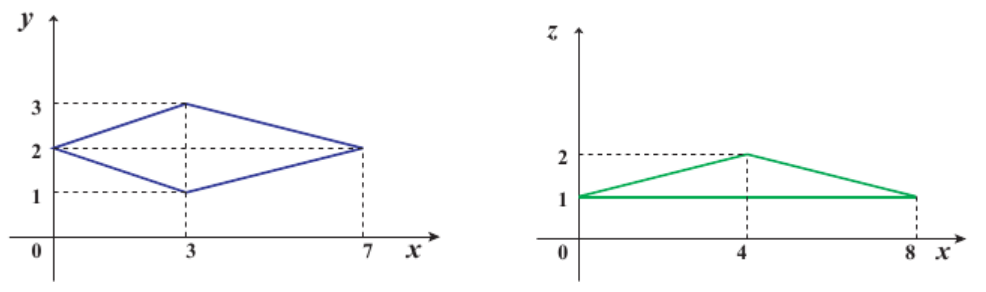
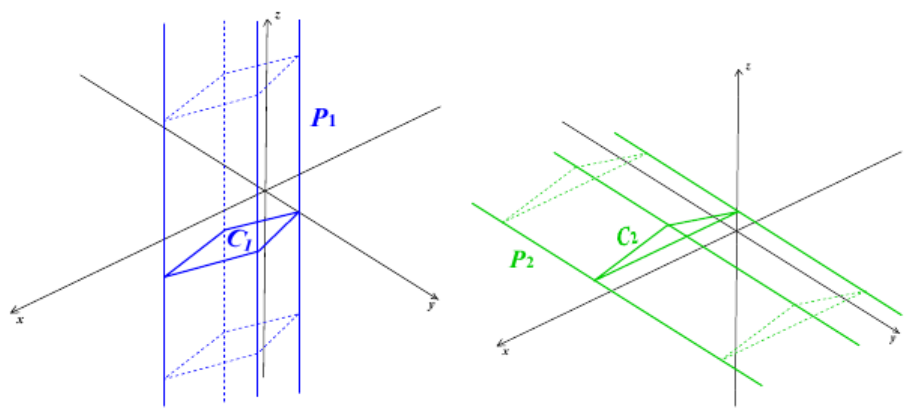
Suppose that P_1 is an infinite-height prism whose axis is parallel to the z-axis, and P_2 is also an infinite-height prism whose axis is parallel to the y-axis. P_1 is defined by the polygon C_1 which is the cross section of P_1 and the xy-plane, and P_2 is also defined by the polygon C_2 which is the cross section of P_2 and the xz-plane.

Figure I.1 shows two cross sections which appear as the first dataset in the sample input, and Figure I.2 shows the relationship between the prisms and their cross sections.



C_1 : Cross section of P_1 and the xy-plane C_2 : Cross section of P_2 and the xz-plane

Figure I.1: Cross sections of Prisms



P_1 and C_1 P_2 and C_2

Figure I.2: Prisms and their cross sections

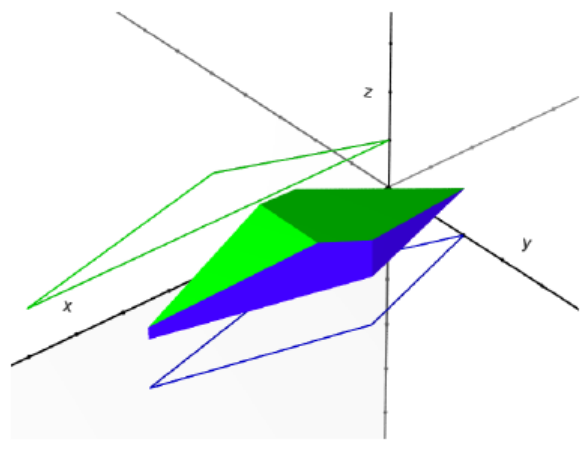


Figure I.3: Intersection of two prisms

Figure I.3 shows the intersection of two prisms in Figure I.2, namely, P_1 and P_2.

Write a program which calculates the volume of the intersection of two prisms.

Input

The input is a sequence of datasets. The number of datasets is less than 200.

Each dataset is formatted as follows.

m n
x_{11} y_{11}
x_{12} y_{12}
$\vdots$
x_{1m} y_{1m}
x_{21} z_{21}
x_{22} z_{22}
$\vdots$
x_{2n} z_{2n}

m and n are integers ($3 \le m \le 100$, $3 \le n \le 100$) which represent the numbers of the vertices of the polygons, C_1 and C_2, respectively.

x_{1i}, y_{1i}, x_{2j} and z_{2j} are integers between -100 and 100, inclusive. (x_{1i}, y_{1i}) and $(x2j, z2j)$ mean the i-th and j-th vertices' positions of C_1 and C_2 respectively.

The sequences of these vertex positions are given in the counterclockwise order either on the xy-plane or the xz-plane as in Figure I.1.

You may assume that all the polygons are *convex*, that is, all the interior angles of the polygons are less than 180 degrees. You may also assume that all the polygons are *simple*, that is, each polygon's boundary does not cross nor touch itself.

The end of the input is indicated by a line containing two zeros.

Output

For each dataset, output the volume of the intersection of the two prisms, P_1 and P_2, with a decimal representation in a line.

None of the output values may have an error greater than 0.001. The output should not contain any other extra characters.

Sample Input

```
4 3
7 2
3 3
0 2
3 1
4 2
0 1
8 1
4 4
30 2
30 12
2 12
2 2
15 2
30 8
13 14
2 8
8 5
13 5
21 7
21 9
18 15
11 15
6 10
6 8
8 5
10 12
5 9
15 6
20 10
18 12
3 3
5 5
10 3
10 10
20 8
10 15
10 8
4 4
-98 99
-99 -99
99 -98
99 97
-99 99
-98 -98
99 -99
96 99
0 0
```

Sample Output

```
4.708333333333333
1680.0000000000005
491.1500000000007
0.0
7600258.4847715655
```