

Problem H: Sequential

Thinking

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 Kth digit in S?

Specifically, sequence begins as 12,20,32,4,52,60,..., resulting in $S = "12203245260..."$.

Leap Years															
596	1600	1604	1608	1612	1616	1620	1624	1628	1632	1636	1640	1644	1648	1652	1656
1660	1664	1668	1672	1676	1680	1684	1688	1692	1696	1700	1704	1708	1712	1716	1720
1724	1728	1732	1736	1740	1744	1748	1752	1756	1760	1764	1768	1772	1776	1780	1784
1788	1792	1796	1800	1804	1808	1812	1816	1820	1824	1828	1832	1836	1840	1844	1848
1852	1856	1860	1864	1868	1872	1876	1880	1884	1888	1892	1896	1900	1904	1908	1912
1916	1920	1924	1928	1932	1936	1940	1944	1948	1952	1956	1960	1964	1968	1972	1976
1980	1984	1988	1992	1996	2000	2004	2008	2012	2016	2020	2024	2028	2032	2036	2040

Input Format

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 Format

For each test case, print the Kth digit of S on separate line.

Sample Input

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1
7
15
0
```

Sample Output

1
4
9

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