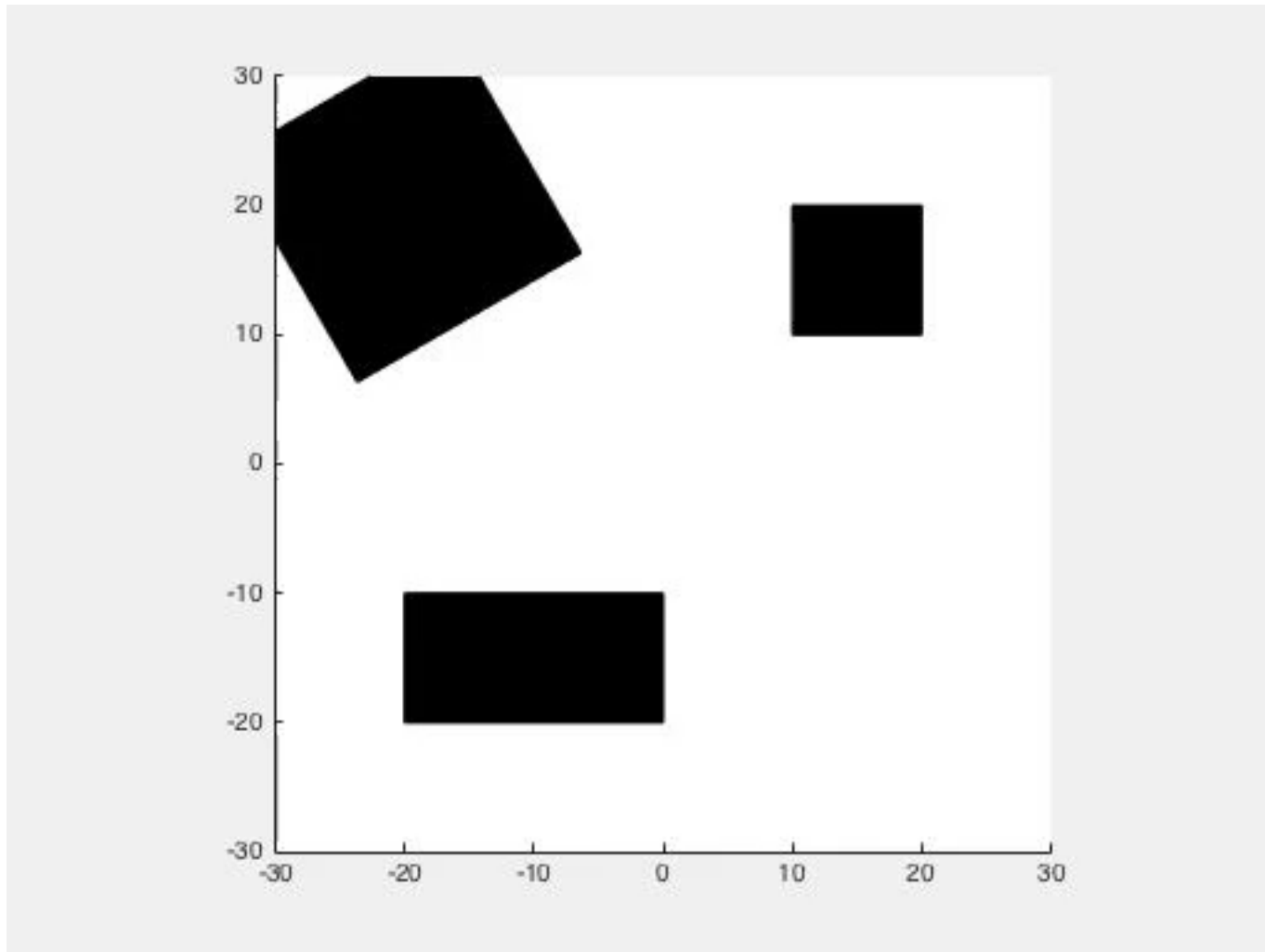


Rapidly Exploring Random Trees

SECTION 3.3

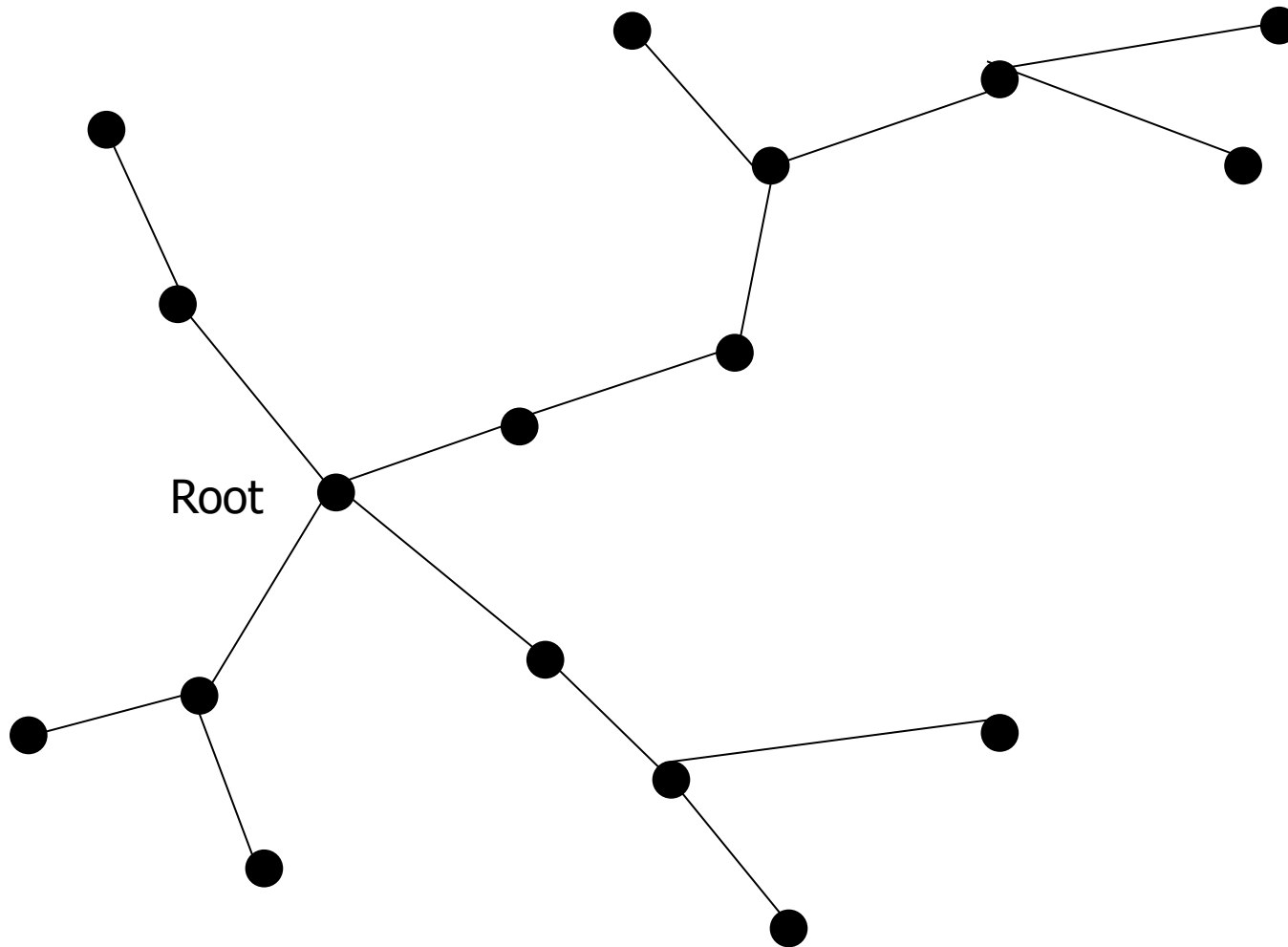
Example of RRT growth in 2D Space



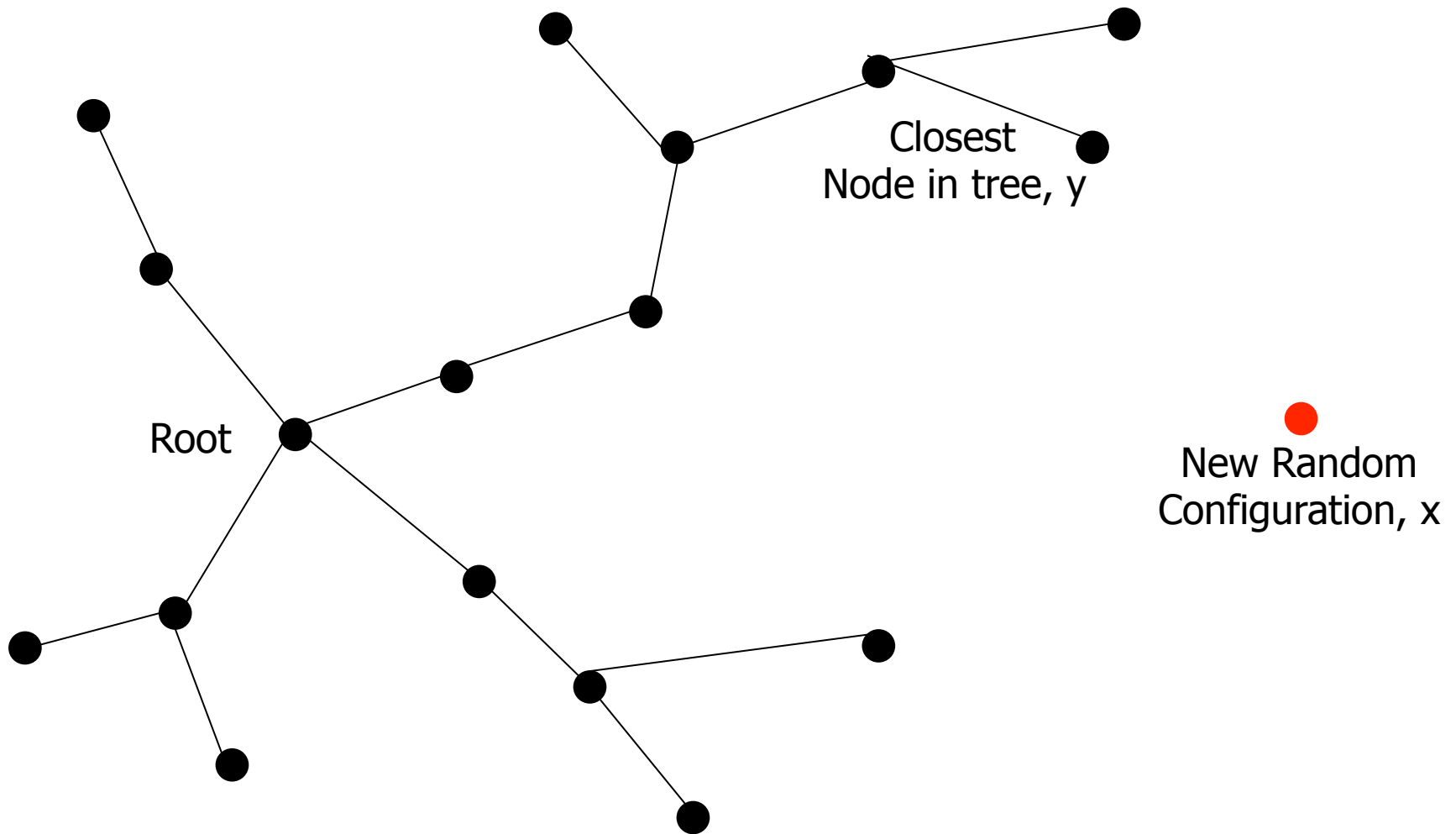
RRT Procedure

- Add start node to tree
- Repeat n times
 - o Generate a random configuration, x
 - o If x is in freespace using the **CollisionCheck** function
 - Find y , the closest node in the tree to the random configuration
 - If (**Dist** (x, y) $>$ δ) – Check if x is too far from y
 - Find a configuration, z , that is along the path from x to y such that $\text{Dist}(z, y) \leq \delta$
 - $x = z$;
 - If (**LocalPlanner** (x, y)) – Check if you can get from x to y
 - Add x to the tree with y as its parent

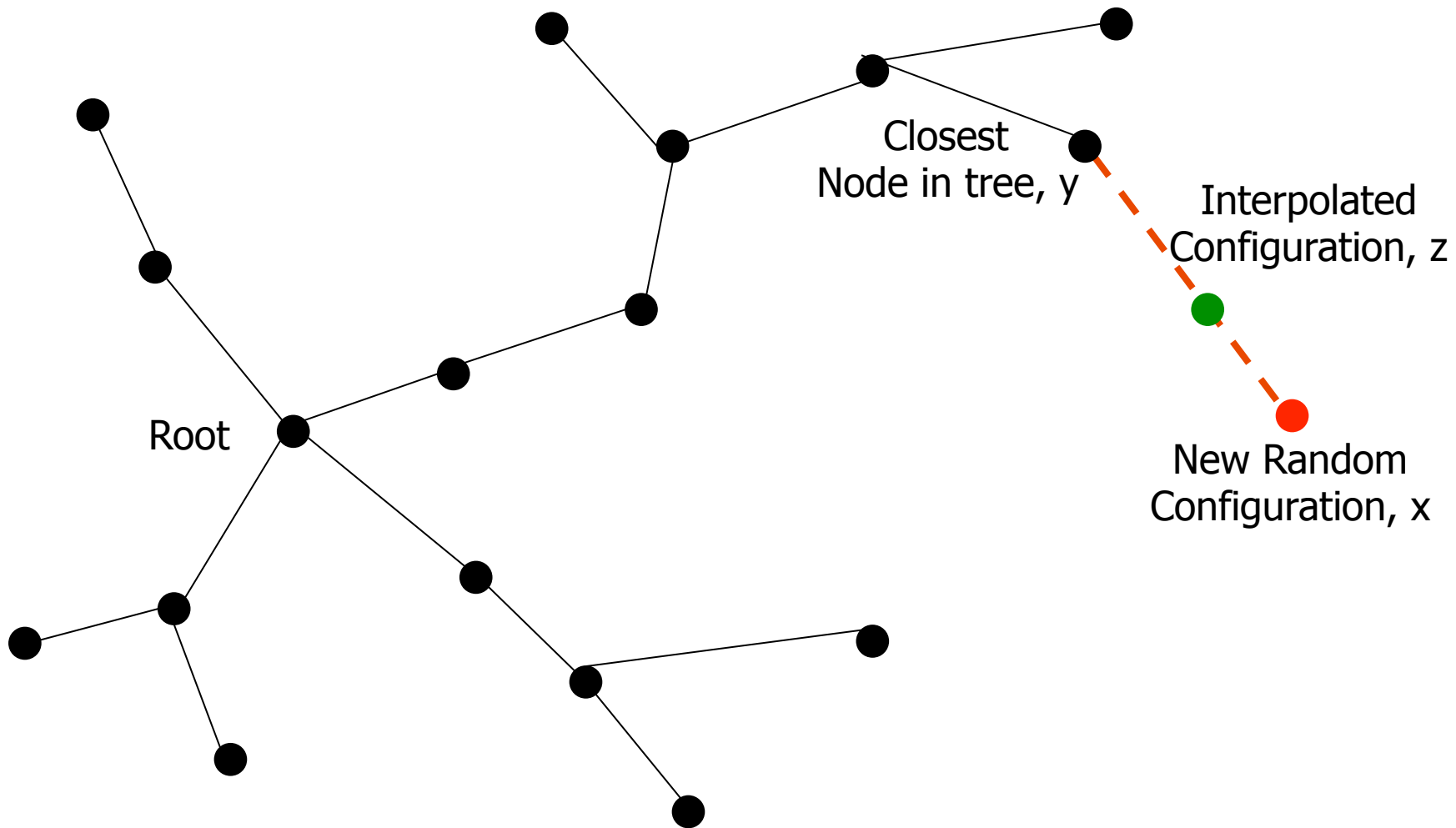
RRT Extension Procedure – Initial tree



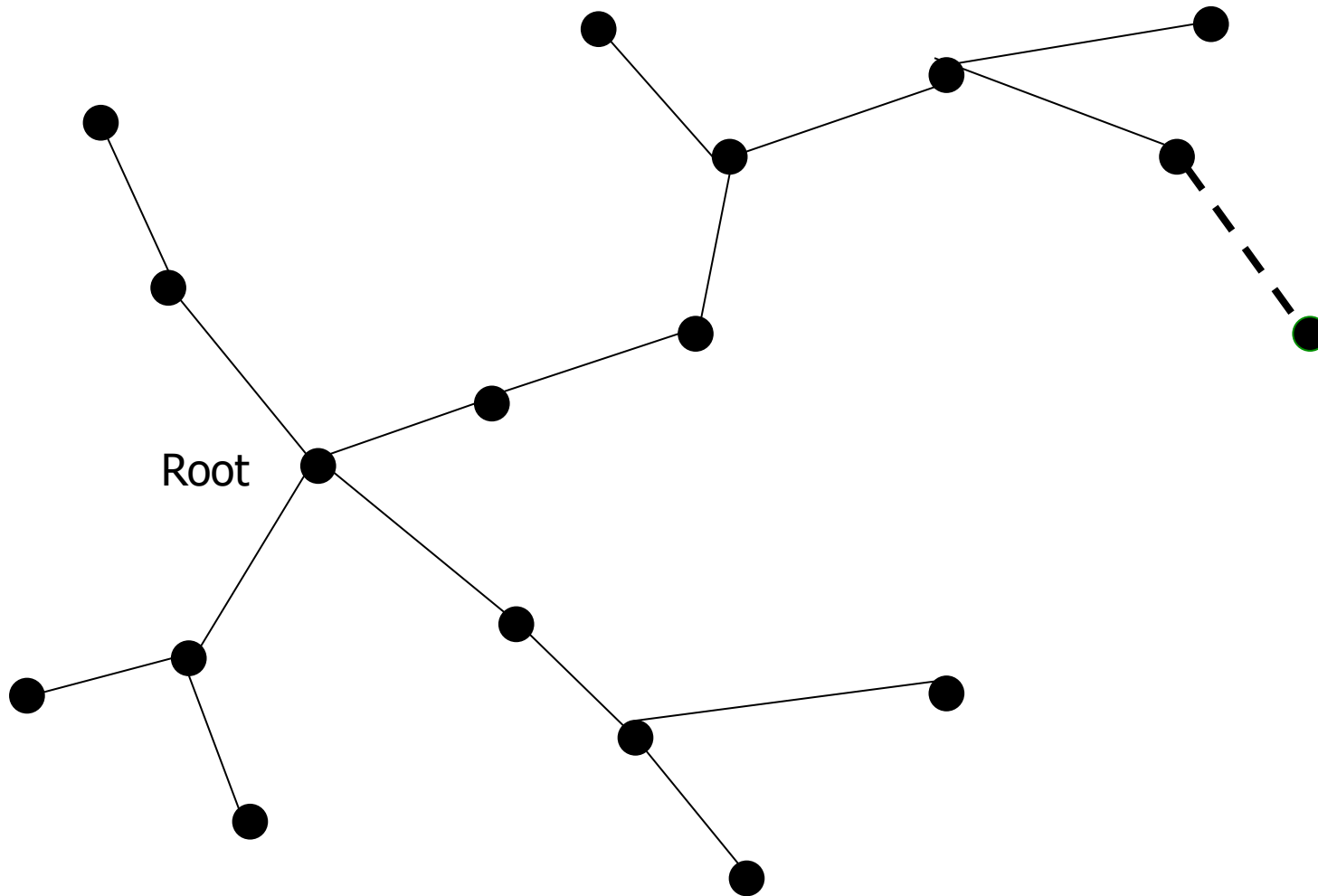
RRT Extension Procedure



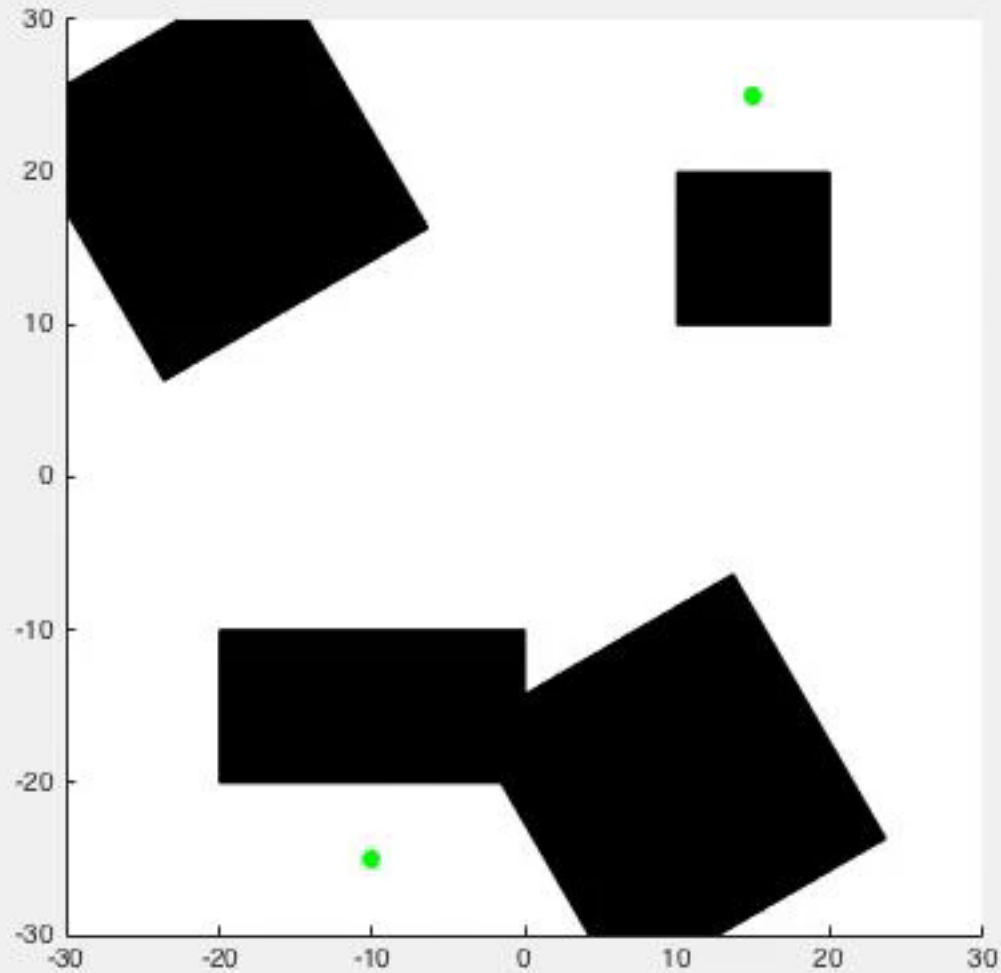
RRT Extension Procedure



RRT Extension Procedure – Graph after extension



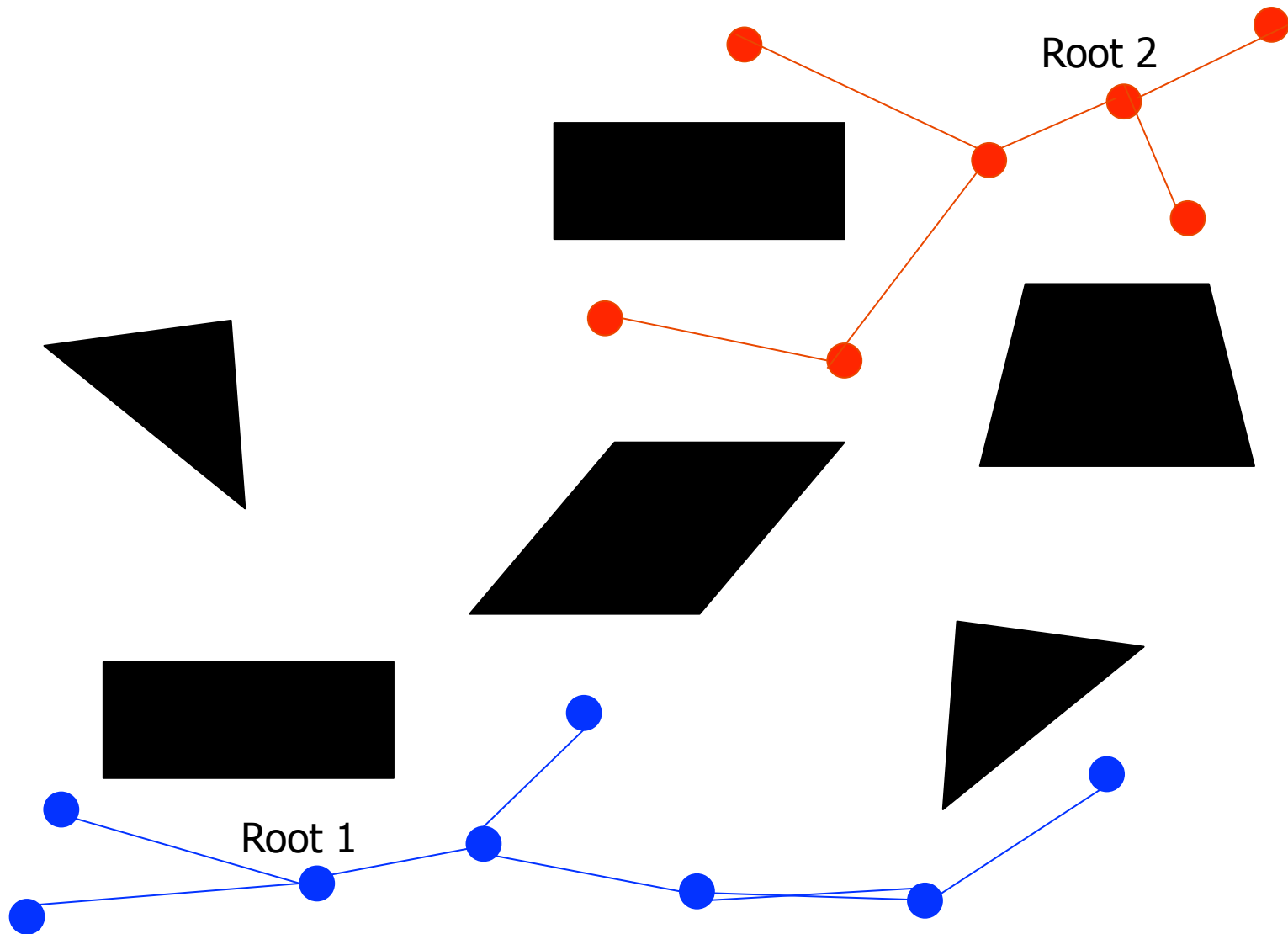
RRT Planning using 2 trees



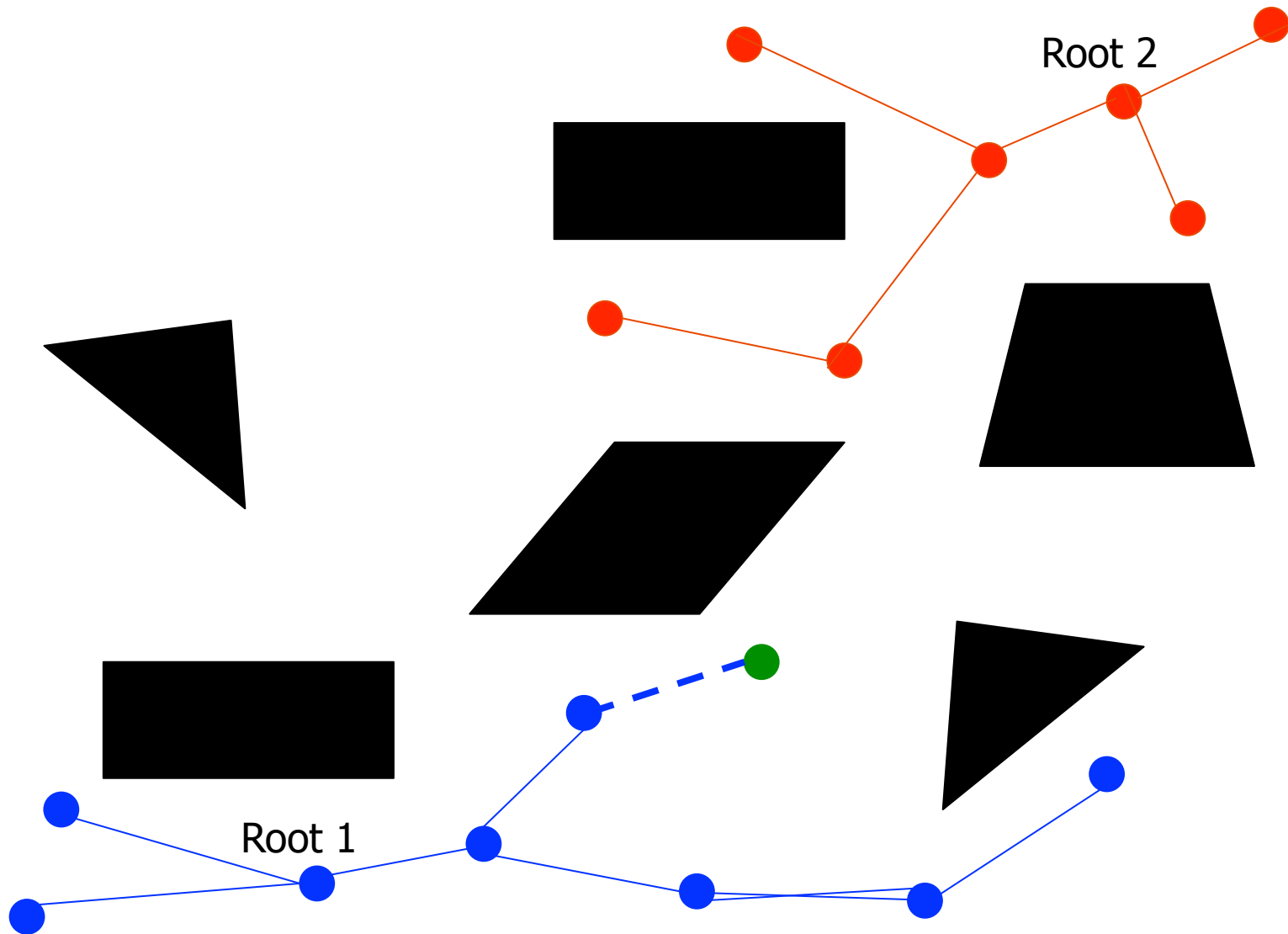
RRT 2 tree procedure

- While not done
 - o Extend Tree A by adding a new node, x
 - o Find the closest node in Tree B to x , y
 - o If (**LocalPlanner**(x, y)) – Check if you can bridge the 2 trees
 - Add edge between x and y .
 - This completes a route between the root of Tree A and the root of Tree B. Return this route
 - Else
 - Swap Tree A and Tree B

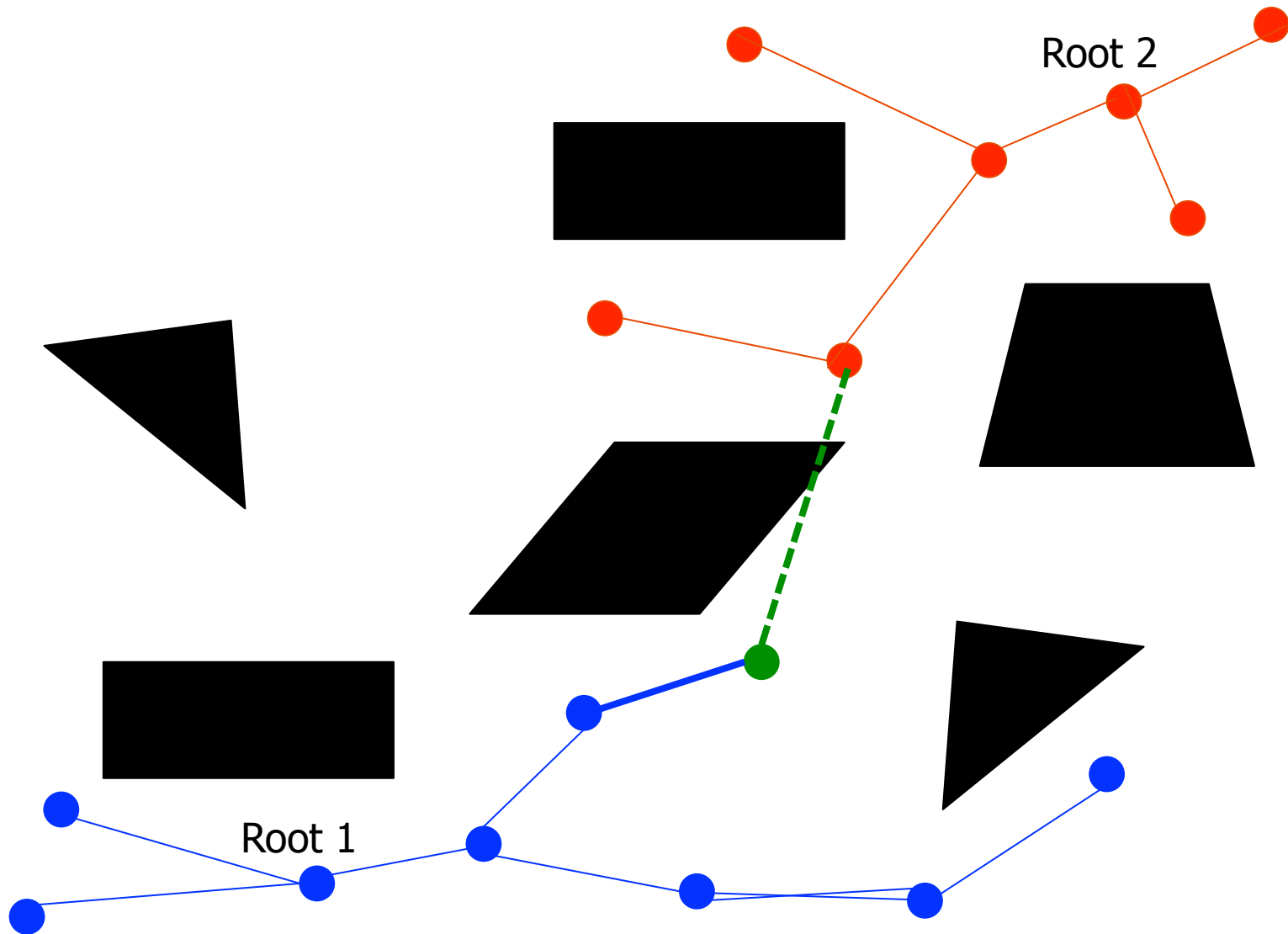
RRT 2 Tree Procedure



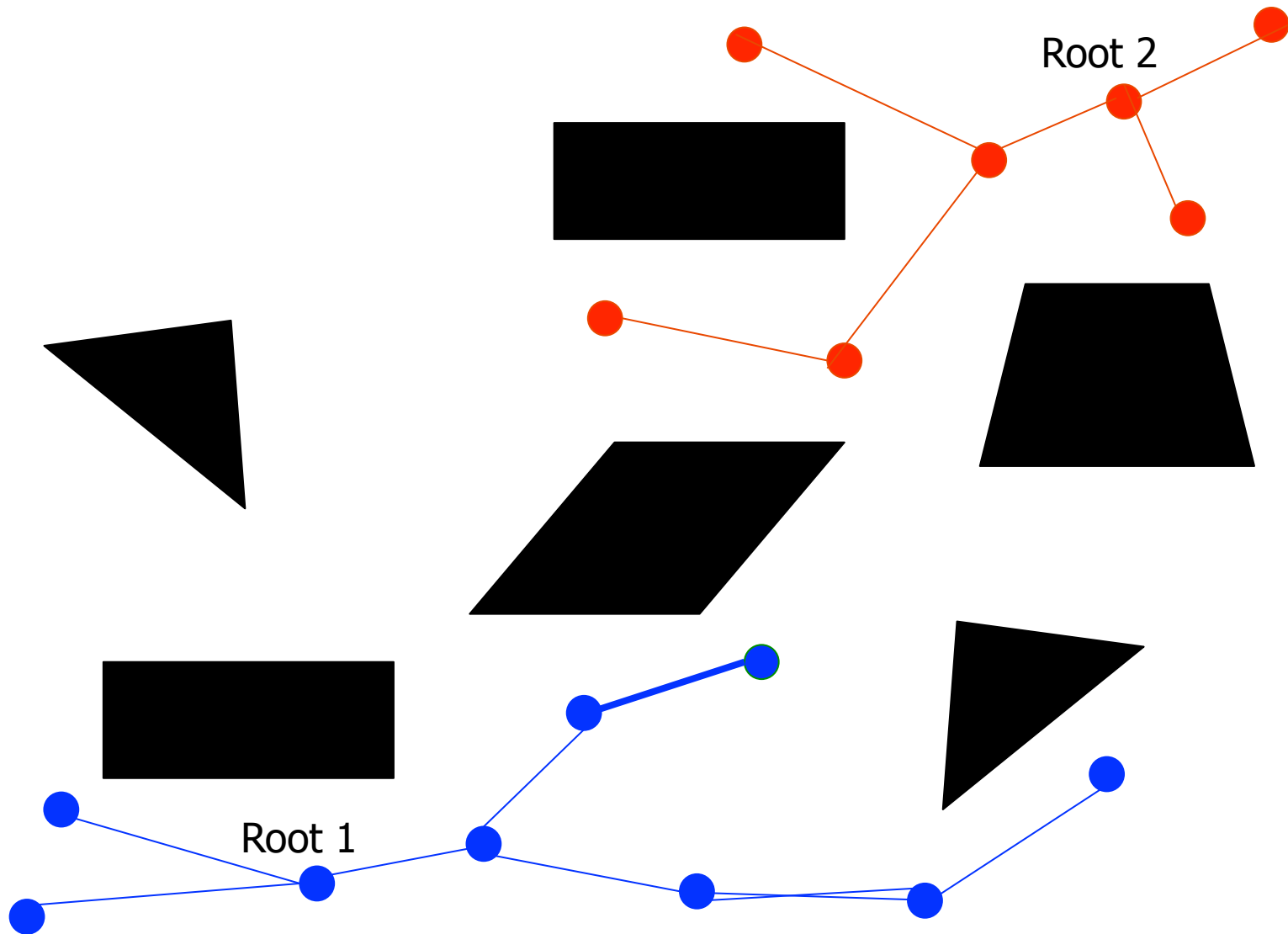
RRT 2 Tree Procedure



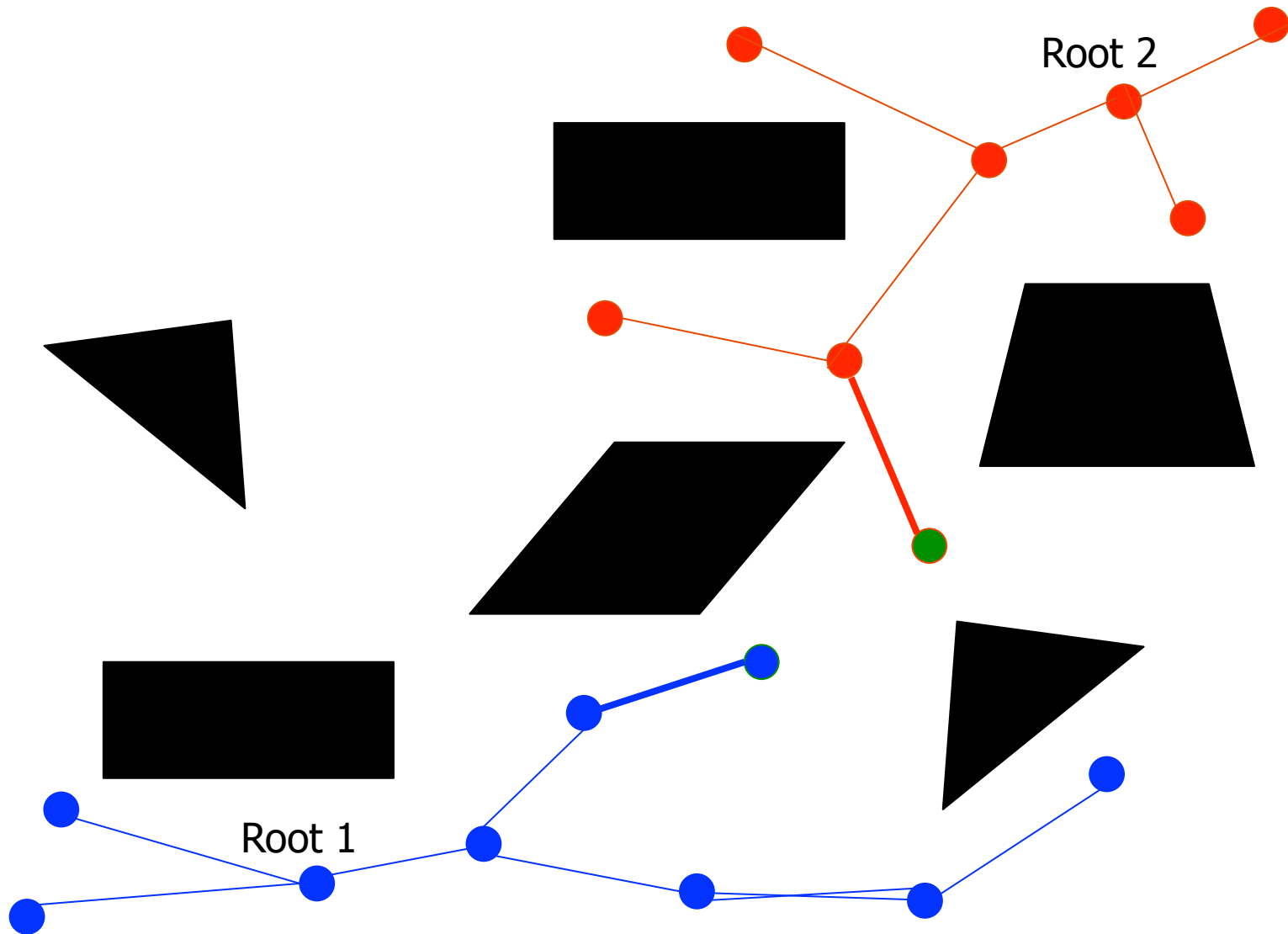
RRT 2 Tree Procedure



RRT 2 Tree Procedure



RRT 2 Tree Procedure



RRT 2 Tree Procedure

