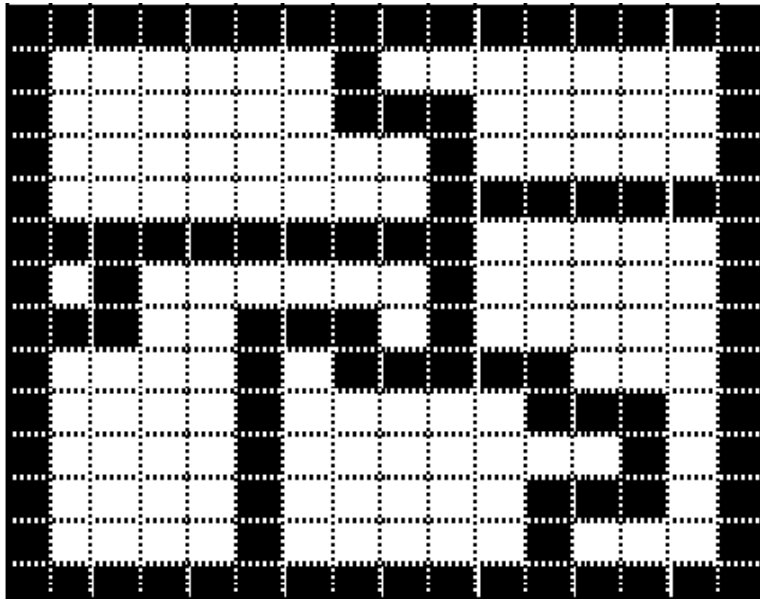


House Plan

The plan of a house shows rooms in the house separated by its walls. This plan can be represented by using the character “I” for walls and “.” for tiles on the floor. Doorways are not shown. Each “I” or “.” character occupies one square metre.

Here is a house where there are six rooms.



You have been given the plan of a house and a supply of tiles. You are to determine how many rooms will have the tiling installed if you start installing the tiles in the largest room first and move to the next largest room, and so on. You may not skip over any room, and you must stop when you do not have enough tiles for the next room. Output the number of rooms that can have tiles installed, and how many square metres of flooring are left over. For full marks, use a recursive function in your program.

No room will be larger than 64 square metres.

The first line of the data file contains the number of square metres of flooring you have. The second line in the file contains an integer r from 1 – 25 that represents the number of rows in the grid. The third line contains an integer c from 1 – 25 that represents the number of columns in the grid. The remaining r lines contain c characters of grid data. Create your input files using Notepad.

A recursive function can be used to calculate the size of each room. To process the data, you will need to go through each tile in the array. If the current tile is empty (it equals ‘.’), you can call a recursive function, let’s say `countRooms(r, c)`, that will calculate the size of the room (the number of tiles in the room). Within that function, the recursion occurs by checking the tiles above, below, right and left to the current tile. So the pseudo-code of your function could look like:

```

int countRoom(r, c)
area = 1
tile(r, c) has been counted, so mark it as non-empty
if row and col are valid and the square is empty
    area +=countRoom(r + 1, c) // check below
    area +=countRoom(r - 1, c) // check above
    area +=countRoom(r, c - 1) // check left
    area +=countRoom(r, c + 1) // check right
end if
return area

```

Sample Input 1

```

125
14
16
IIIIIIIIIIIIIIIIII
I.....I.....I
I.....III.....I
I.....I.....I
I.....IIIIIII
IIIIIIIIII.....I
I.I.....I.....I
III..III.I.....I
I....I.IIIII...I
I....I.....III.I
I....I.....I.I
I....I.....III.I
I....I.....I...I
IIIIIIIIIIIIIIIIII

```

Output for Sample Input 1

```

6 rooms, 3 square metre(s) left over

```

Sample Input 2

```

13
2
3
.I.
.I.

```

Output for Sample Input 2

```

2 rooms, 9 square metre(s) left over

```

Problem	Criteria	Strand	Out of	Mark
House Plan	Program Header – Name Date Purpose	C	1	
	Comments – Variables Statements	C	2	
	Correct file read and vector initialized	A	5	
	Correct recursive function	A	5	
	Correct output	A	10	
	Total	C	3	
	Total	A	20	