CAT Crafter

A DNA sequence is a molecular chain composed of the four nucleobases: cytosine (C), guanine (G), adenine (A), and thymine (T). Those letters are used to encode a genetic sequence as text. You've been hired to assist with our research on genetics and CAT degrees...

Oh, you hadn't heard of CAT degree? It's the number of times that a genetic sequence contains the nucleobases C-A-T in that order, even with other nucleobases between them. For instance, the sequences GACT, GCAT, and CCGAAGT have CAT degrees of 0, 1, and 4, respectively. It's been hypothesized that felines owe their traits to higher CAT degrees.

Today you'll be crafting fresh DNA sequences. We will ask you for strings having specific CAT degrees. But there are also some restrictions. To improve stability, you cannot have two consecutive copies of a nucleobase. Sequences like CAAT and ACTGGG will not work. Also, each sequence may not have more than 5000 nucleobases.

Are you up to the challenge?

Input Format

The input will begin with a line containing an integer T denoting the number of test cases. The following T lines will each contain a test case. Each case will consist of an integer N, the required CAT degree.

Constraints

$1 \leq T \leq 100$
$1 \leq N \leq 10^6$

Output Format

For each test case, output a single line containing any DNA sequence that has the specified CAT degree and meets the requirements detailed above. The order of the results must follow the same order in which the test cases are provided.

Sample Input 0

```
4
1
3
6
8
```

Sample Output 0

```
CAT
CATCTGT
CTCGCAGAT
CGCAGATGT
```

Explanation 0

The first result has exactly 1 copy of CAT in it.

There are 3 ways to form CAT in the second result: [C][A][T]CTGT, [C][A]TC[T]GT, [C][A]TCTG[T]

There are 6 ways to form CAT in the third result: [C]TCGC[A]GA[T], [C]TCGCAG[A][T], CT[C]GC[A]GA[T], CT[C]GCAG[A][T], CTCG[C][A]GA[T], CTCG[C]AG[A][T]

There are 8 ways to form CAT in the fourth result: [C]GC[A]GA[T]GT, [C]GC[A]GATG[T], [C]GCAG[A][T]GT, [C]GCAG[A]TG[T], CG[C][A]GA[T]GT, CG[C][A]GATG[T], CG[C]AG[A][T]GT, CG[C]AG[A]TG[T]

Remember that each of these is one example of a valid solution. There are many other correct answers.