

Prefix Free Set (prob9)

You want to build some strings and you are now in a shop which sells two upper case letters A and B only. Each A costs 1 and each B costs 4. The cost of a string is just the sum of the cost of its letters. For example AAB will cost 6.

You want to build a set of N strings where none of the string is a prefix of another string in the set. There are many ways to do this, but you want to minimize the total cost of such sets. For example if N is 3 then one possible set is { AAA, B, ABBA} which costs 17, but an optimal set is {AA, AB, B} which costs 11.

Input

First line of the input contains T , a positive integer representing the number of test cases. The next T lines each hold one test case. Each test case contains an integer N ($1 \leq N \leq 10^9$) denoting the length of the desired prefix free set.

Output

For each test case output the size of the test case followed by a colon and the minimum cost of a prefix free set of size N which uses only the letters A and B.

Sample Input

```
5
1
10
100
1000
10000
```

Sample Output

```
1: 1
10: 74
100: 1455
1000: 21708
10000: 288578
```