Problem 2.d: Gathering with Limited visibility
Gathering with Limited Visibility

Initially the robots are in arbitrary positions.

In finite time, they gather in the same place.
Limited Visibility

Visibility Graph
Gathering (Point Formation)  
Limited Visibility

For both models:

Necessary Condition: The Visibility Graph must be connected.

Correctness Condition: The Visibility Graph must remain connected during the computation.
SYm Solutions

Ando, Oasa, Suzuki, Yamashita

*IEEE Trans. on Robotics and Automation*, 1999

Istantaneous Activities
No agreement
They provide *asymptotic* convergence to the point
Gathering (Point Formation)
Limited Visibility

**Corda (STACS 2001):**

- The problem has been solved assuming common knowledge on direction and orientation of both axes
- Finite solution
Gathering: The Algorithm
Limited Visibility (STACS 2001)

When a robot sees other robots only below ...
Gathering: The Algorithm
Limited Visibility (STACS 2001)

When a robot sees other robots only to its right ...
Gathering: The Algorithm
Limited Visibility (STACS 2001)

When a robot sees other robots to its right and below ...
For any given vertical axis $\Psi$ at some distance $d > 0$ from the end of the Universe, all the robots that are on the left of $\Psi$ at the beginning of the algorithm will pass $\Psi$ in a finite number of steps.
When all the robots of the system are on the rightmost vertical axis, then they will gather on the bottom most robot in a finite number of steps.