

Given an infinite sequence A with $A[N]$ ($N \geq 1$) being the smallest multiple of 4 that begins with N , concatenate digits of $A[N]$ to create an infinite string S . Chuck Norris can do this for you in his spare time.

What is the K -th digit in S ?

Specifically, sequence begins as 12, 20, 32, 4, 52, 60, ..., resulting in

$S = "12203245260\dots"$.

Input

Number of cases, each case contains positive integer K ($K \leq 10^{15}$). Last case is followed by the line containing a single zero.

Output

For each test case, print the K -th digit of S on separate line.

Sample Input

```
1
7
15
0
```

Sample Output

```
1
4
9
```

Leap Years

596	1600	1604	1608	1612	1616	1620	1624	1628	1632
644	1648	1652	1656	1660	1664	1668	1672	1676	1680
692	1696	1700	1704	1708	1712	1716	1720	1724	1728
740	1744	1748	1752	1756	1760	1764	1768	1772	1776
788	1792	1796	1800	1804	1808	1812	1816	1820	1824
836	1840	1844	1848	1852	1856	1860	1864	1868	1872
884	1888	1892	1896	1900	1904	1908	1912	1916	1920
932	1936	1940	1944	1948	1952	1956	1960	1964	1968
980	1984	1988	1992	1996	2000	2004	2008	2012	2016