```
1   public class CreditCard {
2     public boolean verify(String num) {
3       if (num.length() < 12 || num.length() > 16) // return false if invalid length
4         return false;
5
6       if (findType(num) == 0) // return false if no type
7         return false;
8
9       int sum = 0; // initialize sum variable
10
11      for (int i = num.length()-1; i >= 0; i --) { // for all of the characers in num
12        if (num.length()%2 == i%2) // if placement is even
13          sum += Integer.parseInt(num.substring(i,i+1))/5 + Integer.parseInt(num.
    substring(i,i+1))*2%10; // add double tens place and double ones place of that one
    digit
14        else // if placement is odd
15          sum += Integer.parseInt(num.substring(i,i+1)); // just add digit to sum
16      }
17
18      return sum%10 == 0; // valid if divisible by 10
19    }
20
21
22    public int findType(String num) {
23      if (num.length() < 4) // if there are no first 4 digits, then throw it out
24        return 0;
25      if (num.substring(0,1).equals("4")) // if first digit is 4, Visa
26        return 2;
27      if (Integer.parseInt(num.substring(0,2)) > 50 && Integer.parseInt(num.substring
    (0,2)) < 56) // if first digits are 51-55, MC
28        return 1;
29      if (num.substring(0,2).equals("34") || num.substring(0,2).equals("37")) // if
    first two digits are 34, 37, AmEx
30        return 3;
31      if (num.substring(0,2).equals("36") || num.substring(0,2).equals("38")) // if
    they are 36 or 38, Diner thing
32        return 5;
33      if (Integer.parseInt(num.substring(0,3)) > 299 && Integer.parseInt(num.
    substring(0,3)) < 306) // if first 3 digits are between 300 and 305, also Diner
    thing
34        return 5;
35      if (num.substring(0,4).equals("6011")) // if starts with 6011, discover
36        return 4;
37      return 0; // otherwise, other
38    }
39
40
41    public String randomNumber(int type) {
42      String randNum;
43      switch (type) { // initialises the output so that it starts with the proper
    characters
44        case 1:
45          randNum = Integer.toString((int)(Math.random()*5+51));
46          break;
47        case 2:
48          randNum = "4";
49          break;
50        case 3:
51          randNum = Integer.toString((int)(Math.random()*2)*3+34);
52          break;
53        case 4:
54          randNum = "6011";
55          break;
56        case 5:
57          if (Math.random()<.5)
58            randNum = Integer.toString((int)(Math.random()*2)*2+36);
59          else
60            randNum = Integer.toString((int)((Math.random()*2)*6+300));
61          break;
62        default:
63          randNum = "";
64      }
65
66      for (int i = randNum.length(); i < 15; i ++) // puts on random numbers until
    length is 15
67        randNum += Integer.toString((int)(Math.random()*10));
68
69      for (int i = 0; i < 10; i ++) // checks 0-9 to see which final digit will make
    it valid (there is always exactly one)
70        if (verify(randNum + i))
71          return randNum + i;
72
73      return "ERROR"; // if, somehow, it does not find it, then math is broken so
    return "ERROR"
74    }
75  }
```