

Contest Duration: 2025-09-07(Sun) 14:10 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20250907T1310&p1=248>) - 2025-09-07(Sun) 15:50 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20250907T1450&p1=248>) (local time) (100 minutes)

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D - Least Unbalanced

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Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 400 points

Problem Statement

Let N be a positive integer. Define the **imbalance** of a sequence $A = (A_1, A_2, \dots, A_{2^N})$ of non-negative integers of length 2^N as the non-negative integer value obtained by the following operation:

- Initially, set $X = 0$.
- Perform the following series of operations N times:
 - Update X to $\max(X, \max(A) - \min(A))$, where $\max(A)$ and $\min(A)$ denote the maximum and minimum values of sequence A , respectively.
 - Form a new sequence of half the length by pairing elements from the beginning two by two and arranging their sums. That is, set $A \leftarrow (A_1 + A_2, A_3 + A_4, \dots, A_{|A|-1} + A_{|A|})$.
- The final value of X is the imbalance.

For example, when $N = 2$, $A = (6, 8, 3, 5)$, the imbalance is 6 through the following steps:

- Initially, $X = 0$.
- The first series of operations is as follows:
 - Update X to $\max(X, \max(A) - \min(A)) = \max(0, 8 - 3) = 5$.
 - Set A to $(6 + 8, 3 + 5) = (14, 8)$.
- The second series of operations is as follows:
 - Update X to $\max(X, \max(A) - \min(A)) = \max(5, 14 - 8) = 6$.

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- Set A to $(14 + 8) = (22)$.
- Finally, $X = 6$.

You are given a non-negative integer K . Among all sequences of non-negative integers of length 2^N with sum K , construct a sequence that minimizes the imbalance.

Constraints

- $1 \leq N \leq 20$
- $0 \leq K \leq 10^9$
- N and K are integers.

Input

The input is given from Standard Input in the following format:

```
N  K
```

Output

Let $B = (B_1, B_2, \dots, B_{2^N})$ be a sequence with minimum imbalance. Let U be the imbalance of B . Output a solution in the following format:

```
U  
B1  B2  ...  B2N
```

If there are multiple solutions, any of them will be considered correct.

Sample Input 1

Copy

```
1 11
```

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Sample Output 1

Copy

```
1  
5 6
```

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$(5, 6)$ is a sequence with imbalance 1, which is the minimum imbalance among sequences satisfying the condition.

Sample Input 2

Copy

```
3 56
```

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Sample Output 2

Copy

```
0  
7 7 7 7 7 7 7 7
```

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