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 1  /* Problem 4--Roman Numerals
 2     I read the number in as a string and break it up into groups of 3. */
 3
 4  import java.io.*;
 5  import java.util.*;
 6
 7  public class prob4 {
 8
 9   private static Scanner in;
10   private static PrintWriter out;
11   private static int cs;
12
13   public static void main (String[] args) throws Exception {
14
15    in = new Scanner (new File ("prob4.in"));
16    out = new PrintWriter ("prob4.out");
17    cs = 1;
18    String n = "";
19    while (true) {
20     n = in.next(); //Get next entry
21     if (n.equals("0")) break;
22     out.printf ("Case %d: ",cs++);
23     while (n.length()%3 > 0) n = "0"+n; //Make length divisible by 3
24     int gps = n.length()/3; //Number of groups of three digits
25     for (int i=gps-1; i>=0; i--) {  //Process each group of three
26      String gp = n.substring (0,3);
27      n = n.substring (3);  //Grab and remove first three digits
28      Process (gp,i);
29     }
30     out.printf ("\r\n\r\n");
31    }
32    in.close ();
33    out.close ();
34   }
35
36   //Process processes a group of three.  i is the group number with 0
37   //being the far right
38   //Only digits 1-9 are relevant.  Each digit translates into a
39   //string depeding on where it is in the group of three.  All 1's
40   //are M at this level.
41   public static void Process (String n, int i) {
42
43    if (n.charAt (0)=='1') Spit ("C",i,0);
44    if (n.charAt (0)=='2') Spit ("CC",i,0);
45    if (n.charAt (0)=='3') Spit ("CCC",i,0);
46    if (n.charAt (0)=='4') Spit ("CD",i,0);
47    if (n.charAt (0)=='5') Spit ("D",i,0);
48    if (n.charAt (0)=='6') Spit ("DC",i,0);
49    if (n.charAt (0)=='7') Spit ("DCC",i,0);
50    if (n.charAt (0)=='8') Spit ("DCCC",i,0);
51    if (n.charAt (0)=='9') Spit ("CM",i,0);
52    if (n.charAt (1)=='1') Spit ("X",i,1);
53    if (n.charAt (1)=='2') Spit ("XX",i,1);
54    if (n.charAt (1)=='3') Spit ("XXX",i,1);
55    if (n.charAt (1)=='4') Spit ("XL",i,1);
56    if (n.charAt (1)=='5') Spit ("L",i,1);
57    if (n.charAt (1)=='6') Spit ("LX",i,1);
58    if (n.charAt (1)=='7') Spit ("LXX",i,1);
59    if (n.charAt (1)=='8') Spit ("LXXX",i,1);
60    if (n.charAt (1)=='9') Spit ("XC",i,1);
61    if (n.charAt (2)=='1') Spit ("M",i,2);
62    if (n.charAt (2)=='2') Spit ("MM",i,2);
63    if (n.charAt (2)=='3') Spit ("MMM",i,2);
64    if (n.charAt (2)=='4') Spit ("MV",i,2);
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65    if (n.charAt (2)=='5') Spit ("V",i,2);
66    if (n.charAt (2)=='6') Spit ("VM",i,2);
67    if (n.charAt (2)=='7') Spit ("VMM",i,2);
68    if (n.charAt (2)=='8') Spit ("VMMM",i,2);
69    if (n.charAt (2)=='9') Spit ("MX",i,2);
70   }
71
72   //Spit takes a string of letters, the group number i, and the position
73   //p of the corresponding digit in the group of three (0, 1, or 2)
74   public static void Spit (String n, int i, int p) {
75
76    for (int j=0; j < n.length(); j++) { //After each letter we add 's.
77     char c = n.charAt (j);
78     if (c=='M') //M's become I's if they are the far right digit in
79      if (i==0 && p==2) //far right group.
80       out.print ('I');
81      else {
82       out.printf ("M");
83       int apos=i-1; //M's usually take one fewer ' than you think they
84       if (p==0) apos=i; //should
85       for (int k=0;k < apos;k++) out.printf ("'");}
86     else { //Other letters take 's matching their group number
87      out.printf ("%c",c); for (int k=0; k < i; k++) out.printf ("'");}
88    }
89   }
90  }
91
```