4. Artillery (`svejk`)   1 sec   50 points

The good soldier Švejk, serving in the 14-th mounted artillery regiment, has reached České Budějovice. Unexpectedly, general Finck von Finckenstein arrives to inspect the regiment. Lieutenant Lukaš must line up N cannons (all horse-drawn, of course) and fire each one exactly once.

Unfortunately, the shots scare the horses. The effect is worse when consecutive shots are fired from cannons close to each other. Therefore, Lieutenant Lukaš asks Švejk to devise a firing sequence where consecutive shots are fired from cannons that are as far from each other as possible. More precisely, the sum of the distances is to be maximized.

A firing sequence for N cannons is a reordering P of the numbers $1 \ldots N$, where P_1 is the number of the cannon fired first, P_i the number of the cannon fired i-th in the sequence, and P_N the number of the cannon fired last. The sum of distances for such a sequence is $S = |P_1 - P_2| + |P_2 - P_3| + \cdots + |P_{N-1} - P_N|$.

When listing sequences, they are orderd so that when the first $i - 1$ elements of two sequences P and Q match, but the i-th elements differ, the sequence with the smaller i-th element comes earlier in the list.

Lieutenant Lukaš knows that the favourite number of general Finck von Finckenstein is M, and suspects the general is likely to request the cannons to be fired in the order of the sequence on the M-th position in the list of possible sequences.

To help Švejk, write a program that computes

- S, the maximal possible sum of distances;
- K, the total number of firing sequences with the maximal sum;
- the first sequence in the list of all sequences with the maximal sum;
- the M-th sequence in the list of all sequences with the maximal sum.

Input. The only line of the file `svejksis.txt` contains two integers: N, the number of cannons ($2 \leq N \leq 10^5$), and M, the favourite number of general Finck von Finckenstein ($1 \leq M \leq \min(10^{18}, K)$), where K is the total number of sequences with the maximal sum of distances.

Output. The first line of the file `svejkval.txt` should contain S, the maximal possible sum of distances when N cannons are fired in some sequence, and $K \bmod 1\,000\,000\,007$, where K is the total number of sequences with the sum S. The second line should contain N integers: the first sequence in the list of all sequences with the maximal sum. The third line should also contain N integers: the M-th sequence in the list of all sequences with the maximal sum.

Example.   `svejksis.txt`   `svejkval.txt`
                  5 3   11 8
                                   2 4 1 5 3
                                   3 1 5 2 4

The maximal sum of distances for 5 cannons is 11 and there are 8 firing sequences with that sum: $(2, 4, 1, 5, 3)$, $(2, 5, 1, 4, 3)$, $(3, 1, 5, 2, 4)$, $(3, 2, 5, 1, 4)$, $(3, 4, 1, 5, 2)$, $(3, 5, 1, 4, 2)$, $(4, 1, 5, 2, 3)$, $(4, 2, 5, 1, 3)$.

Grading. In tests worth 10 points in total, $N \leq 10$; additionally, in tests worth 20 points in total, $N \leq 25$; additionally, in tests worth 10 points in total, $N \leq 1000$; in remaining tests worth 10 points in total, no additional constraints.

In each test, finding S and K gives 50% of points, finding the first sequence in the list of

sequences with the maximal sum gives 25% of points, and finding the M-th sequence in the list gives another 25% of points.