THE SOCIAL INSURANCE NUMBER PROBLEM:

The last digit of any SIN number is a check digit. By checking the digit you can tell whether the number is valid. To determine whether a number is valid or not following steps are performed.

1. Double each second digit commencing at the second from the right.
   For Example: 4**6**2 **9**1**6** 3**2**1
   12 18 12 4

2. If the digit is larger than **9** , **nine** is subtracted from the value
   12 18 12 4
   -9 -9 -9
   3 9 3 4

3. Bring down the remaining digits except the furthest right digit and add them.
   3 9 3 4
   4 2 1 3
   _____

   4+3+2+9+1+3+3+4 = 29

4. Subtract the answer from the next highest multiple of 10. 30-29 = 1. The value obtained should be equal to the last digit of the SIN number if the SIN is valid.

Write a program which determines whether or not a SIN is valid.

PROBLEMS:

1. It is possible to devise an account number which is self-checking to prevent fraud or clerical errors. One digit in the number is assigned by some fixed sequence of operations on the other digits. Assume that the account numbers are ten digits and the left most digit is the check digit. The account number is validated in the following way.

   Account Number -> 8213267894
   Last 9 digits -> 213267894
   2***2** + 1***2** + 3***2** + 2***2** + 6***2** +7***2** + 8***2** + 9***2** + 4***2** = 84

   If the first digit of the sum of the last nine digits doubled is the check digit the account number is valid. Write a program to check a set of account numbers. Your output should list each account number and below it the word **valid** or **invalid**. The number 1111111111 is a **valid** number.

2. J.M. Schneider Ltd. has a very sophisticated computer operation. As with most computerized operations, each product is referred to with a unique product code. The first 4 digits are information digits and the last is a check digit. The checking system involves modulo 11 arithmetic. Here's how it works:
   Example: code -> 43982
   5*4 + **4***3 + **3***9 + **2***8 = 75
   Take the **sum** 75 and **divide** it by **11**
   Keep the **remainder** only -> 9
   Then do **11** - 9 = **2** this answer should equal the **check digit** to be a valid product code.
   Write a program to check the validity of any number of (J.M. Schneider) product codes.