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         |                          /     Michael Beaver
         |                          /     CS 311 - Fall 2013
         |                          /
         |                          /     This program calculates N! (N-factorial), where the user
         |                          /     specifies N. The result is stored in Fact, which is
         |                          /     printed to the output region.
         |                          /
         |                          /
         |          ORG 100
100 5000 |  Start   INPUT
101 8000 |          SKIPCOND 000    /Check for negative input
102 9104 |          JUMP Here
103 9110 |          JUMP End
         |                          /
104 8400 |  Here    SKIPCOND 400    /Check for 0 input
105 9107 |          JUMP There
106 910E |          JUMP Zero1
         |                          /
107 2113 |  There   STORE N          /Input > 0, calculate Factorial
108 2114 |          STORE Fact
109 4115 |          SUBT One
10A 8800 |          SKIPCOND 800
10B 910E |          JUMP Zero1
10C 0126 |          JNS DoFact
10D 9110 |          JUMP End
         |                          /
10E 1115 |  Zero1   LOAD One         /Input either is 0 or 1
10F 2114 |          STORE Fact
         |                          /
110 1114 |  End     LOAD Fact
111 6000 |          OUTPUT
112 7000 |          HALT
         |                          /
         |                          /
113 0000 |  N       DEC 0
114 0000 |  Fact    DEC 0
115 0001 |  One     DEC 1
116 0000 |  Prod    DEC 0
117 0000 |  Ctr1    DEC 0
118 0000 |  Ctr2    DEC 0
         |                          /
         |                          /
         |                          /     Mult multiplies two integer values.
         |                          /
119 0000 |  Mult    HEX 0
11A 1117 |          LOAD Ctr1
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11B 4115 |          SUBT One
11C 2118 |          STORE Ctr2
         |                          /
11D 1116 |  MLoop  LOAD Prod        /Multiply by repetitive addition
11E 3114 |          ADD Fact
11F 2116 |          STORE Prod
120 1118 |          LOAD Ctr2
121 4115 |          SUBT One
122 2118 |          STORE Ctr2
123 8000 |          SKIPCOND 000
124 911D |          JUMP MLoop
125 C119 |          JUMPI Mult      /Return to caller
         |                          /
         |                          /     DoFact computes the factorial of an integer N.
         |                          /
126 0000 |  DoFact HEX 0
127 1113 |          LOAD N
128 4115 |          SUBT One
129 2117 |          STORE Ctr1
         |                          /
12A 0119 |  FLoop  JNS Mult         /Multiply N x (N - 1) x . . . x 1
12B 1116 |          LOAD Prod
12C 2114 |          STORE Fact
12D A000 |          CLEAR           /Zero-out product
12E 2116 |          STORE Prod
12F 1117 |          LOAD Ctr1
130 4115 |          SUBT One
131 2117 |          STORE Ctr1
132 8400 |          SKIPCOND 400
133 912A |          JUMP FLoop
134 C126 |          JUMPI DoFact    /Return to caller
         |          END
```

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Assembly successful.

          SYMBOL TABLE
          ------------------------------------------------
           Symbol | Defined | References
          --------+---------+-------------------------------
           Ctr1   |   117   | 11A, 129, 12F, 131
           Ctr2   |   118   | 11C, 120, 122
           DoFact |   126   | 10C, 134
           End    |   110   | 103, 10D
           FLoop  |   12A   | 133
           Fact   |   114   | 108, 10F, 110, 11E, 12C
           Here   |   104   | 102
           MLoop  |   11D   | 124
           Mult   |   119   | 125, 12A
           N      |   113   | 107, 127
           One    |   115   | 109, 10E, 11B, 121, 128, 130
           Prod   |   116   | 11D, 11F, 12B, 12E
           Start  |   100   |
           There  |   107   | 105
           Zero1  |   10E   | 106, 10B
          ------------------------------------------------
```