ECOO '18 R3 P4 - Circular Cities

Time limit: 13.0s   **Memory limit:** 256M

In Ringworld, there are M cities numbered from 1 to M which lie uniformly spaced along a circular, two-way road. It takes one hour to travel between city i and city $i + 1$ for $1 \le i \le M$ and one hour to travel between city 1 and city M.

There are N students and N teachers living in the cities. You would like to assign every teacher to a distinct student such that the sum of the times needed for each student to travel to their assigned teacher's city is minimized.

What is the minimum sum of the travel times for a teacher-student assignment?

Input Specification

The standard input contains 10 datasets. Each dataset begins with two integers N and M $(1 \le N \le 5 \times 10^5, 1 \le M \le 10^9)$.

The next line contains N integers A_i $(1 \le A_i \le M)$ such that student i lives in city A_i. The third line contains N integers B_i $(1 \le B_i \le M)$ such that teacher i lives in city B_i. At most one student or teacher lives in each city.

for the first 4 cases, $N \le 1000$.

Output Specification

For each dataset, output the minimum sum of the travel times for a teacher-student assignment.

Sample Input (Two Datasets Shown)

```
2 5
1 4
5 3
5 100
10 20 30 40 50
60 70 80 90 100
```

Sample Output

```
2
130
```