Problem 9: Saving ink

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정유석

• Susan likes to make a line drawing with ink. There ‘re several

dots on drawing paper. Your job is to tell Susan how to

connect the dots so as to minimize the amount of ink used.

• Susan connects the dots by drawing straight lines between pairs,

possibly lifting the pen between lines.

• When Susan is done there must be a sequence of connected lines

from any dot to any other dot.

• Test using 3 different data sets (test cases).

CODE

//Using Kruskal's Algorithm

#include<stdio.h>

#include<math.h>

#include<stdlib.h>

typedef struct{ //Struct dots

float x;

float y;

int check;

}dots;

dots p[30];

void init(dots \* p, int); //Dots Initialized

void main(){

int i,j=1,k=1,cnt,min\_N,min\_C;

float distance[30][100];

float min,sum=0;

//Receive number of dots

printf("Input number of dots : ");

scanf("%d",&cnt);

//Exception

while(!(cnt>0) || !(cnt<30)){

printf("Re input number of dots (0< dots <30) : ");

scanf("%d",&cnt);

}

//Initialized

init(p,cnt);

//Kruskal's Algorithm

while(k < cnt){

min =900;

for(i=0; i<cnt; i++){

for(j=i+1; j<cnt; j++){

if(distance[i][j] == 1000)

continue;

//Store the all distance

distance[i][j] = sqrt((p[i].x - p[j].x)\*(p[i].x - p[j].x)+(p[i].y - p[j].y)\*(p[i].y - p[j].y));

if(min>distance[i][j]){//check the cycle

if(p[i].check == 1.0 && p[j].check ==1.0){

continue;

}

min = distance[i][j];

min\_N = i;

min\_C = j;

distance[i][j] = 1000;

}

}

}

sum = sum+min;//check increase

p[min\_N].check = 1.0;

p[min\_C].check = 1.0;

k++;

}

printf("Sum : %.2f \n",sum);

}

//Initialize

void init(dots \*p, int cnt){

int i;

for(i=0; i<cnt; i++){

printf("Enter the X,Y values : ");

scanf("%f %f",&p[i].x,&p[i].y);

p[i].check = 0;

}

}

PRINT





