

Computer Science 130B
Spring 2017
Programming Assignment #2

Due: **11.59pm**, May 7, Sunday

Your task here is to implement the minimum cost spanning tree algorithms. You can choose to implement either Kruskal's or Prim's algorithm.

You read input data from `stdin`. The format will be

```
n                /* number of vertices */
x0 y0          /* coordinates of the 0th vertex */
...              ...
xn-1 yn-1      /* coordinates of the (n - 1)th vertex */
m                /* number of edges */
v00 v10        /* indices of the first edge, or the first edge goes from vertex v00 to v10 */
...              ...
v0m-1 v1m-1    /* indices of the (m - 1)th edge, or the (m - 1)th edge goes from vertex v0m-1 to v1m-1 */
```

where $0 \leq v_0^i, v_1^i < n, 0 \leq i < m$. A special case is when $m = 0$, in that case, the graph is a complete graph and there exists an edge in between every pair of vertices. The “cost” or “weight” of an edge is conveniently defined to be the Euclidean distance between the two vertices.

Your program should output (to `stdout`) the following information:

```
V00 V10        /* indices of the first MCST edge that goes from vertex V00 to V10 */
...              ...
V0n-1 V1n-1    /* indices of the (n - 1)th MCST edge that goes from vertex V0n-1 to V1n-1 */
```

The MCST edges should be written out in the order of the vertex of the smaller index (e.g., edge (1,3) before edge (2,3)). If the vertices of the smaller index are the same for two MCST edges, the tie is resolved by the other vertex (e.g., edge (1,2) before edge (1,3)).