```
  LOC  OBJECT CODE    ADDR1 ADDR2   STMT    SOURCE STATEMENT

                                       2 ************************************************************************
                                       3 *  MICHAEL BEAVER                                                      *
                                       4 *  CS 310, SPRING 2013                                                 *
                                       5 *  PROGRAM 6                                                           *
                                       6 *  DUE: APRIL 22,2013                                                  *
                                       7 *                                                                      *
                                       8 *  DESCRIPTION:                                                        *
                                       9 *    THIS PROGRAM EXPECTS AS INPUT A DATA FILE CONTAINING 20 LINES OF*
                                      10 *    INTEGER DATA (ONE INTEGER PER LINE). THE PROGRAM WILL READ IN   *
                                      11 *    THE DATA FROM THE FILE AND STORE IT INTO A TABLE. NEXT, THE     *
                                      12 *    PROGRAM WILL PRINT THE DATA FROM THE TABLE FROM FIRST-TO-LAST   *
                                      13 *    (IN THE ORDER THE DATA WAS ORIGINALLY READ). FINALLY, THE       *
                                      14 *    PROGRAM WILL PRINT THE DATA FROM THE TABLE FROM LAST-TO-FIRST   *
                                      15 *    (IN THE OPPOSITE ORDER THE DATA WAS ORIGINALLY READ). THIS      *
                                      16 *    VERSION OF THE PROGRAM USES EXTERNAL SUBROUTINES.               *
                                      17 *                                                                    *
                                      18 *  SUBROUTINES:                                                      *
                                      19 *    DATAREAD: READS DATA FROM FILE AND STORES INTO DATA TABLE       *
                                      20 *    PRINTFTL: PRINTS DATA FROM TABLE IN ORDER ORIGINALLY READ       *
                                      21 *    PRINTLTF: PRINTS DATA FROM TABLE IN 'REVERSED' ORDER            *
                                      22 ************************************************************************
```

```
  LOC  OBJECT CODE    ADDR1 ADDR2   STMT    SOURCE STATEMENT

                                     24 ********************************************************************
                                     25 *  REGISTER KEY:                                                   *
                                     26 *     REG1: USED TO PASS PARAMETER LIST TO SUBROUTINES             *
                                     27 *    REG14: USED TO BRANCH TO SUBROUTINES                          *
                                     28 *    REG15: PROVIDES ADDRESS OF SUBROUTINES TO BE BRANCHED TO      *
                                     29 ********************************************************************
000000                               30 MBPROG6  START
000000 90EC D00C            0000C    31          STM   14,12,12(13)          BEGINNING HOUSEKEEPING
000004 05C0                          32          BALR  12,0
000006                               33          USING MAINHERE,12
000006 50D0 C036            0003C    34 MAINHERE ST    13,MAINSAVE+4
00000A 41D0 C032            00038    35          LA    13,MAINSAVE


00000E 4110 C0DA            000E0    37          LA    1,PARMLIST
000012 58F0 C0E2            000E8    38          L     15,=V(DATAREAD)       READ DATA FROM FILE INTO TABLE
000016 05EF                          39          BALR  14,15

000018 4110 C0DA            000E0    41          LA    1,PARMLIST
00001C 58F0 C0E6            000EC    42          L     15,=V(PRINTFTL)       PRINT TABLE FIRST-TO-LAST
000020 05EF                          43          BALR  14,15

000022 4110 C0DA            000E0    45          LA    1,PARMLIST
000026 58F0 C0EA            000F0    46          L     15,=V(PRINTLTF)       PRINT TABLE LAST-TO-FIRST
00002A 05EF                          47          BALR  14,15


00002C 58D0 C036            0003C    49          L     13,MAINSAVE+4         ENDING HOUSEKEEPING
000030 98EC D00C            0000C    50          LM    14,12,12(13)
000034 07FE                          51          BR    14
000038                               52 MAINSAVE DS    18F
000080                               53 DATATAB  DS    20F
0000D0 40                            54 CARRIAGE DC    C' '
0000D1                               55 OUTLINE  DS    CL12
0000E0 00000080                      56 PARMLIST DC    A(DATATAB)
0000E4 000000D0                      57          DC    A(CARRIAGE)
                                     58          LTORG
0000E8 00000000                                  =V(DATAREAD)
0000EC 00000000                                  =V(PRINTFTL)
0000F0 00000000                                  =V(PRINTLTF)
```

```
  LOC  OBJECT CODE    ADDR1 ADDR2   STMT    SOURCE STATEMENT

                                     60 ********************************************************************
                                     61 *  REGISTER KEY:                                                   *
                                     62 *     REG1: USED TO OBTAIN PARAMETERS FROM MAIN                    *
                                     63 *     REG2: HOLDS LOOP INDEX CORRESPONDING TO TABLE SPOTS          *
                                     64 *     REG3: HOLDS DATA READ FROM FILE                              *
                                     65 *     REG8: HOLDS LOOP STEP SIZE (4)                               *
                                     66 *     REG9: HOLDS TERMINAL VALUE FOR LOOP (LAST SPOT IN TABLE)     *
                                     67 *    REG14: USED TO BRANCH BACK TO CALLER                          *
                                     68 ********************************************************************
0000F4                               69 DATAREAD CSECT
0000F8 90EC D00C           0000C     70          STM   14,12,12(13)          BEGINNING HOUSEKEEPING
0000FC 05C0                          71          BALR  12,0
0000FE                               72          USING READHERE,12
0000FE 50D0 C036           00134     73 READHERE ST    13,READSAVE+4
000102 41D0 C032           00130     74          LA    13,READSAVE


000106 5821 0000           00000     76          L     2,0(1)                TOP OF THE TABLE
00010A 4180 0004           00004     77          LA    8,4
00010E 4192 004C           0004C     78          LA    9,76(2)               BOTTOM OF THE TABLE

000112 E000 C07A 0050 00178          80 READTOP  XREAD CARD,80               LOOP THRU FILE & STORE DATA
000118 5330 C07A           00178     81          XDECI 3,CARD
00011C 5032 0000           00000     82          ST    3,0(2)
000120 8728 C014           00112     83          BXLE  2,8,READTOP


000124 58D0 C036           00134     85          L     13,READSAVE+4           ENDING HOUSEKEEPING
000128 98EC D00C           0000C     86          LM    14,12,12(13)
00012C 07FE                          87          BR    14
000130                               88 READSAVE DS    18F
000178                               89 CARD     DS    CL80
                                     90          LTORG
```

```
  LOC  OBJECT CODE    ADDR1 ADDR2   STMT    SOURCE STATEMENT

                                     92 ************************************************************************
                                     93 *  REGISTER KEY:                                                       *
                                     94 *     REG1: USED TO GRAB PARAMETERS FROM MAIN                          *
                                     95 *     REG2: LOOP INDEX CORRESPONDING TO SPOTS IN DATA TABLE            *
                                     96 *     REG3: HOLDS VALUES GRABBED FROM TABLE                            *
                                     97 *     REG8: HOLDS LOOP STEP SIZE (4)                                   *
                                     98 *     REG9: HOLDS TERMINAL VALUE FOR LOOP (LAST SPOT IN TABLE)         *
                                     99 *    REG10: HOLDS POINTER TO OUTPUT CARRIAGE CONTROL AND LINE          *
                                    100 *    REG14: USED TO BRANCH BACK TO CALLER                              *
                                    101 ************************************************************************
0001C8                              102 PRINTFTL CSECT
0001C8 90EC D00C            0000C   103          STM   14,12,12(13)           BEGINNING HOUSEKEEPING
0001CC 05C0                         104          BALR  12,0
0001CE                              105          USING FTLHERE,12
0001CE 50D0 C046            00214   106 FTLHERE  ST    13,FTLSAVE+4
0001D2 41D0 C042            00210   107          LA    13,FTLSAVE


0001D6 E020 C08A 0029 00258         109          XPRNT PFTLSTRT,41

0001DC 5821 0000            00000   111          L     2,0(1)                 TOP OF THE TABLE
0001E0 4180 0004            00004   112          LA    8,4
0001E4 4192 004C            0004C   113          LA    9,76(2)                BOTTOM OF THE TABLE
0001E8 41A1 0004            00004   114          LA    10,4(1)                POINTER TO CARRIAGE

0001EC 5832 0000            00000   116 PFTLTOP  L     3,0(2)                 GRAB EACH VALUE AND PRINT IT
0001F0 523A 0001            00001   117          XDECO 3,1(10)
0001F4 E02A 0000 000D 00000         118          XPRNT 0(10),13
0001FA 8728 C01E            001EC   119          BXLE  2,8,PFTLTOP

0001FE E020 C0B3 001D 00281         121          XPRNT PFTLEND,29


000204 58D0 C046            00214   123          L     13,FTLSAVE+4           ENDING HOUSEKEEPING
000208 98EC D00C            0000C   124          LM    14,12,12(13)
00020C 07FE                         125          BR    14
000210                              126 FTLSAVE  DS    18F
000258 F1D7D9C9D5E3C9D5             127 PFTLSTRT DC    C'1PRINTING TABLE FROM FIRST-TO-LAST VALUE:'
000281 40C4D6D5C540D7D9             128 PFTLEND  DC    C' DONE PRINTING FIRST-TO-LAST.'
                                    129          LTORG
```

```
  LOC  OBJECT CODE    ADDR1 ADDR2   STMT    SOURCE STATEMENT

                                    131 ********************************************************************
                                    132 *  REGISTER KEY:                                                   *
                                    133 *     REG1: USED TO GRAB PARAMETERS FROM MAIN                      *
                                    134 *     REG2: LOOP INDEX CORRESPONDING TO SPOTS IN DATA TABLE        *
                                    135 *     REG3: HOLDS VALUE GRABBED FROM DATA TABLE                    *
                                    136 *     REG8: HOLDS LOOP STEP SIZE (-4)                              *
                                    137 *     REG9: HOLDS TERMINAL VALUE FOR LOOP (ONE SPOT ABOVE TABLE TOP) *
                                    138 *    REG10: HOLDS POINTER TO CARRIAGE CONTROL AND OUTPUT LINE      *
                                    139 *    REG14: USED TO BRANCH BACK TO CALLER                          *
                                    140 ********************************************************************
0002A0                              141 PRINTLTF CSECT
0002A0 90EC D00C            0000C   142          STM   14,12,12(13)           BEGINNING HOUSEKEEPING
0002A4 05C0                         143          BALR  12,0
0002A6                              144          USING LTFHERE,12
0002A6 50D0 C04E            002F4   145 LTFHERE  ST    13,LTFSAVE+4
0002AA 41D0 C04A            002F0   146          LA    13,LTFSAVE


0002AE E020 C092 0029 00338         148          XPRNT PLTFSTRT,41

0002B4 5821 0000            00000   150          L     2,0(1)                 POINTER TO TOP OF THE TABLE
0002B8 4192 0000            00000   151          LA    9,0(2)
0002BC 5A90 C0DA            00380   152          A     9,=F'-4'               POINTER TO TOP OF THE TABLE-4
0002C0 4122 004C            0004C   153          LA    2,76(2)                POINTER TO BOTTOM OF THE TABLE
0002C4 5880 C0DA            00380   154          L     8,=F'-4'
0002C8 41A1 0004            00004   155          LA    10,4(1)                POINTER TO CARRIAGE

0002CC 5832 0000            00000   157 PLTFTOP  L     3,0(2)                 LOOP & PRINT LAST-TO-FIRST
0002D0 523A 0001            00001   158          XDECO 3,1(10)
0002D4 E02A 0000 000D 00000         159          XPRNT 0(10),13
0002DA 8628 C026            002CC   160          BXH   2,8,PLTFTOP

0002DE E020 C0BB 001D 00361         162          XPRNT PLTFEND,29


0002E4 58D0 C04E            002F4   164          L     13,LTFSAVE+4           ENDING HOUSEKEEPING
0002E8 98EC D00C            0000C   165          LM    14,12,12(13)
0002EC 07FE                         166          BR    14
0002F0                              167 LTFSAVE  DS    18F
000338 F1D7D9C9D5E3C9D5             168 PLTFSTRT DC    C'1PRINTING TABLE FROM LAST-TO-FIRST VALUE:'
000361 40C4D6D5C540D7D9             169 PLTFEND  DC    C' DONE PRINTING LAST-TO-FIRST.'
                                    170          LTORG
000380 FFFFFFFC                              =F'-4'
```

```
                                171          END   MBPROG6

***   0 STATEMENTS FLAGGED - 0 WARNINGS, 0 ERRORS

*** PROGRAM EXECUTION BEGINNING -
ANY OUTPUT BEFORE EXECUTION COMPLETE MESSAGE IS PRODUCED BY USER PROGRAM ***

PRINTING TABLE FROM FIRST-TO-LAST VALUE:
          99
          93
          88
          87
          82
          80
          76
          75
          71
          69
          67
          66
          63
          62
          58
          56
          55
          50
          42
          33
DONE PRINTING FIRST-TO-LAST.
```

```
PRINTING TABLE FROM LAST-TO-FIRST VALUE:
          33
          42
          50
          55
          56
          58
          62
          63
          66
          67
          69
          71
          75
          76
          80
          82
          87
          88
          93
          99
DONE PRINTING LAST-TO-FIRST.

*** EXECUTION COMPLETED ***
→
```