

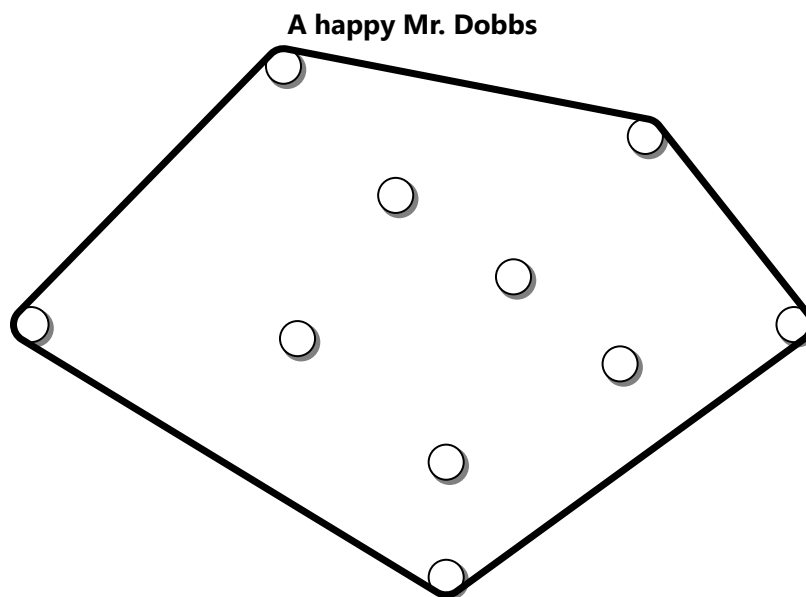
DWITE '07 R3 #4 - The Convex Fence Company

Time limit: 1.0s Memory limit: 64M

DWITE Online Computer Programming Contest, December 2007, Problem 4

The world renowned mathematician, Dr. J.R.R "Bob" Dobbs, has collected rocks for years, and has built up quite a substantial collection, which he keeps scattered throughout his backyard. Unfortunately, after an interview with the local newspaper, thieves have been trying to steal his precious stones, and so Dr. Dobbs has called the Convex Fence Company to build a fence around them for him.

His instructions to the Convex Fence Company were very precise. Being very proud of his collection, he's instructed that the Convex Fence Company make sure that no matter where he's standing in his yard, the fence doesn't block the view. Below is an example of a possible fence.



The above fence has five sections. The Convex Fence Company sells their fence by the meter, and so charges the client for a full meter even if they only use a portion of one for a section. That is to say, if the above sections were $4.3m$, $4.9m$, $2.6m$, $5.1m$ and $1.8m$ long, the Convex Fence Company would charge them for $5m$, $5m$, $3m$, $6m$ and $2m$ for a total of $21m$ of fencing – even though they really only used $18.7m$ of fence (the real thieves are made known!)

Given that fence costs m dollars per meter, what is the minimum that such a setup will cost? Note that sections of the fence can only be built in a straight line, and assume that rocks take up only a point.

The following format will be repeated five times within the file, each time describing a different setup of rocks in Mr. Dobbs' backyard:

Line 1: Positive integer $R \leq 1000$, the number of rocks in Mr. Dobbs' collection.

Line 2: Positive integer $m \leq 50$, the cost in dollars per meter of fence.

Line 3 to $3 + R$: Positive integer X , followed by a space, followed by positive integer Y , representing the location of one of Dobbs' rocks (coordinates given in meters). $(X, Y) \leq (1000, 1000)$

The output will contain 5 lines, a formatted string per line — the cost to fence Mr. Dobbs' rocks.

Note: the **formatted** string for the output is in the form `$abc.00`.

Sample Input

```
4
5
1 1
4 1
1 4
2 2
```

Sample Output

```
$55.00
```

Problem Resource: [DWITE](#)