

- 10.1. The grasshopper jumps from cell 1 to cell  $n$ , jumping 1 or 2 cells forward each time. Each cell has a cost. Find the number of different paths of minimum cost. Time  $O(n)$ .
- 10.2. The grasshopper jumps from cell 1 to cell  $n$ , 1 or 2 cells forward each time. Each cell has a letter written on it. Find such a path so that the string read by the grasshopper is lexicographically minimal. Time  $O(n^2)$ .
- 10.3. The turtle moves from  $(0, 0)$  to  $(n, m)$ . On each cell there is some number of flowers. The turtle will collect all the flowers that she meets on the way. Find the maximum **odd** number of flowers that she can collect (you cannot skip flowers on the way). Time  $O(nm)$ .
- 10.4. Given a sequence of numbers. Find the minimal number of element you need to remove so that the sequence becomes increasing. Time  $O(n^2)$ .
- 10.5. Alice and Bob are playing a game:  $n$  cards are laid out in a row, the number  $a_i$  is written on the  $i$ -th card. In one move, you can take one, two or three cards from the right end of the row. The game ends when there are no more cards. The winner is the one with the maximum sum of numbers on the cards at the end of the game. Who will win if played optimally?
- 10.6. Given an equation of the form  $A + B = C$ , where  $A$ ,  $B$  and  $C$  are non-negative integers of length  $n$ , in the decimal notation of which some digits are replaced by question marks. For example:  $?2 + 34 = 4?$ . Your task is to put digits instead of question marks for this equality to become true.
- 10.7. Vasya has a calculator that can perform three operations: add 1, multiply by 2 and multiply by 3. What is the smallest number of operations needed to get the number  $n$  from the number 1?
- 10.8. There are  $n$  people in the line for tickets to the concert. Two people standing next in line can cooperate, and the one that goes earlier in line will buy two tickets: for oneself and for the next one. Person  $i$  spends  $a_i$  seconds to buy one ticket and  $b_i$  seconds to buy two tickets. How long does it take for everyone to buy tickets?