USACO 2025 FEBRUARY CONTEST, BRONZE
PROBLEM 3. PRINTING SEQUENCES

Not submitted yet

English (en)

Bessie is learning to code using a simple programming language. She first defines a valid program, then executes it to produce some output sequence.

Defining:

- A *program* is a nonempty sequence of *statements*.
- A statement is either of the form "PRINT c" where c is an integer, or "REP o", followed by a program, followed by "END," where o is an integer that is at least 1.

Executing:

- Executing a program executes its statements in sequence.
- Executing the statement "PRINT c" appends c to the output sequence.
- Executing a statement starting with "REP o" executes the inner program a total of o times in sequence.

An example of a program that Bessie knows how to write is as follows.

```
REP 3
    PRINT 1
    REP 2
        PRINT 2
    END
END
```

The program outputs the sequence $[1, 2, 2, 1, 2, 2, 1, 2, 2]$.

Bessie wants to output a sequence of N ($1 \leq N \leq 100$) positive integers. Elsie challenges her to use no more than K ($1 \leq K \leq 3$) "PRINT" statements. Note that Bessie can use as many "REP" statements as she wants. Also note that each positive integer in the sequence is no greater than K.

For each of T ($1 \leq T \leq 100$) independent test cases, determine whether Bessie can write a program that outputs some given sequence using at most K "PRINT" statements.

INPUT FORMAT (input arrives from the terminal / stdin):

The first line contains T.

The first line of each test case contains two space-separated integers, N and K.

The second line of each test case contains a sequence of N space-separated positive integers, each at most K, which is the sequence that Bessie wants to produce.

OUTPUT FORMAT (print output to the terminal / stdout):

For each test case, output "YES" or "NO" (case sensitive) on a separate line.

SAMPLE INPUT:

```
2
1 1
1
4 1
1 1 1 1
```

SAMPLE OUTPUT:

```
YES
YES
```

For the second test case, the following code outputs the sequence $[1, 1, 1, 1]$ with 1 "PRINT" statement.

```
REP 4
    PRINT 1
END
```

SAMPLE INPUT:

```
11
4 2
1 2 2 2
4 2
1 1 2 1
4 2
1 1 2 2
6 2
1 1 2 2 1 1
10 2
1 1 1 2 2 1 1 1 2 2
8 3
3 3 1 2 2 1 2 2
9 3
1 1 2 2 2 3 3 3 3
16 3
2 2 3 2 2 3 1 1 2 2 3 2 2 3 1 1
24 3
1 1 2 2 3 3 3 2 2 3 3 3 1 1 2 2 3 3 3 2 2 3 3 3
9 3
1 2 2 1 3 3 1 2 2
6 3
1 2 1 2 2 3
```

SAMPLE OUTPUT:

```
YES
NO
YES
NO
YES
YES
YES
YES
YES
NO
NO
```

For the first test case, the following code outputs the sequence $[1, 2, 2, 2]$ with 2 "PRINT" statements.

```
PRINT 1
REP 3
    PRINT 2
END
```

For the second test case, the answer is "NO" because it is impossible to output the sequence $[1, 1, 2, 1]$ using at most 2 "PRINT" statements.

For the sixth test case, the following code outputs the sequence $[3, 3, 1, 2, 2, 1, 2, 2]$ with 3 "PRINT" statements.

```
REP 2
    PRINT 3
END
REP 2
    PRINT 1
    REP 2
        PRINT 2
    END
END
```

SCORING:

- Input 3: $K = 1$
- Inputs 4-7: $K \leq 2$
- Inputs 8-13: No additional constraints.

Problem credits: Alex Liang

Language: C

Source File: Browse... No file selected.

Submit Solution