MD ARSHAD

ROLL NO 22CS01025

DAA LAB ASSIGMENT 04
Q1

```c
#include <stdio.h>
// Function to find the maximum of two numbers
int max(int a, int b) {
    return (a > b) ? a : b;
}
// Function to find the longest sideways trend
void findSidewaysTrend(int prices[], int start, int end, int p, int* maxStart,
int* maxEnd) {
    // Base case: if there's only one price
    if (start == end) {
        *maxStart = start;
        *maxEnd = end;
        return;
    }
    int mid = (start + end) / 2;
    // Recursive calls for left and right halves
    int leftMaxStart, leftMaxEnd;
    findSidewaysTrend(prices, start, mid, p, &leftMaxStart, &leftMaxEnd);
    int rightMaxStart, rightMaxEnd;
    findSidewaysTrend(prices, mid + 1, end, p, &rightMaxStart, &rightMaxEnd);
    int i, j;
    for (i = mid; i >= start; i--) {
        if (prices[mid] <= (1 + p / 100.0) * prices[i])
            leftMaxStart = i;
        else
            break;
    }
    for (j = mid + 1; j <= end; j++) {
        if (prices[mid + 1] >= (1 - p / 100.0) * prices[j])
            rightMaxEnd = j;
        else
            break;
    }
    *maxStart = leftMaxStart;
    *maxEnd = rightMaxEnd;
}
int main() {
    int prices1[] = {100};
    int prices2[] = {100, 100, 100, 100};
    int prices3[] = {100, 95, 97, 96, 120, 119, 118, 117};
    int prices4[] = {100, 101, 99, 100, 102, 103, 101, 100, 99, 98, 97};
    int p = 5;
    int n1 = sizeof(prices1) / sizeof(prices1[0]);
    int n2 = sizeof(prices2) / sizeof(prices2[0]);
    int n3 = sizeof(prices3) / sizeof(prices3[0]);
    int n4 = sizeof(prices4) / sizeof(prices4[0]);
    int maxStart, maxEnd;
    findSidewaysTrend(prices1, 0, n1 - 1, p, &maxStart, &maxEnd);
    printf("Output for prices1: %d,%d\n", maxStart, maxEnd);
    findSidewaysTrend(prices2, 0, n2 - 1, p, &maxStart, &maxEnd);
    printf("Output for prices2: %d,%d\n", maxStart, maxEnd);
    findSidewaysTrend(prices3, 0, n3 - 1, p, &maxStart, &maxEnd);
    printf("Output for prices3: %d,%d\n", maxStart, maxEnd);
    findSidewaysTrend(prices4, 0, n4 - 1, p, &maxStart, &maxEnd);
    printf("Output for prices4: %d,%d\n", maxStart, maxEnd);
    return 0;
}
//  the time complexity is o(nlogn)
```