Hasan and Trip - Hackerearth

Tuesday, May 19, 2020 7:47 PM

Hasan has finally finished his final exams and he decided to go in a trip among cities in Syria.
There are N cities in Syria and they are numbered from 1 to N, each city has coordinates on plane, i-th city is in (X_i, Y_i).
Hasan is in first city and he wants to visit some cities by his car in the trip but the final destination should be N-th city and the sequence of cities he will visit should be increasing in index (i.e. if he is in city i he can move to city j if and only if i < j).
Visiting i-th city will increase Hasan's happiness by F_i units (including first and last cities), also Hasan doesn't like traveling too much, so his happiness will decrease by total distance traveled by him.
Help Hasan by choosing a sequence of cities to visit which maximizes his happiness.

Input format:
First line contain integer N.
Next N lines contains three integers each, i-th line contains coordinates of i-th city X_i, Y_i and F_i.

Output format:
Output one number rounded to 6 digits after floating point, the maximum possible happiness Hasan can get.

Constraints:

- 1 <= N <= 3,000
- 0 <= X_i, Y_i, F_i <= 100,000

SAMPLE INPUT

3
0 0 1
3 1 1
6 0 9

SAMPLE OUTPUT

4.675445

The Code:

```
#include <stdio.h>
#include <math.h>
#define max(a,b) a > b ? a : b;
int main(){
    int N, i, j;
    double result;
    scanf("%d", &N);
    int* x = (int*)malloc(N * sizeof(int));
    int* y = (int*)malloc(N * sizeof(int));
    int* f = (int*)malloc(N * sizeof(int));
    double* happiness = (double*)calloc(N, sizeof(double));
    for(i=0; i<N; i++) {
        scanf("%d %d %d", &x[i], &y[i], &f[i]);
```

```
    }
    happiness[N-1] = f[N-1];
    for(i=N-2; i>=0; i--) {
        for(j=i+1; j<N; j++) {
            result = f[i] - sqrt(pow(x[j]-x[i], 2) + pow(y[j]-y[i], 2)) +
happiness[j];
            happiness[i] = j == i+1 ? result : max(happiness[i], result); //
cause if there's only one result and it's -ve, you want that to be the happiness,
not default 0.
        }
    }
    printf("%.6lf", happiness[0]);
}
```

The Stats:

Score
30.0

Time (sec)
1.01828

Memory (KiB)
64

Language
C