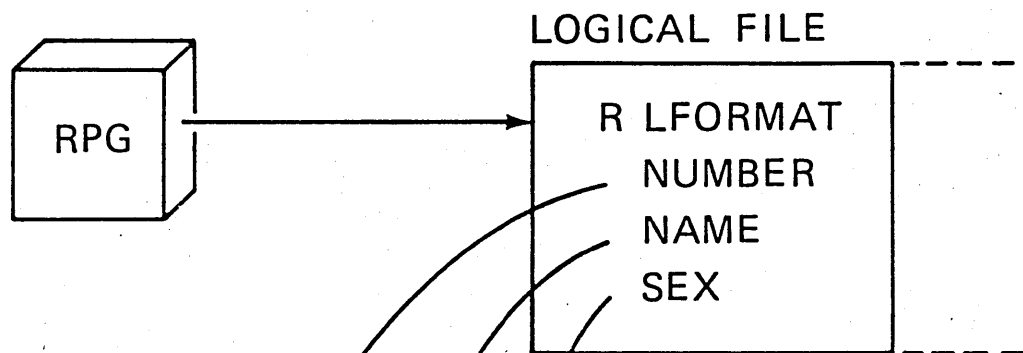
```
::CRTL F FILE(BOOKDFIL.GALIB) MAINT(*REBLD)  
LVLCHK(*NO) PUBAUT(*ALL)  
TEXT('2-BEDS BOOKED 790216')_
```

DB20



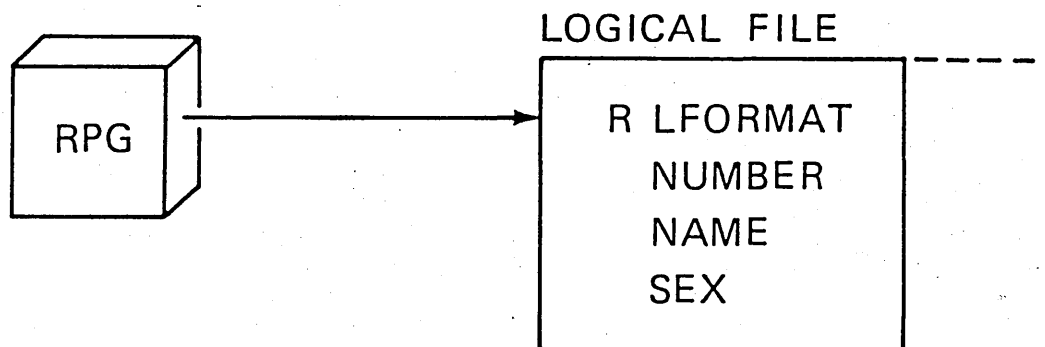
Job:B,I Pgm:B,I

# ADDING A FIELD

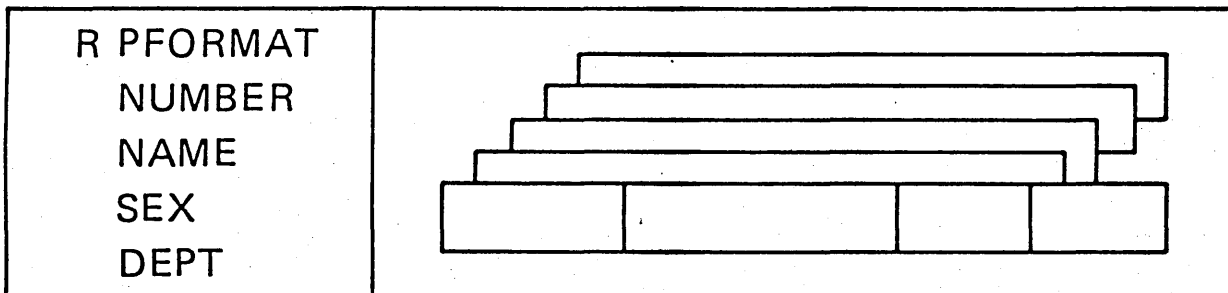




## ADDING A FIELD



## PHYSICAL FILE



1. CHANGE DDS TO ADD FIELD TO PHYSICAL FILE
2. RE-CREATE PHYSICAL FILE IN ANOTHER LIBRARY
3. LOCATE ALL AFFECTED LOGICAL FILES & PROGRAMS
4. RESTRICT USAGE OF OLD PHYSICAL FILE
5. COPY DATA (OLD TO NEW) & ENLARGE RECORDS
6. RE-CREATE LOGICAL FILES

*Display  
DSP DBR  
ATTN: BR  
DATE 12/12/10*

NOTE: LVLCHK( NO) IN CL IF ADDED FIELD IS AT END OF RECORD  
RECOMPILE PROGRAMS IF FIELD IS INSERTED









## DESK EXERCISE NO1

### DDS PHYSICAL FILE

RECORD FORMAT	— PAYMAST
TITLE	— PAYROLL MASTER
EMPNO	— 5,0
NAME	— 25
SSNO	— 9,0
RATE	— 4,2
DUES	— 3,2
BLUEX	— 3,2
KEY	— EMPNO



# DATA DESCRIPTION SPECIFICATIONS

**IBM** International Business Machines Corporation

GX21 7754 0 UM 050  
Printed in U.S.A.

File <b>ROMFILL</b>	Keying Instruction	Graphic					
Programmer <b>MN</b>	Date <b>6/78</b>	Key					

Description <b>LOGICAL FILE</b>	Page <b>1</b> of <b>1</b>
------------------------------------	---------------------------

Sequence Number	Form Type A and/or Comment (A,O,*) Not (N)	Conditioning					Name	Length	Reference (R)	Data Type (A,B,I,N,P,S,W,X,Y) Decimal Positions Usage (L,O,B,H,M)	Location		Functions
		Indicator	Not (N)	Indicator	Not (N)	Indicator					Line	Pos	
1	A*						LOGICAL FILE BASED ON THE ROOM MASTER FILE						
2	A*												
3	A											UNIQUE	
4	A					R	RMFMTL					PFILE(ROMFILP.GALIB)	
5	A											TEXT('LOGICAL FILE FORMAT BASED ON +	
6	A											ROOM MASTER FILE')	
7	A						ROOMNO					CONCAT(FLOOR ROOM) 'COLHDG('ROOM')	
8	A						RATE						
9	A						BEDNO						
10	A						ALLCTD						
11	A						FROMDT						
12	A						TODT						
13	A						TOTCHG						
14	A					K	FLOOR						
15	A					K	ROOM						
16	A												
17	A												
18	A												
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100	A												

DB28

\*Number of sheets per card may vary slightly.







DESK EXERCISE NO2

DDS LOGICAL FILE  
(FOR EMPLOYEE LISTING BY SSNO.)

FORMAT NAME – SSNOLIST

NEED

EMPLOYEE NO.

NAME

RATE

SOCIAL SECURITY NO.

ACCESS PATH BY

SOCIAL SECURITY NO.



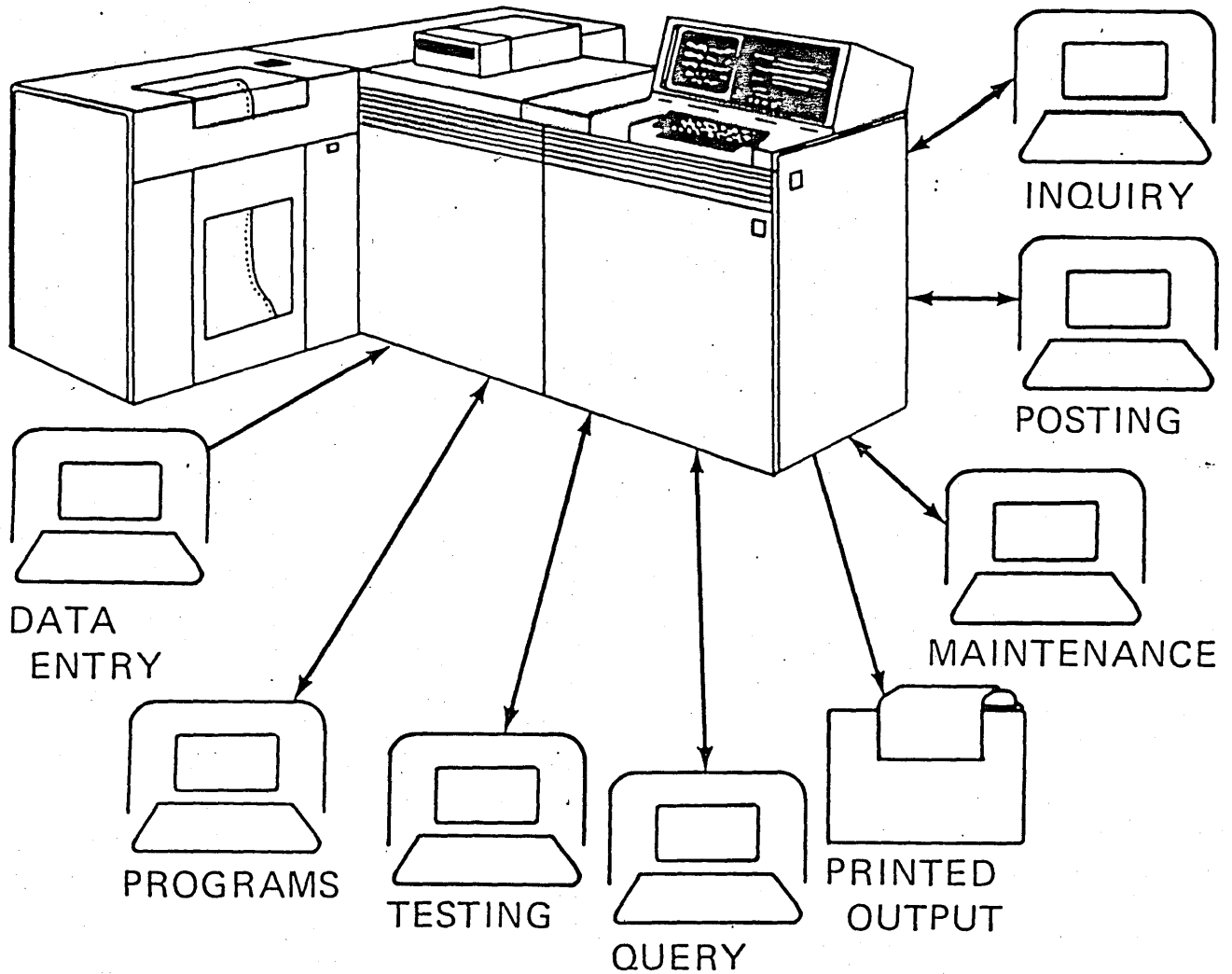
## DATA BASE DATA MANAGEMENT SUMMARY

- LOGICAL "VIEWS" OF SAME PHYSICAL DATA PROVIDES:
  - REDUCED REDUNDANCY
  - BETTER CONTROL
- ONE OR MORE APPLICATIONS SERVED IN AN OPTIMAL FASHION
  - FILE UPDATES IMMEDIATELY AVAILABLE TO ALL USERS
  - ACCESS PATHS ALWAYS CURRENT (NO NEED TO SORT)
- DATA IS INDEPENDENT OF PROGRAMS
  - ALL LOGICAL FILES ARE UPDATED WHENEVER THE PHYSICAL FILE IS UPDATED (WHETHER LOGICAL FILES ARE BEING USED OR NOT)
  - DATA FILES MAY BE USED IN CONJUNCTION WITH UTILITIES OR HLL PROGRAMS
- FIELD ORIENTATION LEADS TO BETTER DOCUMENTATION
- SUBSTANTIAL CODING ELIMINATED
- CHANGES TO FILE ARE MADE TO DDS, NOT PROGRAM
  - CHANGES ARE MADE IN ONLY ONE PLACE
  - PROGRAMS MAY NEED TO BE RE-COMPILED, BUT NOT CHANGED
- WITH ALL DATA PREDEFINED TO THE SYSTEM:
  - LESS CHANCE OF CODING ERRORS
  - LESS CHANCE OF KEYING ERRORS
  - PROGRAMMER MAY CONCENTRATE ON PROCESSING STEPS OF PROGRAM

**WORKSTATION**

**FACILITIES**

# S/38 Workstation Support



Places the power of the computer  
at the source of the data.





ORDER ENTRY MENU

- 01 INQUIRE INTO CUSTOMER INFO
- 02 INQUIRE INTO ITEM INFO
- 03 CUSTOMER NAME SEARCH
- 04 ORDERS BY CUSTOMER
- 05 EXISTING ORDERS
- 06 ORDER ENTRY
- 07 END OF MENU

SELECT: 03

OPERATOR ENTERS SELECTION

WS-9

PROGRAMMER MENU

Select one of the following:

1. Design/execute DFU app (app), ,(options)
2. Design/execute query app (app), ,(options)
3. Create object object name, type, pgm for CMD, (text)
4. Call program program name
5. Execute command command
6. Submit job (job name), (command)
7. Display submitted jobs
8. Edit source (srcmbr), (type), (text)
9. Design display format (srcmbr)
90. Sign off (\*NOLIST \*LIST)

Types: BSCF, CBL, CL, CLP, CMD, CMNF, DSPF, LF, PF, PRTF, RPG, TXT

Option: 3 Parm: MYFILE Type: PF Parm 2:

Command:

Text:

Src file: APPSRC Src lib: APLIB Obj lib: APLIB Jobd: APWJOB Log requests: \*YES  
CF3 - Command entry CF4 - Prompt (3 & 5 only) CF6 - DSPMSG

## VALIDITY CHECKING

ITEM NO.	WAREHOUSE LOCATION	DESCRIPTION	U/M	UNIT PRICE	UNIT COST	ON HAND	ON ORDER	MIN. BAL.	MAX. BAL.
(A)			(C)	(D)	(E)	(E)	(E)	(F)	(G)

WS-13

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>(A) SELF CHECK</li> <li>(B) MANDATORY ENTER</li> <li>(C) COMPARE TO A LIST</li> <li>(D) MUST BE GT ZERO</li> </ul> | <ul style="list-style-type: none"> <li>(E) MUST BE NUMERIC</li> <li>(F) MUST BE WITHIN THE RANGE OF 100 TO 5000</li> <li>(G) MUST BE WITHIN THE RANGE OF 750 TO 10,000</li> </ul> |
|---|---|

FIELD DISPLAY OPTIONS

HIGH INTENSITY

UNDERLINE

BLINKING

**REVERSE IMAGE**

|C|O|L|U|M|N| |S|E|P|A|R|A|T|O|R|S

WS-16

LINE

LINE	ITEM #	QUANTITY	ITEM DESCRIPTION	UNIT PRICE	EXTENSION
01	ORDER #	CUSTOMER NAME	DATE	CUSTOMER ORDER #	
02	NNNN	X	X	NN/NN/NN	N
03	CUSTOMER #	X	X	STATUS	SHIP VIA
04	NNNN	X	X	XIX NNN NN	X-X
05	LINE	ITEM #	QUANTITY	ITEM DESCRIPTION	UNIT PRICE
06	NN	NNNN	NN, NNN	X	NN, NNN, NNN-NN
07					
08					
09					
10					
11					
12					
13					
14					









## **SUBFILE**

**A GROUP OF RECORDS HAVING THE SAME  
RECORD FORMAT AND ARE READ FROM AND  
WRITTEN TO A DISPLAY DEVICE  
IN ONE OPERATION**

### **USES:**

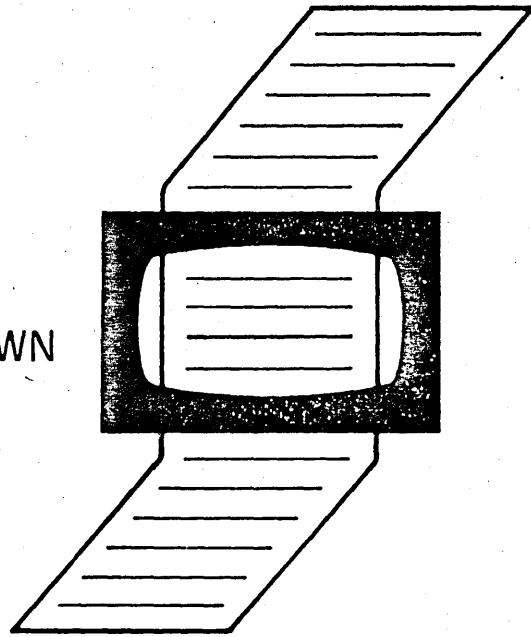
**INPUT**

**MODIFY**

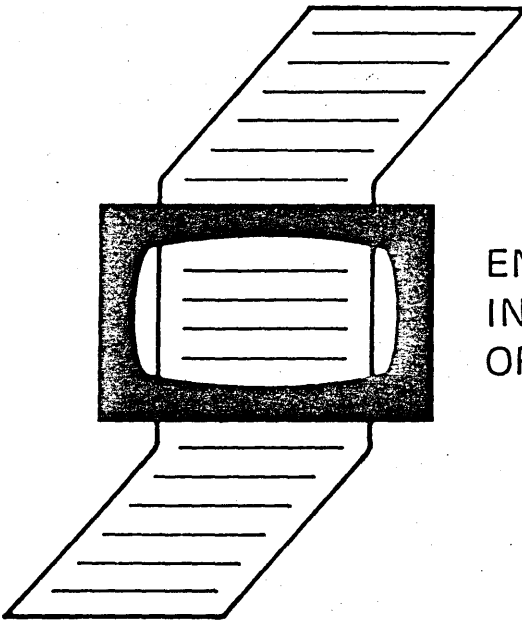
**DISPLAY**

# CONCEPTS: SUBFILE USES

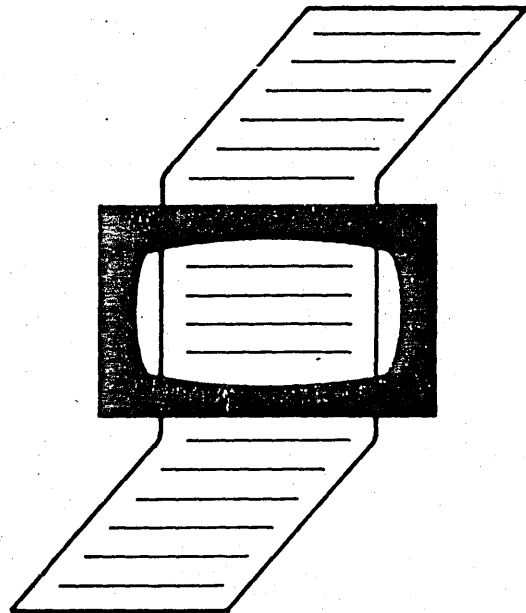
SEARCH MASTER FILES  
WHEN "KEY" FIELD UNKNOWN



ENTER TRANSACTIONS  
INTERACTIVELY IN  
OPTIMAL FASHION



DISPLAY LOGICAL VIEW  
PLUS ASSOCIATED  
FIELDS FROM PHYSICAL  
MASTER



## ALPHABETIC SEARCH

CUSTOMER NAME	ACCOUNT #
SMITH, A. A.	974320
SMITH, A. B.	886565
SMITH, A. C.	923216
SMITH, A. D.	400362
SMITH, A. E.	756238
SMITH, A. EUGENE	134903
SMITH, A. F.	992444
SMITH, A. G.	210345
SMITH, A. GARY	082144
SMITH, A. H.	081067
SMITH, A. J.	060869

WS-22

## USING A SUBFILE FOR CASH RECEIPTS

ENTER CUSTOMER PAYMENTS. WHEN SCREEN IS FILLED,  
PRESS ROLL UP KEY. WHEN LAST PAYMENT IS KEYED,  
PRESS ENTER.

CUST #	INVOICE #	CHECK #	AMOUNT
082144	04105	26721	527.50
082144	04374	26721	426.00
082144	04801	267_	

WS-24

**SUBFILES**  
**— GENERAL RULES —**

- ARE DEFINED WITHIN A DISPLAY FILE
  
- REQUIRE THE DEFINITION OF TWO RECORD FORMATS
  - SUBFILE RECORD (ALWAYS *FIRST!*)
  
  - SUBFILE CONTROL RECORD (ALWAYS FOLLOWS)

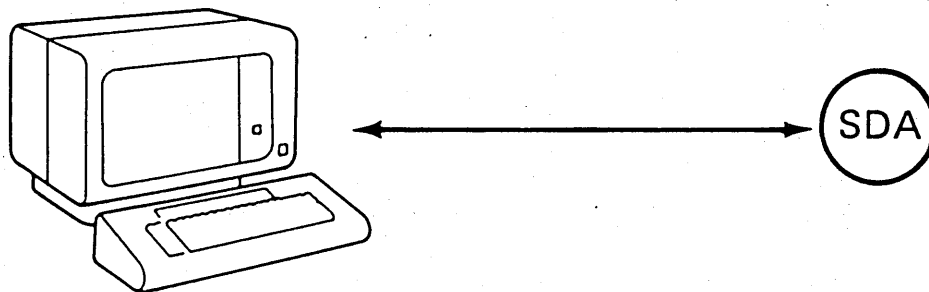








## SDA ALTERNATE METHOD



PROGRAMMER —

- LAYS OUT DISPLAY ON WS
- PROVIDES DETAIL INFORMATION FOR FIELDS

SDA —

- GENERATES DISPLAY FILE



## WORK STATION DATA MANAGEMENT

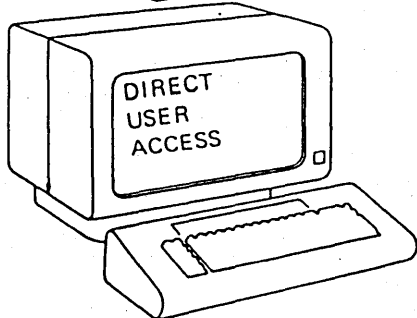
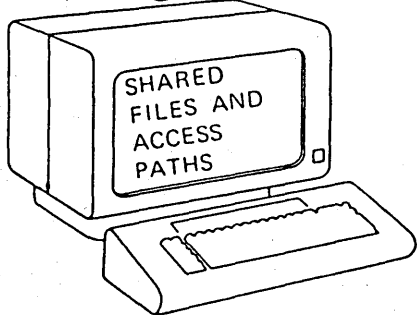
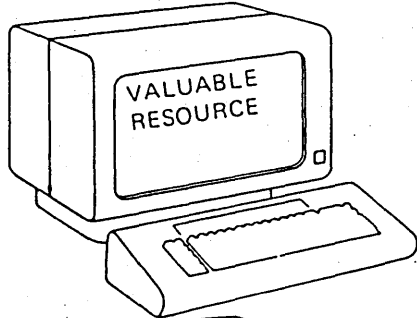
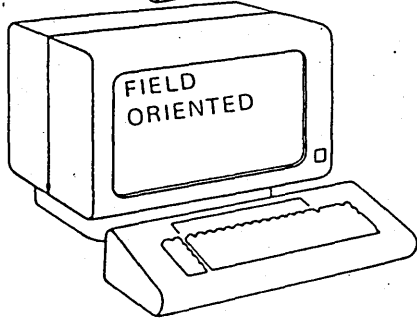
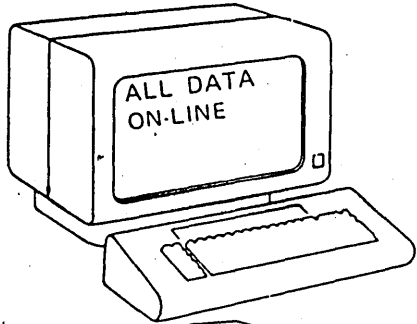
- ALL SYSTEM FUNCTIONS MAY BE INVOKED FROM ANY WORK STATION
- VALIDITY CHECKING AND HIGHLIGHTING CAPABILITIES
- EXTENSIVE PROGRAMMING SUPPORT
- IDU FOR THE ROUTINE JOBS
- EXTENDS THE POWER OF THE COMPUTER BEYOND THE CONFINES OF A ROOM

**DATA**

**ADMINISTRATION**

## DATA BASE

### MAIN POINTS



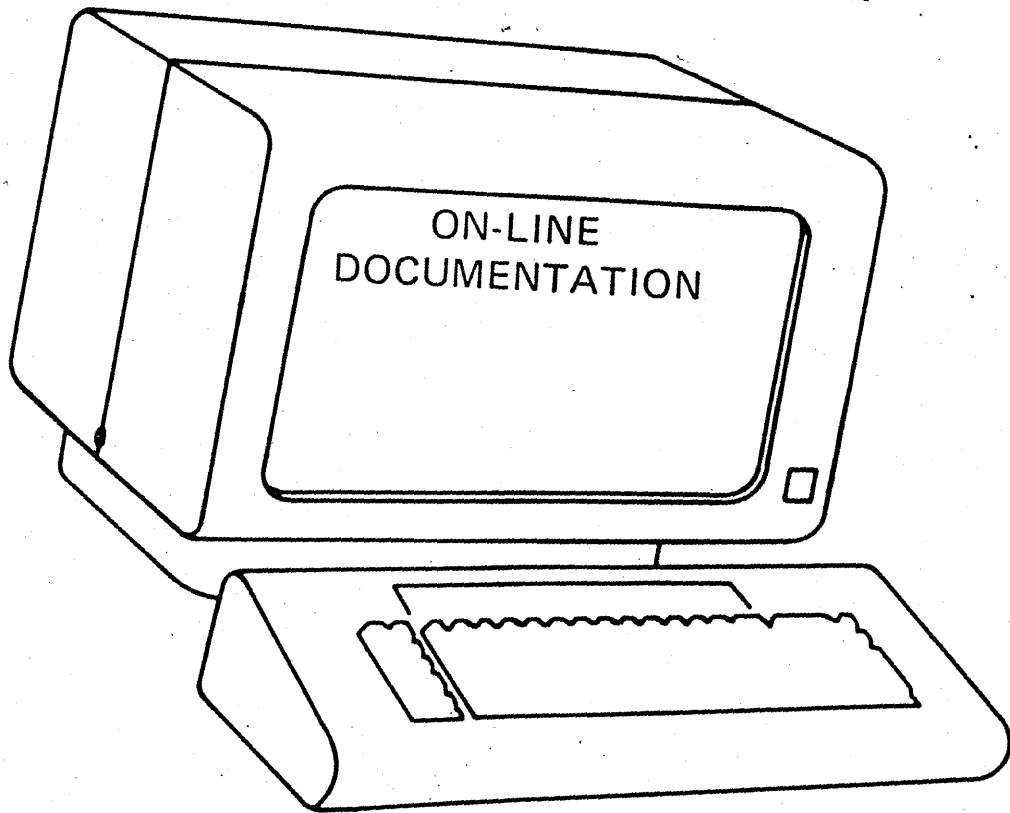
### CONSIDERATIONS

- MUST BE CURRENT AND ACCURATE.
- MUST HAVE SOPHISTICATED DOCUMENTATION AND FOLLOW NAMING CONVENTION METHOD.
- MUST BE PROTECTED WITH "BACK-UP" COPIES.
- MUST DETERMINE THE CONSEQUENCES OF A "SIMPLE" CHANGE.
- MUST INSURE SECURITY OF CONFIDENTIAL DATA.

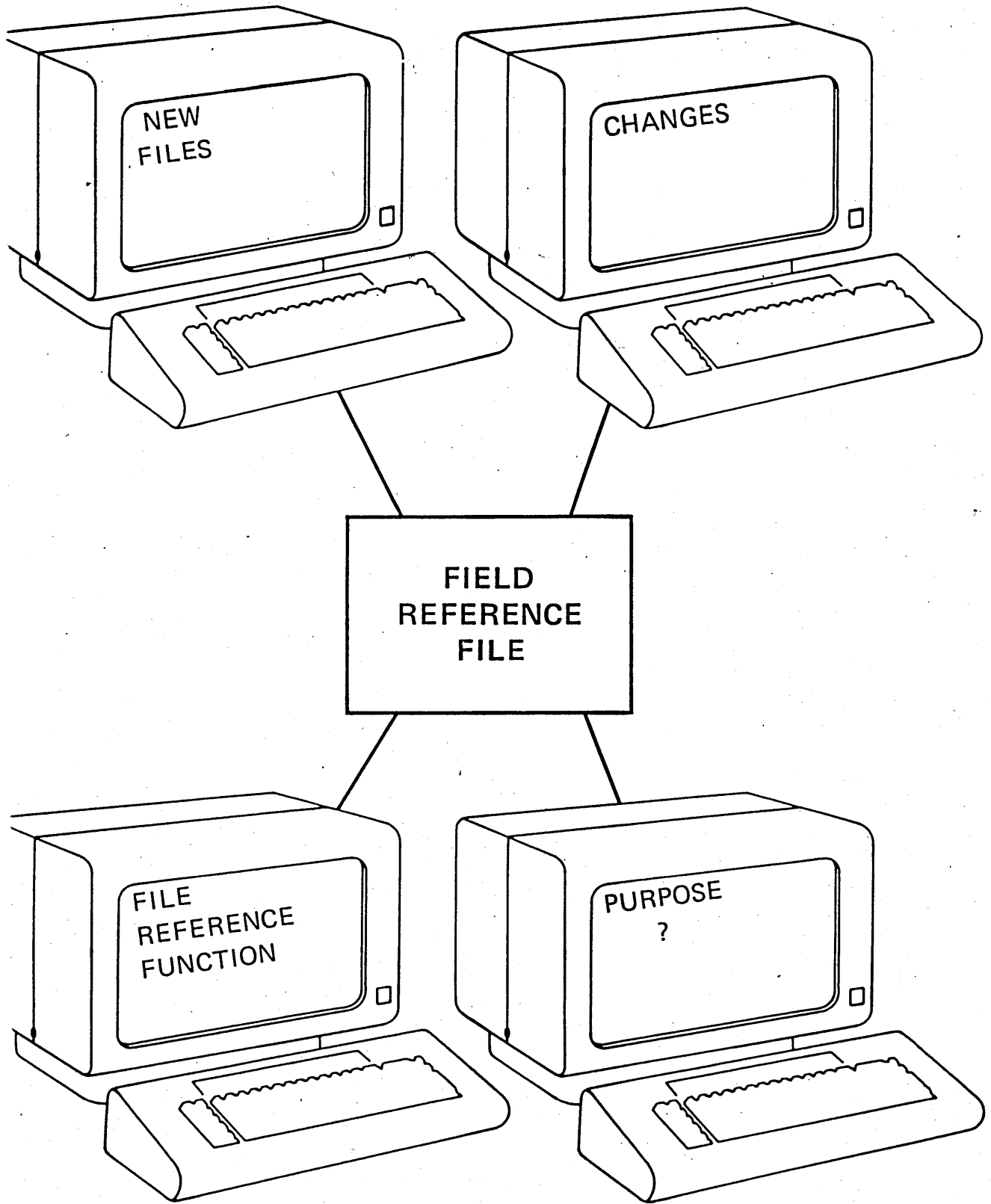
## DATA ADMINISTRATION FACILITIES

- FIELD REFERENCE FILE
- FILE REFERENCE FUNCTION
- DATA DIRECTORY
- SECURITY
- LIBRARIES
- SAVE/RESTORE

# FIELD REFERENCE FILE



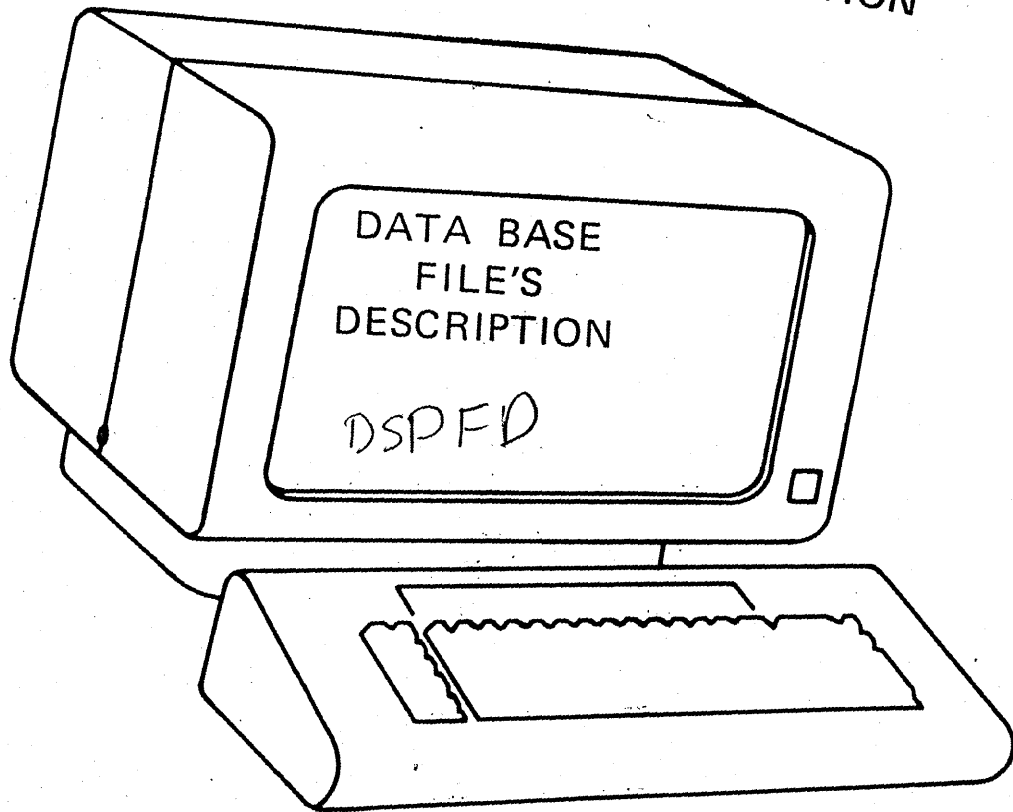
- FILES
- RECORDS
- FIELDS
- COMMENTS



DA-4

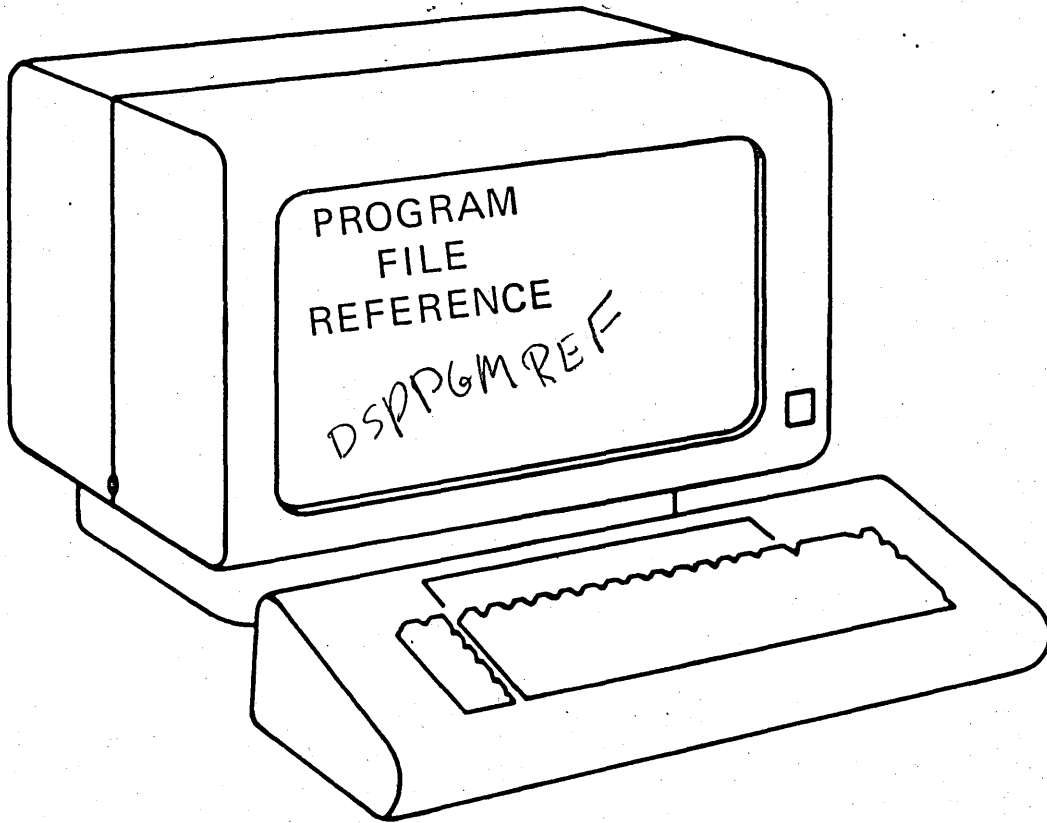


# FILE REFERENCE FUNCTION



- ATTRIBUTES
- ACCESS PATH
- SELECT/OMIT - logic file
- ALTERNATE COLLATING
- RECORD FORMAT

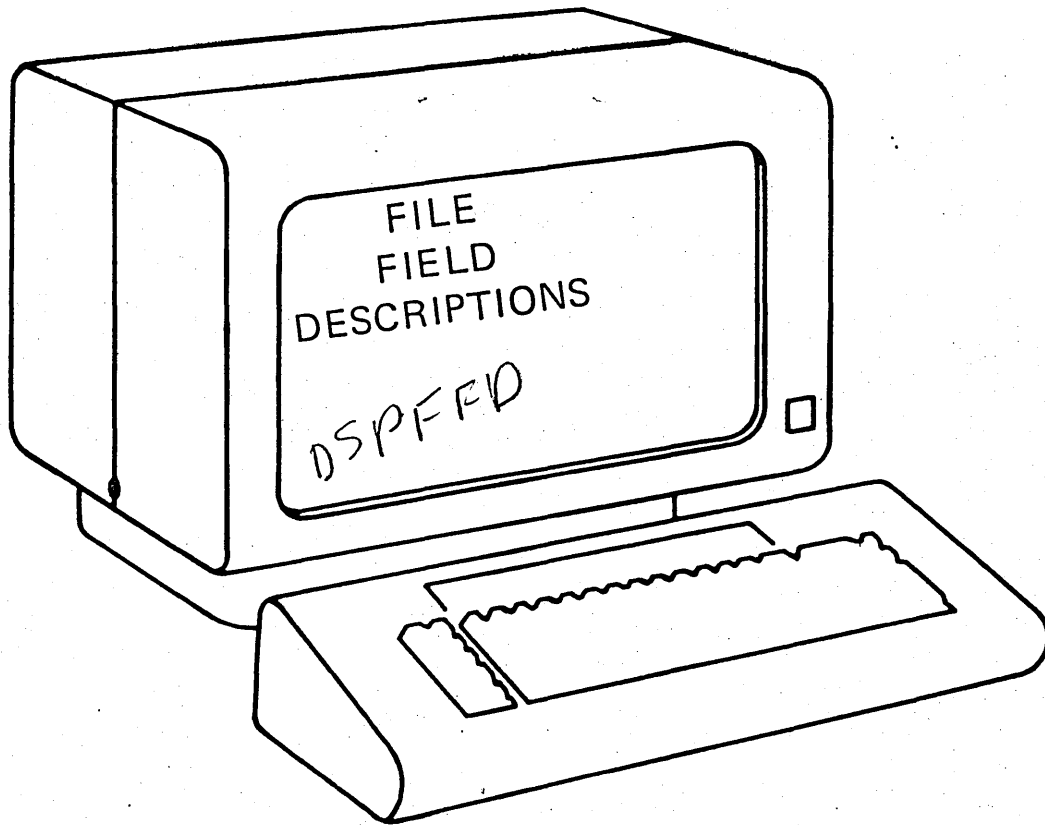
## FILE REFERENCE FUNCTION



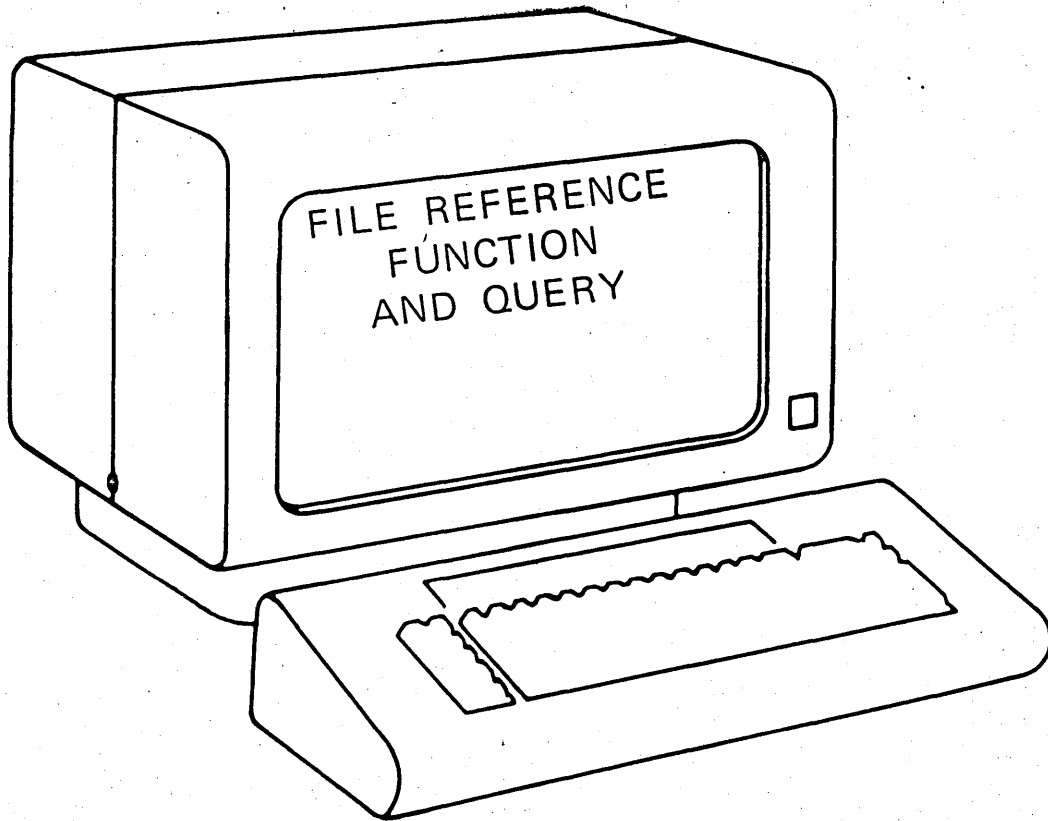
- LIBRARY
- USE OF FILES
- FILES
- FORMAT NAMES

\*list

## FILE REFERENCE FUNCTION

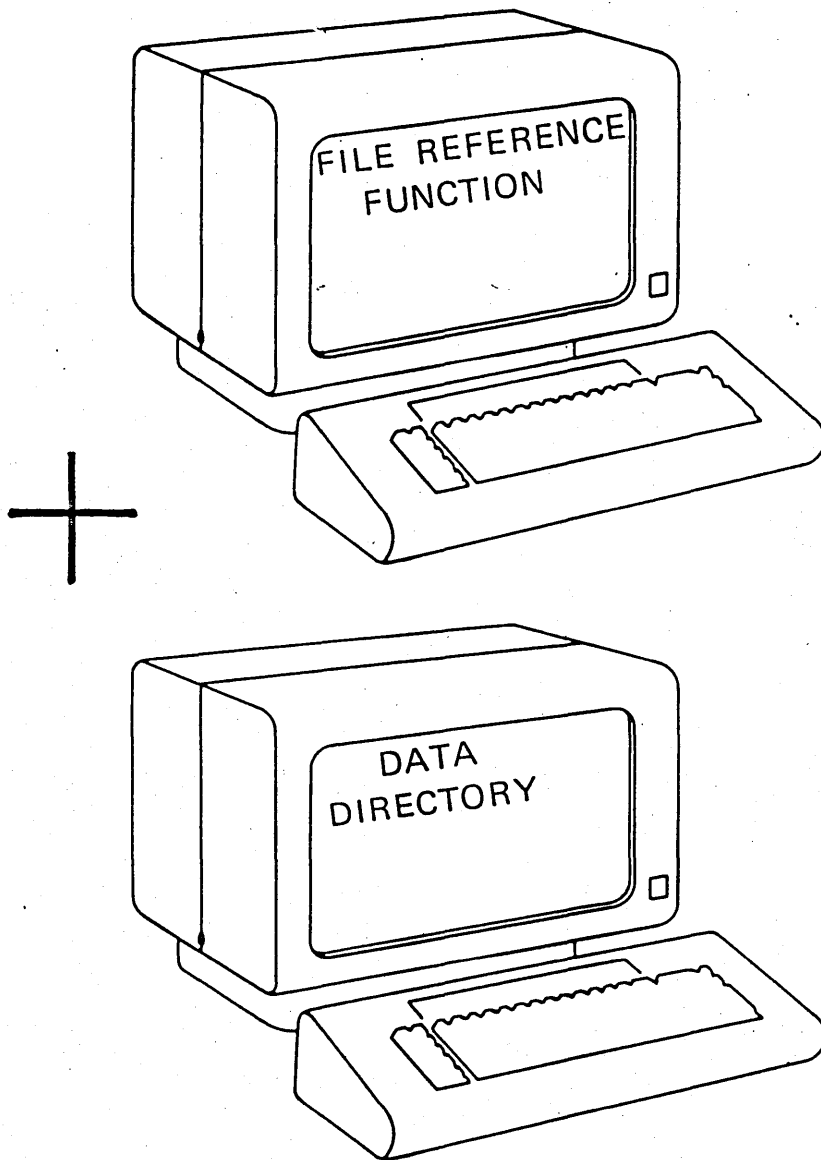


- FIELD TYPE
- FIELD LENGTH
- ATTRIBUTE
- COLUMN HEADING
- FIELD NAME
- ALIAS
- EDIT CODE



- WHERE A FILE IS USED
  - WHERE A FIELD IS USED
- 
- = THE IMPACT OF CHANGE

*DSPDBR -  
File type  
Rec'd & Sent  
# Dependencies  
dependent file names  
showing*



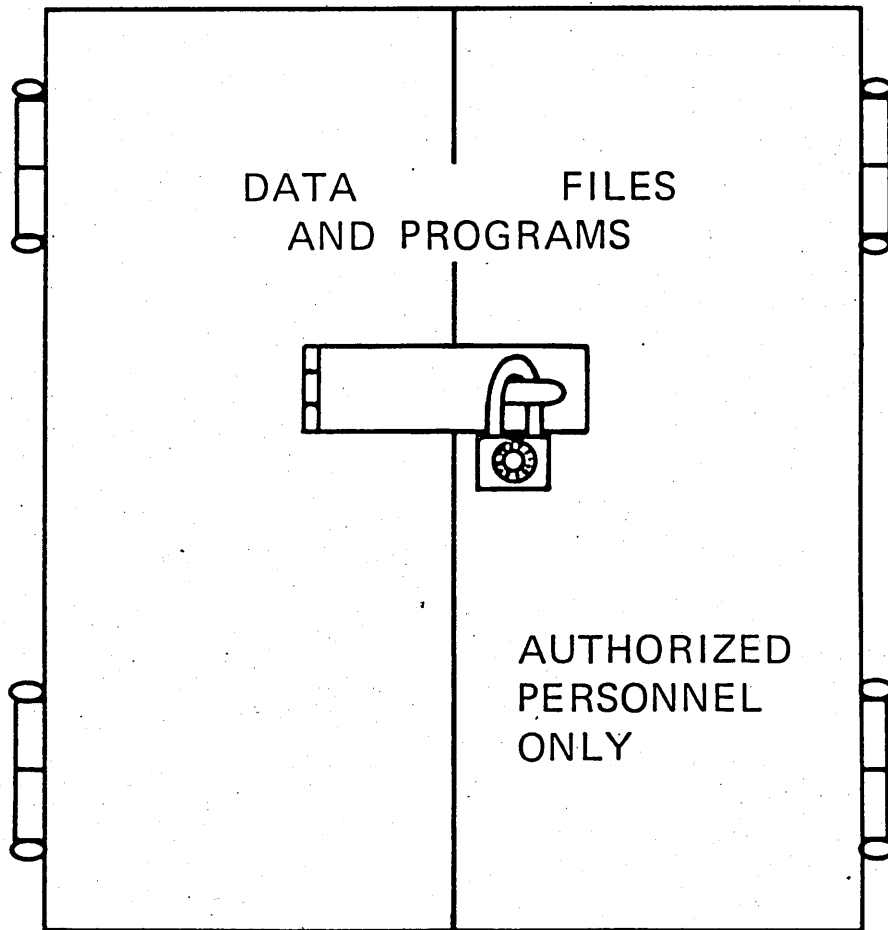
PROVIDE

- FORMAT TO FILE
- FILE TO FILE

CROSS REFERENCES

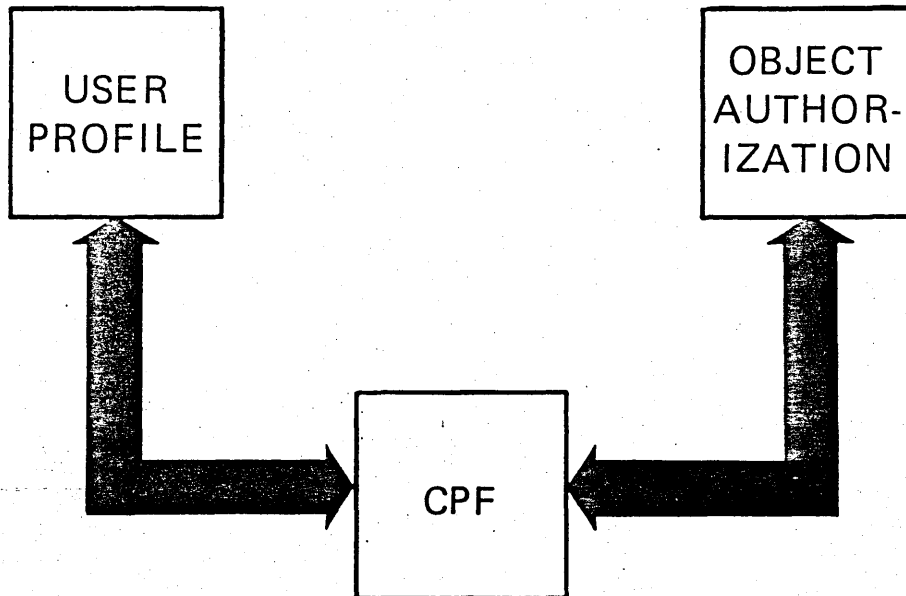
DA-9

# SECURITY



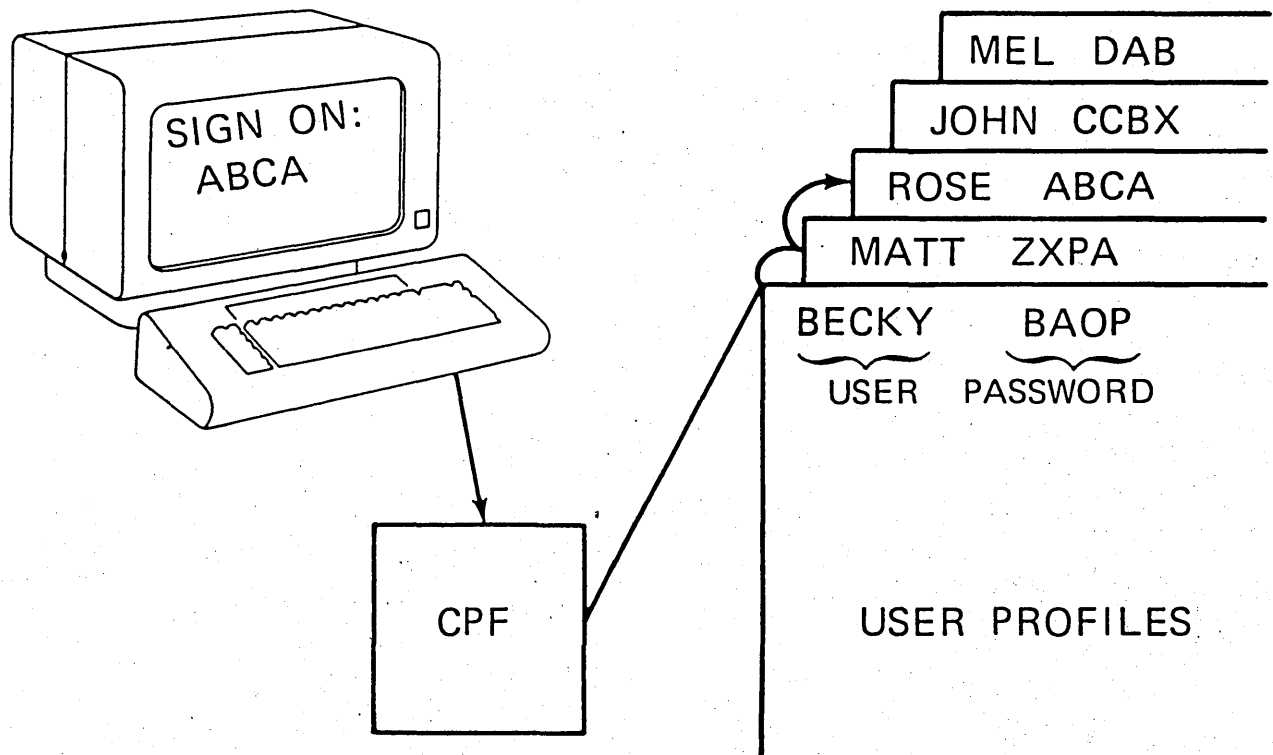
DA-10

## SECURITY COMPONENTS



DA-11

# SECURITY CONTROLS USE OF SYSTEM



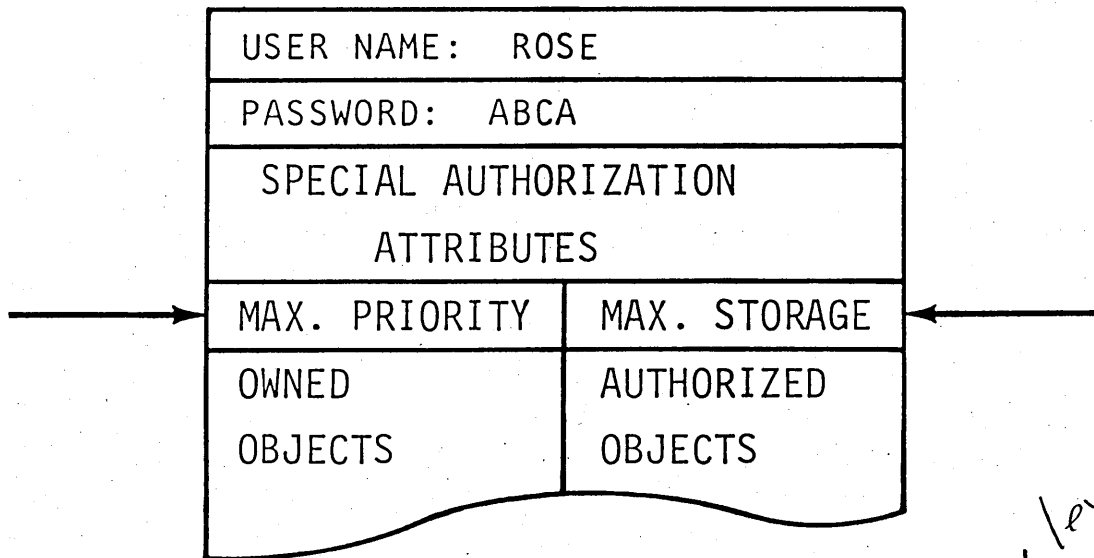


## SECURITY – USER PROFILE

USER NAME: ROSE	
PASSWORD: ABCA	
OWNED OBJECTS	AUTHORIZED OBJECTS
EMPMSTP	GLMSTL
PAYCHK	GLLIST
PGROSS	GLUPT
PTAX	GLBAL
PFICA	GLENT
PW2	
PEDIT	

# USER PROFILE

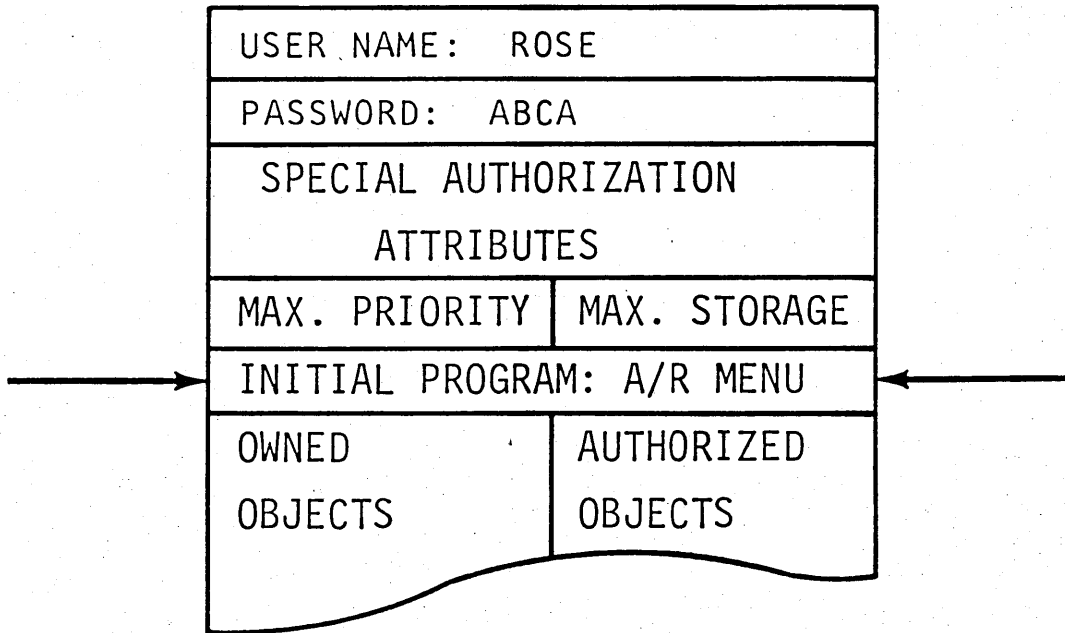
USER NAME: ROSE	
PASSWORD: ABCA	
SPECIAL AUTHORIZATION ATTRIBUTES	
MAX. PRIORITY	MAX. STORAGE
OWNED OBJECTS	AUTHORIZED OBJECTS



9 PRIORITY level

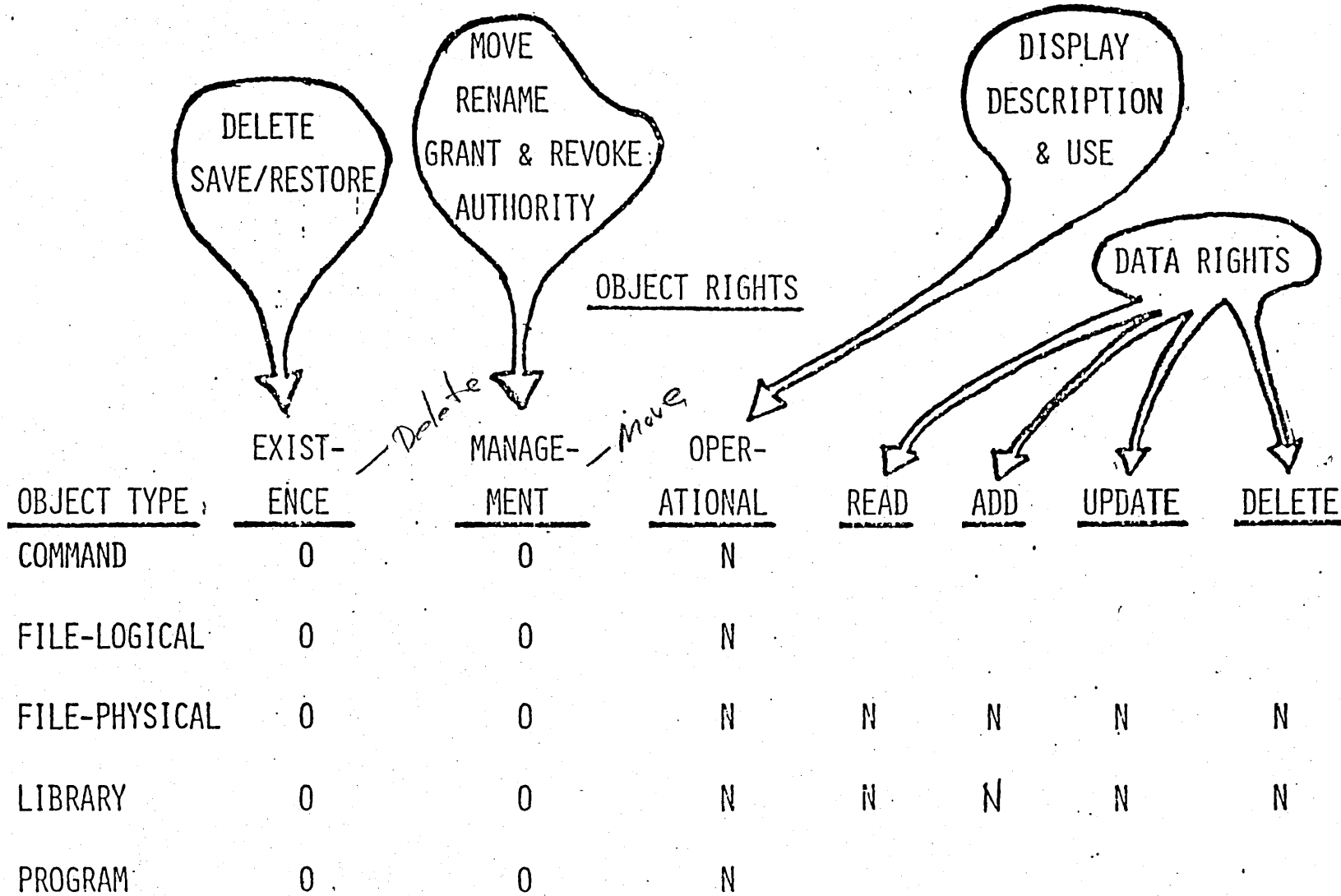
## USER PROFILE

USER NAME: ROSE	
PASSWORD: ABCA	
SPECIAL AUTHORIZATION ATTRIBUTES	
MAX. PRIORITY	MAX. STORAGE
INITIAL PROGRAM: A/R MENU	
OWNED OBJECTS	AUTHORIZED OBJECTS

A diagram of a 'USER PROFILE' form. The form is a rectangular box divided into several sections. The top section is 'USER NAME: ROSE'. The second is 'PASSWORD: ABCA'. The third is 'SPECIAL AUTHORIZATION ATTRIBUTES'. The fourth is split into two columns: 'MAX. PRIORITY' and 'MAX. STORAGE'. The fifth is 'INITIAL PROGRAM: A/R MENU', with two horizontal arrows pointing towards it from the left and right. The bottom section is split into two columns: 'OWNED OBJECTS' and 'AUTHORIZED OBJECTS'. The bottom edge of the form is wavy.

## OBJECT AUTHORIZATION

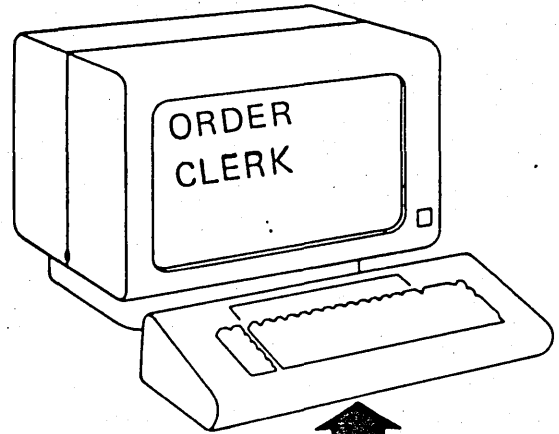
OWNED OBJECTS	AUTHORIZED OBJECTS
OWNER OR SECURITY OFFICER MAY GRANT VARIOUS LEVELS OF AUTHORIZATION TO OTHERS	USER MAY BE GRANTED <ul style="list-style-type: none"><li>● OBJECT RIGHTS<ul style="list-style-type: none"><li>● EXISTENCE</li><li>● MANAGEMENT</li><li>● OPERATIONAL</li></ul></li><li>● DATA RIGHTS<ul style="list-style-type: none"><li>● READ</li><li>● UPDATE</li><li>● ADD</li><li>● DELETE</li></ul></li></ul>



O=RESERVED FOR OWNER

N= \*NORMAL AUTHORITY

# LOGICAL FILE SECURITY



LOGICAL FILE 1

---

ITEM NO.
VENDOR NO.
DESCRIPTION
UNIT COST
MINIMUM BAL.
MAXIMUM BAL.
STANDARD ORD.
LEAD TIME
QTY ON HAND
QTY ON ORDER

LOGICAL FILE 2

---

ITEM NO.
DESCRIPTION
QTY ON HAND
QTY ON ORDER
UNIT PRICE

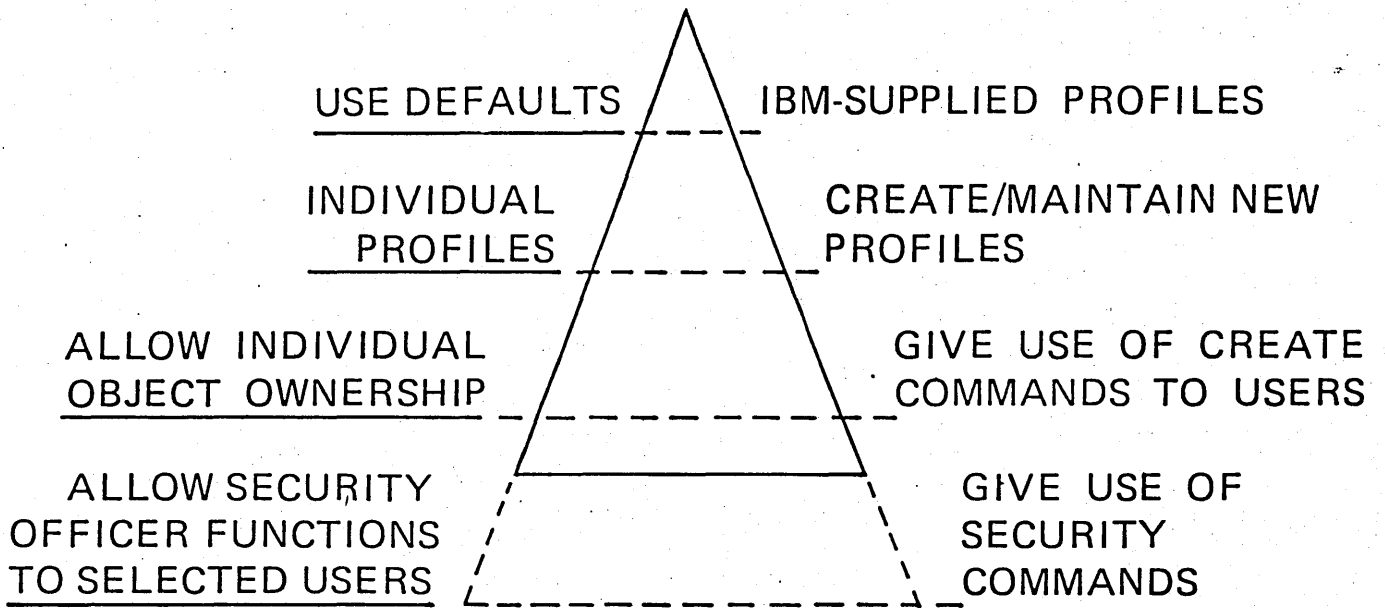
PHYSICAL INVENTORY

---

ITEM NO.
DESCRIPTION
VENDOR NO.
UNIT COST
UNIT PRICE
QTY ON HAND
QTY ON ORDER
MINIMUM BAL
MAXIMUM BAL
STANDARD ORD.
LEAD TIME

## SECURITY OFFICER ROLE

### 1. ESTABLISH THE LEVEL OF SECURITY REQUIRED



## SECURITY OFFICER ROLE

### 2. DEFINE USER PROFILE CONTENT

INITIAL PROGRAM  
SPECIAL AUTHORITY  
MAXIMUM JOB PRIORITY

### 3. ESTABLISH PASSWORDS

(QUSER)  
QPGMR  
QSYSOPR  
QSECOFR  
QCE  
QPSR

### 4. MONITOR SECURITY ASPECTS OF THE INSTALLATION



## SYSTEM/38 SECURITY

- ESSENTIAL FOR SUCH AN EASY TO USE SYSTEM
- PART OF THE MACHINE ITSELF
- CHECKS ACCESS AND OBJECT AUTHORITY
- BASED ON THE USER PROFILE
- CAN BE INCREASED GRADUALLY AS REQUIRED

SE14

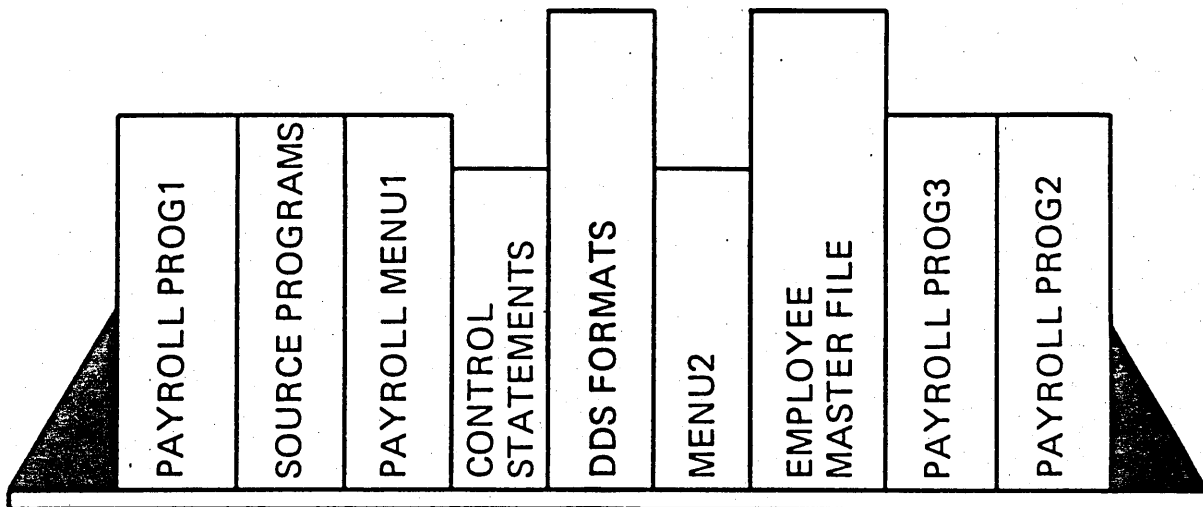
## LIBRARIES

### OBJECTS:

PROGRAMS

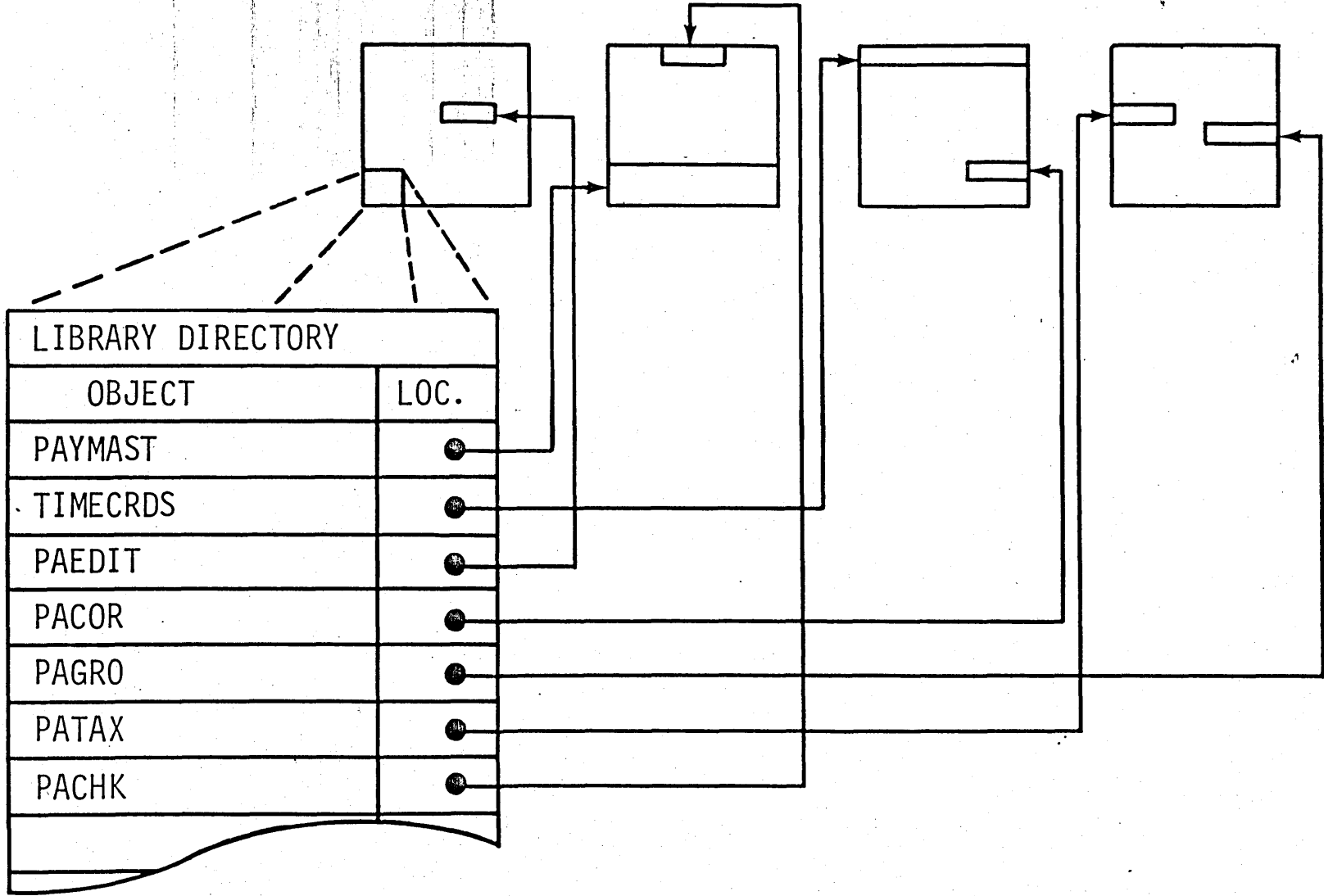
CONTROL STATEMENTS

DATA FILES

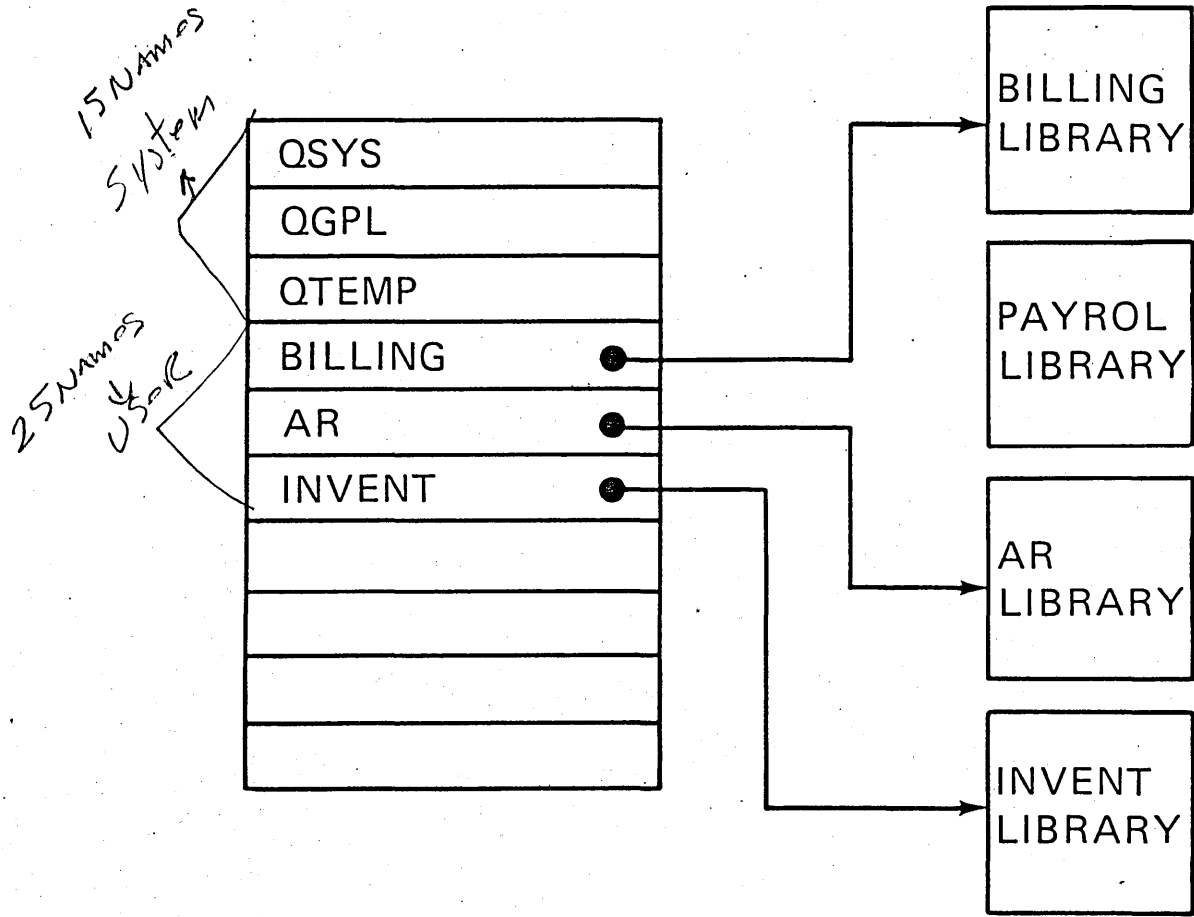


# A LIBRARY IS A DIRECTORY

DA-19

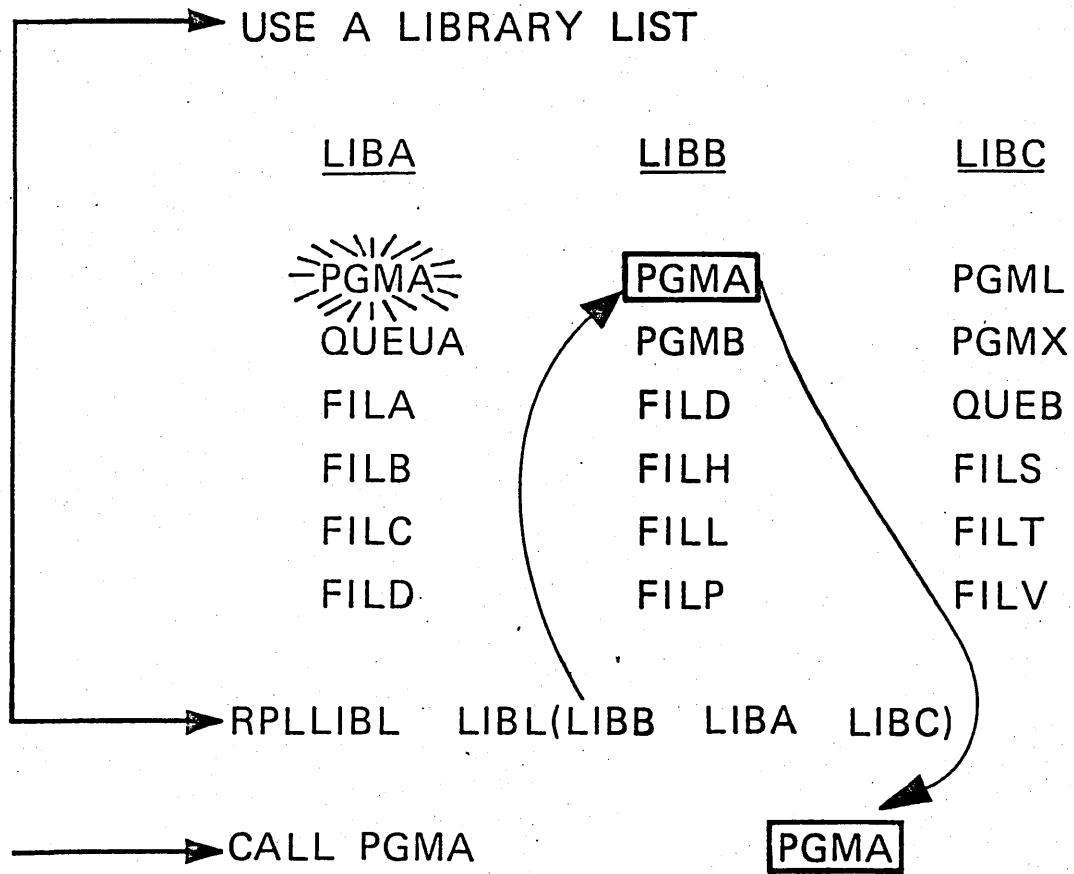


# THE LIBRARY SEARCH LIST



RPLLibl  
Temp

# HOW DO YOU FIND AN OBJECT?




✓ DSPLIBL COMMAND SHOWS LIST YOU ARE CURRENTLY USING

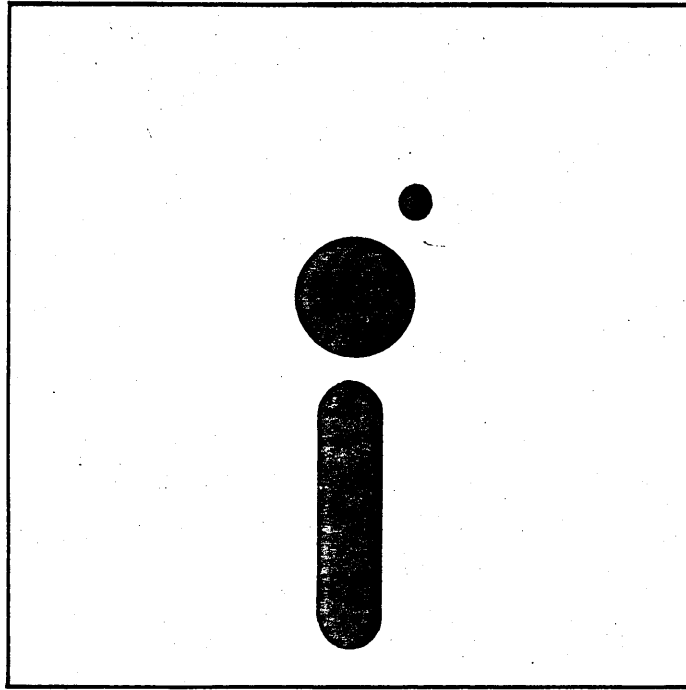
## **LIBRARY CONSIDERATIONS**

- ONE LIBRARY PER OPERATOR**
- ONE LIBRARY PER APPLICATION**
- ASSIGN BASED UPON SAVE / RESTORE  
FREQUENCY**

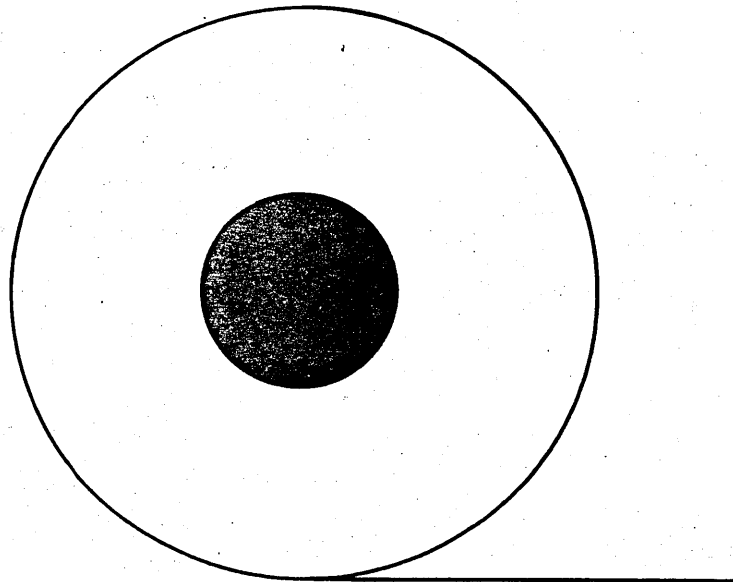
# IBM SUPPLIED LIBRARIES

QSYS	
QGPL	
QTEMP	
QIDU	(OPT)
QRPQ	(OPT)
QS3E	(OPT) - reformatted
QCBL	(OPT)
	

SAVE/RESTORE



— OR —



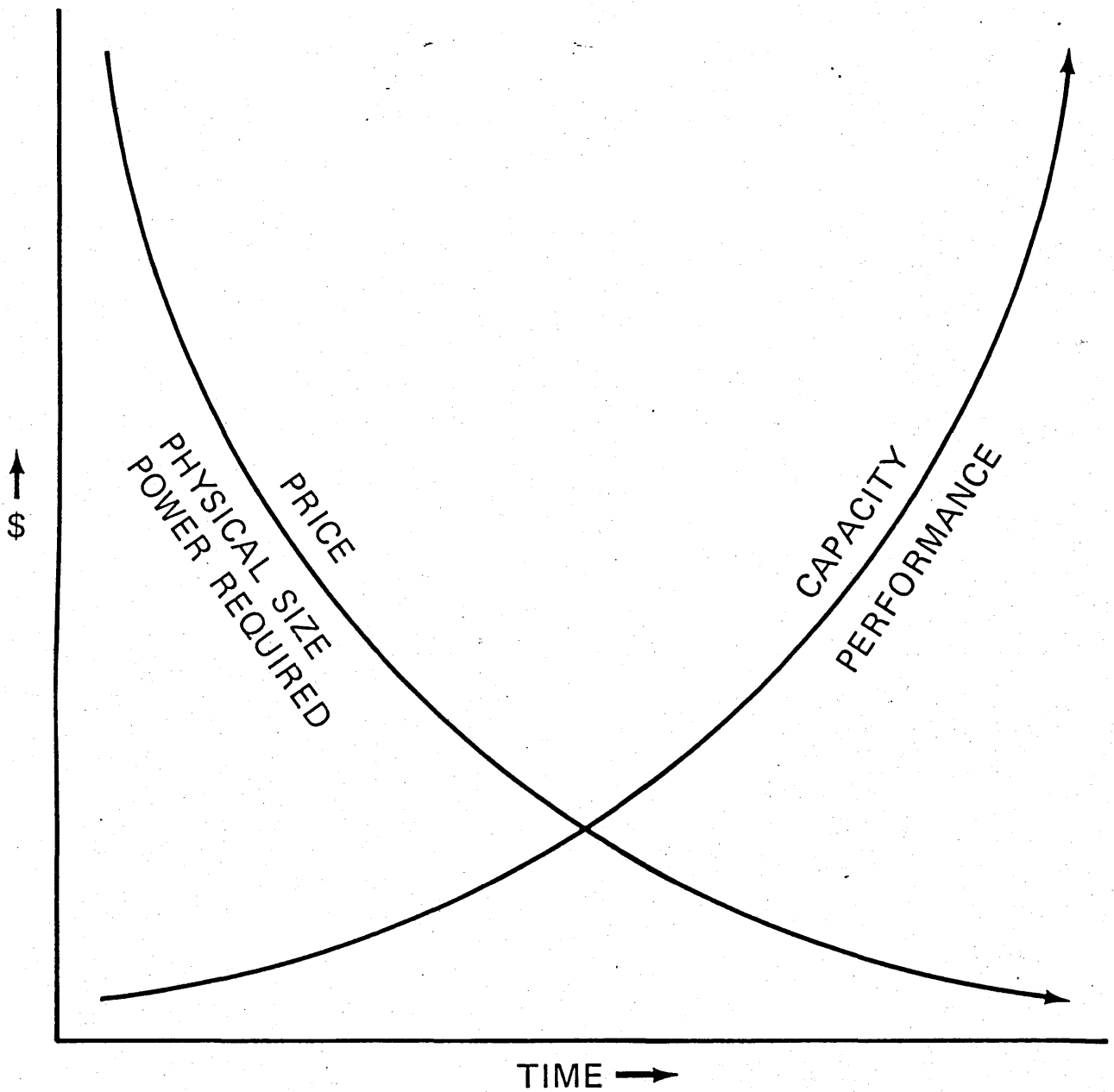
DA-23



**PROGRAMMING**

**TOOLS**

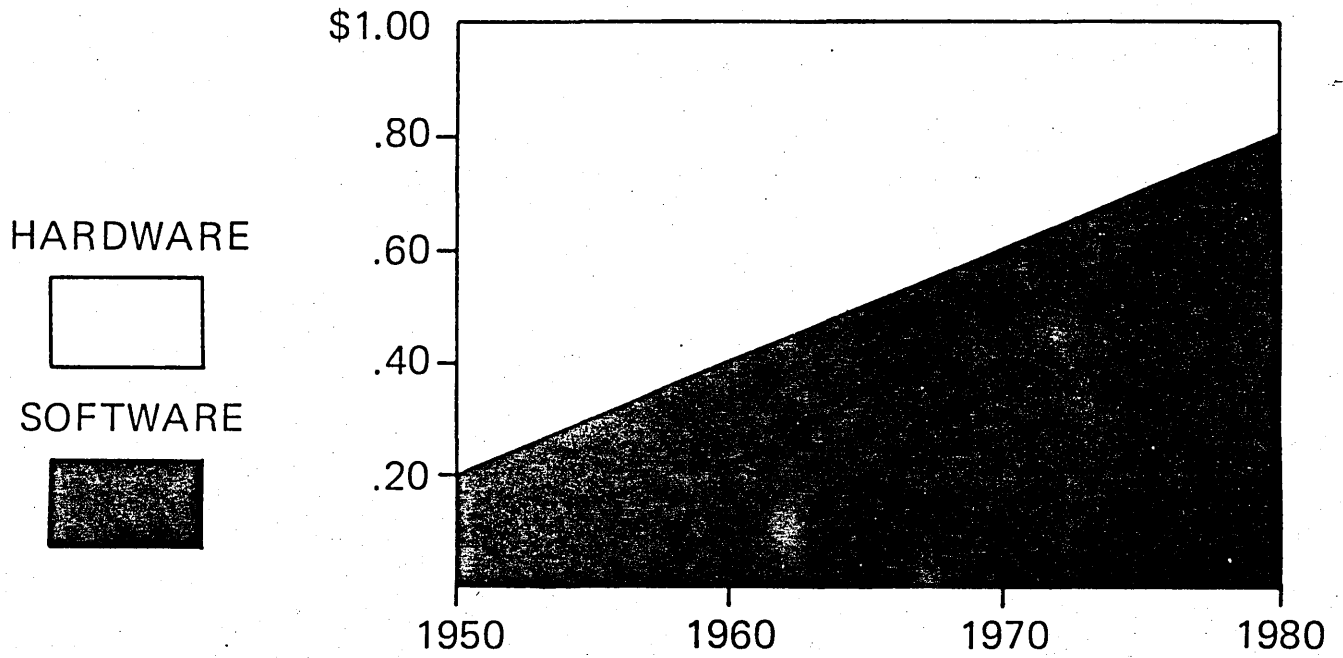
## DECLINING COST OF COMPUTING



PT-1

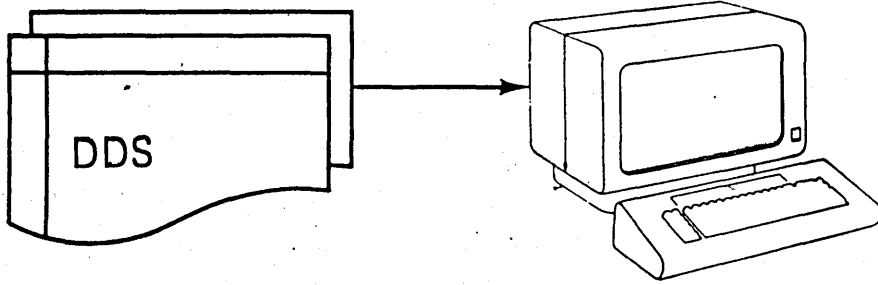
# THE INCREASING COST OF PROGRAMS

## HOW THE D.P. DOLLAR IS SPENT



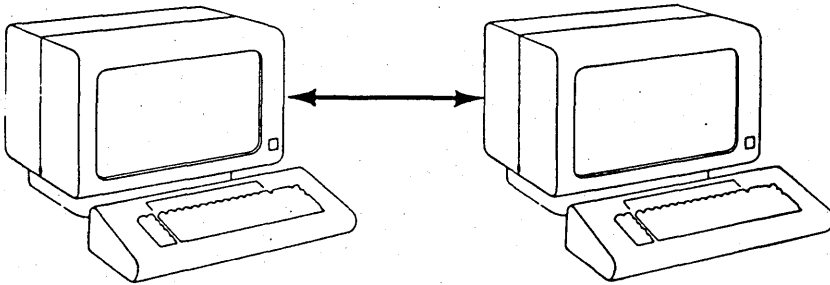
# PROGRAMMER SERVICES

I. SEU / DFU / QUERY / SDA



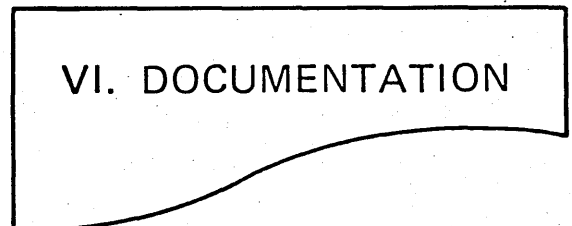
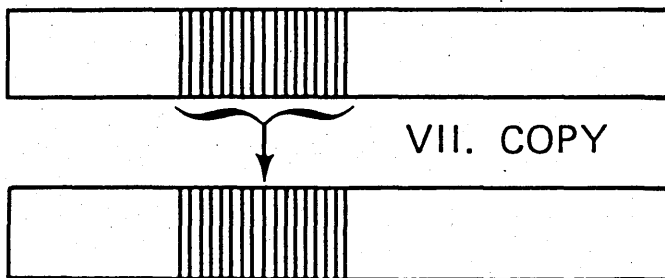
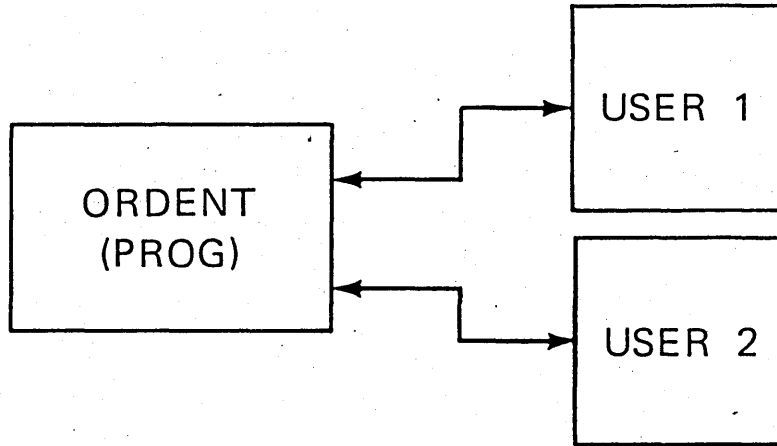
II. EXTERNALLY DESCRIBED DATA

III. SYSTEM REQUEST KEY PERMITS *TWO* INTERACTIVE JOBS AT ONE WORK STATION



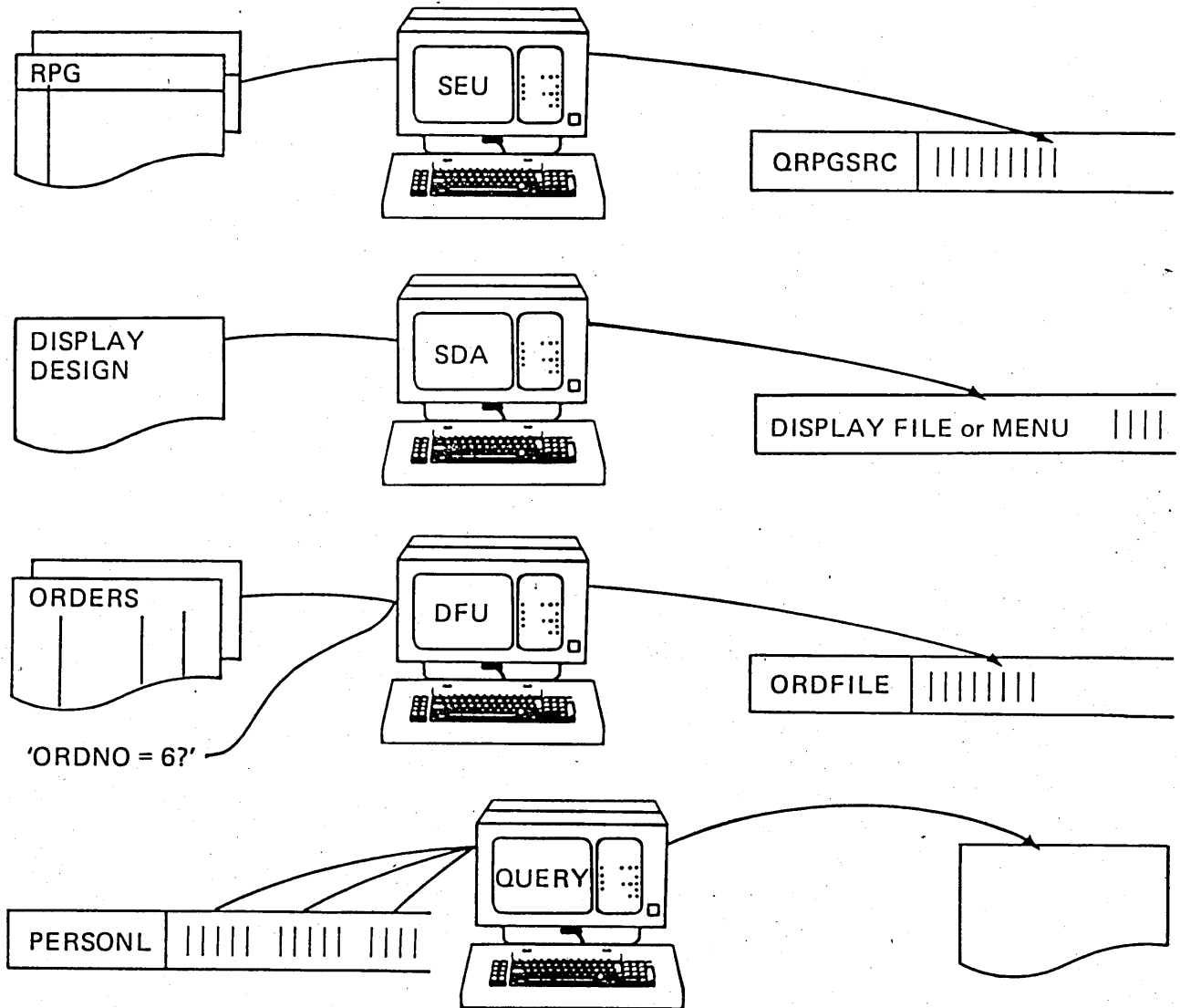
IV. DEBUG MODE

V. SIMPLIFIED DESIGN & CODING

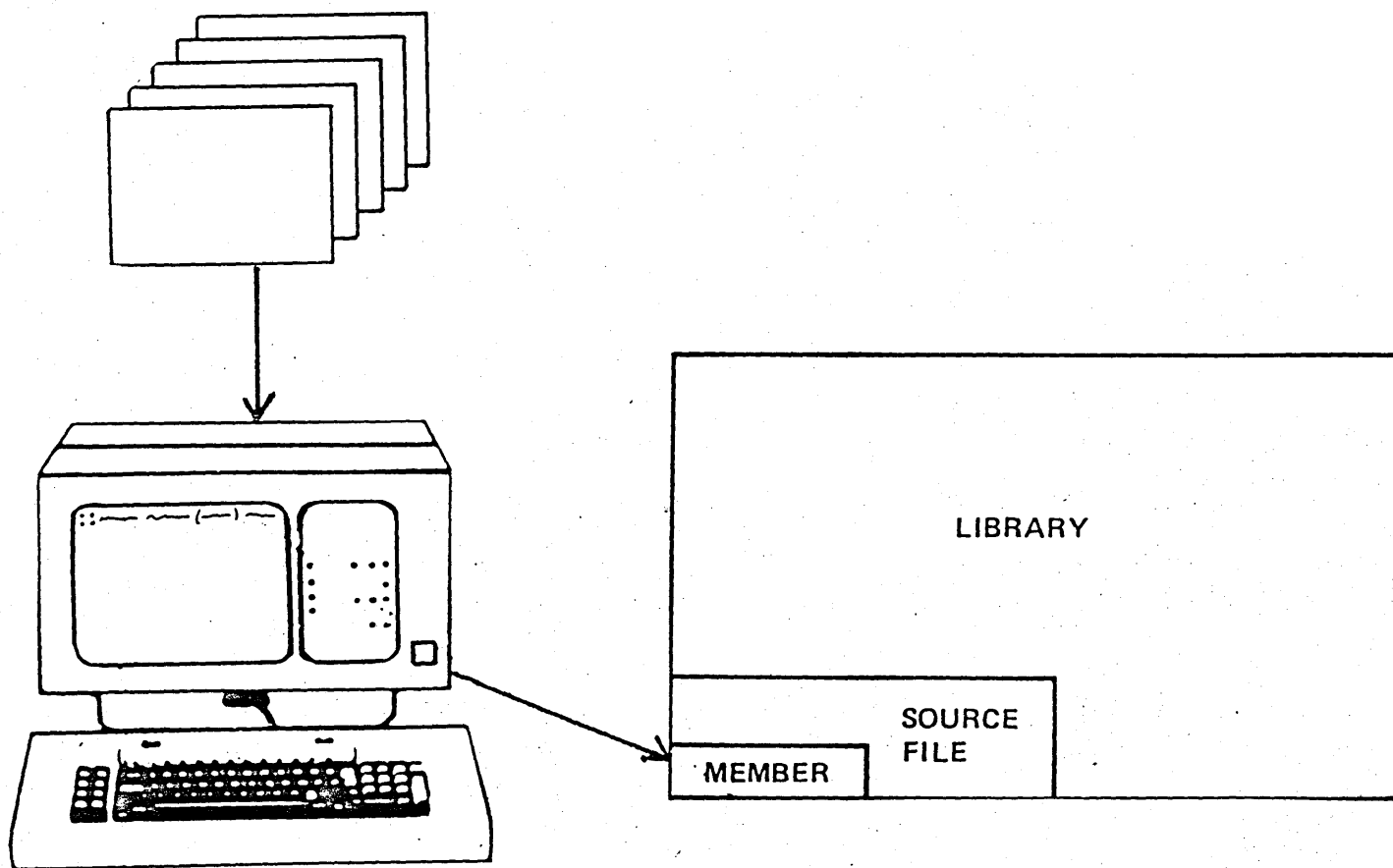


PT-4

## INTERACTIVE DATA BASE UTILITIES



# SOURCE ENTRY UTILITY



# To Initiate SEU

EDTSRC SRCFILE(PGMSRC) SRCMBR(SRCSTATS)  
TYPE { \*RPG }  
          { \*CBL }  
          { \*CL }  
          { ETC }

- OR -

## PROGRAMMER MENU

SELECT ONE OF THE FOLLOWING:

- |                             |  |
|-----------------------------|--|
| 1. DESIGN/EXECUTE DFU APP   | (APP), ,(OPTIONS)                      |
| 2. DESIGN/EXECUTE QUERY APP | (APP), ,(OPTIONS)                      |
| 3. CREATE OBJECT            | OBJECT NAME, TYPE, PGM FOR CMD, (TEXT) |
| 4. CALL PROGRAM             | PROGRAM NAME                           |
| 5. EXECUTE COMMAND          | COMMAND                                |
| 6. SUBMIT JOB               | (JOB NAME), (COMMAND)                  |
| 7. DISPLAY SUBMITTED JOBS   |  |
| 8. EDIT SOURCE              | (SRCMBR), (TYPE), (TEXT)               |
| 9. DESIGN DISPLAY FORMAT    | (SRCMBR)                               |
| 90. SIGN OFF                | (*NOLIST *LIST)                        |

TYPES: BSCF, CBL, CL, CLP, CMD, CMNF, DSPF, LF, PF, PRTF, RPG, TXT

OPTION: 8 PARM: \_\_\_\_\_ TYPE: RPG PARM 2:  
COMMAND: \_\_\_\_\_

TEXT:

SRC FILE: \_\_\_\_\_ SRC LIB: \_\_\_\_\_ OBJ LIB: \_\_\_\_\_ LOG REQUESTS: \*YES  
          CF3 - COMMAND ENTRY CF4 - PROMPT (3 & 5 ONLY) CF6 - DSPMSG \_\_\_\_\_

# SEU MEMBER LIST

SEU MEMBER LIST  
FILE: PGMSRC LIBRARY: MYLIB

ENTER MEMBER NAME OR SELECT FROM LIST: \_\_\_\_\_

MEMBER LIST:

<input type="checkbox"/> PRLIST	<input type="checkbox"/> APCHECHS
<input type="checkbox"/> CHECKS	<input type="checkbox"/> CASH
<input type="checkbox"/> PREDIT	<input type="checkbox"/> LIST3
<input type="checkbox"/> SAMPLE	<input checked="" type="checkbox"/> DEMO1
<input type="checkbox"/> LIST1	
<input checked="" type="checkbox"/> DEMO2	

1 - SELECT MEMBER TO EDIT

9 - REMOVE MEMBER

PT-7



# RPG III SOURCE-ENTRY

```

SEU      US W:1      Mbr: APR056                      Scan:
FMT C    .....CLON01N02N03Factori+++OpcdeFactor2+++ResultLenDHHiLoEqComment+++++
          ****BEGINNING OF DATA****
0014.00  C    01      COUNT      COMP 505                      JQ 02
0015.00  C    02N02                      EXCPT
0016.00  C    02N02                      GOTO REPEAT
0017.00  C                                SETON                      LR
          *****END OF DATA*****
  
```

```

FMT SEQNBR  Level N01N02N03 Factor1  Opcode Factor2
C   0014.00      01      COUNT      COMP  505
   Result Len Dec H/A HiLoEq Comment
   -----
   JQ 02
Resulting indicators entries not valid
  
```

WC-9

## COBOL SOURCE - ENTRY

```

SEU      US W:1      Mbr: APC20B      Scan:
FMT CB .....-A+++B+++++
0006.00      OBJECT-COMPUTER. IBM-S38.
0007.00      SPECIAL-NAMES. REQUESTOR IS DSP.
0008.00      INPUT-OUTPUT SECTION.
0009.00      FILE-CONTROL.
0010.00      SELECT APLTRANB-FILE ASSIGN TO DATABASE-APLTRANG
0011.00      ORGANIZATION IS INDEXED
0012.00      RECORD KEY IS VNDNBR OF PAYBLE
0013.00      ACCESS MODE IS RANDOM.
0014.00      SELECT APDENTRB-FILE ASSIGN TO WORKSTATION-APDENTRB
0015.00      ORGANIZATION IS TRANSACTION.
0016.00      DATA DIVISION.
0017.00      FILE SECTION.
0018.00      FD APLTRANB-FILE LABEL RECORD IS STANDARD.
0019.00      01 DBFILE.
0020.00      COPY DDS-PAYBLE OF APLTRANB REPLACING ##CHECK### BY CHECKS.
0021.00      FD APDENTRB-FILE LABEL RECORD IS OMITTED.

FMT SEQNBR      Cont Area-A Area-B
CB 0020.00      _____ COPY DDS-PAYBLE OF APLTRANB REPLACING ##CHECK### BY CH
ECKS.

```

Syntax of COPY statement checked but COPY not performed.

WC-10

✓NOTE REPLACING CLAUSE!

# HELP

## SEU HELP MENU

Next Option: —  
CF1 To Exit

1. SEU Introduction
  2. Edit Display Introduction
  3. D, DD
  4. C, CC, M, MM, A, An, B, Bn
  5. I, In
  6. F, Fff, IF, IFff, IFffn
  7. S, IS, ISn
  8. P, Pff, IP, IPff
  9. +n, -n, nnnn.nn
  10. Rn, RR, RRn, Ln, LL, LLn
  11. Wn
  12. Browse or Copy from Another Member
  13. CF1 - Exit Display
  14. CF5 - Services Display
  15. CF6 - Cancel Pending Operations
  16. CF7 - Scan or Substitute Forward
  17. CF8 - Scan or Substitute Backward
  18. CF12 - Switch Upper/Lower Case
  19. Special Keys: HOME, ROLL, HELP, DELETE, INSERT, PRINT, DUP
  20. EDTSRC Command Options and Member List Display
  21. Work Space Concepts and Recovery Display
  22. List of Prompt Formats and Source Types
- Delete
  - Copy and Move
  - Insert
  - Format Lines and Inserts
  - Skeleton Lines and Inserts
  - Prompt Lines and Inserts
  - Record Positioning
  - Shifting Data Right or Left
  - Windowing (Sideways Viewing)



## SEU FACILITIES

<u>● FUNCTION</u>	<u>LINE COMMAND</u>
● INSERT	I
● DELETE	D, DD
● MOVE	M, MM
● SCAN WITH SUBSTITUTION	CMD KEY 5
● COPY	C, CC
● SYNTAX	CMD KEY 5
● PROMPTING	P
● BROWSE	CMD KEY 5
● MULTIPLE LINE OPERATIONS	
● USES WORK FILE	

# SEU FACILITIES

5

SEU

SERVICES

Scan/Substitute (CF7-Forward CF8-Backward)

Scan characters:

Substitute characters:

From/to seqnbr: .00 9999.99 Start/end position: 001 080  
Display before substitution (Y N): Y Compress/Expand (Y N): N

Date

Scan: 81/11/04 Scan operator (LT/GT/EQ): Reset all (Y N): N

Browse/Copy another member (Y/N): N Screen separator Line: 14

Member: APLVANLX File: APPSRC Library: APLIB

Browse Spool File (Y/N): Y Screen separator line: 14 Splnbr: \*LAST

File: QPDDSSRC Jobname: APLVANLX User: APWTEAMX Jobnbr:  
DSPOUTQ (Y/N): N Outq: APWOUTQ, Library: \*LIBL

Syntax Checking

When added/modified (Y N): Y

Syntax check member. From/to seqnbr: .00 .00

Modify type from EDTSRC command: LF

# SEU BROWSE COPY FUNCTION

SEU US W:1 Mbr: APLVANL Scan:  
FMT A\* .....A\*. 1 ... .. 2 ... .. 3 ... .. 4 ... .. 5 ... .. 6 ... .. 7  
\*\*\*\*BEGINNING OF DATA\*\*\*\*

---

SEU US W:1 Mbr: APLVANLX Scan:  
FMT A\* .....A\*. 1 ... .. 2 ... .. 3 ... .. 4 ... .. 5 ... .. 6 ... .. 7  
\*\*\*\*BEGINNING OF DATA\*\*\*\*

0001.00	A*TEAMX LOGICAL FILE STRADDLING 2 PHYSICALS	
0002.00	A R VENDMAST	PFILE(APVEND.APLIB)
0003.00	A K VNDNBR	
0004.00	A R PAYBLE	PFILE(APPTRANX.APLIB)
0005.00	A K VNDNBR	
0006.00	A S STATUS	CMP(EQ 'T')
0007.00	A S STATUS	CMP(EQ 'E')

# SEU SPOOL FILE BROWSE

3 FIX IT

```

SEU      US W:1      Mbr: APLVANLX      Scan:
FMT A*   .....A*. 1 ... .. 2 ... .. 3 ... .. 4 ... .. 5 ... .. 6 ... .. 7
          ****BEGINNING OF DATA****
0001.00  A*TEAMX LOGICAL FILE STRADDLING 2 PHYSICALS
0002.00  A          R VENDMAST          PFILE(APVEND.APLIB)
0003.00  A          K VNDNBR
0004.00  A          R PAYBLE           PFILE(APPTRANX.APLIB)
0005.00  A          K VNDNBR
0006.00  A          S STATUS           CMP(EQ 'T')
0007.00  A          S STATUS           CMP(EQ 'E')
          *****END OF DATA*****
    
```

```

-----
Browse Mbr: SPOOLFILE W:1 Pos: Scan: *
  200   A          R VENDMAST          PFILE(APVEND.APLIB)
*      *          CPF7902-*
  300   A          K VNDNBR
  400   A          R PAYBLE           PFILE(APPTRANX.APLIB)
  500   A          K VNDNBR
  600   A          S STATUS           CMP(EQ 'T')
  700   A          S STATUS           CMP(EQ 'E')
          * * * * *   E N D   O F   S O U R C E   * * * * *
    
```

2 ✓ File specified in keyword not found

✓ 1

SE-15



## DATA FILE UTILITY

- MAINTAIN A FILE
  - UPDATE
  - ADD
  - DELETE
  - VERIFY
  - ERROR DETECT  
AND CORRECT
- DISPLAY FILE (INQUIRY)
  - BROWSE ONLY
- "FAST PATH"
  - USE DEFAULTS



## FILE REVIEW PROMPT

FILE REVIEW PROMPT FOR FILE APLTRANX

For each record format to be used, enter R to review the fields, A to select all fields, or E to enter the fields later:

	RECORD FMT	DESCRIPTION
<input checked="" type="radio"/>	PAYBLE	TEAMX PHYSICAL FILE

## FILE REVIEW HELP

Valid input values for each record format:

- R - Review fields
- A - Select all fields
- E - Enter fields later

Enter R, A, or E and press the Enter key to continue.  
Enter A and press the Exit Application command function key  
(CF1) to generate a default definition using all record  
formats selected.

RECORD FMT	- Record format name in the data base file.	
DESCRIPTION	- Record format description from the data description specifications (DDS).	+

## FIELD REVIEW PROMPT

### FIELD REVIEW PROMPT FOR RECORD PAYBLE

Place an X next to each field to be used or enter \*ALL:

X	FIELD NAME	LENGTH	TYPE	DESCRIPTION
K	VNDNBR	5,0	P	VENDOR ID NUMBER
K	INVNBR	8,0	P	VENDORS INVOICE AMOUNT
—	DATREC	6,0	P	DATE RECEIVED
—	MERCH	7,2	P	MERCHANDISE AMOUNT
—	NET	7,2	P	NET AMOUNT PAID
—	STATUS	1	A	E=ENTERED T=TO PAY D=DELETE P=PAID
—	DTPAID	8,0	P	DATE PAID
—	CHECK#	6,0	P	CHECK NUMBER
—	DEPTNO	3,0	P	DEPARTMENT CHARGED

DE-12

# BASIC FIELD DEFINITION PROMPT

## BASIC FIELD DEFINITION PROMPT FOR RECORD PAYBLE

Define format ID AB - TEAMX PHYSICAL FILE

FIELD NAME	ORDER	INPUT	DISPLAY	VERIFY	XDEF	XVAL
VNDNBR	1.0	X	X	—	—	—
INVNBR	2.0	X	X	—	—	—
DATREC	3.0	X	X	—	—	—
MERCH	4.0	X	X	—	—	—
NET	5.0	X	X	—	—	—
STATUS	6.0	X	X	—	—	D
DTPAID	7.0	X	X	—	—	—

DE-14

## EXIT APPLICATION DEFINITION MENU

### EXIT APPLICATION DEFINITION MENU

Select one of the following:

1. Restart definition
2. Modify definition
3. Delete definition
4. Save definition
5. Create application

Option: 5

Display fmt 'KE' rcd fmt PAYBLE too large for console.





# TYPICAL DFU – DATA ENTRY SCREEN

AA	VENDMAST	DB	FORMAT	APD10	ADDRESS LINE 1	ADD
	VENDOR		VENDOR			
	NUMBER		NAME			
ADDRESS LINE 2		ADDRESS LINE 3			ZIP	AREA
					CODE	CODE
PHONE	TERMS	TERMS	CLASS	ACTIVE	SALESPERSON	
	%	DAYS		RECORD		
				CODE		
DISCOUNT	DISCOUNT	PURCHASES		PURCHASES	BALANCE	
TAKEN	TAKEN	YTD		YTD	OWED	
MTD	YTD					
SERVICE	DELIVERY	COMMENTS ABOUT			SEARCH	
RATING	RATING	VENDOR			CODE	

DE-22



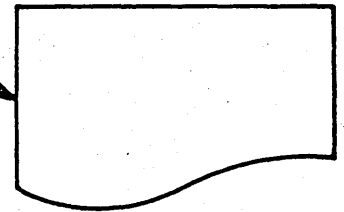
HOW DO WE GET FROM

HERE

TO

HERE

SPECIAL ONE TIME  
VENDOR REPORT



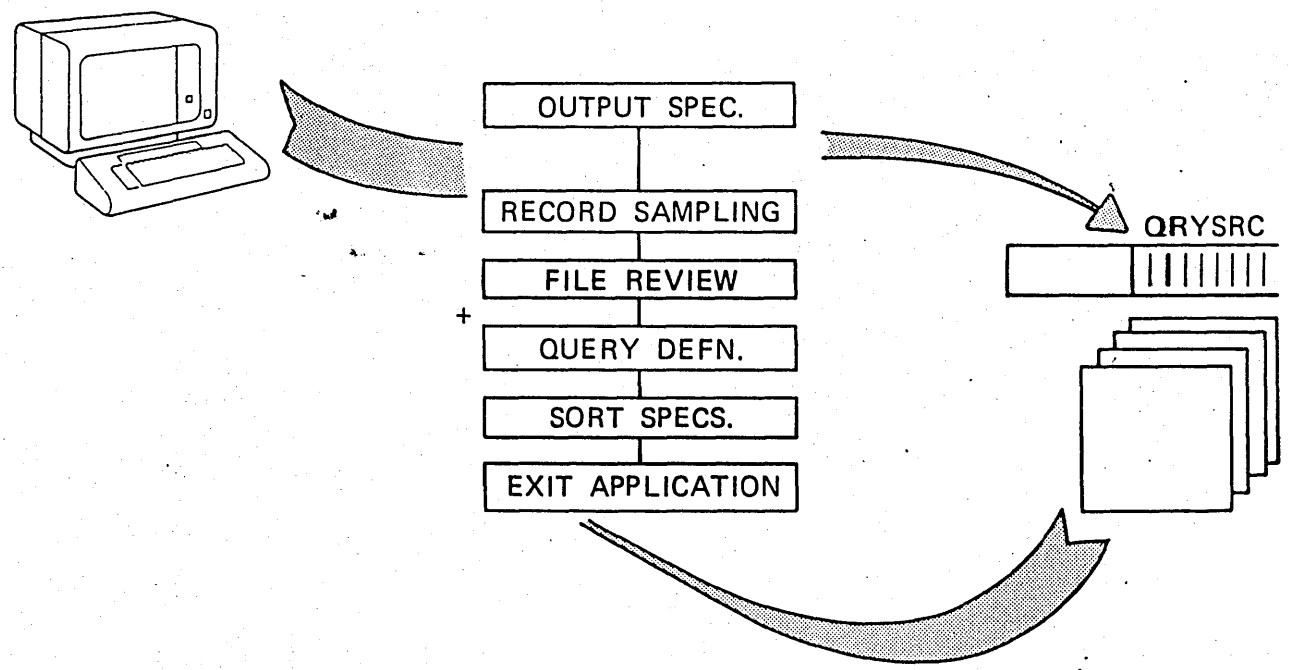
AS SOON AS  
POSSIBLE

## SYSTEM/38 QUERY FACILITY

- CREATE "ONE TIME" REPORTS
- CREATE PERMANENT REPORTS
- EITHER HARD COPY OR CAN BE VIEWED ON SPOOL FILE VIA WORK STATION
- CAN BE DONE OUTSIDE DP DEPARTMENT FOR THOSE WITH AUTHORITY
- UNSCHEDULED REPORTS

# QUERY

- EASILY AND QUICKLY USED
- 'ONE-TIME' OR INFREQUENTLY REQUIRED REPORTS
- PROGRAMMER OR NON-DP USER





# OUTPUT SPECIFICATION PROMPT

## OUTPUT SPECIFICATION PROMPT

Enter the following:

Cover page:

VENDOR ANALYSIS FOR PURCH. DEPT.

Page heading:

VENDOR RANKING BY PURCHASES YTD WITHIN VENDOR CLASS

Detail listing: \*YES

Detail list double spaced: \*NO

Output line width: 132

Separate record format headings: \*YES

Record sampling: \*NO

File review: \*YES

Display all fields in prompt: \*YES

Take defaults for all selected fields:

\*NO

QF-10

→ (ENTER)

\*YES FOR  
FAST-PATH

FILE REVIEW PROMPT FOR FILE APLVEND  
FOR EACH RECORD FORMAT TO BE USED, ENTER R TO REVIEW THE FIELDS,  
A TO SELECT ALL FIELDS, OR E TO ENTER FIELDS LATER:

RECORD FMT	DESCRIPTION
<input checked="" type="radio"/> VENDMAST	VENDOR MASTER (LOGICAL) RECORD

QF-11

→ (ENTER)

## QUERY

### FILE REVIEW HELP

#### Extended description:

Select record format

Enter one of the following options next to the record formats (at least one) to be used in the application:

R - Show the FIELD REVIEW PROMPT for this record format so that you may select individual fields from it.

A - Display all of the fields of the selected record format on the QUERY DEFINITION PROMPT and thus bypass the FIELD REVIEW PROMPT for this record format. +

PT-28



FIELD REVIEW PROMPT FOR RECORD VENDMAST

Place an X next to each field to be used or enter \*ALL:

X	FIELD NAME	LENGTH	TYPE	DESCRIPTION
<input checked="" type="checkbox"/>	VNDNBR	5,0	P	VENDOR ID NUMBER
<input checked="" type="checkbox"/>	VNDNAM	25	A	VENDOR NAME
	VNDAD1	25	A	ADDRESS LINE 1
	VNDAD2	25	A	ADDRESS LINE 2
	VNDAD3	25	A	ADDRESS LINE 3
	VNDZIP	5,0	P	ZIP CODE
	VNDACD	3,0	P	AREA CODE
	VNDPHN	7,0	P	PHONE NUMBER
<input checked="" type="checkbox"/>	VTRMPC	3,3	P	NORMAL PROMPT PAY DISCOUNT %
<input checked="" type="checkbox"/>	VTRMDA	2,0	P	NORMAL NO. OF DAYS FOR TERMS
<input checked="" type="checkbox"/>	VNDCLS	2,0	P	VENDOR CLASS
	ACTCD	1	A	A=ACTIVE D=DELETE S=SUSPEND
	VNDSLS	25	A	VENDOR SALESMAN
	DCTMTD	7,2	P	DISCOUNT TAKEN THIS MONTH
<input checked="" type="checkbox"/>	DCTYTD	9,2	P	DISCOUNT TAKEN THIS YEAR
	PCHMTD	9,2	P	PURCHASES THIS MONTH

OF-12

→ (ROLL-UP)

NOTE →

OF-14

QUERY DEFINITION PROMPT

FOR RECORD FORMAT NAME VENDMAST ENTER:

FIELD NAME	ORDER	SUM	AVG	SORT	TEST	XLIST	TABLE
VNDNBR	②	--	--	--	--	--	--
VNDNAM	③	--	--	--	--	--	--
VTRMPC	④	--	--	--	--	--	--
VTRMDA	⑤	--	--	--	--	--	--
VNDCLS	①	--	--	⊗	--	--	--
DCTYTD	6.0	⊗	--	⊗	--	--	--
PCHYTD	7.0	⊗	--	⊗	--	--	--
SRVRTG	⑨	--	--	--	--	--	--
DELRTG	⑩	--	--	--	--	--	--
COMNTS	⑪	--	--	--	--	--	--
DISCPC	⑧	--	⊗	--	--	--	--

USER-DEFINED FIELD

(ENTER)

SORT SPECIFICATION PROMPT

ENTER CHANGE:

FIELD NAME	ORDER	SUBTOTAL	<del>SUBTOTAL</del>	SPACE	EJECT	DSCEND	ABSNBR
VNDCLS	1.0	(X)					
PCHYTD	2.0					(X)	

OF-17

→ (ENTER)

SELECTION TEST PROMPT  
ENTER TESTS FOR \*SELECT/\*OMIT GROUP: \*SELECT

FIELD NAME	REL	TEST	
PCHYTD	*GT	1000	+
_____	---	_____	---
_____	---	_____	---
_____	---	_____	---
_____	---	_____	---

QF-33

→ (ENTER)

EXIT APPLICATION DEFINITION MENU

Select one of the following:

- 1. Restart definition
- 2. Modify definition
- 3. Delete definition
- 4. Save definition
- 5. Create application

Option: 5

Output lines for record format VENDMAST folded to two lines at most.

OF-18

→ (ENTER)

11/04/81 09:51:36

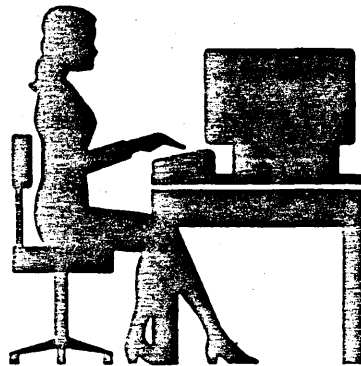
VENDOR RANKING BY PURCHASES YTD WITHIN

CLASS	VENDOR NUMBER	VENDOR NAME	TERMS %	TERMS DAYS	DISCOUNT TAKEN YTD	PURCHASES YTD	DISCPC	SERVICE RATING	DELIVERY RATING
COMMENTS ABOUT VENDOR									
	11	6183 THE LEARNING INSTITUTE	50	10	72.00	8,500.00	.01	A	A
EXCELLENT									
	11	210 GEORGE BAILEY COLLEGE	100	31	72.00	8,000.00	.01	B	C
GOOD									
	11	45892 PETE MOSS & SONS	150	60	72.00	5,500.00	.01	A	A
NEW CUSTOMER									
	11	10 JOHN M. SMITH & SONS	50	10	72.00	3,250.00	.02	A	A
GOOD DEALER									
	11	16 BRAND X BEER	50	20	72.00	1,500.00	.05	A	A
GOOD CUSTOMER									
					360.00	26,750.00			
	12	24133 PATRICK UNDERHILL	100	45	72.00	10,000.00	.02 /	A	C
FAIR CUSTOMER									
	12	88714 ROSS & ROSS	50	10	72.00	9,500.00	.01	B	B
GOOD									
	12	612 R.H.GROCERY STORE	100	45	72.00	4,750.00	.02	A	A
GOOD									
	12	7733 SEAL PRODUCTS INC.	100	30	72.00	4,500.00	.02	C	D
GOOD									
					288.00	28,750.00			
	15	94946 ALLEN'S HARDWARE INC.	50	10	72.00	11,250.00	.02 /	A	A
GOOD									
	15	33333 CLIFFORD PALEY MD	150	60	72.00	6,250.00	.01	F	F
WATCH ACCOUNT									
	15	25256 C.C. GOODWILL INC.	100	45	72.00	6,000.00	.01	A	D
GREAT									
	15	5075 PETER VAN ROTH CORP.	80	15	72.00	2,500.00	.03	B	C
GOOD									
	15	21 MEMORIAL CARETAKERS	50	10	72.00	2,000.00	.04	A	A
GOOD									
					360.00	28,000.00			
	20	296 WOODSTOCK GRAINERY	50	10	72.00	6,750.00	.02 /	A	A
GOOD									
	20	688 SHARON PHILIPS CORP.	100	10	72.00	750.00	.10	F	F
WATCH ACCOUNT									
					144.00	7,500.00			
	22	714 GUY COHRAN CORP.	100	60	72.00	7,250.00	.06 /	D	C
WATCH ACCOUNT									
	22	63410 ROBERT COTTON INC.	50	10	72.00	7,000.00	.01	C	D
NEW ACCOUNT									
					144.00	14,250.00			
	27	24001 ST ALBANS UNIVERSITY	100	45	72.00	12,000.00	.01 /	D	C
GOOD									
	27	431 MARGARET HART INC.	100	60	72.00	11,000.00	.01	C	A

QF-23

Foil Masters 5-217

## SCREEN DESIGN AID



### INTERACTIVELY

CREATE DISPLAY FILES

CREATE MENUS

CREATE MENU CL PROGRAMS

TEST DISPLAY FILES

MAINTAIN MENUS AND DISPLAY FILES





# SCREEN DESIGN AID HELP MENU

## SDA HELP TEXT MENU

NEXT OPTION: \_\_\_\_\_  
CF1 TO EXIT HELP

1. INTRODUCTION
2. DESIGNING RECORD FORMATS
3. DESIGN RECORD FCRMAT MENU
4. MEMBER LIST
5. RECORD FORMAT LIST
6. FILE DEFINITION
7. RECORD FORMAT DEFINITION
8. FIELD DEFINITION
9. WORK DISPLAY CONDITIONING
10. DATA BASE FILE DISPLAYS AND LIST
11. FIELD LIST
12. WORK DISPLAY
13. EXTENDED FIELD DEFINITION
14. SUBFILE CONTROL RECORD DEFINITION
15. SUBFILE RECORD FORMAT DEFINITION
16. SAVE AND CREATE OPTIONS
17. DESIGNING A MENU
18. INITIAL MENU DEFINITION
19. MENU DEFINITION
20. TESTING AN EXISTING RECORD FORMAT

\*\*HELP TEXT FOR SDA MESSAGES -- POSITION CURSOR  
AND PRESS HELP KEY

\*\* TO RETURN TO THIS MENU -- PRESS CF2 KEY

## SDA OPTION MENU

SDA

OPTION MENU

SELECT ONE OF THE FOLLOWING:

1. DESIGN DISPLAY RECORD FORMATS
2. DESIGN A MENU
3. TEST AN EXISTING DISPLAY RECORD FORMAT

OPTION: 2

---

WITHIN SDA

PRESS HELP KEY TO DISPLAY HELP TEXT FOR CURRENT DISPLAY

PRESS CF1 KEY TO EXIT ANY OPTION AND ALLOW SAVING CHANGES

PRESS CF2 KEY TO BACK UP TO THE PREVIOUS DISPLAY

PRESS ENTER/REC ADV TO ADVANCE TO THE NEXT DISPLAY

## INITIAL MENU DEFINITION

SDA INITIAL MENU DEFINITION

MENU/MEMBER: NEWMNU

(BLANK FOR MEMBER LIST DISPLAY)

CL SOURCE FILE QCLSRC

LIBRARY: \*LIBL

ALLOW THIS MENU ON THE FOLLOWING DISPLAY SIZES:

(Y/N)

large display (24X80): Y

small display (12X80):

console (16X64):

NUMBER OF COLUMNS FOR THE MENU (1 or 2): 1

MENU TITLE: SAMPLE MENU NUMBER ONE!!!!

# MENU DEFINITION

SDA

## MENU DEFINITION

CTL	OPTION	MENU PROMPT	TYPE	PGM/CL CMD
—	1	Edit payroll hours	P	PR01
—	2	Calculate payroll	p	PR02
—	3	Display library <del>list</del>	C	DSPLIB
—				
—				

---ETC---

CTL: I-Insert    D-delete  
      C-Copy     A-Copy after  
      P-Prompt for Command now

TYPE: C-CL Cmd  
      P-Program call  
      L-Pgm call w parm list  
      E-Prompt exec time

## SDA OPTION MENU

SDA

OPTION MENU

SELECT ONE OF THE FOLLOWING:

1. DESIGN DISPLAY RECORD FORMATS
2. DESIGN A MENU
3. TEST AN EXISTING DISPLAY RECORD FORMAT

OPTION: 1

-----  
WITHIN SDA

PRESS HELP KEY TO DISPLAY HELP TEXT FOR CURRENT DISPLAY

PRESS CF1 KEY TO EXIT ANY OPTION AND ALLOW SAVING CHANGES

PRESS CF2 KEY TO BACK UP TO THE PREVIOUS DISPLAY

PRESS ENTER/REC ADV TO ADVANCE TO THE NEXT DISPLAY

## SDA UTILITY CHOOSING DB FIELDS FOR WORK DISPLAY

SDA DATA BASE FIELD DISPLAY

RECORD: PAYBLE

TO SCROLL THE FILE ENTER THE NUMBER OF FIELDS TO ROLL      ROLL: 15

TO SEARCH THE FILE FOR A FIELD ENTER THE FIELD NAME      FIELD:

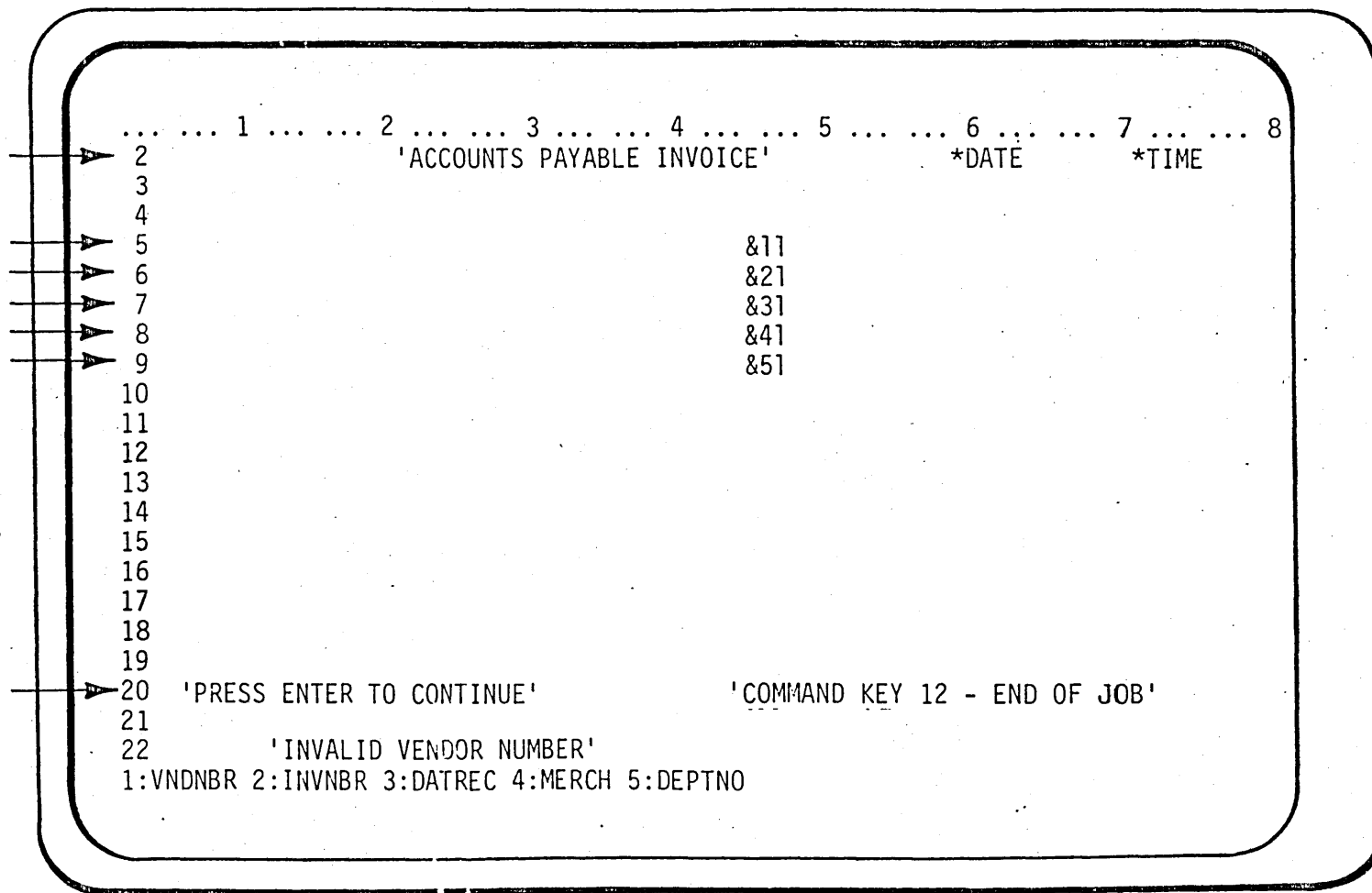
FOR X-I-0-B ENTER X FOR THE EXTENDED DATA BASE FIELD DISPLAY.  
ENTER I, O, OR B FOR USAGE AND SELECTION OF THE FIELD.

X-I-0-B	FIELD	LENGTH	TYPE	COLUMN HEADING
I	VNDNBR	5,0	P	VENDOR NUMBER
I	INVNBR	8	C	VENDOR INVOICE NUMBER
I	DATREC	6,0	P	DATE RECEIVED
I	MERCH	7,2	P	MERCHANDISE AMOUNT
	NET	7,2	P	NET AMOUNT PAID
	STATUS	1	C	STATUS OF RECORD
	DTPAID	6,0	P	DATE PAID
	CHECK#	6,0	P	CHECK NUMBER
I	DEPTNO	3,0	P	DEPARTMENT NUMBER

SD-12

→ (CF2)

# SDA UTILITY POSITIONING TEXT & FIELDS ON WORK DISPLAY



SD-13

→ (ENTER)

# SDA UTILITY REQUESTING EDITING/CONDITIONING

2	..... 1 .....	2	..... 3 .....	4	..... 5 .....	6	..... 7 .....	8
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								

SD-14

→ (ENTER)



SDA UTILITY  
REQUESTING SAVE/CREATE

SDA DESIGN RECORD FORMAT MENU

SELECT ONE OF THE FOLLOWING:

1. FILE DEFINITION
2. RECORD FORMAT DEFINITION
3. FIELD DEFINITION
4. SUBFILE CONTROL RECORD DEFINITION
5. SUBFILE RECORD FORMAT DEFINITION
6. SAVE DDS/CREATE DISPLAY DEVICE FILE

OPTION: 6

NEW OR EXISTING DISPLAY RECORD FORMAT  
(BLANK FOR RECORD FORMAT LIST DISPLAY)

RECORD FORMAT: APENTR

ENTER THE SOURCE FILE FOR DDS  
LIBRARY

DDS SOURCE FILE: APPSRC  
LIBRARY: APLIB

NEW OR EXISTING MEMBER NAME  
(BLANK FOR MEMBER LIST DISPLAY)

MEMBER: APDENTRB

ENTER ADDITIONAL RECORD FORMATS TO BE  
DISPLAYED ON THE WORK DISPLAY

ADDITIONAL RECORDS:

(ENTER)

SD-19

## INTERACTIVE DATABASE UTILITIES

- EASY TO USE
- USE THE DATABASE DEFINITIONS
- CAN REPLACE APPLICATION PROGRAMS

**KNOWLEDGE REQUIRED TO CONTROL A SYSTEM**

3

OPERATION CONTROL LANGUAGE  
UTILITY CONTROL STATEMENTS  
OPERATOR CONTROL COMMANDS  
CCP COMMANDS  
CCP ASSIGNMENT SET

32

OPERATION CONTROL LANGUAGE  
UTILITY CONTROL STATEMENTS  
OPERATOR COMMANDS  
UTILITY COMMANDS

34

OPERATION CONTROL LANGUAGE  
UTILITY CONTROL STATEMENTS  
OPERATOR COMMANDS

38

CONTROL LANGUAGE

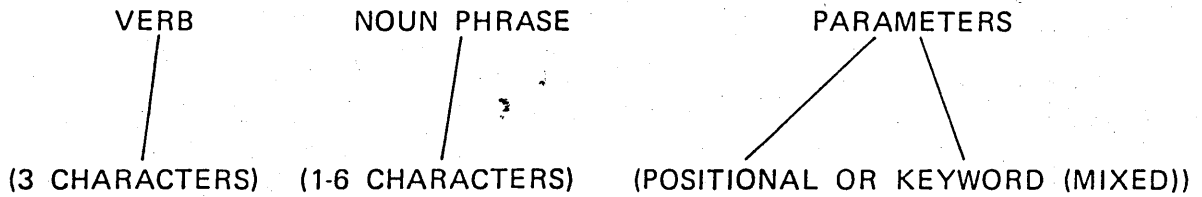
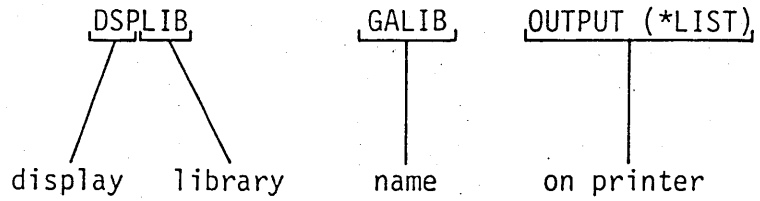
## CONTROL LANGUAGE

### CAN:

- |                     |           |                    |
|---------------------|-----------|--------------------|
| • CALL programs     | CALL      | HISPGM             |
| • COPY files        | CPYF      | THISFILE THATFILE  |
| • DELETE files      | DLTF      | THISFILE           |
| • DISPLAY libraries | DSPLIB    | *ALL               |
| • POWER down        | PWRDWSYS  | DELAY(120)         |
| • REORGANIZE files  | RGZPFM    | THATFILE           |
| • SEND messages     | SNDBRKMSG | CLOSING DOWN . . . |

AND MUCH MORE . . .

## CL STRUCTURE



## CONTROL LANGUAGE VERBS

ADD ALC    allocate [APY    apply]  CALL CHG    change CLR    clear CNL    cancel CPY    copy CRT    create  *DATA DCL    declare DLT    delete [DMP    dump] *DO DSP    display DUP    duplicate	*ELSE *END  *GOTO GRT    grant  HLD    hold  *IF INZ    initialize  *JOB  [LOD    load]  MON    monitor MOV    move	OVR    override  [PCH    patch] *PGM    program [PRP    prepare] PWR    power  RCV    receive *RETURN RGZ    reorganize RLS    release RMV    remove RNM    rename RPL    replace RRT    rerate RSM    resume RTN    return RTV    retrieve RVK    revoke	SAV    save SBM    submit SIGNOFF SND    send [SRV    service] STR    start  TRF    transfer [TRC    trace] TRM    terminate  [VFY    verify] [VRY    vary ]  *WAIT
--	---	---	---

\*CL programs only

## CREATE LIBRARY COMMAND

```
CRTLIB LIB (library.name)
        [TYPE(*PROD|*TEST)]
        [PUBAUT(*NORMAL|*ALL|*NONE)]
        [TEXT(*BLANK|text)]
```

```
::?CRTLIB
```

# CREATE LIBRARY PROMPT

## CREATE LIBRARY (CRTLIB) PROMPT

Enter the following:

Library name:

Library type (\*PROD or \*TEST):

Public authority (\*NORMAL, \*ALL or \*NONE):

Text description:

LIB R	_____
TYPE	*PROD
PUBAUT	*NORMAL
TEXT	*BLANK



## KEYWORD AND POSITIONAL

CRTLIB LIB(BERT) TYPE(\*TEST)  
PUBAUT(\*NONE)

CRTLIB BERT PUBAUT(\*NONE)

CRTLIB BERT \*TEST \*NONE

CRTLIB BERT /\* BERT'S OWN \*/  
PUBAUT(\*NONE)

### COMMAND GROUPING MENU

Select one of the following:

- 1. All Commands
- 2. Object and Library
- 3. Data Base
- 4. Device Management
- 5. Programming
- 6. Program Debug
- 7. Message Handling
- 8. Utilities (If Installed)
- 9. Input/Output Spooling
- 10. System and Job Control
- 11. Subsystem and Class
- 12. Configuration
- 13. Security
- 14. Save/Restore
- 15. Command Definition
- 16. Service

Option\_\_Partial command name:\_\_\_\_\_CF1-Return

PT-45

## OBJECT AND LIBRARY COMMANDS MENU

Select one of the following:

### Object

- RNMOBJ - Rename Object
- MOV OBJ - Move Object
- ALCOBJ - Allocate Object
- DLC OBJ - Deallocate Object
- CHK OBJ - Check Object
- DSPOBJD - Display Object Description

### Library

- CRTLIB - Create Library
- DLTLIB - Delete Library
- CLRLIB - Clear Library
- DSPLIB - Display Library
- RPLLIBL - Replace Library List
- DSPLIBL - Display Library List

Command name: \_\_\_\_\_ CF1-Return

PT-46

# Command Key 3

## To Duplicate a Previous Command

COMMAND ENTRY DISPLAY

```
:: DSPLIB MYLIB OUTPUT(LIST)
:: CALL PYLIST
:: CALL AR100
:: DSPLIB MYLIB OUTPUT(LIST)
```

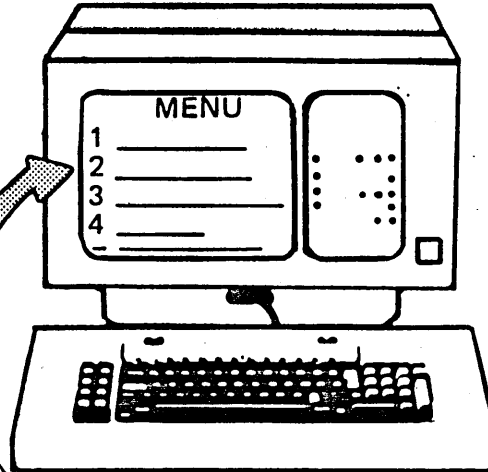
Display Screen Layout Sheet

		1-10										11-20										21-30										31-40										41-50					
		1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6
01																																															
02																																															
03																																															
04																																															
05																																															
06																																															
07																																															
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15																																															
16																																															
17																																															

PT-47



## CL PROGRAMS



```
PGM  
DCLF MENFILE
```

```
MENU: SNDRCVF MENFILE RCDfmt(MENfmt)
```

```
IF      (&CHOICE *EQ 1) CALL INQCUS (&INQNUM)  
IF      (&CHOICE *EQ 2) CALL INQITM (&INQNUM)  
IF      (&CHOICE *EQ 3) CALL INQSUP (&INQNUM)  
IF      (&CHOICE *EQ 4) RETURN  
GOTO    MENU
```

```
ENDPGM
```

PAYROLL MENU

1. ENTER HOURS (ENTER WEEK ENDING DATE)
2. PRINT PAYROLL REGISTER
3. PRINT 941'S
4. PRINT CHECKS (ENTER STARTING CHECK #)

OPTION: \_\_\_\_\_

WEEK ENDING DATE: \_\_\_\_\_

CHECK NO.: \_\_\_\_\_

PT-52





## CL PROGRAM FUNCTIONS

```
EX1: PGM  PARM(&QOH &QTYORD) /* EXPGM*/  
      DCL  &QOH *DEC LEN(5)  
      DCL  &QTYORD *DEC LEN(5)  
  
      IF  ((&QOH-&QTYORD) *LT 0)+  
          DO  
          SNDPGMMMSG  MSGID(OEMSG2)+  
                     MSGFILE(OEMSGS)+  
                     MSGDATA('DUMMY')+  
                     TOMSGQ(SUPVR)  
          [ 'YOUR DATA ENTRY CLERK IS A &1' ]  
  
          CHGVAR &QTYORD VALUE(00000)  
          ENDDO  
      ELSE  CALL RPGPGM PARM(&QTYORD)  
  
      RETURN  
      ENDPGM
```

## CL PROGRAM DESK EXERCISE

1. CODE CL PROGRAM TO DISPLAY PAYROLL MENU (PRMNU IN PRFILE)
2. PROCESS OPTIONS (OPTS) AS FOLLOWS:
  - a. CALL PR01  
(WITH PRAMETER (WEDATE))
  - b. CALL PR02
  - c. CALL PR03
  - d. CALL PR04 WITH (STCKNO)  
(WITH PARAMETER (STCKNO))

## SOLUTION

PGM

START: DCLF (PRFILE)

SNDRCVF PRFILE RCDFMT (PRMNU)

IF (&OPTS \*EQ 1) CALL PR01 (&WEDATE)

IF (&OPTS \*EQ 2) CALL PR02

IF (&OPTS \*EQ 3) CALL PR03

IF (&OPTS \*EQ 4) CALL PR04 (&STCKNO)

GOTO START

ENDPGM

## CONTROL LANGUAGE IS

- A SINGLE CONSISTENT INTERFACE TO ALL SYSTEM FUNCTIONS
- INTERACTIVE
  - PROMPTS
  - COMMAND GROUPING MENUS
- COMPILED
  - FAST
  - POWERFUL LOGIC
  - DATA MANIPULATION
  - DIRECT WORKSTATION INTERFACE
  - AUTO-PROMPT
- DESIGNED FOR CONTROLLING APPLICATION FLOW

## DEBUG

- INTERACTIVE OR BATCH PROGRAMS
- HLL AND CL PROGRAMS
- SECURE PRODUCTION LIBRARIES FROM UPDATE
- DEFINE BREAKPOINTS
- DEFINE TRACE

## DEBUG MODE

### SET A BREAKPOINT

08060C	72	ITEM	CHAININVENT	96
08070C	96		GOTO REENT	
08080C		QTYORD	MULT PRICE	VALUE
08090C		VALUE	ADD TOT	TOT

ADDBKP STMT(08080) PGMVAR (VALUE)

## AT A BREAKPOINT

### PROGRAMMER CAN:

- DISPLAY OTHER FIELDS
- CHANGE FIELD VALUES
- SET ADDITIONAL BREAKPOINTS
- USE SYSTEM REQUEST KEY TO:
  - EXAMINE DATA FILE
  - ALTER DATA FILE



01/03/80 12:00:15 BREAKPOINT DISPLAY

STMT: 1200 PROGRAM: SAR250 INV LVL: 1

OUTPUT START: 1 LENGTH: \*DCL FORMAT: \*CHAR

VARIABLE: TOTAMT

TYPE: NUMERIC LENGTH: 6 2

'1010.25+'

CF1-CANCEL REQUEST CF3-COMMAND ENTRY ENTER-RESUME EXECUTION

DG-5

## TRACE

- TRACE LISTS THE SEQUENCE OF EXECUTION OF INSTRUCTIONS. IT CAN ALSO DISPLAY THE CONTENTS OF VARIABLES IN THESE INSTRUCTIONS.
- IT DIFFERS FROM BREAKPOINT IN THAT YOU ARE NOT GIVEN CONTROL DURING THE TRACE. YOU CAN ASK FOR A DISPLAY OF THE TRACE INFORMATION, BUT YOU CANNOT CHANGE VARIABLES.
- YOU CAN SPECIFY THAT THE VALUES OF THE VARIABLES ARE TO BE RECORDED ONLY WHEN THEY CHANGE.

"DSPTRCDTA" COMMAND YIELDS:

TRACE DATA DISPLAY

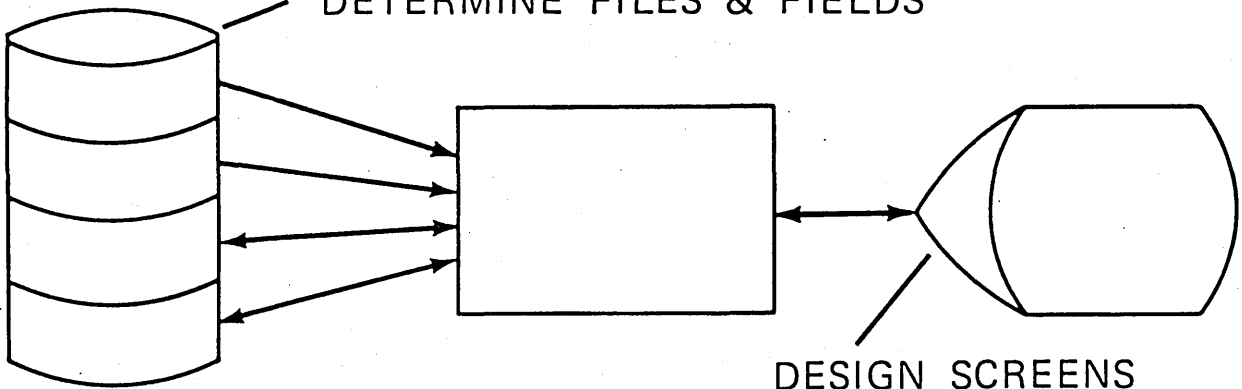
STMT: 00000700	PGM: SAR250	LVL: 1	12
STMT: 00000900	PGM: SAR250	LVL: 1	13
STMT: 00008300	PGM: SAR250	LVL: 1	14
STMT: 00008400	PGM: SAR250	LVL: 1	15
STMT: 00008500	PGM: SAR250	LVL: 1	16
STMT: 00001000	PGM: SAR250	LVL: 1	17
STMT: 00001100	PGM: SAR250	LVL: 1	18
START: 1 DISPLAY LEN: *DCL OUTPUT FORMAT: *CHAR			
*VARIABLE: TOTAMT			
TYPE: NUMERIC		DECLARE LEN: 62	
'1010.25'			
STMT: 00001200	PGM: SAR250	LVL: 1	19
STMT: 00001400	PGM: SAR250	LVL: 1	20
STMT: 00001600	PGM: SAR250	LVL: 1	21

## TEST LIBRARY

- TO AVOID DESTRUCTION OF PRODUCTION DATA WHILE TESTING PROGRAMS, BOTH PROGRAMS AND FILES SHOULD BE PUT INTO TEST LIBRARIES.
  - FIRST OPERATION IS TO CREATE A TEST LIBRARY
  - THE LIBRARY LIST SHOULD NEXT BE CHANGED TO PUT THE TEST LIBRARY FIRST
  - GET THE NEEDED OBJECTS FROM PRODUCTION LIBRARY TO TEST LIBRARY
    - COPY PHYSICAL FILES
    - RECREATE LOGICAL FILES
- OR
- SAVE NEEDED OBJECTS (OR WHOLE LIBRARY) AND *RESTORE* TO TEST LIBRARY
  - ENTDBG PGM(pgm-name) UPDPROD(\*NO)
  - IN THIS ENVIRONMENT, THE USER WILL BE PREVENTED FROM UPDATING PRODUCTION FILES

### PREPARING TO WRITE A PROGRAM

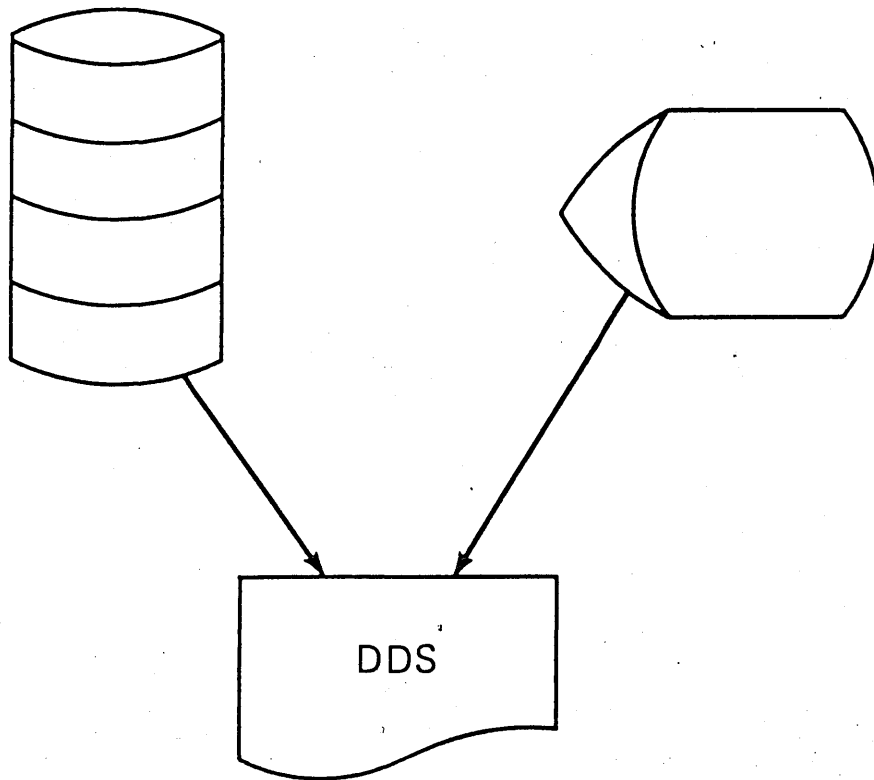
\*DETERMINE FILES & FIELDS



DESIGN SCREENS

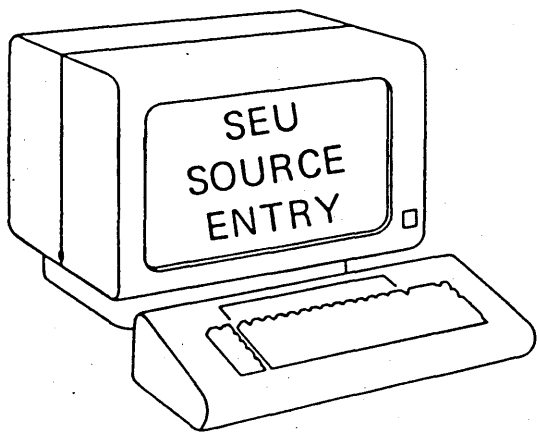
\*NAMES AND DEFINITIONS;  
LOCATIONS NOT NECESSARY

## COMPLETE DATA DESCRIPTIONS



SAME FORM IS USED  
CODE ONCE — USE FOR  
MANY PROGRAMS

# ENTER DATA DESCRIPTION SPECIFICATIONS



PT-66

- FORMATTING
- SYNTAX CHECKING

A		Conditioning														Type (R,K,S,O) Reserved	Name	Reference (R)												
		Sequence Number	Form Type	And/Or/Comment (A,O,*)	Condition Name																									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29		
					A	*		L	O	G	I	C	A	L		F	I	L	E		D	E	S	C	R	I	P	T		
					A	*																								
					A												R		O	R	D	E	R	F	M	T				
					A																	O	R	D	E	R	#			
					A																	I	T	E	M	#			R	
					A																									
					A																									

**USE CONTROL LANGUAGE COMMANDS TO CREATE  
DATA FILES & SCREEN FORMATS**

- CRTLF FILE(ORDENTL.BILLING) +  
SRCFILE(ORDERSRC.SRCCELIB)
- CRTDSPF FILE(DISPORD) SRCFILE(ORDIS.SRCCELIB)

COMMANDS MAY BE ENTERED USING PROMPTS





# ENTER THE PROGRAM USING IDU SOURCE ENTRY

```

SEU   US W:1   MBR: RPGSAMP           SCAN:_____
FMT C

0014.00 C   01   COUNT   COMP 505           02
0015.00 C   01N02           EXCPT
0016.00 C   01N02           GOTO REPEAT
0017.00 C                               LR
.....
      **** END OF DATA ****

```

```

FMT SEQNBR   LEVEL   NO1NO2NO3  FACTOR1  OPCODE  FACTOR2
C           _____  01           COUNT   COMP   505

RESULT LEN DEC H/A   HILOEQ COMMENT
_____  _____  _____  _____  02 _____

```

PT-69

COMPILE THE PROGRAM  
CRTRPGPGM PGM(ORDER1)

PT-70

COMPILE THE PROGRAM  
CRTRPGPGM PGM(ORDER1)

PT-70

USE DEBUG MODE

ENTDBG

PT-71

FILE REVIEW PROMPT FOR FILE CUSTMASTL

For each record format to be used, enter R to review the fields,  
A to select all fields, or E to enter fields later:

X RECORD FMT DESCRIPTION

A CUSTMAST CUSTOMER MASTER RECORD / LOGICAL FILE

Press ENTER to continue prompting.

Press EXIT APPLICATION command key to generate a default  
application using all record formats selected with an A.

PT-72

EXECUTE THE PROGRAM  
CALL PGM(ORDER1)

PT-73

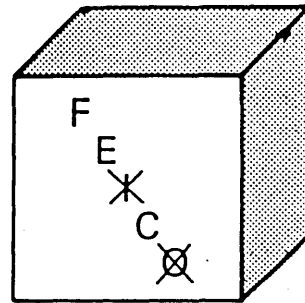
## PROGRAMMER ADVANTAGES

- DATA BASE AND DDS
  - ELIMINATE CLERICAL TASKS
  - SIMPLIFY FILE CHANGES
- DEBUG MODE TO TEST OR TRAIN
  - REALISTIC WITHOUT DANGER
- DEBUG MODE TO DEBUG
  - TRUE "ON-LINE" TESTING AND CORRECTIONS
- RPG AND CL
  - PROCEDURAL INTERACTIVE PROGRAMMING
- SYSTEM REQUEST KEY
  - INCREASES FLEXIBILITY



## RPG III ENHANCEMENTS . . . 1

- \* EXTERNALLY DESCRIBED FILES



## TWO WAYS OF FILE HANDLING WITHIN A PROGRAM

1. USING THE RPG CYCLE
2. FULL PROCEDURAL PROGRAMMING

NOTE: BOTH PROGRAM DESCRIBED AND EXTERNALLY DESCRIBED FILES CAN BE PROCESSED IN THESE TWO WAYS.

## DATA CAN BE ACCESSED

1 – VIA FILE NAME

2 – VIA RECORD FORMAT NAME

1. CAN BE USED WITH

– EXTERNALLY DESCRIBED DATA

– PROGRAM DESCRIBED DATA

2. CAN ONLY BE USED WITH

– EXTERNALLY DESCRIBED DATA

- ENHANCED FILE PROCESSING

CHAIN READ SETLL

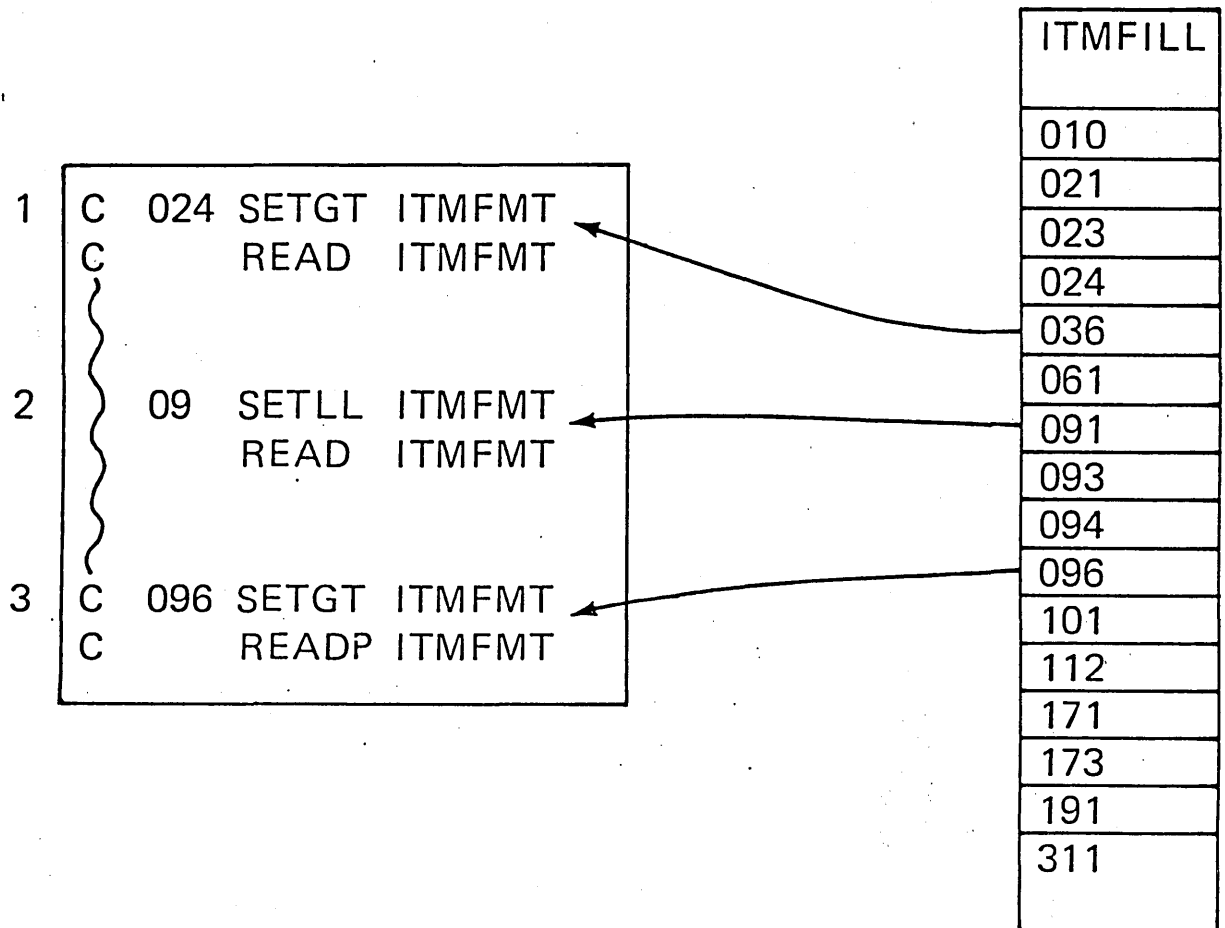
- NEW FILE PROCESSING

DELET READE READP  
SETGT UPDAT WRITE

- NEW FILE CONTROL

OPEN CLOSE FEOD

## PROCEDURAL OPERATIONS ... 3



RG7

## RPG ENHANCEMENTS . . . 3

- WORKSTATION SUPPORT:
  - EXFMT
  - READ
  - WRITE
- FOR SUBFILES:
  - CHAIN
  - READC
  - UPDAT
  - WRITE

## RPG ENHANCEMENTS...5

10 KEY	KLIST		COMPOSITE KEY
	KFLD	ORDNO	
	KFLD	CUSTNO	
	KFLD	ITEM	

11 PRTCTL DATA STRUCTURE

12 USER-DEFINED EDIT CODES (5-9)

13						
0	QPRINT	01		RELATIVE		
0			CUSTNO	20	END	
0			CUSNAM	+25	POSITION	
0			ADR1	+30		
0			ADR2	+30		
14	FIGURATIVE CONSTANTS:				*BLANK	*ZERO
				*HIVAL	*LOVAL	
				*ALL'C'		

# DATA STRUCTURES

## DATA STRUCTURE

FIELD1
FIELD2
FIELD3
FIELD4

	PARTNO	DS				
				1	2	FIELD1
				3	8	FIELD2
				9	20	FIELD3
				21	28	FIELD4

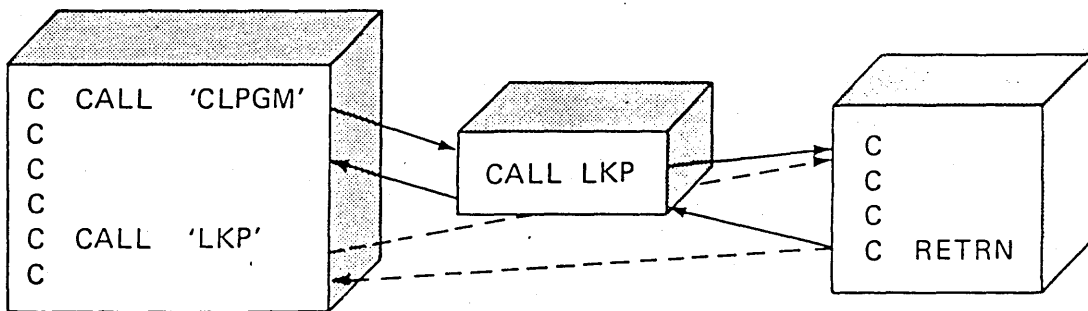
C		2	OCUR	PARTNO		
C			MOVE	1	1	FIELD3
C			ADD	.6		FIELD4



## RPG III ENHANCEMENTS . . . 4

1	CUSTYP	CABEQ	03	ROUTN3	COMPARE AND BRANCH
2		SUB	AMT	AMT	(SHORT FORM)
3		EXCPT	TOTALS		(EXCPT TO A NAME)
4		MOVE	'1'	*IN,X	(INDICATOR ARRAY)
5	*LIKE	DEFN	FIELDA	FIELDB	(DEFINE FIELD SAME AS)
6		SETON		... U6	(CONTROL U. INDICATORS)
7		TIME		TIMDAT 12	(GET DATE/TIME)
8		SHTDN		... 99 ...	(TEST FOR SHUTDOWN)
9		SORTA	MSG		(SORT AN ARRAY)

### RPG III ENHANCEMENTS . . . 3



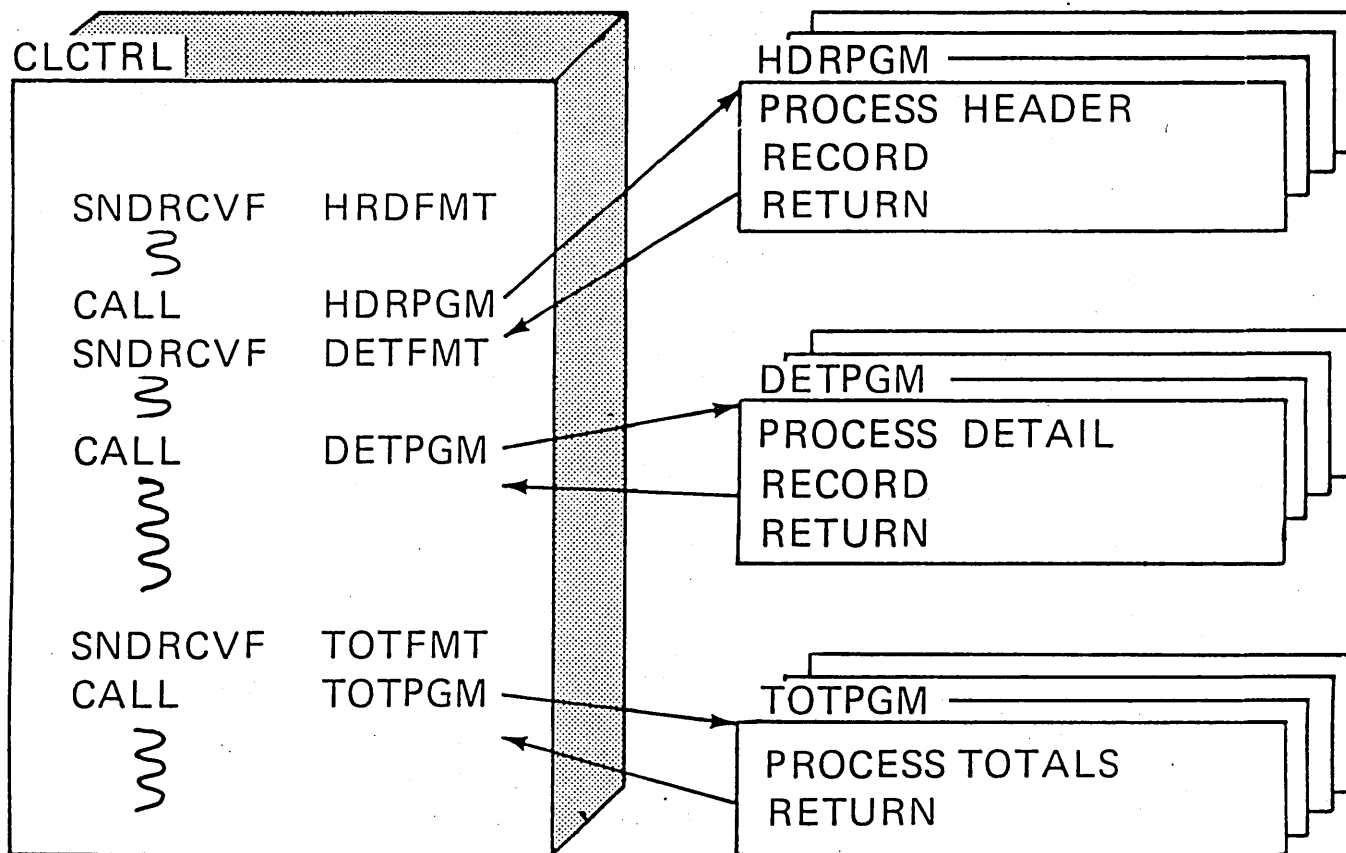
- PASSING DATA

```
PLIST  
PARM      CUSNO  
PARM      ORDNO  
PARM *IN01 IND
```

- RETURNING

```
RETRN  
SETON          RT
```

## MODULAR APPLICATION DESIGN



- EASY DESIGN, CODE, TEST, AND MAINTENANCE
- ALLOWS SYSTEM FUNCTIONS THROUGH CALLS TO CL

DO

GROUPS/IF ELSE

- DO { DO  
    ~  
    ~  
    ~  
    END

- DOW { QTYORD    DOWLT    QOH  
          ~  
          ~  
          ~  
          END

- DOU { QTY        DOUEQ    QDH  
          ~  
          ~  
          ~  
          END

- IF/ELSE { QTY        IFEQ        QTR  
           ~  
           CALL    'XYZ'  
           ~  
           ELSE  
           ~  
           CALL    'ABC'  
           ~  
           END



## RPG III ON SYSTEM/38

- A POWERFUL BATCH PROCESSING LANGUAGE

+

- A POWERFUL INTERACTIVE LANGUAGE

HL-11

**S/38 COBOL  
IBM EXTENSIONS**

- PHYSICAL AND LOGICAL FILES**
- WORKSTATION SUPPORT**
- WORKSTATION SUBFILES**
- INDICATORS**
- LINKAGE FROM AND TO RPG AND CONTROL  
LANGUAGE PROGRAMS**
- COPYING OF FIELD DEFINITIONS OF EXTERNALLY  
DESCRIBED FILES INTO THE COBOL PROGRAM**
- SYNTAX CHECKING OF COBOL SOURCE WITH SEU**

FILE PROCESSING

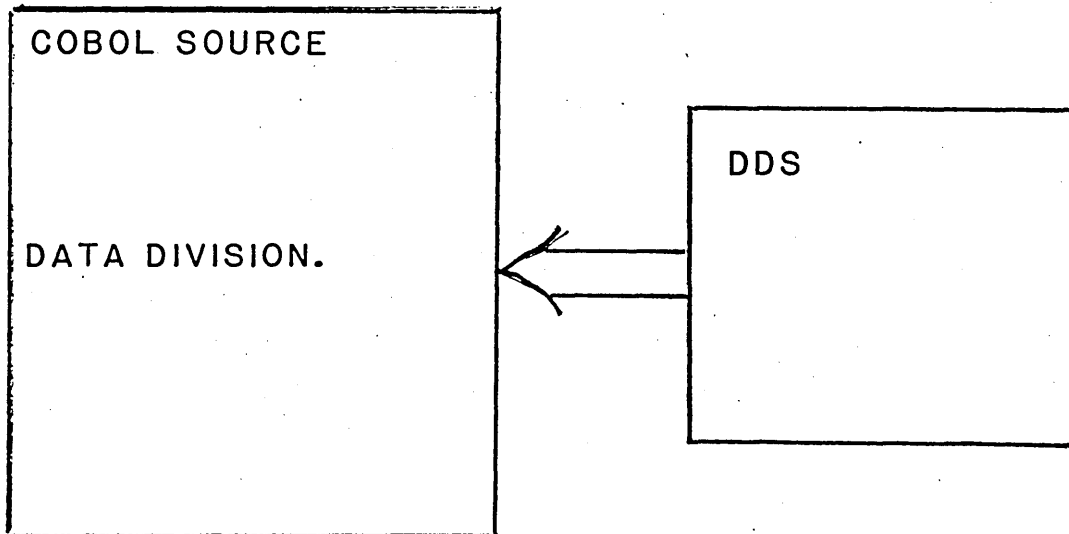
SYSTEM/38 COBOL USES CPF DATA MANAGEMENT  
FOR FILE PROCESSING

BOTH PHYSICAL AND LOGICAL FILES ARE  
SUPPORTED



## IBM EXTENSION

AT COMPILE TIME, DDS USED TO CREATE A FILE  
CAN BE USED TO CREATE AN EQUIVALENT RECORD  
DEFINITION



NOTE: THE ABOVE IS THE FORMAT 2 COPY. THE  
FORMAT 1 COPY IS USED TO COPY SOURCE  
STATEMENTS INTO A PROGRAM.

EXAMPLE OF USING THE COPY STATEMENT (FORMAT 2)

ENVIRONMENT DIVISION.

SELECT PINVMAST ASSIGN TO DATABASE-PINVMAST.

DATA DIVISION.

FILE SECTION.

FD PINVMAST

LABEL RECORDS ARE STANDARD.

01 INVMAST.

COPY DDS-INVMASTR OF PINVMAST.

I-O FORMAT: INVMASTR FROM FILE PINVMAST  
OF LIBRARY QSPT

05 INVMASTR

06 CSTTM PIC S9(7)V9(2) COMP-3.

06 CTTY PIC S9(9)V9(2) COMP03.

06 DESC PIC X(30).

06 DLTOA PIC S9(6).



DATA DESCRIPTION SPECIFICATIONS

A*	INVENTORY MASTER FILE:	PINVMAST.QSP1
A	R INVMASTR	
A	CSTTM	9 2
A	CTTY	11 2
A	DESC	30
A	DLTOA	6 0

IBM EXTENSIONS  
BOOLEAN DATA

-- TO SUPPORT INDICATORS USED IN DDS FOR  
WORKSTATION CODING

-- SPECIFIED:    B"1"  
                  B"0"  
                  ZERO

-- EXAMPLE:      88 END-PROCESS      VALUE IS B"1".  
                  88 HI-LITE         VALUE IS B"0".

IBM EXTENSION  
READ AND WRITE DISPLAYS

WRITE RECORD-NAME FROM IDENTIFIER  
FORMAT IS IDENTIFIER/LITERAL  
INDICATORS ARE IDENTIFIER

READ FILE-NAME RECORD INTO IDENTIFIER  
FORMAT IS IDENTIFIER/LITERAL  
INDICATORS ARE IDENTIFIER

SAMPLE OF WORK STATION CODING

ENVIRONMENT DIVISION  
INPUT-OUTPUT SECTION  
FILE-CONTROL

SELECT DSPFILE ASSIGN WORK STATION-DSPFLO1  
ORGANIZATION IS TRANSACTION

DATA DIVISION  
FILE SECTION

FD DSPFILE LABEL RECORD OMITTED

01 DSP01

03 DSP01-0-INDICATORS

05 FILLER PIC 1 INDICATOR 22  
88 HI-INTENSITY VALUE IS B'1'

05 FILLER PIC 1 INDICATOR 25  
88 MSG01 VALUE IS B'1'

03 DSP01-I-INDICATORS

05 FILLER PIC 1 INDICATOR 98  
88 END-PROCESS VALUE IS B'1'

03 CUSTNO PIC X(8)

03 CUSTNM PIC X(20)

03 CUSTADRI PIC X(20)

WORKING-STORAGE SECTION

SAMPLE OF WORK STATION CODING (CONT)

PROCEDURE DIVISION

PARA01

OPEN I-O DSPFILE

MOVE ZEROS TO DSP01-0-INDICATORS

·  
·  
·

PARA03

WRITE DSP01

FORMAT IS 'DSPFMT03'

INDICATORS ARE DSP01-0-INDICATORS

·  
·  
·

READ DSPFILE

FORMAT IS 'DSPFMT03'

INDICATORS ARE DSP01-I-INDICATORS

IF END-PROCESS

GO TO EXIT-PROG

·  
·  
·

SUBFILE SUPPORT  
(IBM EXTENSION)

READ SUBFILE FILE-NAME NEXT MODIFIED RECORD INTO IDENTIFIER

WRITE SUBFILE RECORD-NAME FROM IDENTIFIER

REWRITE SUBFILE RECORD-NAME FROM IDENTIFIER

USED TO REPLACE RECORDS THAT EXIST IN THE SUBFILE

EXAMPLE OF USE OF NEXT MODIFIED RECORD OPTION

READ SUBFILE DSPFLO6 NEXT MODIFIED RECORD

THE LAST RECORD READ WAS 2

DSPFLO6

1	2	3	4	5*	6	7	8	...
---	---	---	---	----	---	---	---	-----



\* RECORD 5 IS THE NEXT MODIFIED RECORD  
EXECUTION OF THE READ, READS RECORD 5

DSPFLO6

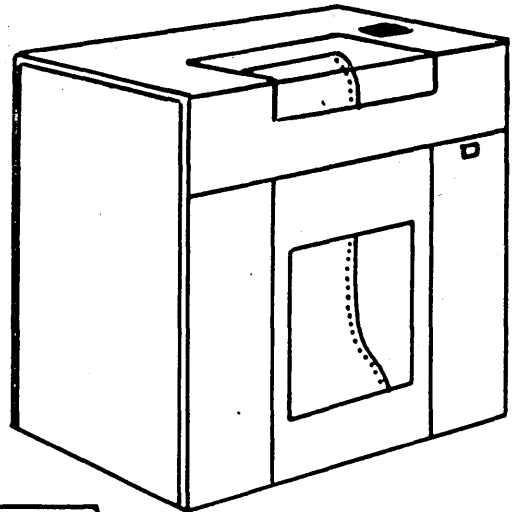
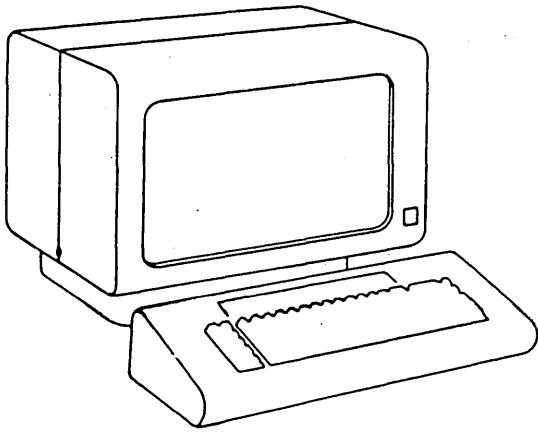
1	2	3	4	5*	6	7	8	...
---	---	---	---	----	---	---	---	-----



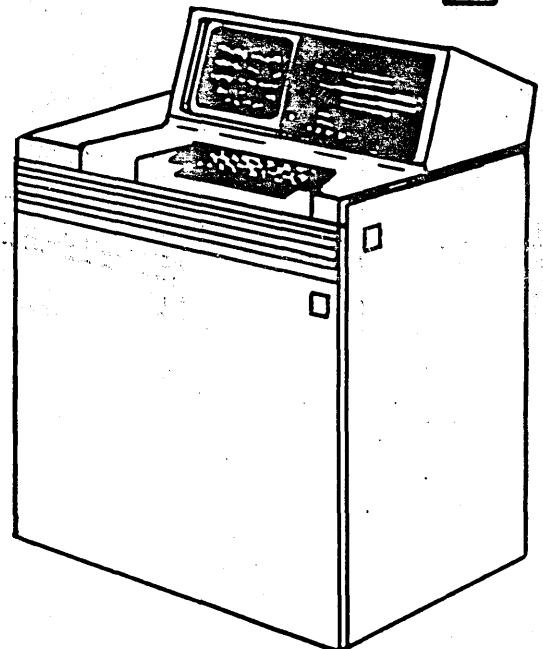
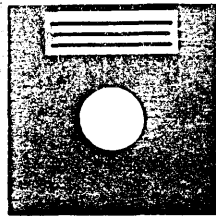
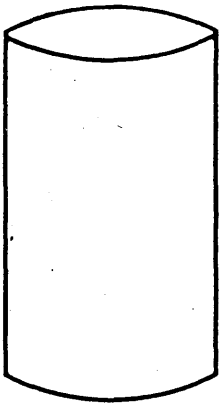
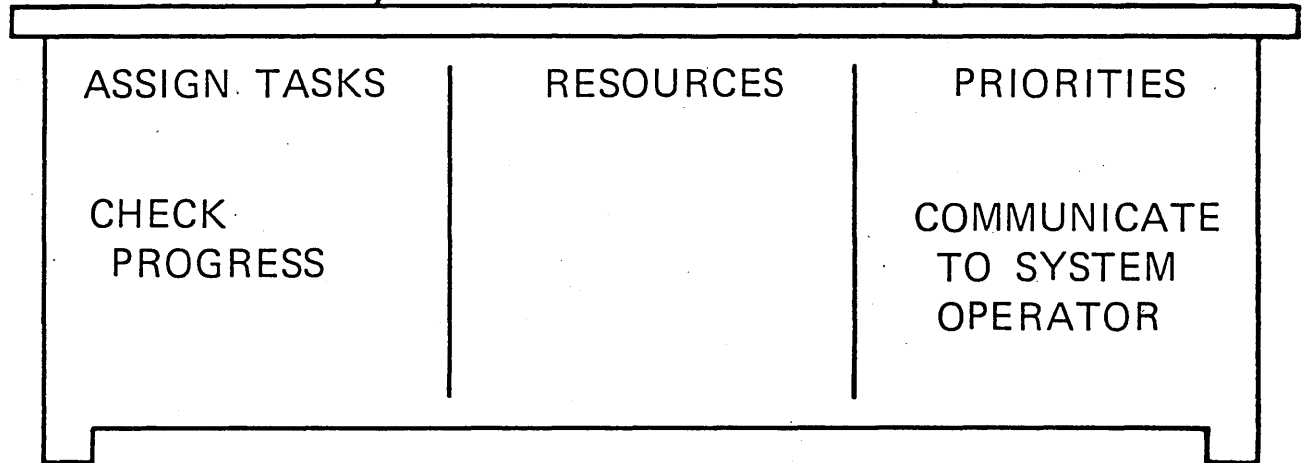


**WORK**

**MANAGEMENT**

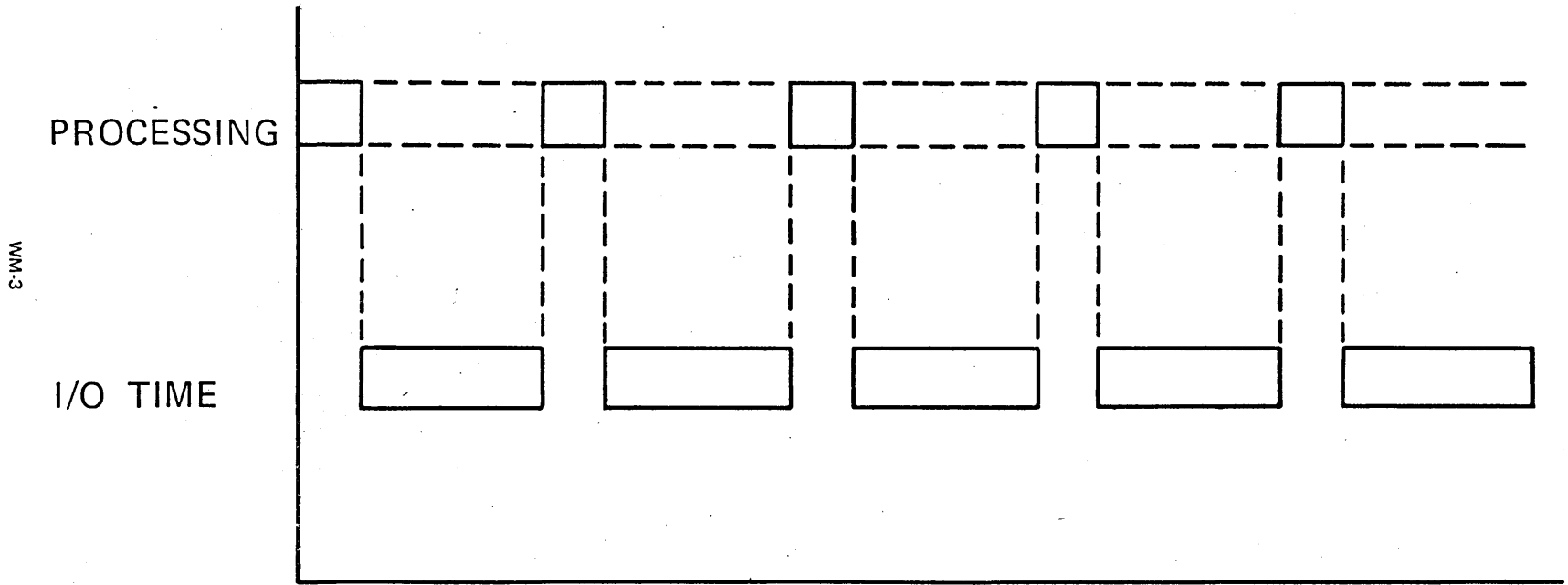


WORK MANAGER



WM-2

### SINGLE PROGRAM UTILIZATION OF PROCESSING UNIT

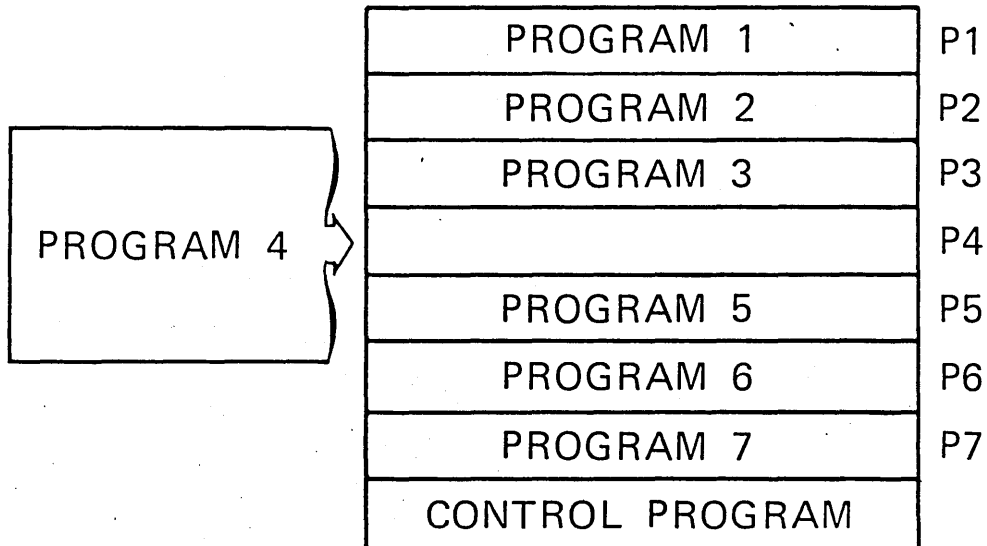


## PARTITIONS TO SUPPORT MULTIPROGRAMMING

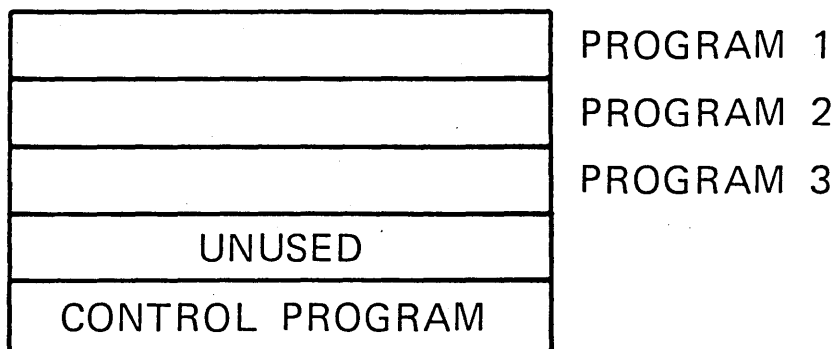
PROGRAM 1	P1
PROGRAM 2	P2
CONTROL PROGRAM	

WM-5

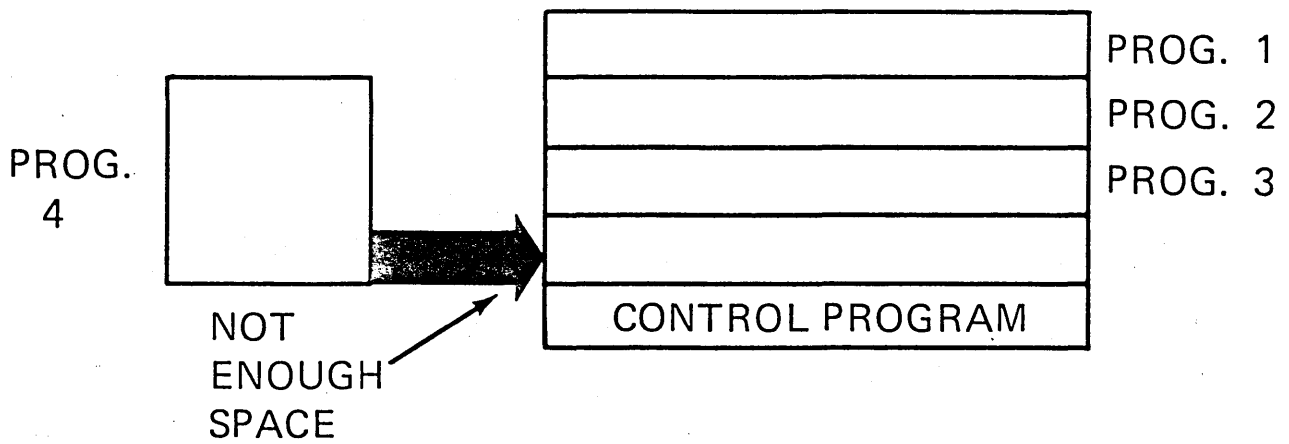
MORE STORAGE FOR MORE PARTITIONS  
MEANT MORE PROGRAMS



ADVANCED CONTROL PROGRAM PERMITS  
MULTIPROGRAMMING WITHOUT PARTITIONS

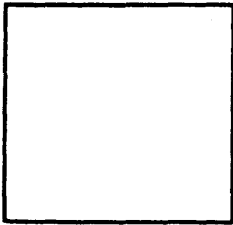


ATTEMPT TO EXECUTE PROGRAM 4  
OVERCOMMITTS AVAILABLE STORAGE



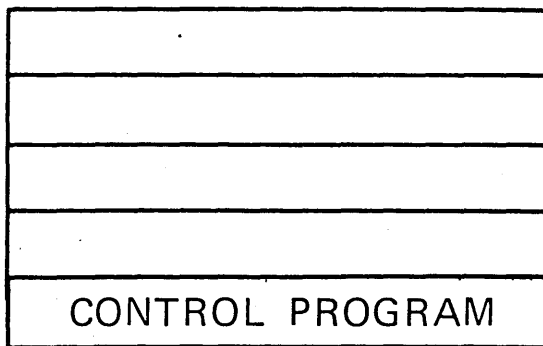
LEAST ACTIVE PROGRAM "SWAPPED OUT" TO MAKE ROOM FOR PROGRAM 4

"I'LL BE BACK."



*PROGRAM 2*

TEMPORARY  
HOLD AREA



PROG. 1

PROG. 4

PROG. 3

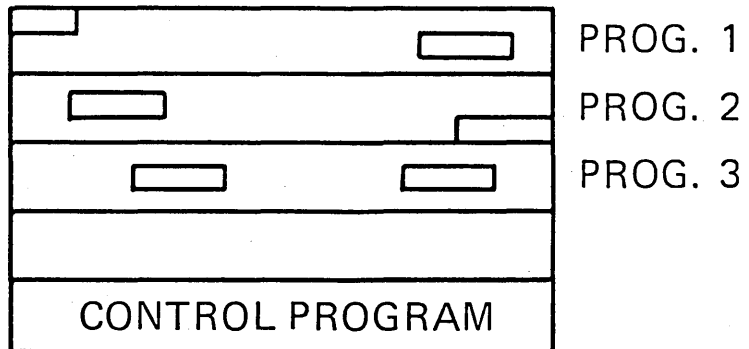
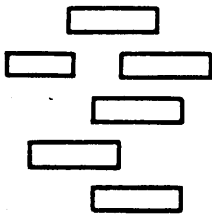
PROG. 4

CONTROL PROGRAM



# LEAST ACTIVE PORTIONS OF PROGRAMS "PAGED" OUT

"WE'LL  
BE BACK!"



## WORK MANAGEMENT

SWAPS INTERACTIVE JOBS  
AND

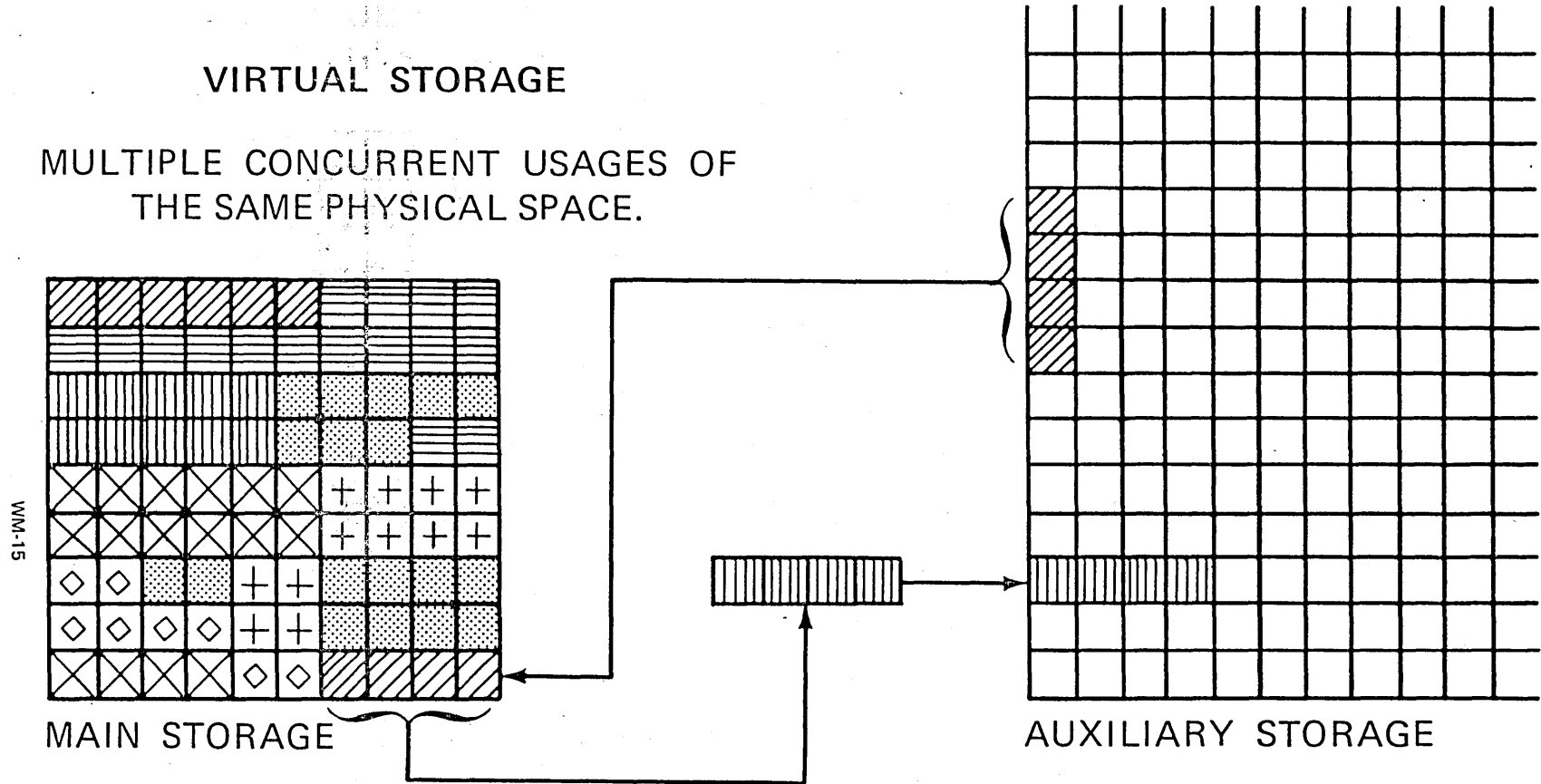
*572 bytes* → PAGES BATCH JOBS  
ONLY WHEN NECESSARY

VIRTUAL ...  
CREATES AN ILLUSION

WM-13

# VIRTUAL STORAGE

MULTIPLE CONCURRENT USAGES OF THE SAME PHYSICAL SPACE.



SWAPPING IS DONE WITH AN ENTIRE "PROGRAM"  
PAGING IS DONE WITH A PORTION OF A PROGRAM

ACCOMPLISHED THROUGH SWAPPING AND PAGING.

## SUBSYSTEMS

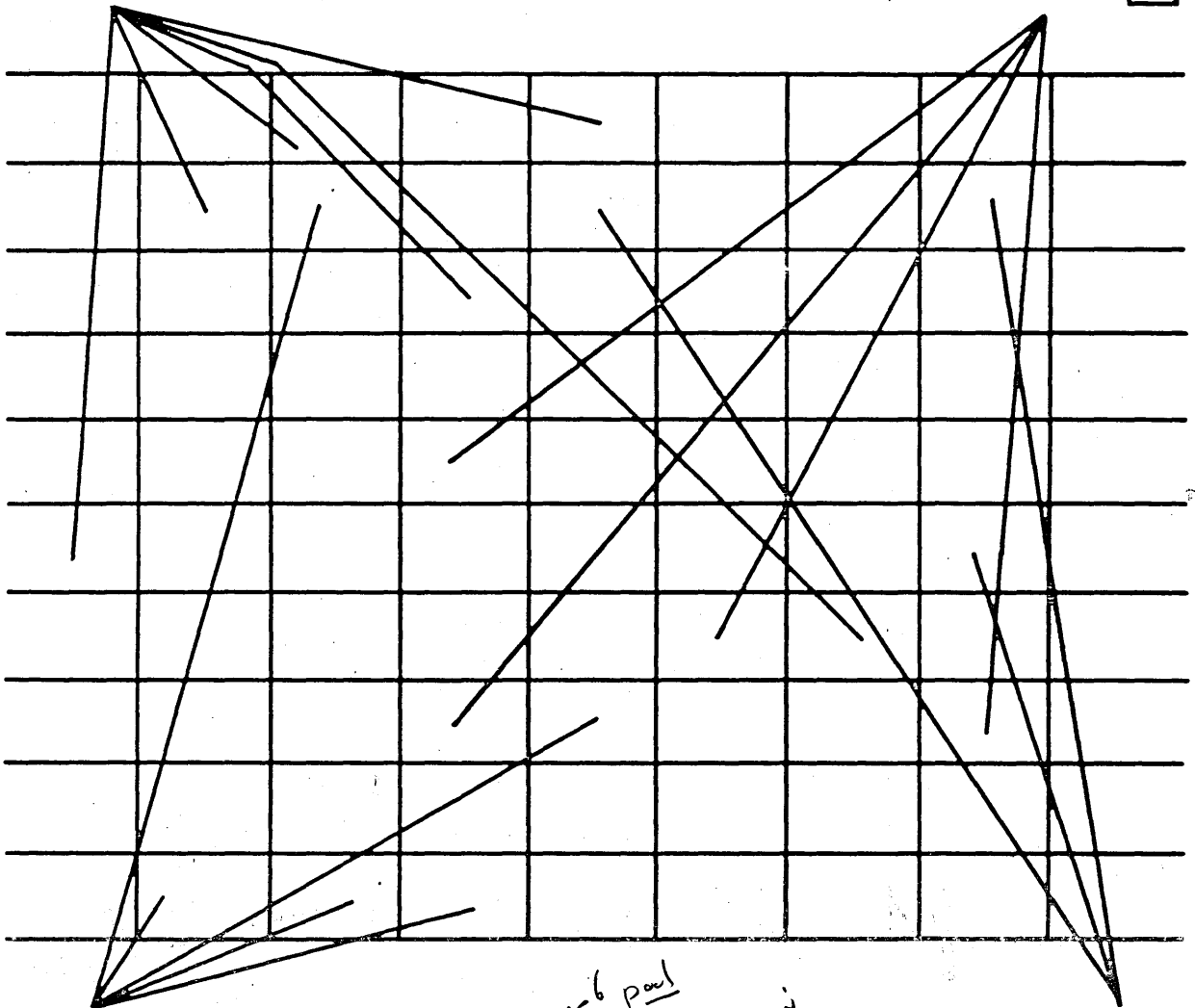
- UNIQUE ENVIRONMENT  
– LIKE
- INTERACTIVE JOBS
- BATCH JOBS
- SPOOL FUNCTIONS

Q INTER  
Q Batch  
Q SPL  
Q CTL - h-v-h .PRINT  
console

16- Active at  
one time  
10 per system

STORAGE  
POOL #12  
6K

STORAGE  
POOL #4  
4K



STORAGE  
POOL #1  
5K

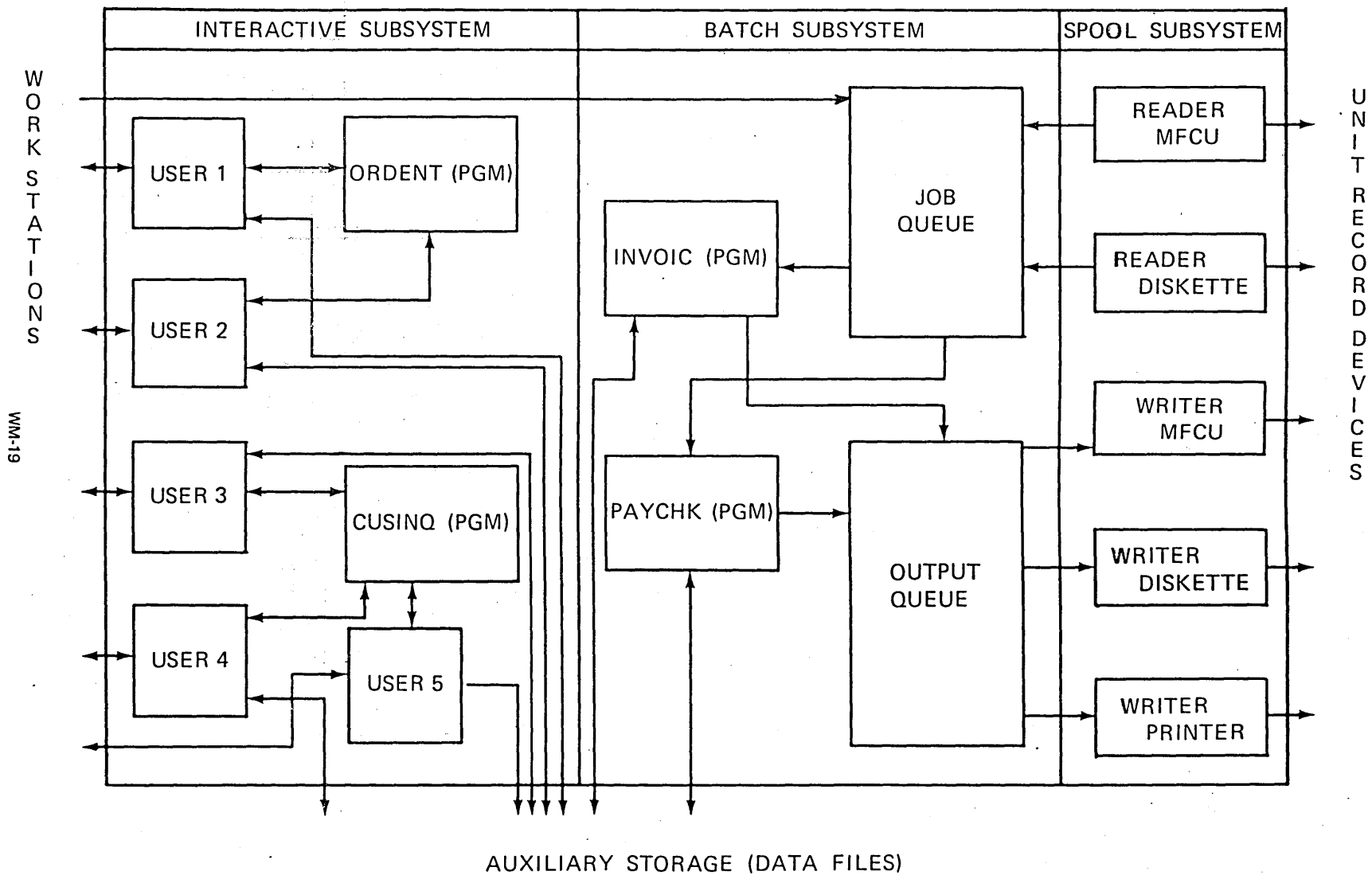
All unassigned pool  
\* BASE - 150K min

STORAGE  
POOL #7  
3K

## JOB QUEUE

JOBG (3)
JOBF (6)
JOBE (2)
JOB D (1)
JOBC (6)
JOBB (4)
JOBA (1)

### LOGICAL SCHEMATIC OF SUBSYSTEMS



WORKSTATIONS  
WM-19

UNIT RECORD DEVICES

AUXILIARY STORAGE (DATA FILES)



## MULTIPLE USER PROGRAMS

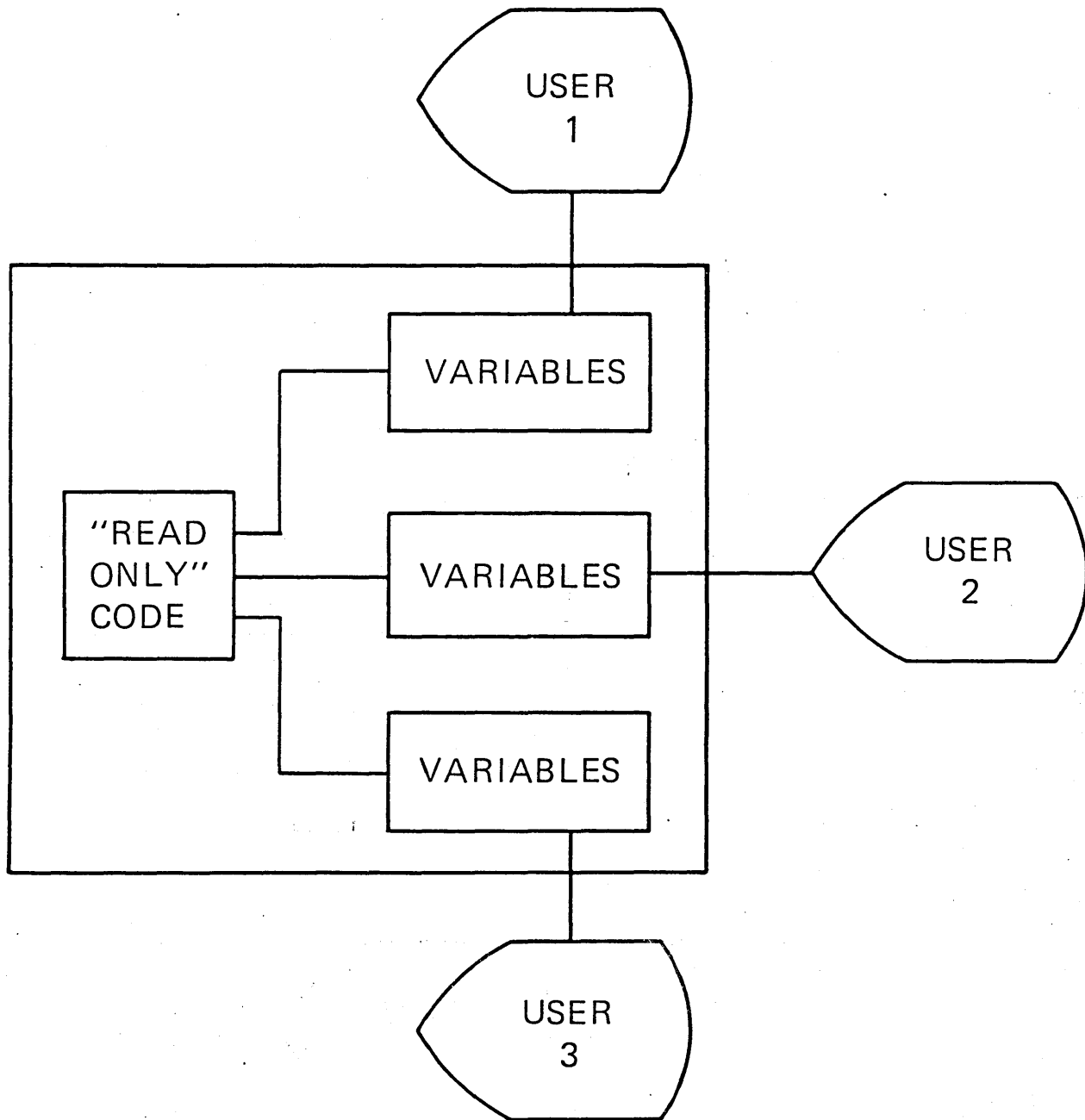
ON PRIOR SYSTEMS:

- MULTIPLE COPIES

— OR —

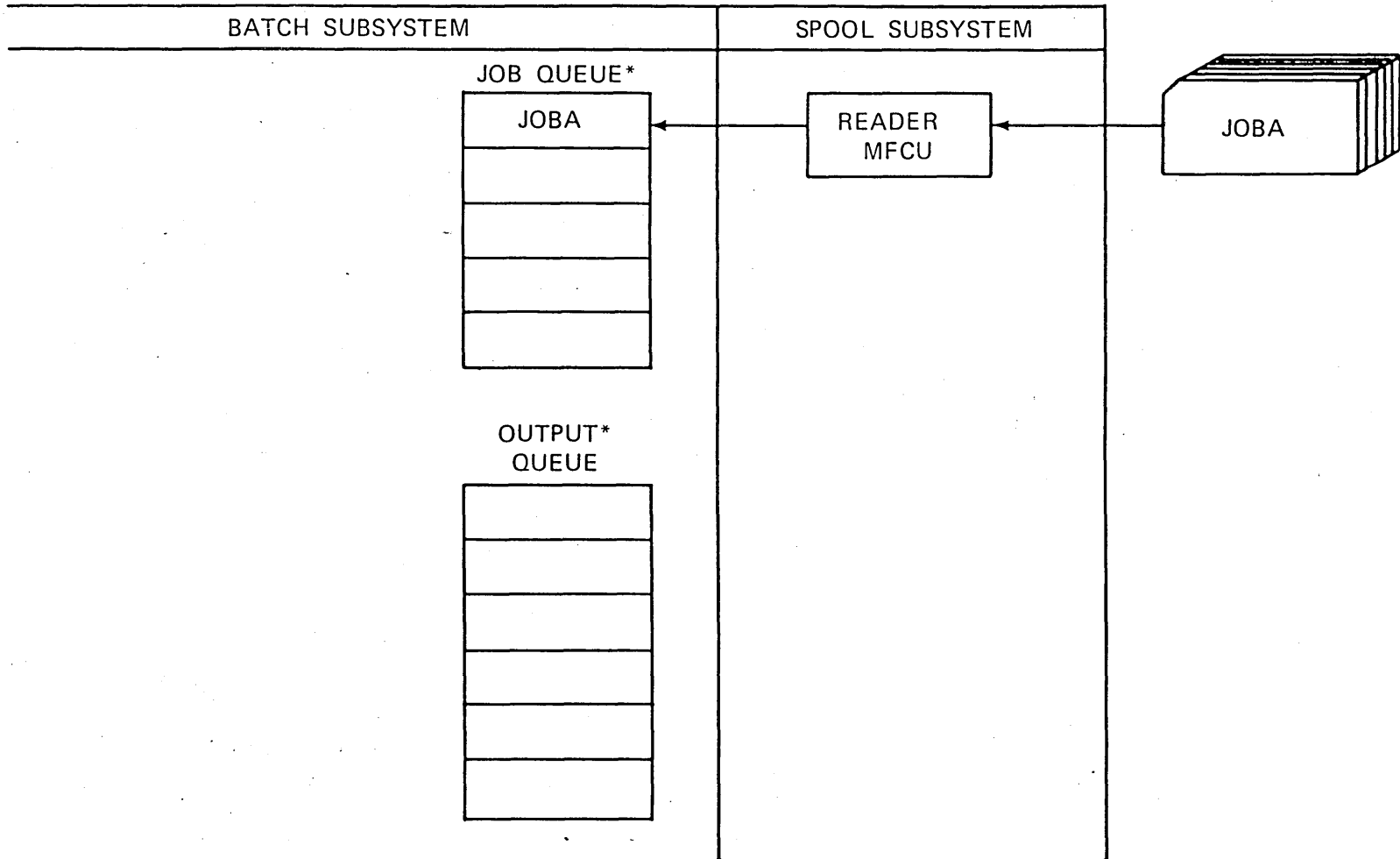
- COMPLEX CODING

IMPORTANT DESIGNER AND  
PROGRAMMER CONSIDERATION



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SPOOL - EXAMPLE 1, READING

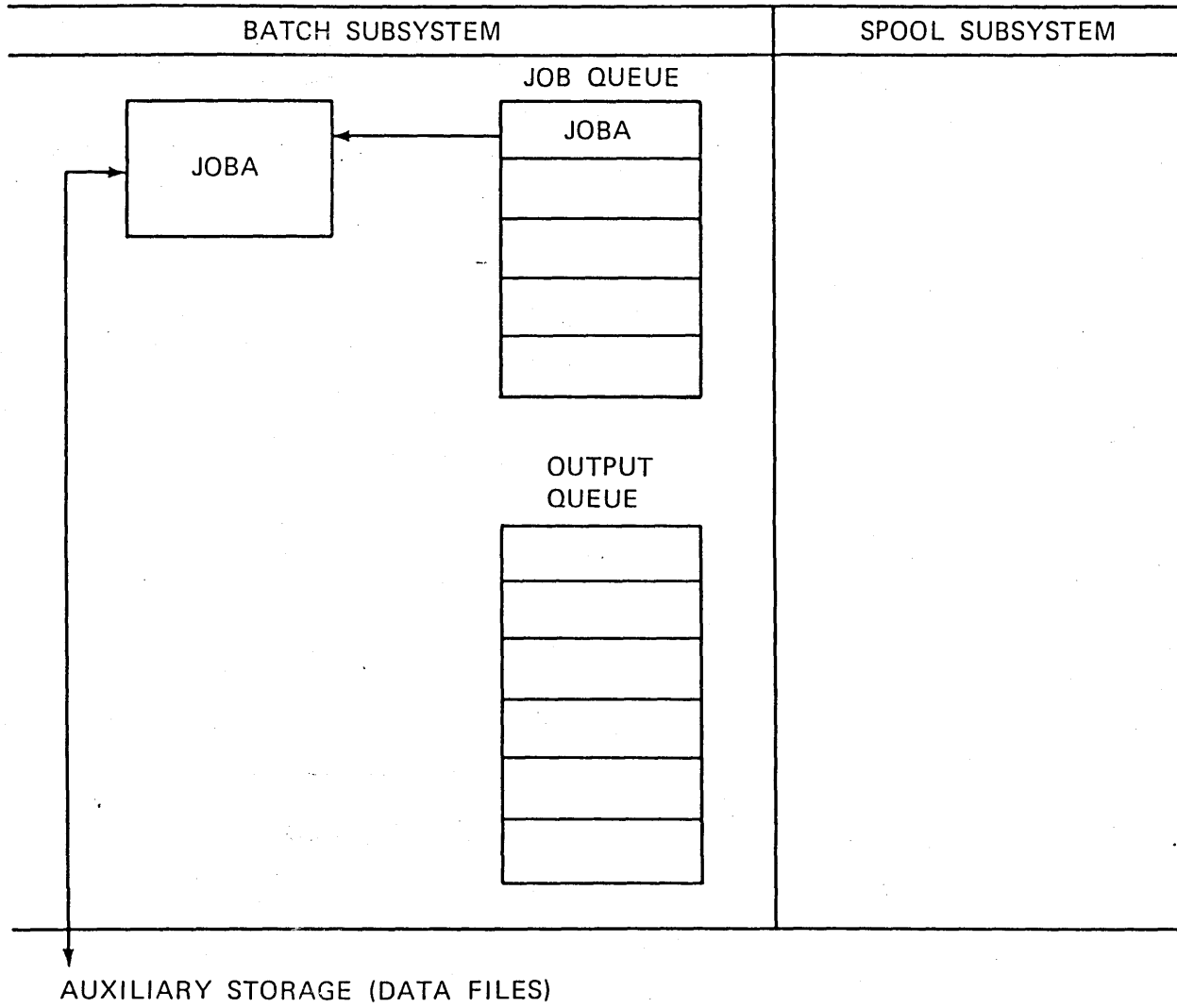


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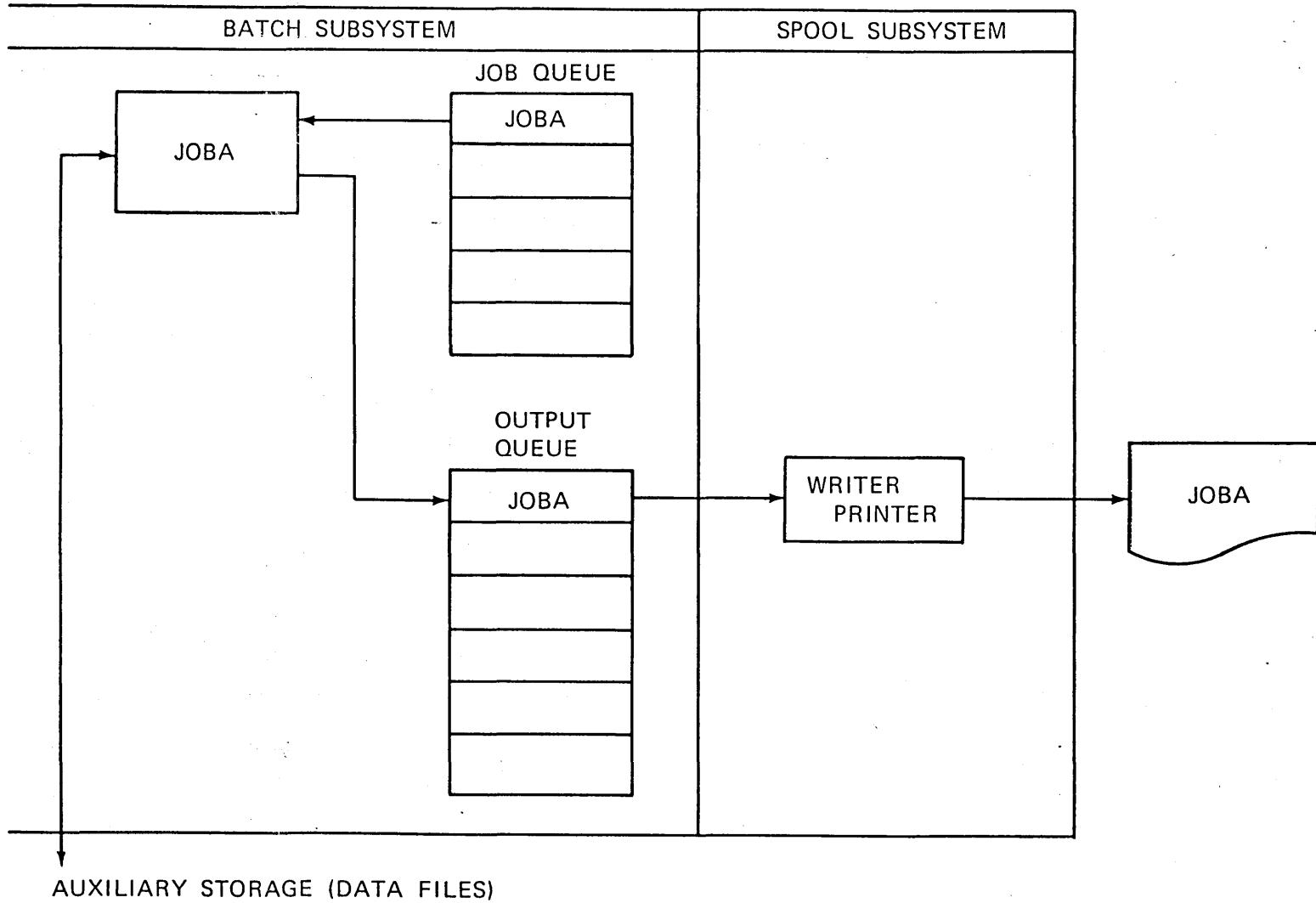
\*THE JOB QUEUE AND THE OUTPUT QUEUE WILL AUTOMATICALLY BE PLACED ON AUXILIARY STORAGE.

SPOOL - EXAMPLE 2, JOB EXECUTION. (PROGRAM THINKS IT IS READING CARDS FROM MFCU.)

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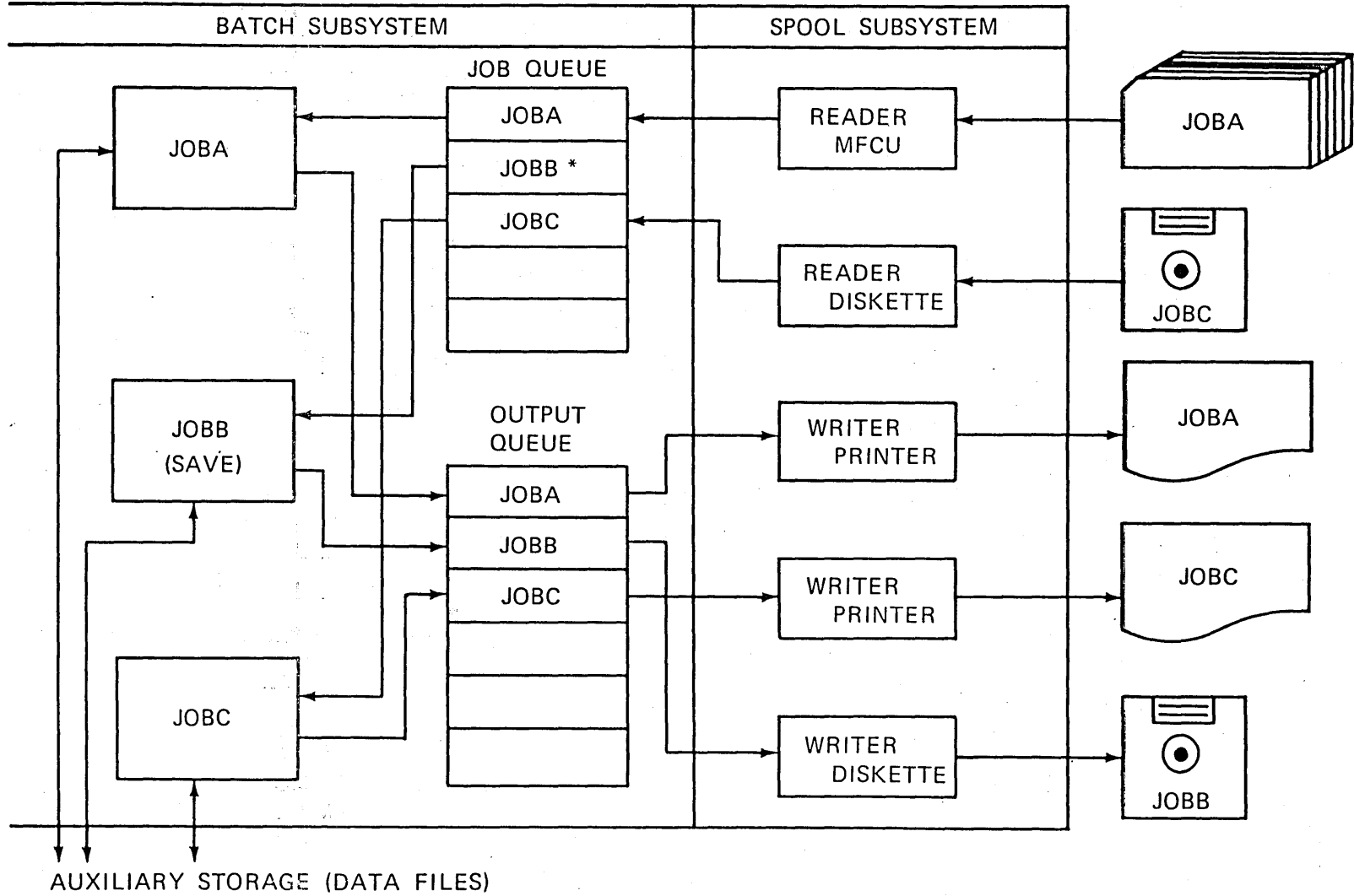


SPOOL - EXAMPLE 3, AS PROGRAM PRODUCES OUTPUT,  
IT IS PLACED IN OUTPUT QUEUE.



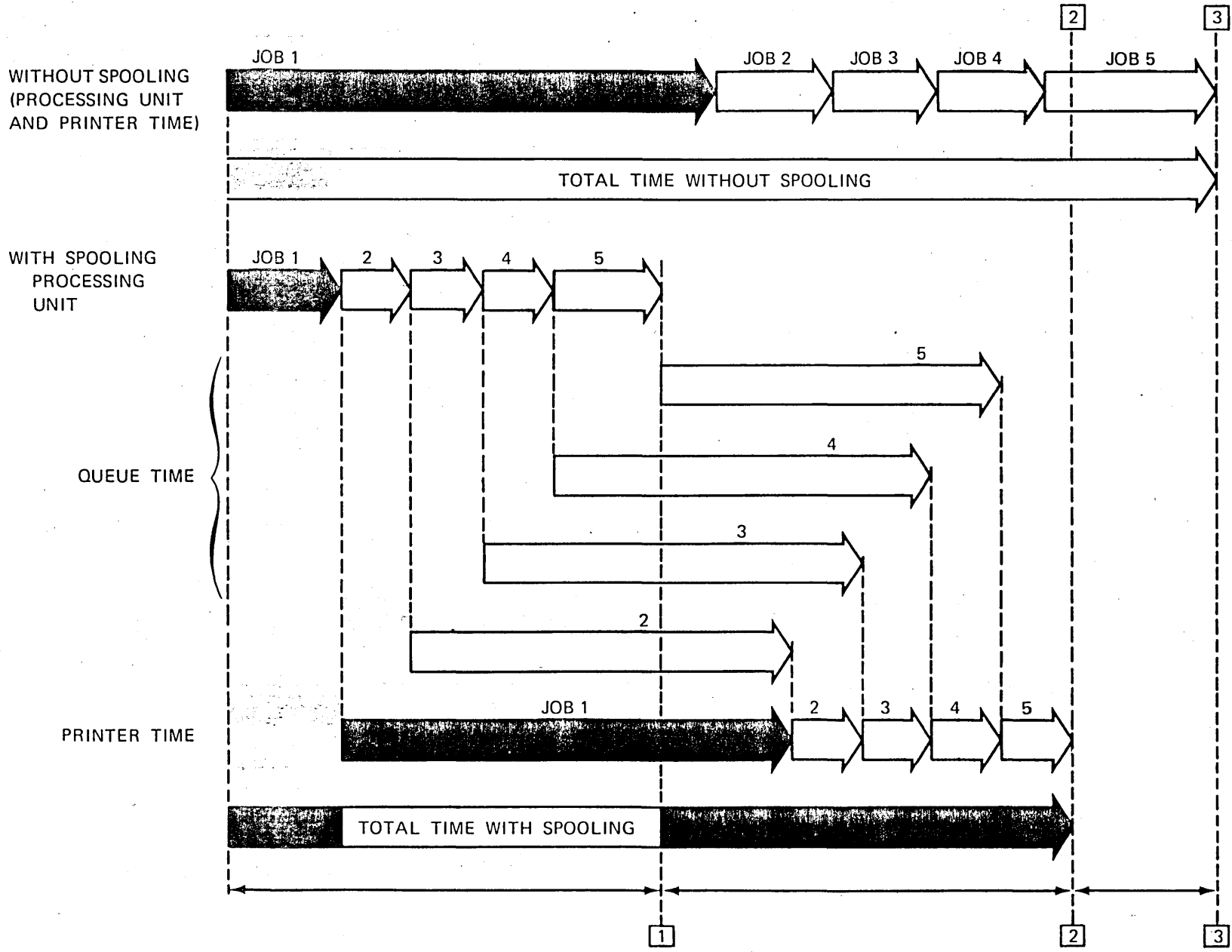
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SPOOL - EXAMPLE 4, EXECUTION OF MULTIPLE JOBS.



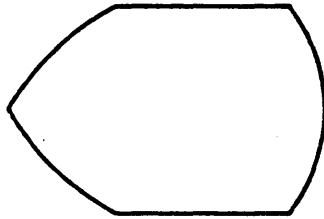
\*JOBB SUBMITTED FROM WORK STATION THROUGH INTERACTIVE SUBSYSTEM.

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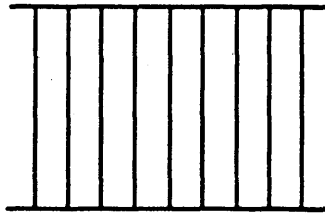


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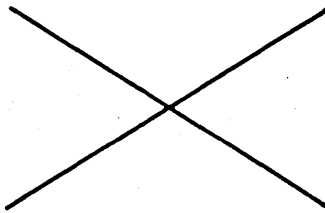
SPOOLED OUTPUT MAY BE



DISPLAYED



HELD

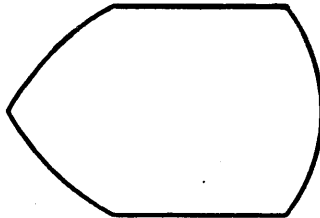


CANCELLED

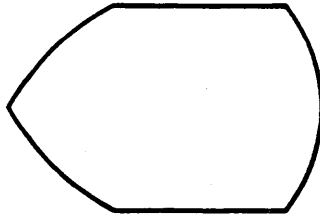
OR PRINTED, PUNCHED, OR WRITTEN  
TO AUXILIARY STORAGE.



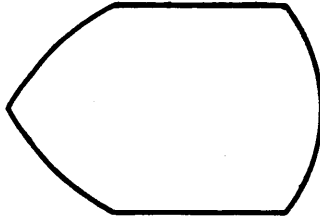
# SYSTEM OPERATOR CAN DISPLAY



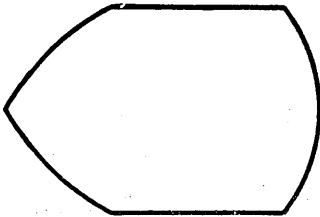
SYSTEM STATUS



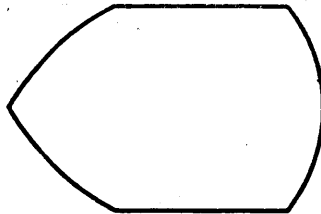
SUBSYSTEM STATUS



SPOOL STATUS



JOB STATUS



PROGRAM STATUS

INFORMATIONAL MESSAGES

FILE DOES NOT EXIST  
COPYFILE COMPLETE  
BATCH SUBSYSTEM STARTED  
LOGICAL FILE ORDENTL CREATED  
SHUTDOWN IN 30 SECONDS  
PICNIC COMMITTEE MEETS TONIGHT  
  
HELP TEXT

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## INQUIRY MESSAGES

ENTER DATE:

WHAT IS BEGINNING CHECK NO.?

HAVE YOU PROCESSED CASH RECEIPTS YET?

WM-32

REPLY MESSAGES

06/30/7\_

PA72001

NO, JUST GETTING READY TO.

WM-33

## DIAGNOSTIC MESSAGES

YOU DO NOT HAVE AUTHORITY TO USE THAT FILE.  
YOUR PROGRAM HAS SEVERE AND/OR TERMINAL  
ERRORS.  
PROGRAM PAYCHK NOT IN LIBRARY PTEST.

WM-34

## MESSAGE DELIVERY

- BREAK MODE
  - INTERRUPTION
  - ATTENTION LIGHT
  - AUDIBLE ALARM
- NOTIFY MODE
  - ATTENTION LIGHT
  - AUDIBLE ALARM
- HOLD MODE
  - OPERATOR MUST DISPLAY MESSAGES
- DEFAULT MODE
  - AUTOMATIC DEFAULTS TAKEN

## SECOND LEVEL TEXT – HELP KEY

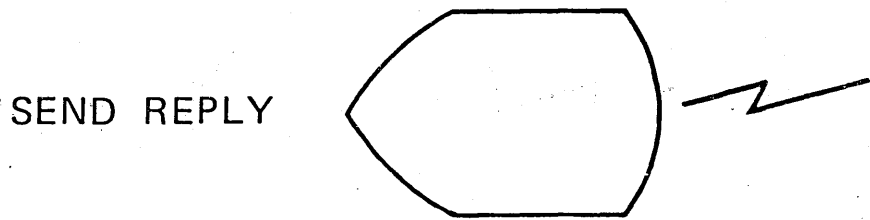
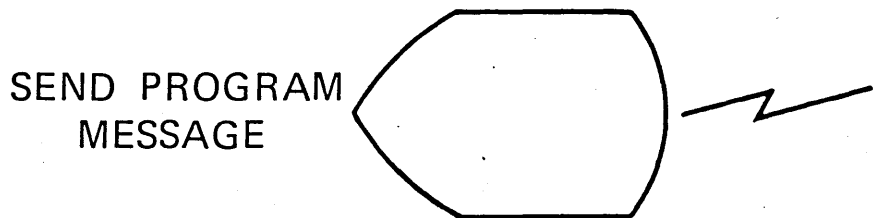
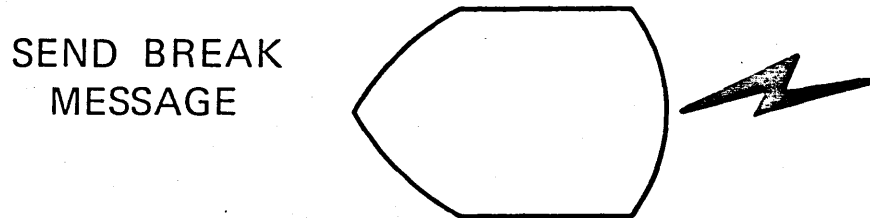
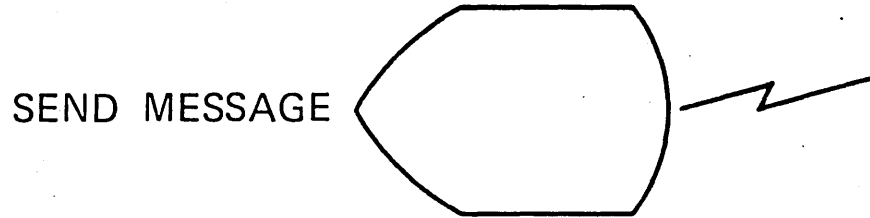
### VARIABLE DATA FIELD HELP

A VARIABLE FIELD FORMAT DEFINITION CAN BE USED WHEN THE DATA TO BE ENTERED EITHER HAS NO COLUMN POSITION REQUIREMENTS OR HAS A DEFINED DELIMITER CHARACTER, SUCH AS BLANK, WHICH CAN BE USED BY THE SYSTEM TO DETERMINE FIELD BOUNDARIES.

START COLUMN - POSITION FOR THE START OF DATA FIELD.

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## MESSAGE SENDING CHOICES







## WORK MANAGEMENT SUMMARY

- SUBSYSTEMS
  - SWAPPING
  - PAGING
- READ ONLY CODE
  - MULTIPLE USERS
  - MINIMUM EFFORT
- SPOOL
  - MULTIPLE DEVICES
  - MULTIPLE QUEUES
  - MULTIPLE FILES
  - HOLD, CHANGE, CANCEL
- SYSTEM DISPLAYS
- MESSAGES
  - BREAK MODE
  - HELP TEXT

## CONVERSION

???

## CONVERT EXISTING APPLICATIONS

### Advantages:

LESS TIME AND RESOURCE REQUIRED

### Disadvantages:

NOT UTILIZING CAPABILITIES OF S/38

## REWRITE EXISTING APPLICATIONS

### Advantages:

TAKE ADVANTAGE OF S/38 FUNCTION

### Disadvantages:

MORE TIME AND RESOURCE REQUIRED

## CONVERSION AIDS AND UTILITIES

- S/3–S/38 BATCH CONVERSION UTILITIES
- S/3–S/38 BATCH CONVERSION FDP
- S/3–S/38 CCP CONVERSION AID
- S/3–S/38 BATCH COBOL CONVERSION AID
- S/34–S/38 CONVERSION AID

### S/3 BATCH COBOL CONVERSION AID

- S/3 (ANS 68) – S/38 (ANS 74)
- FACILITIES TO CHANGE I/O CONFIGURATION
- ELIMINATES RESERVED WORDS CONFLICTS
- REPORTS TO MANAGE OCL & DATA CONVERSION
- RUNS ON S/3 MOD 12, 15
- CODED IN COBOL AND ASSEMBLER

### S/34 - S/38 CONVERSION AID

- RPG II - RPG III
- SFGR - DDS
- OCL - CL
- SORT - REFORMAT UTILITY
- MENUS - DDS AND CL
- MSG MEMBER - MSG FILE
- MUST RUN ON S/34 AND S/38

## S/3 BATCH COBOL CONVERSION AID

- S/3 (ANS 68) – S/38 (ANS 74)
- FACILITIES TO CHANGE I/O CONFIGURATION
- ELIMINATES RESERVED WORDS CONFLICTS
- REPORTS TO MANAGE OCL & DATA CONVERSION
- RUNS ON S/3 MOD 12, 15
- CODED IN COBOL AND ASSEMBLER



## CCP CONVERSION AID

- LICENSED PROGRAM
- CODED IN RPG II
- RPG II – RPG III
- DFF – DDS
- SOME CCP FUNCTIONS NOT CONVERTED
- DOCUMENTATION FOR NOT CONVERTED FUNCTIONS

# INSTALLATION PLANNING

DETERMINE CONVERSION APPROACH

IDENTIFY PROGRAMS TO BE CONVERTED, REWRITTEN,  
REPLACED WITH UTILITIES, OR ELIMINATED

DESIGN DATA BASE

ESTABLISH RESPONSIBILITIES

EDUCATION

PROGRAMMERS

SYSTEM OPERATORS

WORKSTATION OPERATORS

PHYSICAL PLANNING

ESTABLISH SECURITY GUIDELINES

MONITER PLAN