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BOOTSTRAP FOR CLEAR ,008015,022026,030040/019,001L020100   ,047054,061068,072072)0810811022                    1
CLEAR OR BOOTSTRAP  ,008047/047046       /000H025B022100  4/061046,054061,068072,0010401040                    2

                        COMPUTE MERSENNE PRIME 23 = 2**11213 - 1                  CHEAT              PAGE    1

 SEQ PG LIN  LABEL  OP    OPERANDS                                          SFX CT  LOCN  INSTRUCTION TYPE  CARD

 101               JOB   COMPUTE MERSENNE PRIME 23 = 2**11213 - 1
 102               CTL   6611
 103         *
 104         * COMPUTE THE 23RD MERSENNE PRIME = 2**11213 - 1. WE START
 105         * WITH THE 6 THAT'S THE LOW-ORDER DIGIT OF 2**4 IN THE
 106         * NUMBER.  THE OVFL LOOP ADDS A HIGH-ORDER 1 TO MAKE 16.
 107         * THEN IT PROCEEDS BY DOUBLING FROM THEN, WITH THE OVERFLOW
 108         * LOOP MOVING OVER THE HIGH-ORDER DIGIT WORD MARK, AND
 109         * PUTTING IN A 1.  WE DON'T NEED TO CLEAR THE OVERFLOW ZONE,
 110         * BECAUSE THE NEXT DOUBLING WILL DO IT.
 111         *
 112         * THIS ONE CHEATS BY NOT COUNTING THE NUMBER OF DOUBLINGS.
 113         * INSTEAD, IT KNOWS THAT THE HIGH-ORDER DIGIT IS 2.  IT ALSO
 114         * KNOWS THAT THE LOW ORDER DIGIT IS 1, AVOIDING A SUBTRACT
 115         * AND ZONE CORRECTION.
 116         *
 117               ORG   081                                                        0081
 118         WHAT  DCW   @0001: @    STARTING DIGIT NUMBER PRINT FIELD          6  0086                    3
 119         *
 120         * X1 IS USED TO KEEP TRACK OF THE CURRENT HIGH-ORDER DIGIT
 121         * (ACTUALLY ONE CHARACTER BEFORE IT).  AT THE END, IT'S ONE
 122         * BEFORE THE HIGH-ORDER DIGIT FOR THE WHOLE NUMBER.  THEN,
 123         * IT'S USED TO PRINT THE RESULT, BEING INCREMENTED BY 100 FOR
 124         * EACH LINE.
 125         *
 126         X1    DSA   NUMBER-1    INITIAL CONTENT OF X1, AT 87-89           3  0089  G07                3
 127         *
 128         * COMPUTE THE 23RD MERSENNE PRIME.  THIS CODE RUNS THROUGH X2
 129         * AND X3, AND INTO THE PUNCH AREA, BUT WE'RE NOT USING X2 OR
 130         * X3, OR PUNCHING, SO WE MIGHT AS WELL USE IT.
 131         *
 132         START W               PRINT THE TITLE PRELOADED AT 201-...      1  0090  2                  3
 133         OVFL  CW    1&X1      CLEAR WM TO MAKE MORE ROOM                4  0091  ) 0'1              3
 134               LCA   ONE       DO THE OVERFLOW, SET THE WM               4  0095  L 184              3
 135               SBR   X1        HIGH-ORDER DIGIT INDEX - 1                4  0099  H 089              3
 136         INNER BCE   DONE,NUMHI,2  DONE IF HIGH-ORDER DIGIT == 2           8  0103  B 124 333 2        3
 137               A     NUMBER    DOUBLE IT                                 4  0111  A G08              4
 138               BAV   OVFL      OVERFLOW?                                 5  0115  B 091 Z            4
 139               B     INNER     NO                                        4  0120  B 103              4
 140         DONE  MCW   ONE,NUMBER  ACTUALLY, SUBTRACT 1 FROM 2             7  0124  M 184 G08          4
 141         *
 142         * PRINT IT
 143         *
 144               SW    207                                                 4  0131  , 207             4
 145               LCA   WHAT                                                4  0135  L 086             4
 146         PLOOP SBR   X1,100&X1   BUMP PRINTING INDEX BY 100              7  0139  H 089 1'0          4
 147               MCS   WHAT-2,204  INDEX OF FIRST DIGIT                    7  0146  Z 084 204          5
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                     COMPUTE MERSENNE PRIME 23 = 2**11213 - 1                CHEAT              PAGE    2

SEQ PG LIN  LABEL  OP    OPERANDS                                  SFX CT  LOCN  INSTRUCTION TYPE  CARD

148               A     ONE,WHAT-4  ADD 100 TO DIGIT NUMBER TO PRINT     7  0153  A 184 082           5
149               MCW   0&X1,306    NEXT HUNDRED DIGITS                 7  0160  M 0'0 306           5
150               W                 PRINT THEM                          1  0167  2                   5
151               BCE   FINIS,306,  DONE IF BLANK IN PRINT AREA         8  0168  B 180 306           5
152               B     PLOOP       PRINT 100 MORE DIGITS               4  0176  B 139               5
153         FINIS H     FINIS       HALT LOOP (AS GOOD HERE AS ANYWHERE)4  0180  . 180               5
154         ONE   DCW   1                                               1  0184                      6
155         *
156               ORG   201         PRE-LOAD TITLE INTO PRINT AREA            0201
157               DCW   @23RD MERSENNE PRIME = 2**11213 - 1@           34  0234                      7
158         *
159         * HERE'S THE NUMBER
160         *
161               ORG   333                                                   0333
162               DA    1X3375                                          0333  3707
163         NUMHI       1,1         HIGH-ORDER DIGIT                    0333            FIELD
164         NUMBER DCW  6           LOW-ORDER DIGIT                     1  3708              8
165         *
166               END   START                                                 / 090 080
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SYMBOL	ADDRESS	SYMBOL	ADDRESS	SYMBOL	ADDRESS	SYMBOL	ADDRESS	SYMBOL	ADDRESS	SYMBOL	ADDRESS	SYMBOL	ADDRESS
DONE	124	FINIS	180	INNER	103	NUMBER	3708	NUMHI	333	ONE	184	OVFL	91
PLOOP	139	START	90	WHAT	86	X1	89						