```
         |                          /     Michael Beaver
         |                          /     CS 311 - Fall 2013
         |                          /
         |                          /     This program calculates the sum 12 + 22 + 32 + . . . + N2, where
         |                          /     the user specifies N. The result of the summation is stored in
         |                          /     Sum, which is printed to the output region.
         |                          /
         |                          /
         |          ORG 100
100 5000 |  Start   INPUT
101 2116 |          STORE N
102 8800 |          SKIPCOND 800     /If N <= 0, skip summation altogether
103 9113 |          JUMP End
104 4118 |          SUBT One
105 211C |          STORE Ctr1
         |                          /
106 011E |  SLoop   JNS Mult         /Turn each number A in [1..N] into A2: (A x 10 + 2)
107 111A |          LOAD Prod
108 3119 |          ADD Two
109 311B |          ADD Sum          /Update running sum
10A 211B |          STORE Sum
10B A000 |          CLEAR            /Zero-out the product
10C 211A |          STORE Prod
10D 111C |          LOAD Ctr1
10E 2116 |          STORE N
10F 4118 |          SUBT One
110 211C |          STORE Ctr1
111 8000 |          SKIPCOND 000
112 9106 |          JUMP SLoop
         |                          /
113 111B |  End     LOAD Sum
114 6000 |          OUTPUT
115 7000 |          HALT
         |                          /
116 0000 |  N       DEC 0
117 000A |  Ten     DEC 10
118 0001 |  One     DEC 1
119 0002 |  Two     DEC 2
11A 0000 |  Prod    DEC 0
11B 0000 |  Sum     DEC 0
11C 0000 |  Ctr1    DEC 0
11D 0000 |  Ctr2    DEC 0
         |                          /
         |                          /     Mult multiplies a positive integer value by 10.
         |                          /
11E 0000 |  Mult    HEX 0
```

```
11F 1117 |          LOAD Ten
120 4118 |          SUBT One
121 211D |          STORE Ctr2
122 111A |  MLoop  LOAD Prod        /Multiply by using repetitive addition
123 3116 |          ADD N
124 211A |          STORE Prod
125 111D |          LOAD Ctr2
126 4118 |          SUBT One
127 211D |          STORE Ctr2
128 8000 |          SKIPCOND 000
129 9122 |          JUMP MLoop
12A C11E |          JUMPI Mult      /Return to caller
         |          END



Assembly successful.

          SYMBOL TABLE
          ------------------------------------------------
           Symbol | Defined | References
          --------+---------+-------------------------------
           Ctr1   |   11C   | 105, 10D, 110
           Ctr2   |   11D   | 121, 125, 127
           End    |   113   | 103
           MLoop  |   122   | 129
           Mult   |   11E   | 106, 12A
           N      |   116   | 101, 10E, 123
           One    |   118   | 104, 10F, 120, 126
           Prod   |   11A   | 107, 10C, 122, 124
           SLoop  |   106   | 112
           Start  |   100   |
           Sum    |   11B   | 109, 10A, 113
           Ten    |   117   | 11F
           Two    |   119   | 108
          ------------------------------------------------
```