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Programming Task P1.

Enrollment Key: `asymptotic`

Submission Link:
`https://judge.inf.ethz.ch/team/websubmit.php?cid=28784&problem=WindT`

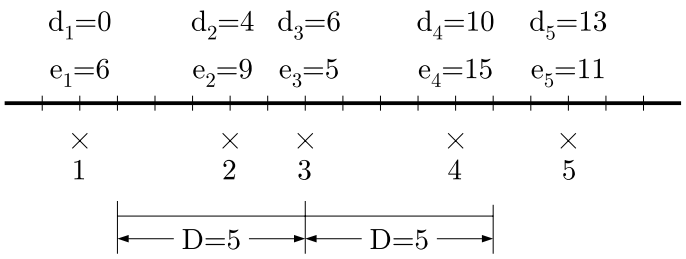
Wind Turbines

We want to place wind turbines along one road out of our town to produce energy. Due to the local conditions, n different positions are possible, some better suited than others. The laws prescribe that the distance between two wind turbines has to be at least D meters.

The n possible positions are given as the distances $d_1, \ldots, d_n$ in meters from the start of the road, e.g. as coordinates on a line, such that $0 \leq d_i < d_{i+1}$ for all $i \in \{1, \ldots, n-1\}$. When a wind turbine is installed at location i it produces energy e_i, where all the values of $e_1, \ldots, e_n$ are also given.

The task is to determine where to build the wind turbines to maximizes the total energy yield (the sum of energy produced). The number of turbines to build is limited only by the number n and the minimal distance constraint.

Example



The image above shows a situation for $n = 5$ possible positions. For example, if a wind turbine is installed at position 3, no wind turbines can be installed at the positions 2 or 4. When the wind turbines are placed on the positions 1, 3 and 5, they produce $6 + 5 + 11 = 22$ units of energy. This solution is not optimal: An installation of wind turbines on the positions 2 and 4 produces $9 + 15 = 24$ units of energy.

Grading You can get up to 20 judge points. To get full points your program should require $O(n)$ time (with reasonable hidden constants). Less efficient solutions can obtain up to 5 points.

Instructions

For this exercise, we provide a program template as an Eclipse project in your workspace that helps you reading the input and writing the output. Importing any additional Java class is **not allowed** (with the exception of the already imported ones `java.io.{InputStream, OutputStream}` and `java.util.Scanner` class). Submit only your `Main.java`.

The project also contains data for your local testing and a `JUnit` program that runs your `Main.java` on all the local tests – just open and run `WindTurbinesTest.launch` in the project. The local test data are different and generally smaller than the data that are used in the online judge.

The input and output are handled by the template – you should not need the rest of this text.

Input The input of this problem consists of a number of test-cases.

Each case is independent of the others and consists of three lines: The first line contains the integers $n > 0$ and $D > 0$ separated by a space. The second line contains n integers d_1 to d_n separated by spaces. The third line contains n integers e_1 to e_n separated by spaces.

Output For every case, the output should contain one integer number on a separate line – the maximal total energy yield of that case.

The output contains one line for each test-case. More precisely, the i-th line of the output contains a single integer corresponding to the the maximum total energy yield of the i-th test-case.

Example input (as in the figure above plus one more case).

```
2
5 5
0 4 6 10 13
6 9 5 15 11
5 1
1 2 3 5 6
3 2 4 5 1
```

Example output:

```
24
15
```