5.1. Given an array of positive numbers, to answer queries: «What is the maximum number of elements from the beginning of the array that can be taken so that their sum is no more than X?».

5.2. Given an array, obtained by cyclic shift from an ascending order. All elements of the array are different. Find the given element in $O(\log n)$.

5.3. Suppose that in the previous problem the condition that all elements of the array are different were removed. Is it possible to find a given element in such an array in $O(\log n)$?

5.4. Given an array, obtained by attaching a descending sorted array to the end of an ascending sorted array. All elements of the array are different. Find the given element in $O(\log n)$.

5.5. Given an array, obtained by attaching a descending sorted array to the end of an ascending sorted array and then cycling the resulting array. All elements of the array are different. Find the given element in $O(\log n)$.

5.6. There are n piles of items, in the i-th pile there are a_i items. All items are numbered consecutively, so that in a pile with a lower number there are items with smaller numbers. Answer the query: «in which pile is the item number x?» in $O(\log n)$.

5.7. There are n resource types in the game, to build one unit you need a_i resources i for all i from 1 to n. Petya has b_i resources i and d units of gold. One unit of gold can be exchanged for d_i resources i. How many units can Petya build?

5.8. There are n candidates participating in the elections. According to the latest polls, a_i voters are ready to vote for the candidate i. You want your candidate to win (get more votes than any other candidate). For s dollars, you can change the opinion of one voter. How much money should be spent on such an election campaign?