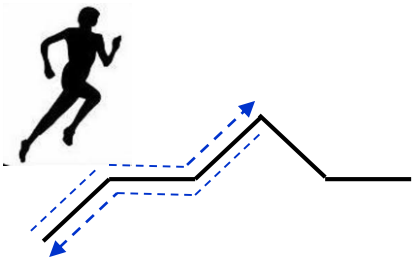
Practice Exercise #39: Jogging in NUS

http://www.comp.nus.edu.sg/~cs1020/4_misc/practice.html



Objective:

- Using recursion

Task statement:

John likes jogging inside the NUS campus. John starts jogging from PGP to a certain location and then turns back and heads back to PGP. The whole journey must fall within **M** seconds ($1 \le \mathbf{M} \le 1{,}000{,}000$). However, the jogging route in NUS is not all flat; some parts of it may be uphill or downhill. The route can be divided into **T** units ($1 \le \mathbf{T} \le 10{,}000$) in length and consists of equal-length portions that are uphill, flat, or downhill.

John takes **U** seconds ($1 \le \mathbf{U} \le 1000$) to run one unit of uphill road, **F** seconds ($1 \le \mathbf{F} \le 1000$) for a unit of flat road, and **D** seconds ($1 \le \mathbf{D} \le 1000$) for a unit of downhill road. Note that when returning to PGP, uphill units become downhill units and downhill units become uphill units.

Given the road description and time limit (**M** seconds), help John to figure out the farthest distance (number of units) he can run from PGP and still make it back to PGP within **M** seconds.

(In your program, you should use more descriptive variable names instead of **M**, **T**, **U**, **F** and **D** and follow Java naming convention.)

Input

Line 1: **M**, **T**, **U**, **F**, and **D** separated by space.

Line 2: A **T**-character string describing the route. Each character is '**u**', '**f**', or '**d**' indicating uphill, flat, or downhill respectively.

Output

A single integer that is the farthest distance (number of units) that John can run from PGP and make it back in time.

Sample Input

```
13 5 3 2 1
ufudf
```

Sample Output

```
3
```

Explanation

Had John ventured out 1 unit (uphill and then downhill on his way back), he would have taken 3+1 = 4 minutes.

Had he ventured out 2 units (uphill-flat and then flat-downhill), he would have taken 3+2+2+1 = 8 minutes.

Had he ventured out 3 units (uphill-flat-uphill and then downhill-flat-downhill), he would have taken 3+2+3+1+2+1 = 12 minutes.

Had he ventured out 4 units (uphill-flat-uphill-downhill and then uphill-downhill-flat-downhill), he would have taken 3+2+3+1+3+1+2+1 = 16 minutes and this exceeds the allowed 13 minutes.

Hence the farthest he could run is 3 units from PGP.