Circuits

Jane and Joe are planning their winter vacation. They already have a list with N cities that they want to visit and another list with M flights connecting the cities.

Since Jane and Joe just won the lottery, instead of finding the cheapest circuit that visits all the cities exactly once, they want to choose the K^{th} such circuit in lexicographic order because this is their lucky number.

Standard input

The first line contains three integers N, M and K.

The following M lines contain the list of flight connections in the format: `u v` meaning that there is a flight leaving from city u and arriving in city v.

Standard output

The first line contains $N + 1$ numbers representing the circuit that Jane and Joe want to take, if it exists. **Otherwise print a single number:** `0` .

Constraints and notes

- A circuit starts and finishes in city number `1` (Jane and Joe's home city).
- A flight connection allows them to fly from city u to city v but not the other way around.
- Two circuits are different if the order the cities are visited is different.
- $3 \leq N \leq 18$.
- $0 \leq M \leq N \cdot (N - 1)$.
- $1 \leq K \leq 10^{18}$.
- $1 \leq u, v \leq N, u \neq v$ for all flights.

Subtasks

Test cases will be scored ***individually***.

Subtask	Percentage of test cases	Additional input constraints
1	30%	$N \leq 10$
2	20%	$K \leq 10^4$
3	50%	none

Examples

Input	Output	Explanation

```
4 10 2
1 2
2 1
2 4
4 2
1 3
3 1
3 4
4 3
1 4
2 3
```

```
1 3 4 2 1
```

There are `3` possible circuits. In lexicographic order, they are:

```
1 2 4 3 1
```

```
1 3 4 2 1
```

```
1 4 2 3 1
```