

Programming Assignment 1

CMPE 250, Data Structures and Algorithms, Fall 2014

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Due: 17 October 2014, 23:59

Problem Definition

In this project you are asked to find K nearest neighbors of all points on a 2D space. The distance metric that you are going to use is simply the Euclidean distance.

Input & Output Format

Your code must be compiled by the simple "make" command and your code must read the arguments from the command line. Your code will be tested with the command:

```
./project1 inputFile outputFile
```

The input file has the following format:

```
N K
x1 y1
x2 y2
...
...
xN yN
```

where N is the number of points, K is the number of neighbors that will be returned. The remaining lines are the x and y coordinates between 0 and 100.

You are going to output the K nearest neighbors of each point in one line with the following format:

```
1 n11 n12 ... n1K
2 n21 n22 ... n2K
...
...
N nN1 nN2 ... nNK
```

where n_{11} is the nearest neighbor of the 1st point, n_{12} is the second nearest neighbor of the 1st point, etc...

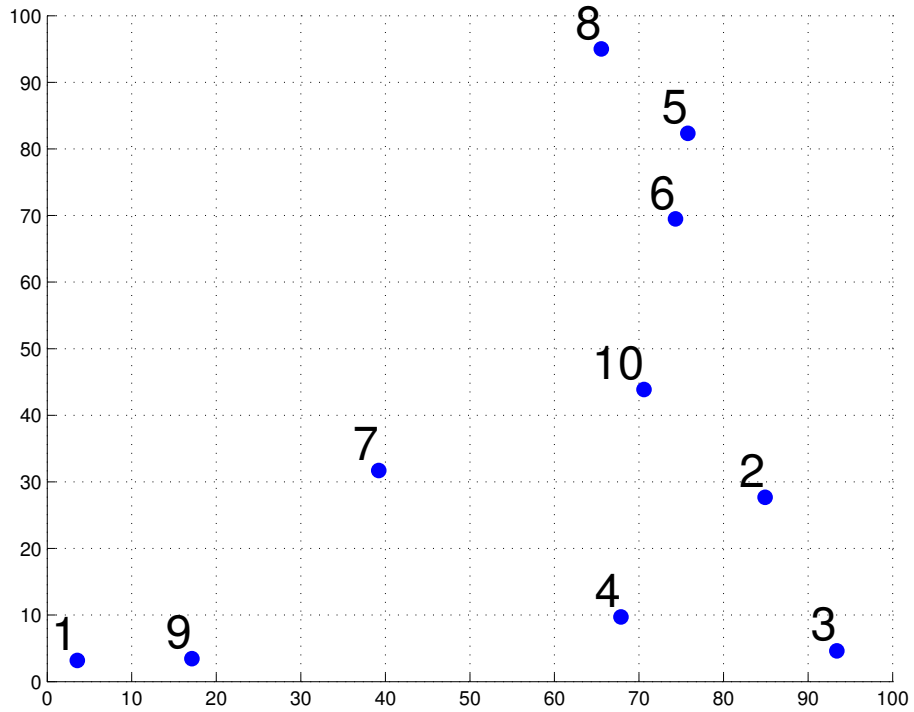


Figure 1: A sample question with 10 points.

10 2	1 9 7
3.57 3.18	2 10 3
84.91 27.69	3 2 4
93.40 4.62	4 2 3
67.87 9.71	5 6 8
75.77 82.35	6 5 10
74.31 69.48	7 10 9
39.22 31.71	8 5 6
65.55 95.02	9 1 7
17.12 3.44	10 2 6
70.60 43.87	
Input	Output

Table 1: Input and output for the sample question with $K = 2$.

Submission Details

You are supposed to use the Git system provided to you for all projects. No other type of submission will be accepted. Also pay attention to the following points:

- All source codes are checked automatically for similarity with other submissions and exercises from previous years. Make sure you write and submit your own code.
- In our case, you are expected to use C++ as powerful, steady and flexible as possible. Use mechanisms that affects these issues positively.
- Make sure you document your code with necessary inline comments, and use meaningful variable names. Do not over-comment, or make your variable names unnecessarily long.