D - 板チョコ/Chocolate Bar

Time limit : 2sec / Stack limit : 256MB / Memory limit : 256MB

Question

There is a chocolate bar separated into $H*W$ squares. The weight of the square at j_{th} column of the i_{th} row is $w_{i,j}$ grams. Mr. Takahashi can divide it into 2 chocolate bars by breaking up the chocolate bar along the vertical and horizontal square. Breaking up a piece of the chocolate bar requires a cost equal to the total weight of that piece. Also, he can break up the chocolate bars which he just breaks up.(However, it requires a cost equal to the total weight of that piece he is going to break up.) He wants to break up the chocolate bar along the vertical and horizontal square until all of the chocolate is broken into $1*1$ squares. Find the minimum cost at which Mr. Takahashi breaks up the whole chocolate bar into $1*1$ squares.

Constrains

- $1 \leq H, W \leq 20$
- $1 \leq w_{i,j} \leq 9$

Input

Inputs are provided from standard inputs in the following form.

```
H   W
w_{1,1}   …   w_{1,W}
:
w_{H,1}   …   w_{H,W}
```

Output

Output the minimum cost required to break up the entire chocolate bar.

Input Example 1

```
2 3
123
519
```

Output Example 1

```
51
```

Firstly, break up the chocolate bar as shown below.

```
12|3
51|9
```

The cost of breaking up the chocolate this way is $1+2+3+5+1+9=21$.

Next, break up the piece of the chocolate bar consisting of $1,2,5,1$ in the following way.

```
12
--
51
```

The cost of breaking up the piece this way is $1+2+5+1=9$.

Breaking up the rest of the chocolate bar so that it all is $1*1$ will lead to a total cost of $21+9+(1+2)+(5+1)+(3+9)=51$.

Input Example 2

```
20 20
82974679747443623449
99848689175856419363
76176864783927917153
```

```
95994458844671227999
24751866958692621633
28349838675818739355
34954415788764814992
39153112548333381794
47276747285795456137
84822237939823756735
68224965769568974895
35297421584754898975
62742452966111755391
68988327736328686224
13348891328147495612
77859999486165925717
21525593921444953767
66118863996149676751
26699268658973912665
31161843986819858694
```

Output Example 2

```
18325
```