

Problem C

The Shortest Path

Time Limit: 2 seconds

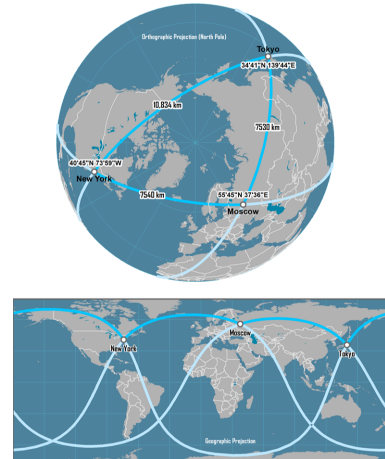
Given a string S , your task is to find an occurrence of the string $T = \text{"path"}$ as a subsequence in S , such that T spans the least number of characters in S .

Input

The input file starts with an integer T ($1 \leq T \leq 100$), the number of test cases. Each case contains a string S on a separate line. ($4 \leq |S| \leq 500$, $s_i \in \{ 'p', 'a', 't', 'h' \}$)

Output

For each test case output the minimum number of characters in S that the string T is 'spanning' as a subsequence, or -1 if T is not a subsequence of S .



Sample Input

Sample Output

3	4
path	-1
htap	8
hptatptahaha	