**Algorithm 1:** Find candidate disks with plane sweeping technique

**Input**: $\mathcal{T}[t_i]$: positions in timestamp $t_i$, sorted by x-axis values, $\epsilon$: flock diameter, $\mu$: minimum size of flock
**Output**: $\mathcal{C}$: candidate disks for timestamp $t_i$, $\mathcal{B}$: active boxes in timestamp $t_i$

$\mathcal{C} \leftarrow \emptyset, \mathcal{B} \leftarrow \emptyset$
**foreach** $p_r \in \mathcal{T}[t_i]$ **do** // analyze elements in increasing x-values
  $\mathcal{P} \leftarrow \emptyset$ // list of elements of current box defined by $p_r$
  **foreach** $p_s \in \mathcal{T}[t_i] : \mid p_s.x - p_r.x \mid \leqslant \epsilon$ **do** // test only elements inside $2\epsilon$ x-band
    **if** $|p_s.y - p_r.y| \leqslant \epsilon$ **then** // check if $p_s$ is inside $2\epsilon$ y-band
      $\mathcal{P} \leftarrow \mathcal{P} \cup p_s$ // add element $p_s$ to box
  **foreach** $p \in \mathcal{P} : p.x \geqslant p_r.x$ **do** (// elements inside right half of box
    **if** $dist(p_r, p) \leqslant \epsilon$ **then** // calculate pair distance
      let $\{c_1, c_2\}$ be disks defined by $\{p_r, p\}$ and radius $\epsilon/2$
      **foreach** $c \in \{c_1, c_2\}$ **do**
        **if** $|c \cap \mathcal{P}| \geqslant \mu$ **then** // check the number of entries in disk
          $\mathcal{C} \leftarrow \mathcal{C} \cup c$ // add $c$ to candidate disks
          $\mathcal{B} \leftarrow \mathcal{B} \cup box(p_r)$ // add box to active boxes
**return** $\mathcal{C}, \mathcal{B}$