POINTS RELATED TO NUMERIC DATA ITEMS

1. ASSUMED DECIMAL POINT

2. INTERNAL SIGN REPRESENTATION

3. USAGE CLAUSES

- V is used in PIC CLAUSE TO INDICATE ASSUMED DECIMAL POINT

FOR EX:

77	N1	PIC	9(4)V9(2)	VALUE 25.67	002567
77	N2	PIC	9(4)V9(3)	VALUE 1.2	0001200

- PIC clause S is to be given if sign is to be stored
- SIGN is stored in TRAILING POSITION along with the digit
- For example S9(4) VALUE -1234 is stored as 123M
- For example S9(4) VALUE +1234 is stored as 123D
- S9(4) sign leading value -1234 is stored as J234
- No separate byte is allocated for the sign
- SIGN TRAILING SEPARATE stores the sign in a separate byte

DECLARING DECIMAL ITEMS

```
77    CTR1     PIC  S9(4)V99   VALUE  -1.23  SIGN  LEADING .
                stored as  }00J23
77    CTR2   PIC  S9(4)V9(2)  VALUE  -12.34  SIGN   TRAILING.
                stored as  00123M
 -1  TO  -9  STORED  AS   J  TO  R    -0  AS  }
+1  TO  +9  STORED  AS   A  TO  I    +0  AS  {

 77    CTR1     PIC  S9(4)V99   VALUE  -1.23
                              SIGN  LEADING SEPARATE.
                stored as -000123
 77    CTR2            PIC  S9(4)V9(2)  VALUE  -12.34
                                    SIGN   TRAILING SEPARATE.
                stored as 001234-
```

Arithmetic
and
Edited Pictures

ADD var/lit .. .. .. TO var .. .. ..

ADD var/lit .. .. .. TO var/lit GIVING var .. .. ..

SUBTRACT var/lit .. .. .. FROM var .. .. ..

SUBTRACT var/lit .. .. .. FROM var/lit GIVING var .. .. ..

MULTIPLY var/lit BY var .. .. ..

MULTIPLY var/lit BY var/lit GIVING var .. .. ..

DIVIDE var/lit BY var/lit GIVING var
[REMAINDER var]

DIVIDE var/lit INTO var/lit .. ..
[GIVING var .. .. ..] [REMAINDER VAR]

ADD EXAMPLES

ASSUME A B C P Q R HAS VALUES 1 2 3 4 5 6

```
 ADD  A       TO    P Q R

ADD 10      TO  P.

ADD 7.25    TO  P

ADD A B     TO  P.

ADD A    TO  C  GIVING  P Q R.
```

SUBTRACT EXAMPLES

```
SUBTRACT A      FROM  P.

SUBTRACT A      FROM  P Q R S.

SUBTARCT 10     FROM  P.

SUBTRACT A B    FROM  P.

SUBTRACT A      FROM  C    GIVING  P Q.

SUBTRACT A B    FROM  C    GIVING  P Q R.
```

MULTIPLY EXAMPLES

```
MULTIPLY A      BY  P.

MULTIPLY A      BY  P Q R S.

MULTIPLY 10     BY  P.

MULTIPLY A      BY  C  GIVING  P Q

MULTIPLY BASICPAY   BY 2   GIVING DA
```

DIVIDE EXAMPLES

```
DIVIDE   A    BY  P

DIVIDE   A    BY  P  GIVING Q REMAINDER R

DIVIDE   A    BY  4  GIVING Q1 Q2
                    REMAINDER R1.

DIVIDE   P    INTO A B C.

DIVIDE   4    INTO A  GIVING Q1 REMAINDER R1
```

COMPUTE

```
COMPUTE     P   Q   R   =  ( A + B – C * 5 +  D/E + K ** 2 )

COMPUTE     P   Q   R   =
            ( ( A + B) – ( C * 5)  +  ( D / E )  + ( K ** 2 ))

COMPUTE     P   Q   R   =  A + B   /   C - D
```

OPERATOR PRIORITIES: () ** * / + -

ROUNDED option

- The following is an example using ROUNDED:

```
ADD   A   TO    B      GIVING    C   ROUNDED

A                    B                    C
99V999   12.817      99V999    25.122     99V99      37.94
```

ON SIZE ERROR

ON SIZE ERROR OPTION CHECKS THE OVERFLOW CONDITION OF THE OUTPUT VARIABLES IN ARITHMETIC OPERATIONS

```
Assume    A   PIC 99    VALUE  88
          B   PIC 99    VALUE  50
          C   PIC 99    VALUE  12
 ADD   A   B   GIVING   C   ON SIZE ERROR
                DISPLAY    “C SIZE IS INSUFFICIENT".
```

Will display the message because C cannot hold the result 138

MOVE

- MOVE COPIES THE CONTENTS OF A VARIBALE TO ONE OR MORE VARIABLES

- MOVE var/lit TO var1 var2 .. .. ..

- Two types of movements NUMERIC / ALPHANUMERIC

- DEPENDS ON THE DESTINATION TYPE

- IF DEST TYPE IS NUMERIC

  INTEGER DATA IS MOVED FROM RIGHT TO LEFT AND DECIMAL PORTION IS MOVED FROM LEFT TO RIGHT

  IF DEST TYPE IS ALPHANUMERIC

  DATA IS MOVED FROM LEFT TO RIGHT

Move examples

- **MOVE A TO B C D .. ..**
- **MOVE 12.5 TO B C D .. ..**
- **MOVE ZERO TO B C D .. ..**
- **MOVE 'MAPLES' TO WS-NAME**
- **MOVE SPACES TO WS-NAME**

Edited Pictures.

- **Edit items are used to convert data from Numeric Format To Numeric Edited format OR ALPHANUMERIC to EDITED format**

- **The purpose of editing is to insert characters like , $ + - / blank and to replace the leading zeros by spaces**

- **Editing involves two variables numeric item and numeric edit item**

- **MOVE statement is used to copy data from numeric items to edit items**

EDITING

Use move statement to transfer data to edit item.

According to the edit characters used values will be edited

Z . , $ * + - CR DB

ARE NUMERIC EDIT CHARACTERS

/ B 0

ARE ALPHANUMERIC EDIT CHARACTERS

EXAMPLES

ORIGINAL	VALUE	EDITED PIC	DISPLAY EDTED
PIC 999999	123456	PIC 999,999	123,456
PIC 9(6)	000012	PIC 9(3),9(3)	000,012
PIC 9(6)	000012	PIC ZZZ,ZZZ	12
PIC 9(6)	000123	PIC ***,***	****123
PIC 9(6)	001234	PIC ***,***	**1,234
PIC 9(6)	120598	PIC 99/99/99	12/05/98
PIC X(6)	120598	PIC 99B99B99	12 05 98
PIC 9(6)	001234	PIC 990099	120034

- PIC 999V99 12345 PIC 999.99 123.45
- PIC 999V99 01234 PIC 999.9 012.3
- PIC 999V99 56789 PIC 99.99 67.89
- PIC 999 123 PIC 999.99 123.00

Sending		Receiving	
Picture	VALUE	Picture	DISPLAYED
PIC S9999	-0123	PIC -ZZZZ	- 123
PIC S9999	-0123	PIC ZZZZ-	123-
PIC S9999	+123	PIC -9999	0123
PIC S9(5)	+12345	PIC +9(5)	+12345
PIC S9(3)	-123	PIC +9(3)	-123

Sending Picture	Data	Receiving Picture	Result
PIC S9(4)	+1234	PIC 9(4)CR	1234
PIC S9(4)	-1234	PIC 9(4)CR	1234CR
PIC S9(4)	+1234	PIC 9(4)DB	1234
PIC S9(4)	-1234	PIC 9(4)DB	1234DB
PIC 9(4)	1234	PIC $99999	$01234
PIC 9(4)	0000	PIC $ZZZZZ	$

Sending		Receiving	
Picture	Data	Picture	Result
PIC 9(4)	1234	PIC $$,$$9.99	$1234.00
PIC 9(4)	1234	PIC $$,$$9.00	$1,234.00
PIC 9(5)	12345	PIC $$,$$9	$2,345
PIC S9(4)	- 0012	PIC ++++9	-12
PIC S9(4)	+0012	PIC ++++9	+12
PIC S9(4)	- 0080	PIC - - - - 9	-80
PIC S9(5)	+12345	PIC - - - - 9	+2345

Sending Picture	Data	Receiving Picture	Result
PIC 9(6)	001234	PIC *****9	**1234
PIC 9(6)	001234	PIC ***,**9	**1,234
PIC 9(6)	000000	PIC ***,***	*******
PIC 9(6)	000000	PIC ***,**9	******0