Practice Problem PB

Palindromic Parentheses

Construct a parentheses sequence consisting of N characters such that it is **balanced** and the length of its **longest palindromic subsequence (LPS)** is exactly K. Determine whether such a construction is possible. If there are several possible sequences, construct any of them.

A parentheses sequence consists of only character (and). A parentheses sequence is **balanced** if each character (has a corresponding character) and the pairs of parentheses are properly nested. For example, (), (()), (())(), and ((())()) are balanced. However,)(, ((), and ()) are not balanced.

A sequence is **palindromic** if it reads the same backwards as forwards. For example, ((,), ())(, and (()((are palindromic. However, (),)(, and (()) are not palindromic.

A **subsequence** can be derived from another sequence by removing zero or more characters without changing the order of the remaining characters. For example, (,))),))(, and (())() are subsequence of (())(). However,)((and ((())) are not subsequence of (())().

The **longest palindromic subsequence (LPS)** of a sequence is a subsequence with the maximum number of characters, derived from that sequence and it is palindromic. For example, the LPS of sequence (())() is))(, which can be obtained by removing the second and sixth characters. Therefore, the length of the LPS of (())() is 4.

Input

Input consists of two integers N K ($2 \le N \le 2000; 1 \le K \le N$). N is an even number.

Output

If there is no such parentheses sequence such that it is balanced and the length of its LPS is exactly K, then output -1.

Otherwise, output a string of N characters, representing the parentheses sequence. If there are several possible answers, output any of them.

Sample Input #1

```
6 4
```

Sample Output #1

```
(())()
```

Sample Input #2

```
6 3
```

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Sample Output #2

```
(()())
```

Explanation for the sample input/output #2

The LPS of (()()) is either (((by removing all) characters, or))) by removing all (characters.

The output ((())) also satisfies the requirements.

Sample Input #3

```
4 1
```

Sample Output #3

```
-1
```

Explanation for the sample input/output #3

The only possible balanced parentheses sequences are (()) and ()(). The length of the LPS of (())
and ()() are 2 and 3, respectively.

Sample Input #4

```
14 11
```

Sample Output #4

```
()((())()())()
```

Explanation for the sample input/output #4

The LPS of ()((())()())() is)())()())(), which can be obtained by removing the first, fourth, and
fifth characters.