Problem F
Robert Floyd

Time limit: 1.2 seconds
Memory limit: 256 megabytes

Problem Description

Robert W Floyd was an American computer scientist who was also awarded the Turing Award. In the ACM-ICPC community, his most known work is probably the Floyd-Warshall algorithm which can find all-pairs shortest paths and transitive closure efficiently. It has many applications and many of them is very useful, but the following is not one of them.

Stitches is the terror of Darkshire. He emits a putrid bile along his path that is stinky, disgusting and slows you by 35% percent when walking in it. So in short, you don't want to stand in them. With Stitches's movement, he can potentially cut the map into several separated areas. Two areas are separated if there is no way one can reach the other without crossing Stitches's bile. Stitches always walks along a single direction (up, down, left or right) for a unit of length and then decides whether to change his direction or not. In order to bring peace to Darkshire, the heroes will kill him as soon as possible. You may assume that Stitches only emits bile for at most 2048 units of length, since the heroes will not allow him to walk more.

Unfortunately, Stitches' bile does not disappear after his death. As the mayor of Darkshire, you want to determine how many separated areas there are after Stitches walks through. So how can we solve this with the Floyd-Marshall algorithm and why is it not useful? Well, because of how Stitches move, we can imagine he is walking on the edges of a square grid of 4098×4098 cells. Stitches begins his walk at the center of the grid, thus he will never touch its boundary. Thus easily transform the map into a graph where neighboring blocks on the grid are connected if Stitches did not walk on its connecting edge. After running the Floyd-Marshall algorithm, we can easily determine whether two blocks are in the same area. Then, just simply counting the number of areas by using a data structure for storing disjoint sets. However, since Darkshire is not a small town and there can be more than 16 millions of blocks on the grid, this method will simply not be fast enough. Unless you have the help of bronze dragon Chromie, the Keeper of Time. Please find a better way to solve this problem. Again, cheating with the bronze dragon is not allowed.

Input Format

On the first line there is a single integer T ($T \leq 30$) indicating the number of test cases. For every test case, the sequence of Stitches' movement will be given on a line with 'U' as up, 'D' as down, 'L' as left and 'R' as right. The length of the sequence will not exceed 2048.

Output Format

Output the number of separated areas on one line.

Sample Input

```
4
LURD
LUDR
LDRDRURRDLUURURD
LLUURRDDRULLLLUR
```

Sample Output

```
2
1
2
5
```

Problem F
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Time limit: 1.2 seconds
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Problem Description

羅伯特・W・弗洛伊德 (Robert W Floyd) 是個美國計算機科學家，也是個圖靈獎得主。在 ACM-ICPC 社群中，他最為人知的成果，可能是 Floyd-Warshall 演算法，可用於求出任兩點間最短路徑以及傳遞閉包 (Transitive closure)。此演算法有相當多應用，但或許無法用於解決本問題。

縫合怪引起了夜色鎮的恐慌。縫合怪會沿著行進路徑分泌出腐敗的膽汁，不但又臭又噁心還會讓你在上面行走的移動速度下降 35%。簡而言之，你不想要踩在那上面。隨著縫合怪的移動，他可能將整個地圖切成好幾個被分開的區域。兩個區域被分開的意思是說，如果有人要從一個區域走到另外一個，非得踩過縫合怪的膽汁不可。

縫合怪總是沿著單一方向前進 (上下左右)，而且一步只走一單位長，走完之後再來決定他要不要改變他行進的方向。為了帶給夜色鎮平靜的生活，英雄們將盡快的殺死縫合怪。可以假定縫合怪最多流出 2048 單位長的膽汁，因為英雄們不會允許他在夜色鎮走更多步了。

但不幸的，縫合怪的臭膽汁並不會隨著他的死亡而消失。作為夜色鎮的鎮長，你想要算出夜色鎮被切成多少個分開的區域。我們該怎樣用 Floyd-Warshall 演算法解決這個問題？又該如何得出這個問題用 Floyd-Warshall 演算法沒有太大幫助的結論呢？因為縫合怪行進的方式，我們可以想像他在一個 4098 × 4098 的方格圖上行走，一開始他在中心，而且他到死之前都不會碰到方格圖的邊界。我們可以簡單的把地圖轉化成圖形 (Graph)，把方格當作點，而縫合怪沒有走過得邊界，轉換成邊。接下來執行 Floyd-Warshall 演算法，變可以得知任兩個方格，是不是在同一個區域，接下來套用互斥集合 (Disjoint sets) 的資料結構，便能算出有多少個分開的區域了。然而，夜色鎮太大了，而上面這個作法要處理一千六百多萬個格子，在實務上這方法不夠快。請找出更好的方法解決這個問題。

Input Format

測試輸入的第一行只有一個整數 T ($T \leq 30$) 代表有多少組測試資料。每筆測試資料只有一行，有一個描述縫合怪移動的序列，`U` 代表往畫面上方、`D` 代表下方、`L` 代表左方、`R` 代表右方，序列長度不會超過 2048。

Output Format

對每筆測試資料，輸出有多少個分開的區域。

Sample Input

```
4
LURD
LUDR
LDRDRURRDLUURURD
LLUURRDDRULLLLUR
```

Sample Output

```
2
1
2
5
```