Magic Show

Alice and Bob are famous magicians. Catherine, a wealthy woman who showed interest in their amazing deeds, declared that she would give them huge wealth if they could perform the following magic trick. The contents of the magic are as follows:

- Step 1: Bob enters a room and completely cuts off from the outside. Bob can only communicate with Catherine. Then, Alice tells Catherine a number n between 2 and 5 000.
- Step 2: Catherine tells a number X to Alice, which is between 1 and 10^{18}.
- Step 3: Alice makes a tree with exactly n vertices, and gives it to Catherine.
- Step 4: Catherine deletes at most $\left\lfloor \frac{n-2}{2} \right\rfloor$ edges from the tree, and gives the remaining edges to Bob.
- Step 5: Bob carefully observes the graph, and tell the number which Catherine told to Alice.

However, Alice and Bob don't think they are smart enough to successfully perform this magic trick, so they are seeking your help. Please write a program which implements Alice's strategy and Bob's strategy so that they can beat Catherine's challenge.

Implementation Details

You need to submit **two files**:

The first file is `Alice.cpp`, which implements Alice's strategy. It should include `Alice.h` using the preprocessing directive `#include`. The function that needs to be implemented in the file is:

```
std::vector<std::pair<int, int>> Alice();
```

- For each test case, this function is called exactly once in the beginning.
- The function should return a vector of pairs, which represents the edges in the tree Alice constructed in Step 3 of the magic.
    - Note that the nodes of the tree should be numbered starting from 1.
    - You need to ensure that the returned tree is compliant, which means there should be exactly $n - 1$ edges and all nodes should be connected.

The function `Alice()` should call the following function **exactly once**:

```
long long setN(int n);
```

- Using this function, Alice chooses the parameter n which she gave to Catherine in Step 1 of the magic.
- The function then returns the value X, which Catherine gave to Alice in Step 2 of the magic.

The second file is `Bob.cpp`, which implements Bob's strategy. It should include `Bob.h` using the preprocessing directive `#include`. The function that needs to be implemented in the file is:

```
long long Bob(std::vector<std::pair<int, int>> V);
```

- For each test case, this function is called exactly once after the call of function `Alice()`.
- The parameter V is the list of edges of the graph Catherine gave to Bob in Step 4 of the magic.
- The edges are given **in sorted order**, which means:
    - For the two endpoints of each edge, the smaller numbered endpoint comes first;
    - All edges are sorted in ascending order based on the first endpoint being the first keyword and the second endpoint being the second keyword.
- The function should return a single integer, which represents the number X.

Sample Interaction

Call	Return Value
`Alice()`	
`setN(4)`	3
	$\{\{1,2\},\{2,3\},\{2,4\}\}$
`Bob({{1,2},{2,4}})`	3

It represents the following scenario:

- Step 1: At first, Alice gives 4 to Catherine.
- Step 2: Catherine gives 3 to Alice.
- Step 3: Alice makes a tree with 4 nodes and edges $\{\{1,2\},\{2,3\},\{2,4\}\}$, and tells it to Catherine.
- Step 4: Catherine cut the edge connecting nodes 2 and 3, and gives the remaining edges $\{\{1,2\},\{2,4\}\}$ to Bob.
- Step 5: Bob tells the number 3. Because his answer is correct, they can successfully perform the magic show.

Constraints

- $1 \le X \le 10^{18}$.

Subtasks

1. (5 points): $X \leq 5\,000$.
2. (30 points): $X \leq 25\,000\,000$.
3. (65 points): No additional constraints.

Sample Grader

The sample grader reads the input in the following format:

- Line 1: T $(T \in \{1, 2\})$

if $T = 1$, then the sample grader reads as follows:

- Line 2: X $(1 \leq X \leq 10^{18})$

The sample grader prints your answer of function `Alice()` in the following format:

- Line 1: n

- Line $2 + i$ $(0 \leq i \leq n - 2)$: $u[i]$ $v[i]$, where there exists an edge connecting $u[i], v[i]$.

if $T = 2$, then The sample grader reads as follows:

- Line 2: n m $(2 \leq n \leq 5000, n - 1 - \lfloor \frac{n-2}{2} \rfloor \leq m \leq n - 1)$, where n is number of vertices, and m is number of remaining edges.
- Line $3 + i$ $(0 \leq i \leq m - 1)$: $u[i]$ $v[i]$, which means there exists an edge connecting $u[i], v[i]$.

The sample grader prints your answer of function `Bob()` in the following format:

- Line 1: X