



Legac-E Education

## Use MVN & ZAP to loose extraneous digits

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A question was asked on LinkedIn as follows:

“Can anyone help me to understand the below piece of assembler code, when some arithmetic operations are performed and the result is stored in A.

```
                MVN    A+11 (1) , A+14
                ZAP    A,  A+3 (9)
A                DC    PL15 “
```

My response was

“The MVN (MoVe Numeric) instruction is moving the last 4 bits of byte 14, (the first byte would be offset 0), to the last 4-bits of byte 12. The ZAP (Zero and Add Packed) instruction is adding the content of bytes 4 to 12 of field A to A after first zeroising it.

Having tried these instructions it implies that .the tail end of field A is of no interest, and these instructions purify field A by dropping the last 3 bytes. “

It then became apparent from a further post that the original code was being used to purify a number so that it could be reported to an accuracy of 4 decimal places, but that the new requirement was for 6 decimal places to be report.

At first I adjusted the MVN / ZAP combination to produce the desired output, but then realised it could be achieved with a single instruction, SRP (Shift and Round Packed). By setting the rounding value to zero the same effect as MVN / ZAP is achieved.

In order to demonstrate all this I produced the following code.



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## Process PDS or PDSE Directory - Assembler

```
PRINT NOGEN
MVNZAP CSECT
      USING *,R15                INITIAL BASE REGISTER
BEGIN  B    START
      DC    AL1(8)
      DC    CL6'MVNZAP'          PROGRAM NAME FOR DEBUGGING
SAVEAREA DS 0F                    MY SAVE AREA
      DC    AL4(*-*)
PRESAVE DC AL4(*-*)              ADDR OF PREVIOUS SAVE AREA
NEXTSAVE DC AL4(*-*)            ADDR OF NEXT SAVE AREA
SREG14  DC AL4(*-*)             GENERAL
SREG15  DC AL4(*-*)             PURPOSE
SREG0   DC 13AL4(*-*)           REGISTER SAVE
SAVEEND DS 0H
      DROP R15                  LOOSE INITIAL BASE REGISTER
START  STM R14,R12,12(R13)      SAVE THE REGISTERS ON ENTRY.
      LR   R12,R15              SET UP MY
      USING BEGIN,R12          BASE REGISTER
      ST   R13,PRESAVE         PERFORM SAVE
      LA   R15,SAVEAREA        AREA
      ST   R15,8(R13)          CHAINING
      LR   R13,R15             R13 = ADDR OF MY SAVE AREA.
*-----*
* THIS CODE PROVIDES EXAMPLES OF HOW A COMBINATION OF MVN AND *
* ZAP INSTRUCTIONS CAN BE USED TO PURIFY A NUMBER AND DROP *
* UNWANTED TRAILING DIGITS. THE INSTRUCTION FUNCTIONS ARE: *
* * MVN - MOVES THE DECIMAL SIGN FORWARD THE CORRECT NUMBER *
*       OF BYTES TO ENSURE THE ZAP INSTRUCTION WORKS. *
* * ZAP - THIS ADDS THE NUMBER TO ITSELF AFTER ZEROISING THE *
*       FIELD, THUS PURIFYING THE NUMBER TO THE CORRECT *
*       LENGTH. *
*-----*
* IT WAS MODIFIED TO INCLUDE EXAMPLES OF THE SRP INSTRUCTION *
* AS LOGICALLY THAT WOULD BE THE RECOMMENDED METHOD OF *
* ACHIEVING THE DESIRED OUTCOME. *
*-----*
* DISPLAY THE NUMBER WITH 4 DECIMAL PLACES, USING MVZ/ZAP *
*-----*
      ZAP  A,BASENUM            INITIALISE
      MVC  MSGTEXT,MSGTXT1     USE MVN/ZAP TEXT
      MVN  A+11(1),A+14
      ZAP  A,A+3(9)
      MVC  DISA,EDPATN1        INSERT EDIT PATTERN (4DP)
      ED   DISA,A+2            CONVERT TO DISPLAYABLE FORM
      LA   R10,MYMSG           R10 POINTS TO MESSAGE AREA
      WTO  TEXT=(R10),ROUTCDE=13 ISSUE MESSAGE TO JES JOB LOG
      MVN  B+12(1),B+14
```



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## Use MVN & ZAP to loose extraneous digits

```
*-----*
*          DISPLAY THE NUMBER WITH 4 DECIMAL PLACES, USING SRP          *
*-----*
      ZAP   A,BASENUM                                NUMERIC FIELDS
      MVC   MSGTEXT,MSGTXT2                          USE SRP TEXT
      SRP   A,64-6,0
      MVC   DISA,EDPATN1                             INSERT EDIT PATTERN (4DP)
      ED    DISA,A+2                                 CONVERT TO DISPLAYABLE FORM
      LA    R10,MYMSG                                R10 POINTS TO MESSAGE AREA
      WTO   TEXT=(R10),ROUTCDE=13                    ISSUE MESSAGE TO JES JOB LOG
      ED    DISA,B+2                                 CONVERT TO DISPLAYABLE FORM
      LA    R10,MYMSG                                R10 POINTS TO MESSAGE AREA
      WTO   TEXT=(R10),ROUTCDE=13                    ISSUE MESSAGE TO JES JOB LOG
*-----*
*          DISPLAY THE NUMBER WITH 6 DECIMAL PLACES, USING MVN/ZAP      *
*-----*
      MVC   A,BASENUM
      MVC   MSGTEXT,MSGTXT1                          USE MVN/ZAP TEXT
      MVN   A+12(1),A+14
      ZAP   A,A+3(10)
      MVC   DISA,EDPATN2                             INSERT EDIT PATTERN (6DP)
      ED    DISA,A+2                                 CONVERT TO DISPLAYABLE FORM
      LA    R10,MYMSG                                R10 POINTS TO MESSAGE AREA
      WTO   TEXT=(R10),ROUTCDE=13                    ISSUE MESSAGE TO JES JOB LOG
*-----*
*          DISPLAY THE NUMBER WITH 6 DECIMAL PLACES, USING SRP          *
*-----*
      ZAP   A,BASENUM                                INITIALISE
      MVC   MSGTEXT,MSGTXT2                          USE MVN/ZAP TEXT
      SRP   A,64-4,0
      MVC   DISA,EDPATN2                             INSERT EDIT PATTERN (6DP)
      ED    DISA,A+2                                 CONVERT TO DISPLAYABLE FORM
      LA    R10,MYMSG                                R10 POINTS TO MESSAGE AREA
      WTO   TEXT=(R10),ROUTCDE=13                    ISSUE MESSAGE TO JES JOB LOG
      SPACE 3
EXIT   SR    R15,R15                                FORCE COND CODE ZERO
      L     R13,PRESAVE                              R13 = PREVIOUS SAVE AREA ADDR.
      L     R14,12(R13)                             RESTORE REGISTERS
      LM    R0,R12,20(R13)                          EXCEPT REGISTER 15
      BR    R14                                     RETURN TO CALLER (OS/390)
      EJECT
      LTORG
EDPATN1 DC X'40212020202020202020202020202020202020204B20202020'
EDPATN2 DC X'40212020202020202020202020202020202020204B2020202020'
      DC   C'FIELD A AFTER MVN / ZAP: '
A      DC   PL15'0'
BASENUM DC   PL15'91234567890'
*          THE ASSUMPTION IS THAT BASENUM HAS 10 DIGITS AFTER THE
*          LOGICAL DECIMAL POINT (PERIOD) WHICH OCCURS AFTER THE
*          LEADING 9.
*-----*
```



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## Process PDS or PDSE Directory - Assembler

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```
MYMSG      DC      AL2 (MYMSGE-MYMSG-2)      LENGTH OF ACTUAL MESSAGE
MSGTEXT    DC      CL25' '                  MESSAGE TEXT AREA
DISA       DS      CL27                      DISPLAYABLE NUMBER GOES HERE
MYMSGE     DS      0H                        ESTABLISH END OF MESSAGE
MSGTXT1    DC      C'FIELD A AFTER MVN / ZAP: ' INFORMATIVE TEXT
MSGTXT2    DC      C'FIELD A AFTER SRP:      ' INFORMATIVE TEXT          R0
EQU        0
R1         EQU     1
R2         EQU     2
R3         EQU     3
R4         EQU     4
R5         EQU     5
R6         EQU     6
R7         EQU     7
R8         EQU     8
R9         EQU     9
R10        EQU     10
R11        EQU     11
R12        EQU     12
R13        EQU     13
R14        EQU     14
R15        EQU     15
END
```

The results produced in the JES Job Log are:

```
-STEPNAME  PROCSTEP      RC      EXCP      CONN      TCB      SRB
-S0020     C              00       74         0         .00      .00
-S0020     L              00       50         0         .00      .00
+FIELD A  AFTER MVN / ZAP: 00000000000000000009.1234
+FIELD A  AFTER SRP:      00000000000000000009.1234
+FIELD A  AFTER MVN / ZAP: 00000000000000000009.123456
+FIELD A  AFTER SRP:      00000000000000000009.123456
```