Fork’s Escape

When Fork woke up, he found himself trapped in a three-dimensional space, and Fork wanted to escape!

The three-dimensional space can be regarded as an $n\*m\*h$ cube, and each position can be represented by coordinates $(x,y,z)$. Fork finds himself trapped in $(x\_S,y\_S,z\_S)$, and the only exit is $(x\_T,y\_T,z\_T)$, and there are many bombs in the cube. If Fork hits the bomb, he will go to heaven. Fortunately, there may be a one-time protection tool in the cube. If you find the tool, you can touch one bomb without dying. More fortunately, the space is circular, which means going from the boundary outward will return to the opposite boundary. For example, if you move in the positive direction of the $x$ axis at the $(n,y,z)$ position, you will reach $(1,y,z)$. Similarly, if you move in the negative direction of the $x$ axis at $(1,y,z)$, you will reach $(n,y,z)$. The same is true for the $y$ and $z$ directions.

Fork can only move up, down, left, right, forward and backward in six directions. Each time he takes one minute to move and he doesn't need to take any time to pick up the tools. Now Fork wants to know how long it will take him to escape at least, can you tell him?

Input format:

The first line contains three integers n, m, and h (1 <= n, m, h <= 300)--- the length, width, and height of the cube.

Next read h times, each time contains an n \* m character matrix, the i-th read represents the cube profile of the i-th layer, and each read is separated by a blank line. "S" means the position of Fork, "T" means the exit, "#" means a bomb, "\*" means a safe area, "P" meas a tool, and data guarantees that "S" and "T" appear once, and "P" appears at most once.

Output format:

Output one integer, indicating the shortest time for Fork to successfully escape, or -1, indicating that Fork cannot escape.