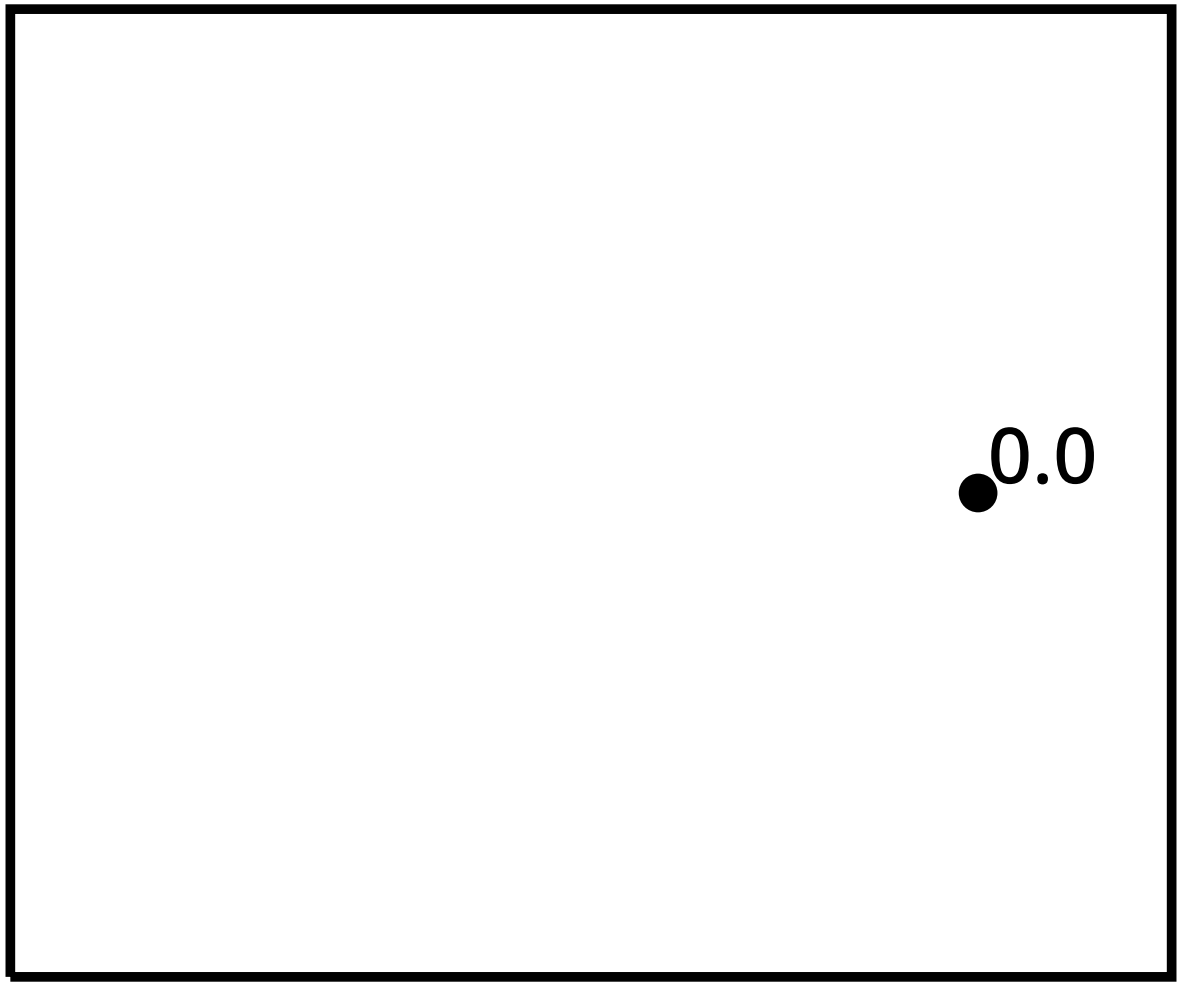
Asymptotically Optimal Motion Planning

RRT* Examples

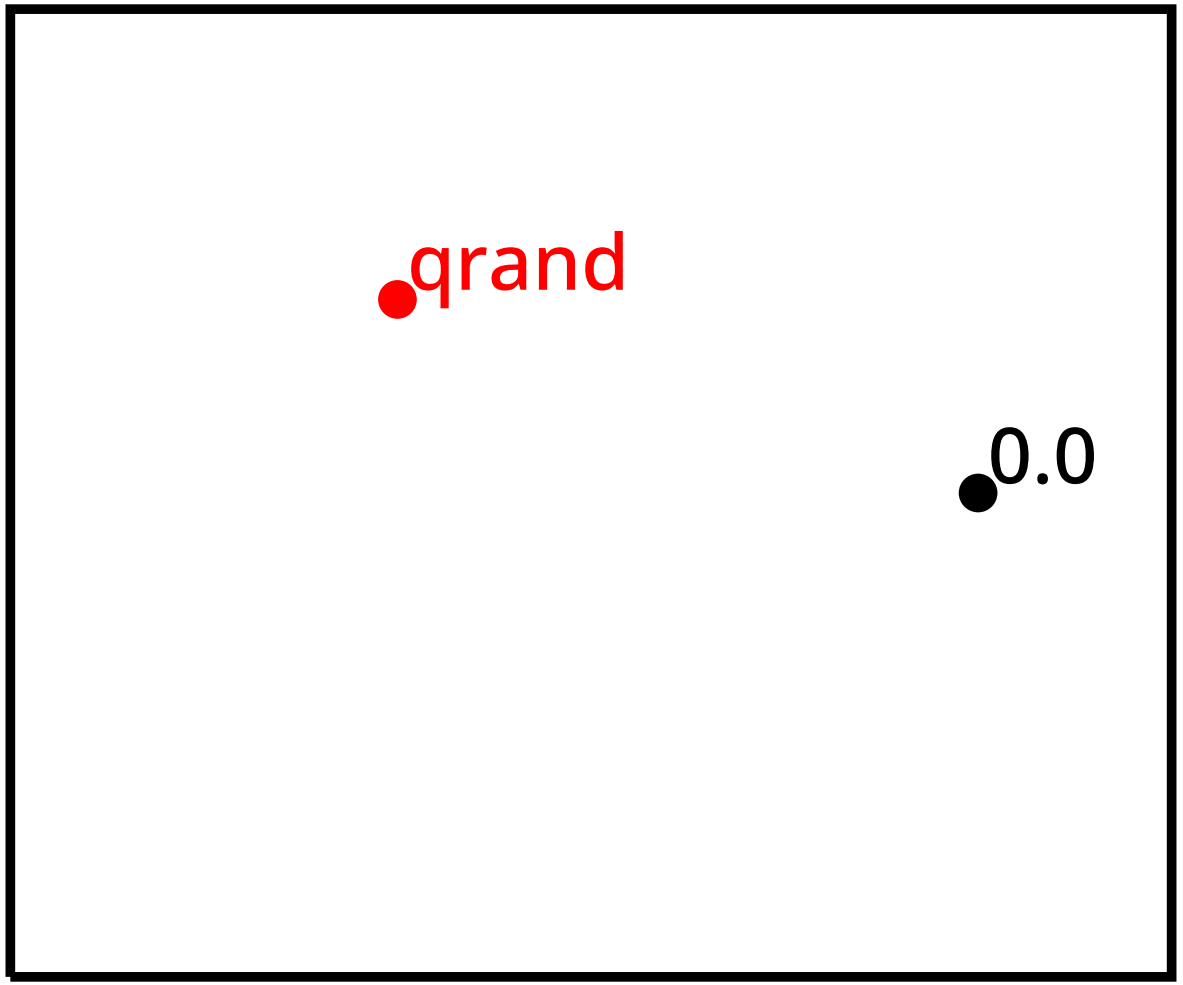
RRT*: Example 1

Start from a tree with just the start configuration.



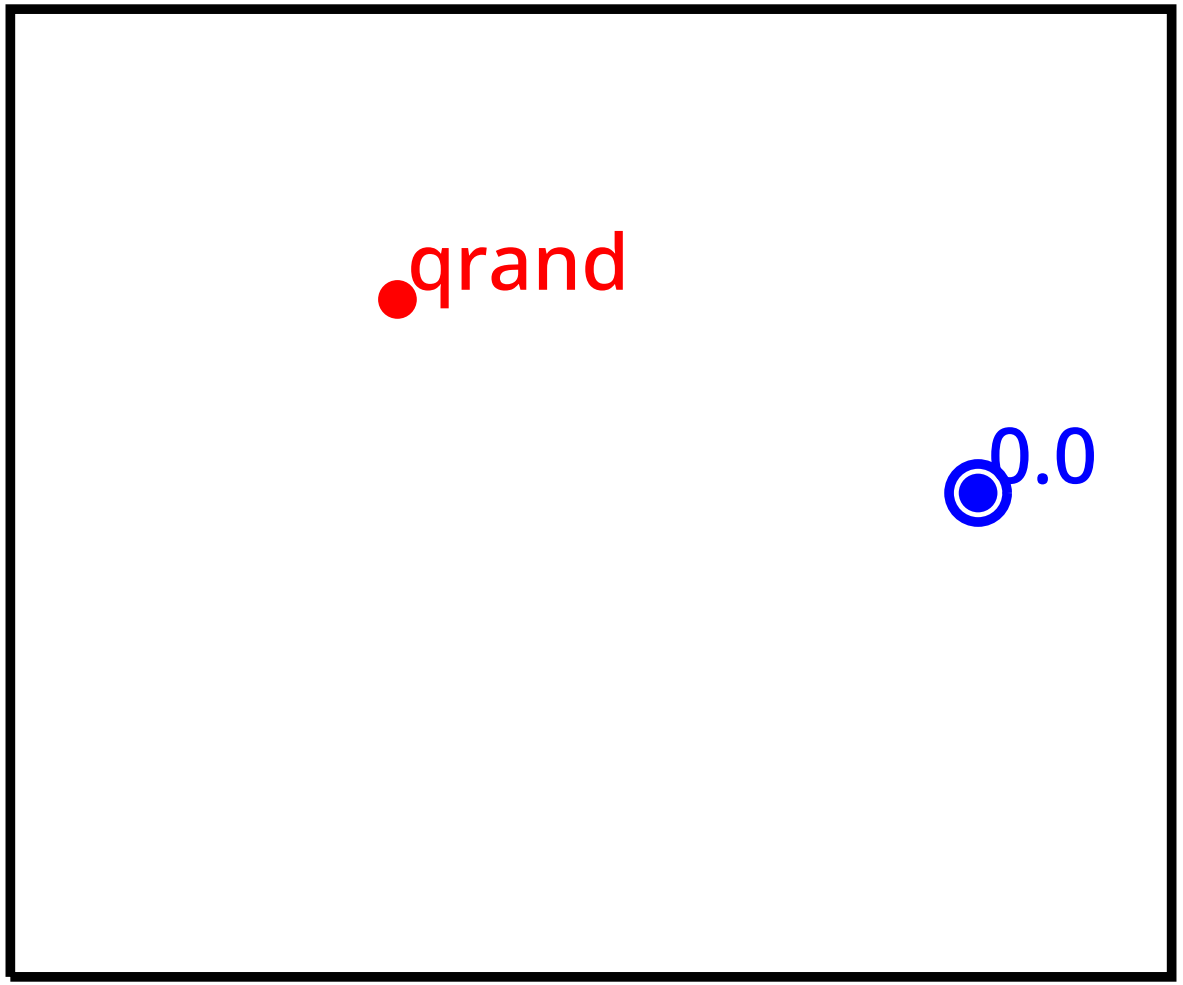
RRT*: Example 1

Choose a random sample.



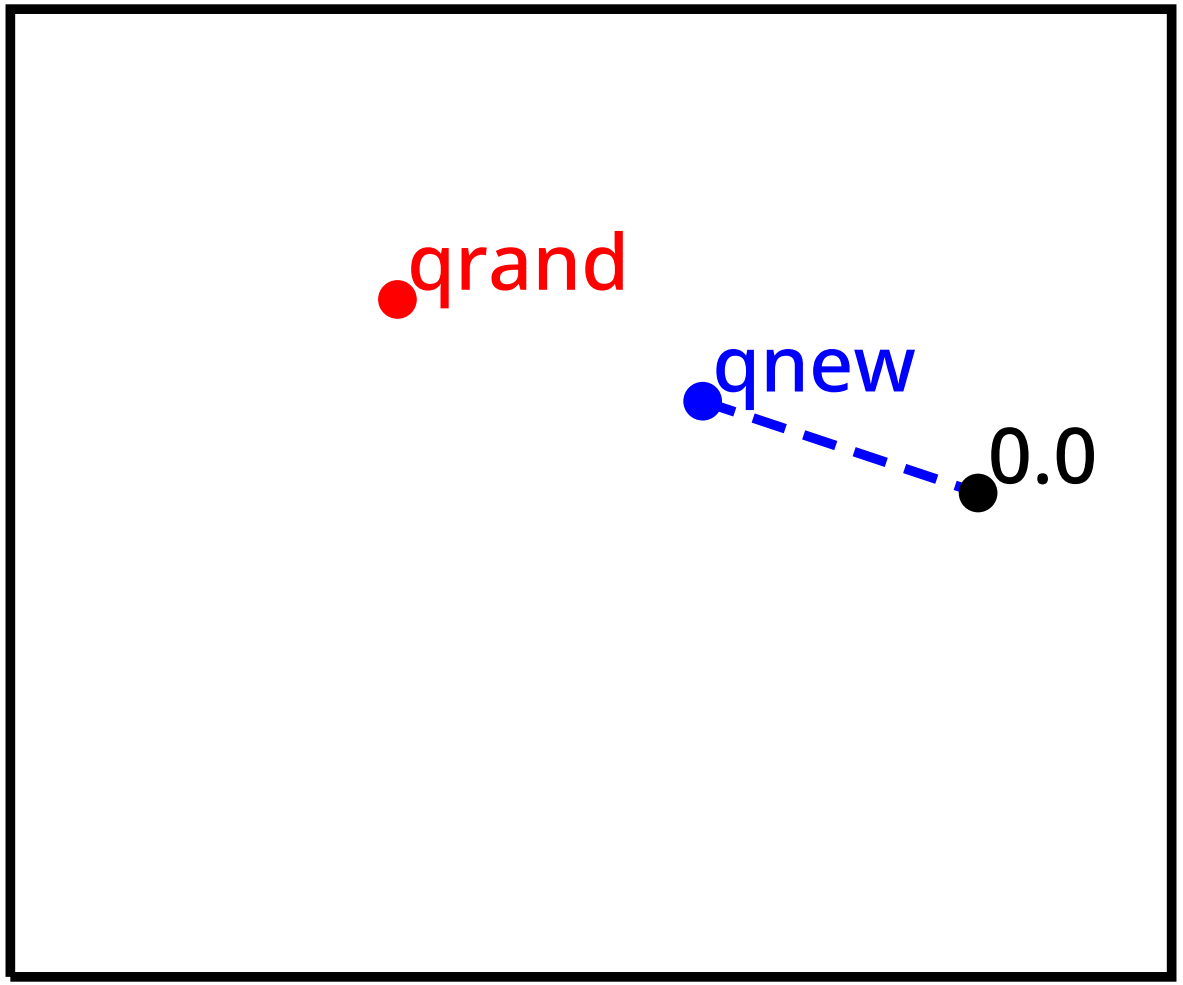
RRT*: Example 1

Find the nearest neighbor.



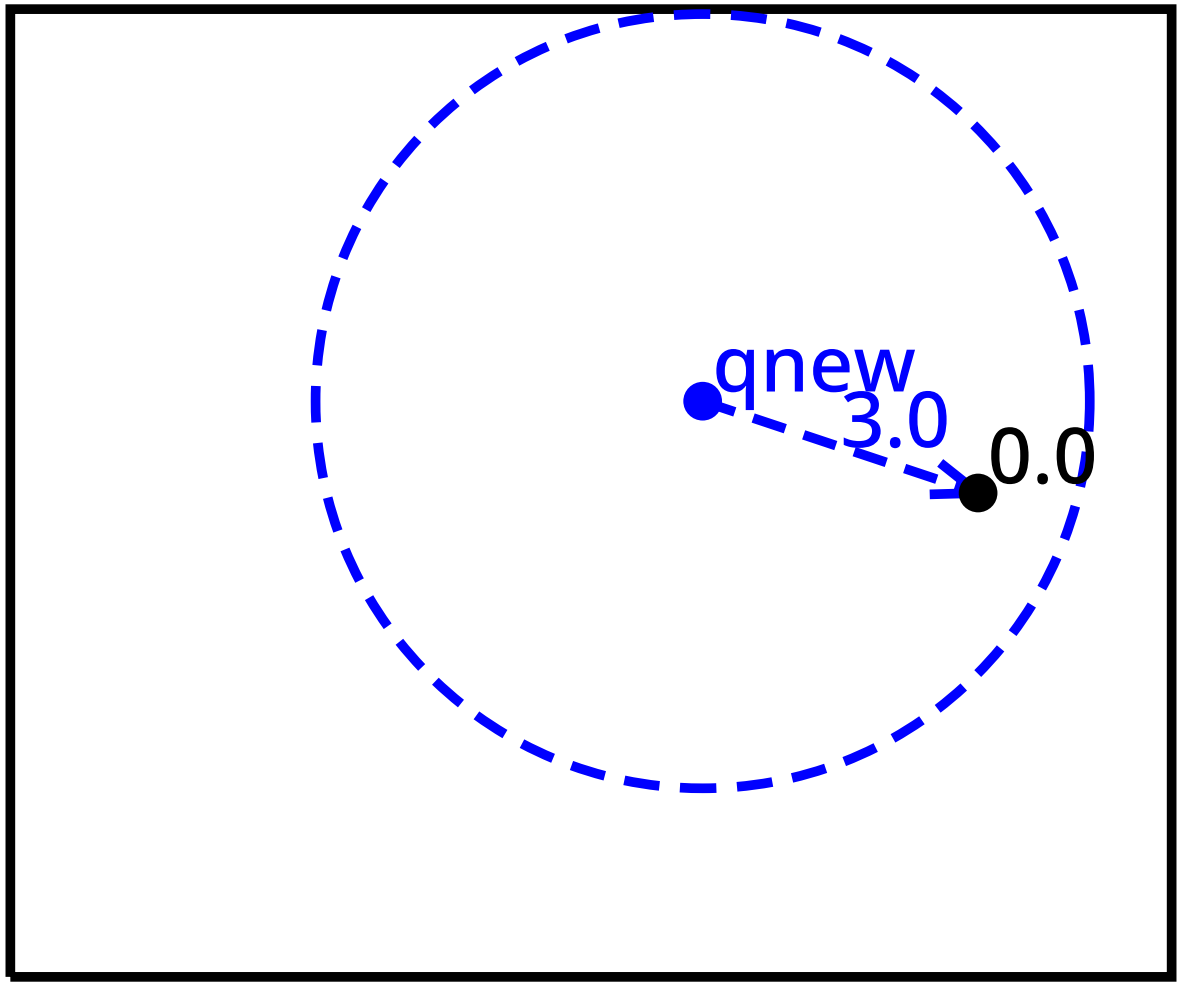
RRT*: Example 1

Extend from the nearest neighbor toward the sample.



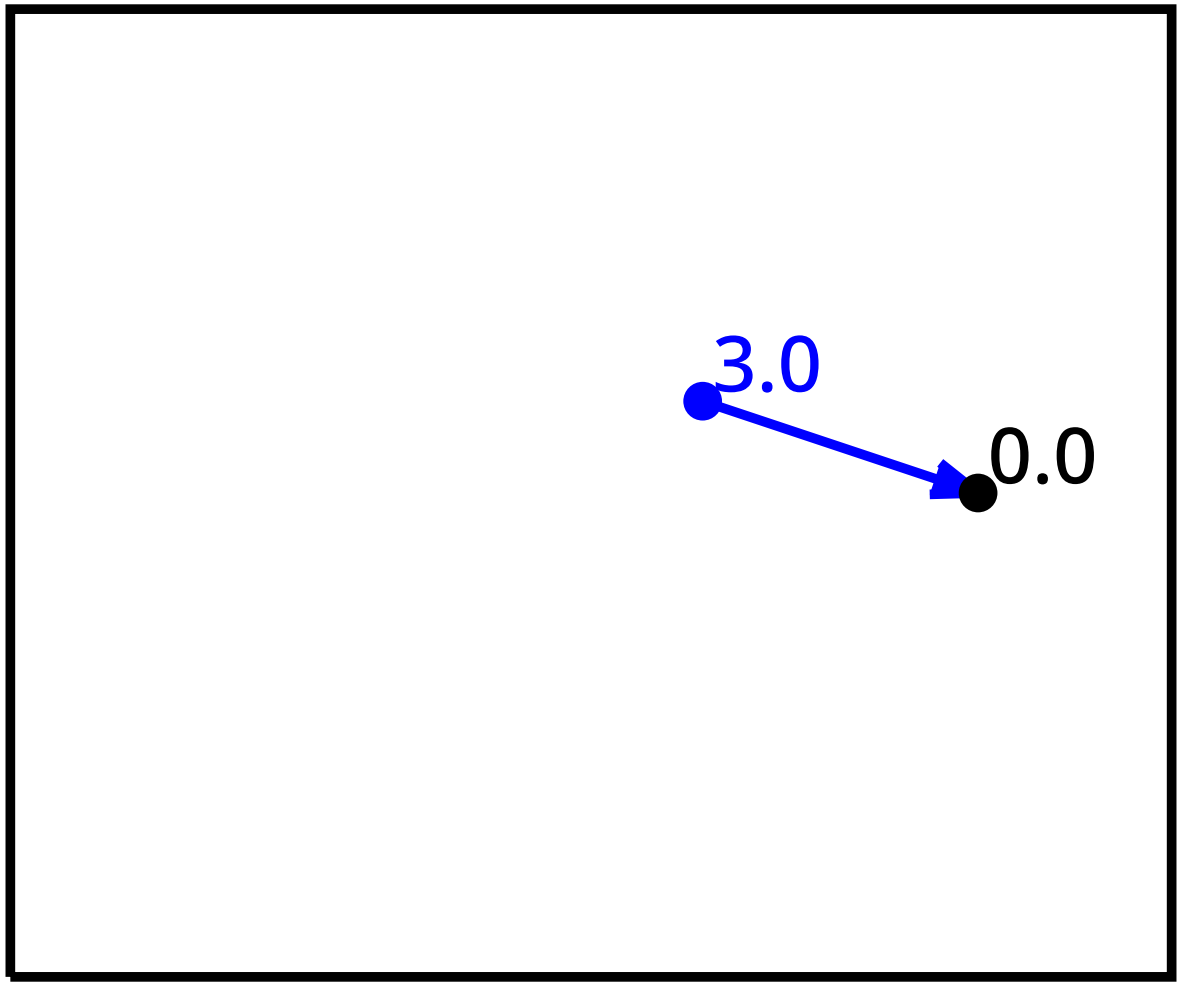
RRT*: Example 1

Find candidate parents for the new node; 1 candidate this time.



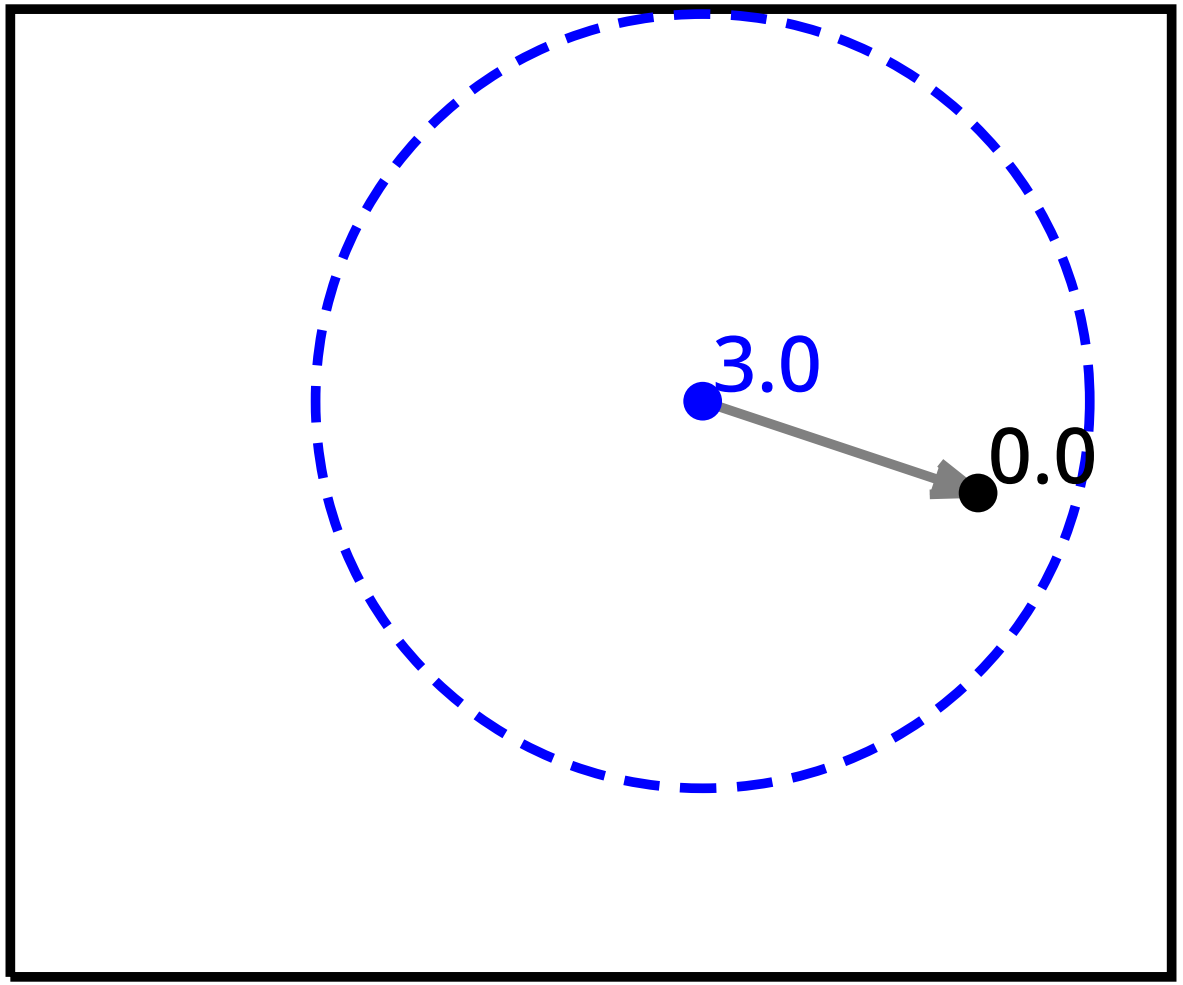
RRT*: Example 1

Choose the best parent for the new node.



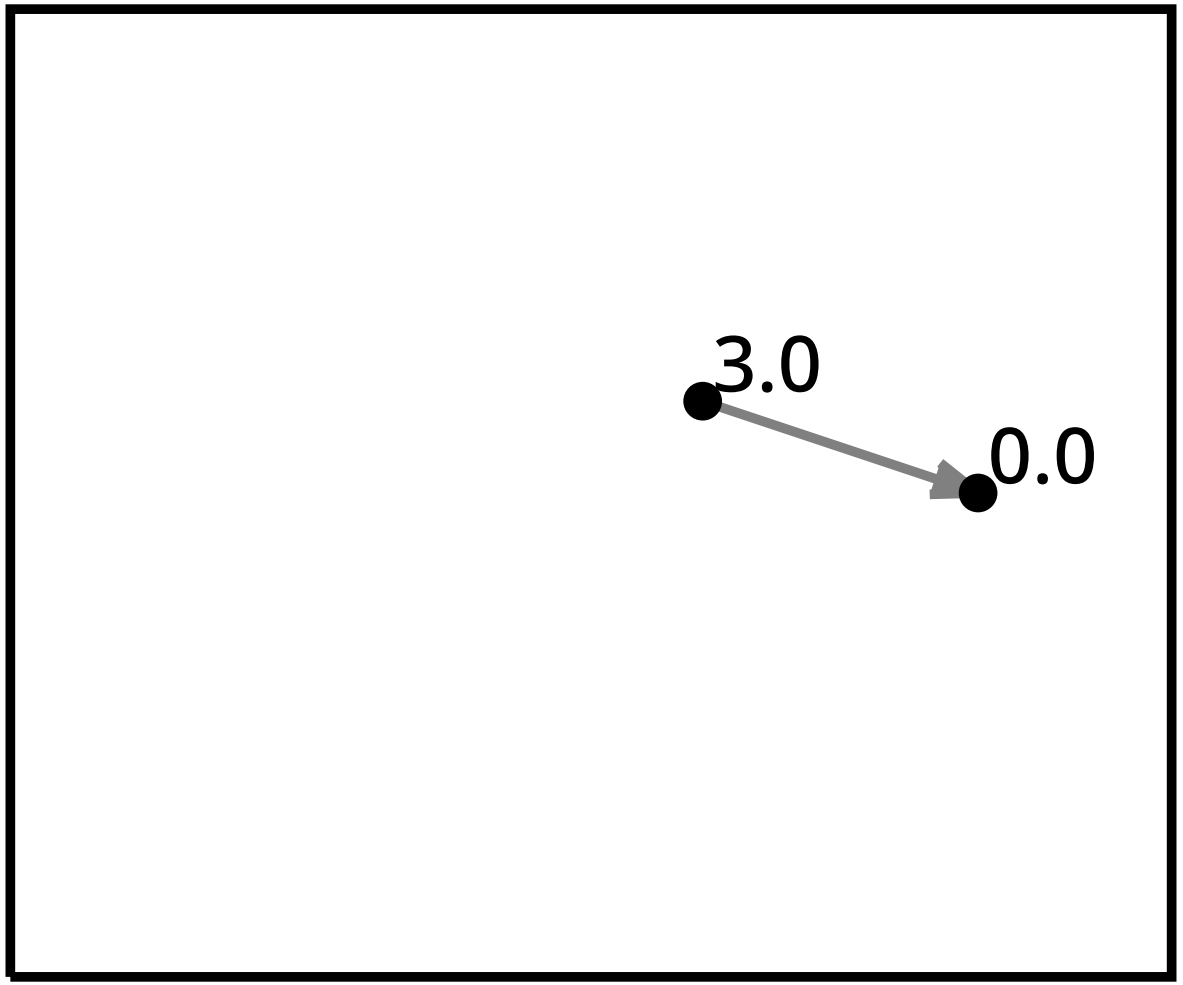
RRT*: Example 1

Find rewiring candidates near the new node; 0 candidates this time.



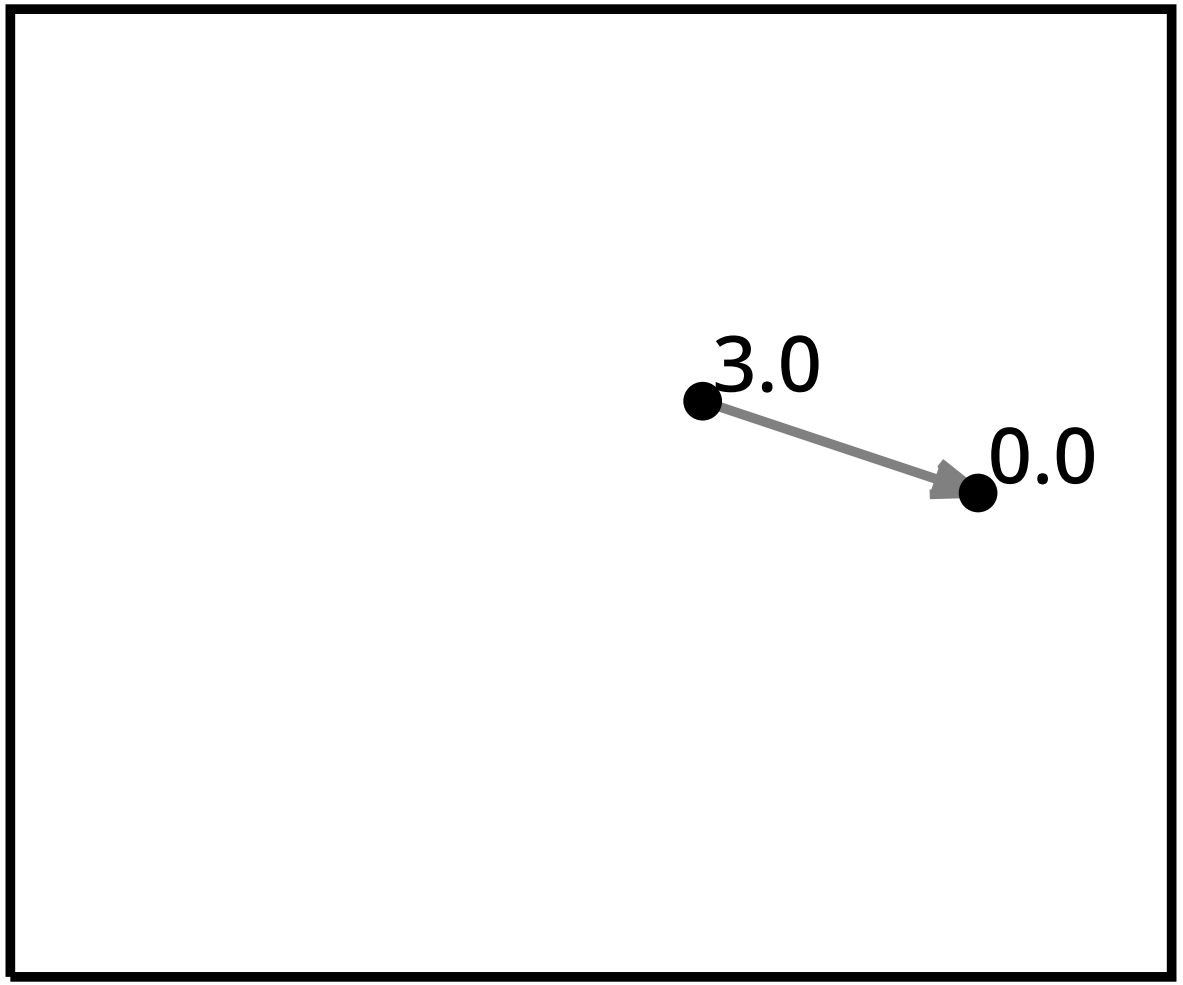
RRT*: Example 1

Rewire if needed; 0 changes this time.



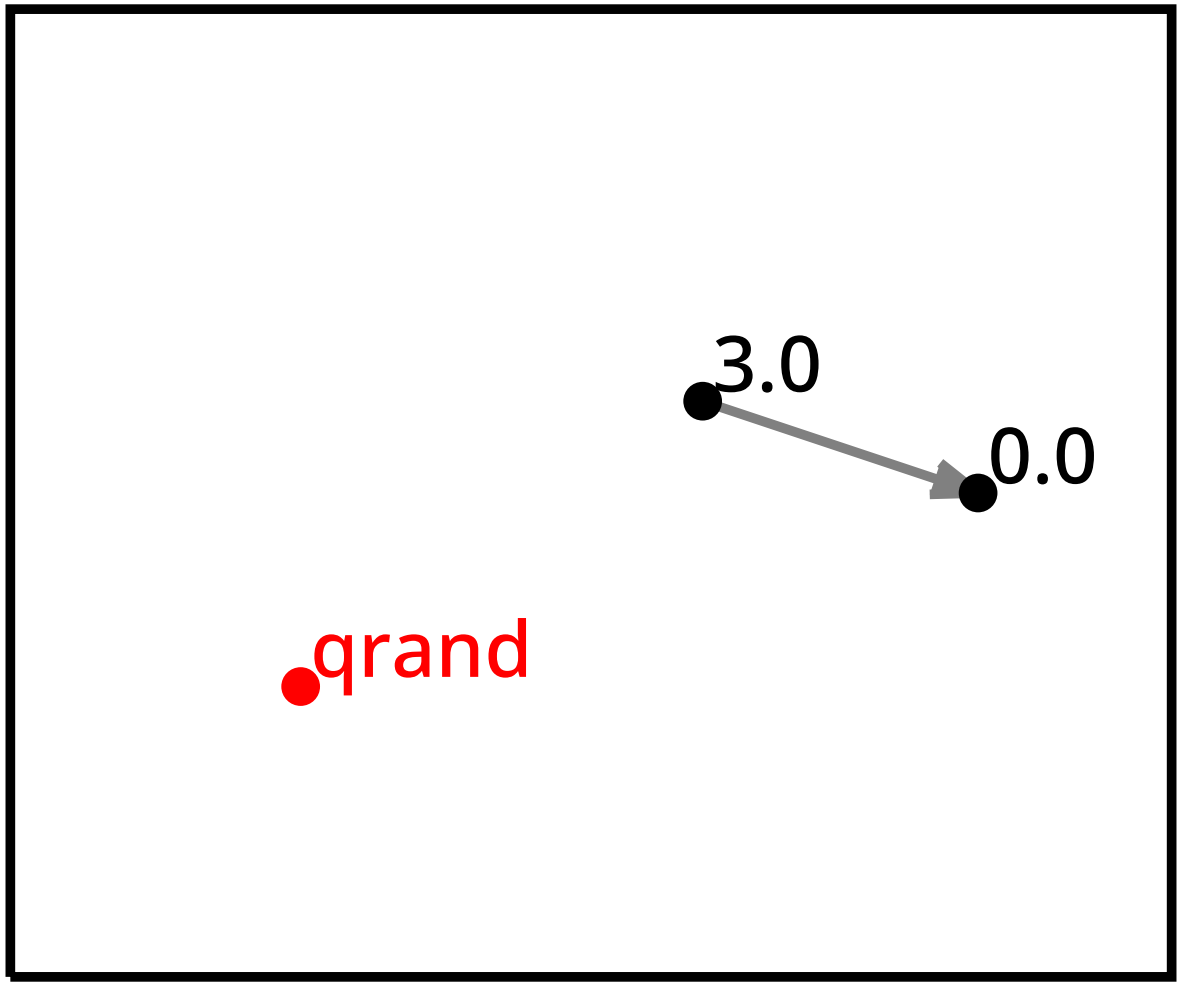
RRT*: Example 1

After 1 iterations.



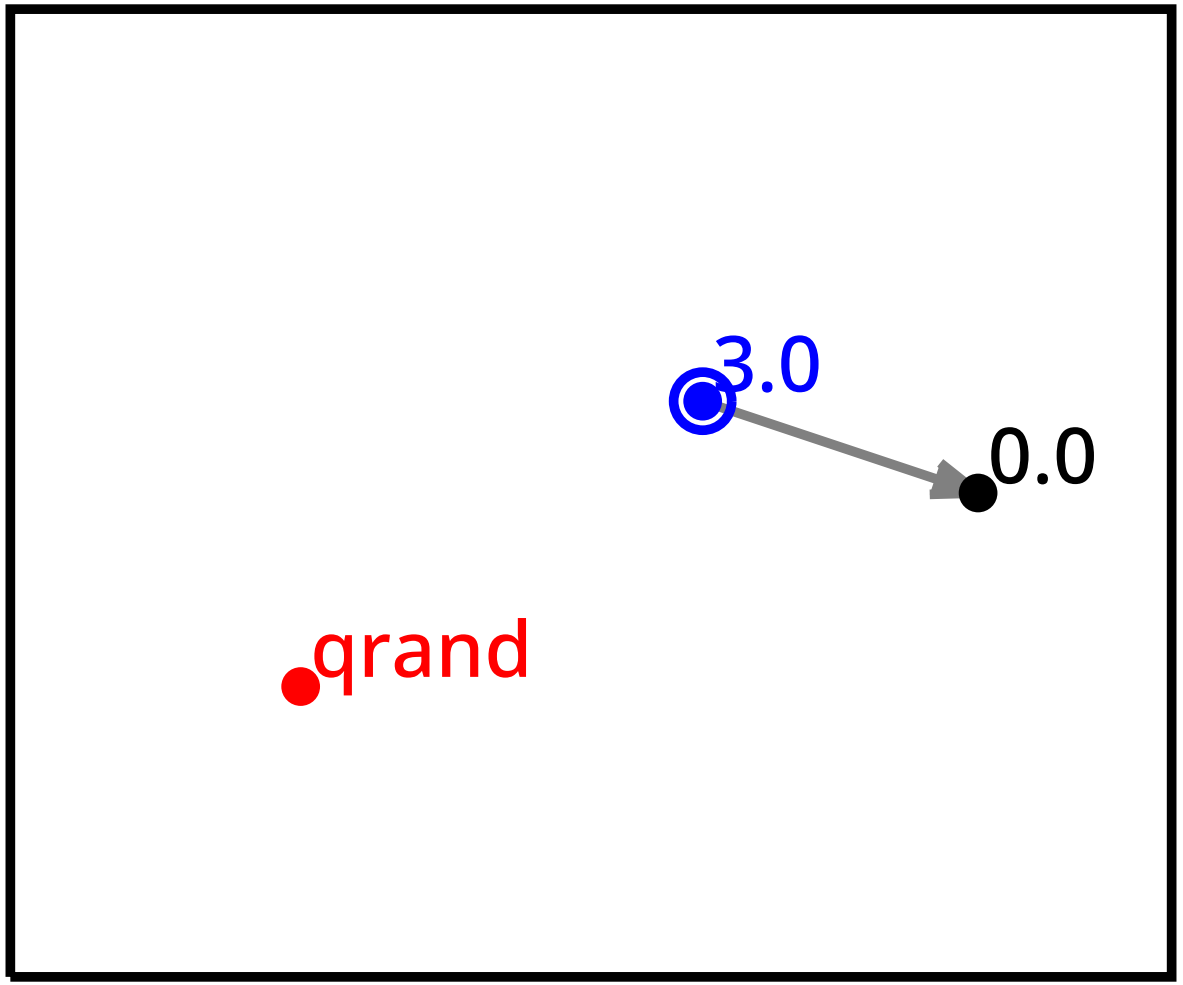
RRT*: Example 1

Choose a random sample.



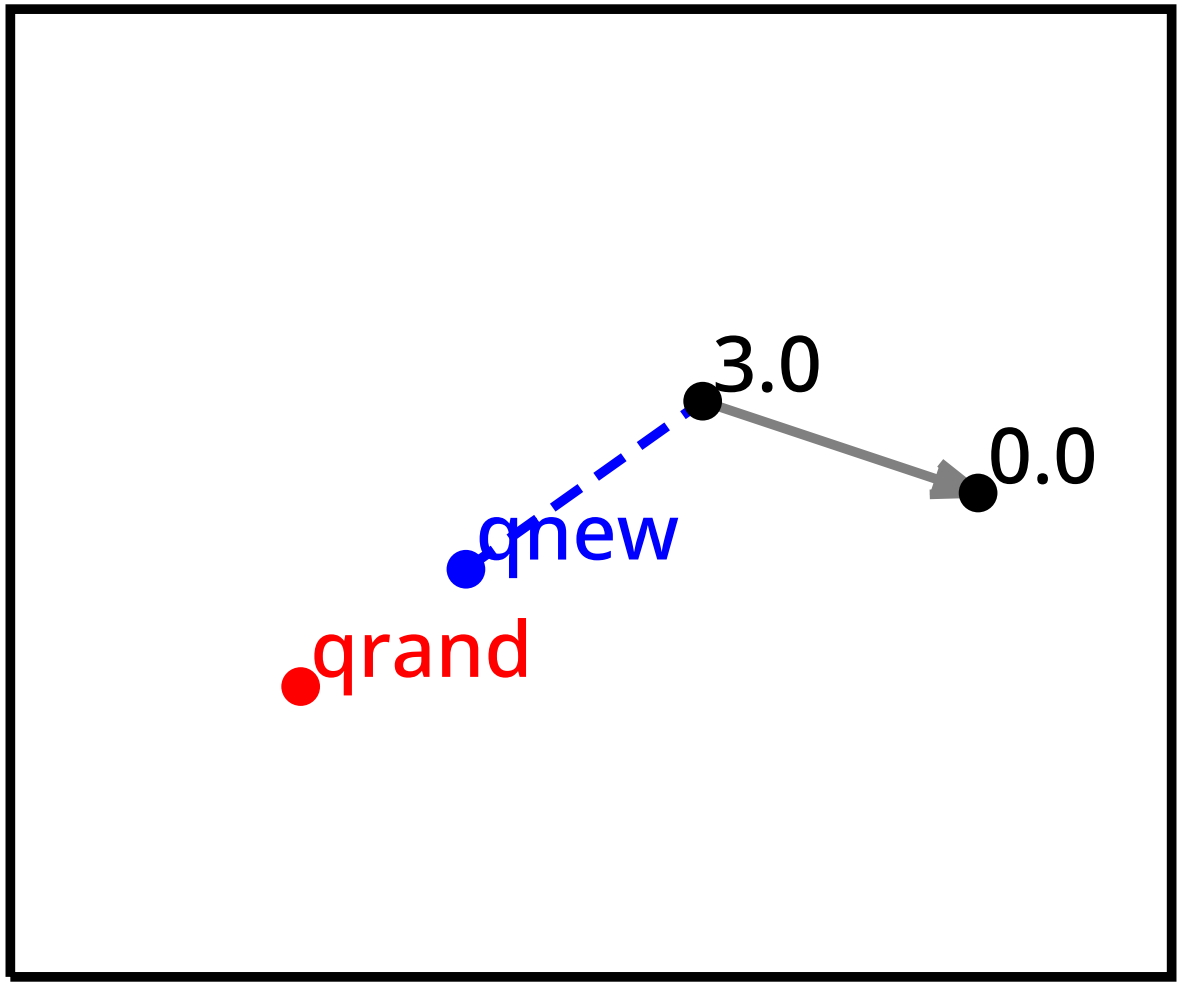
RRT*: Example 1

Find the nearest neighbor.



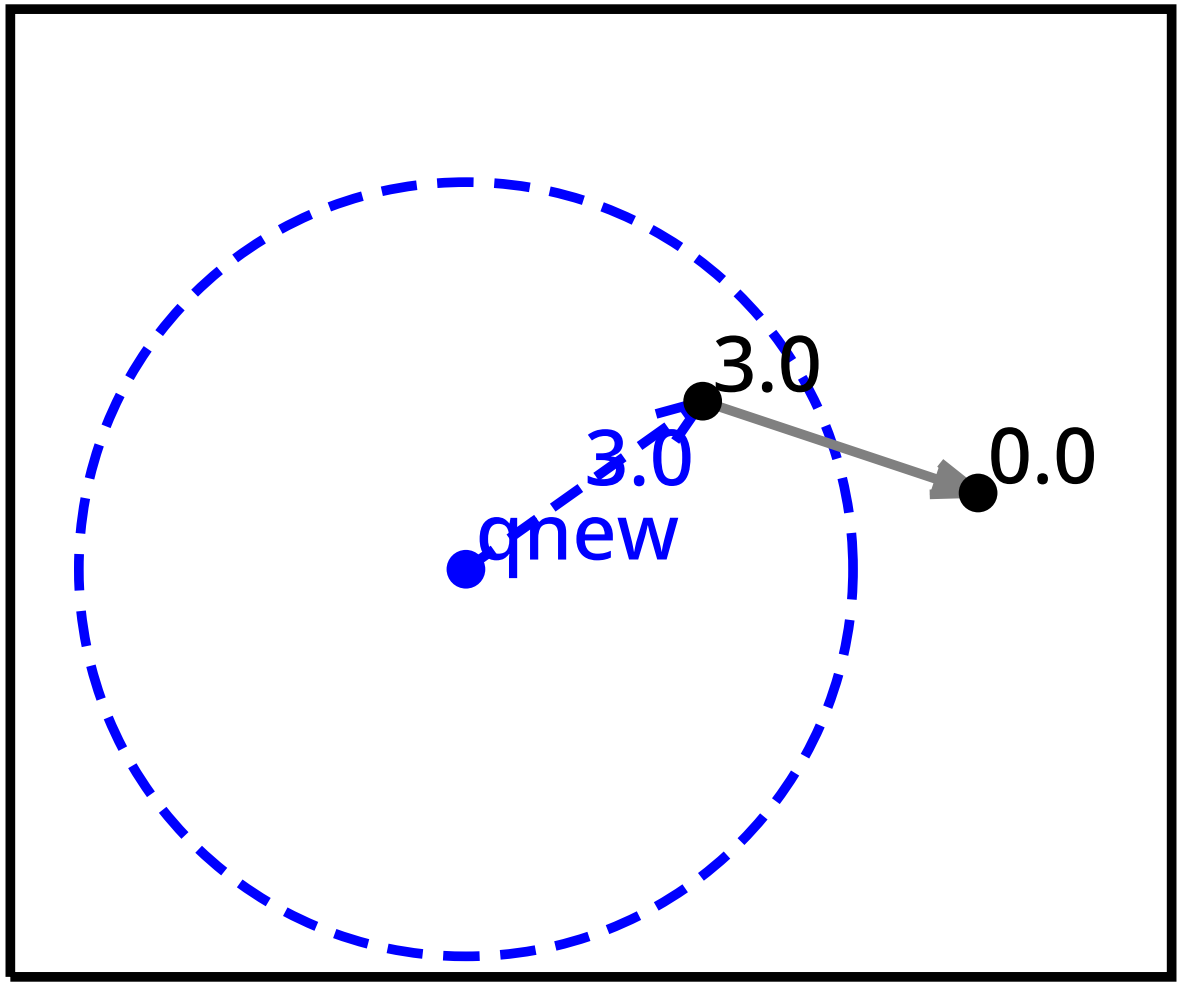
RRT*: Example 1

Extend from the nearest neighbor toward the sample.



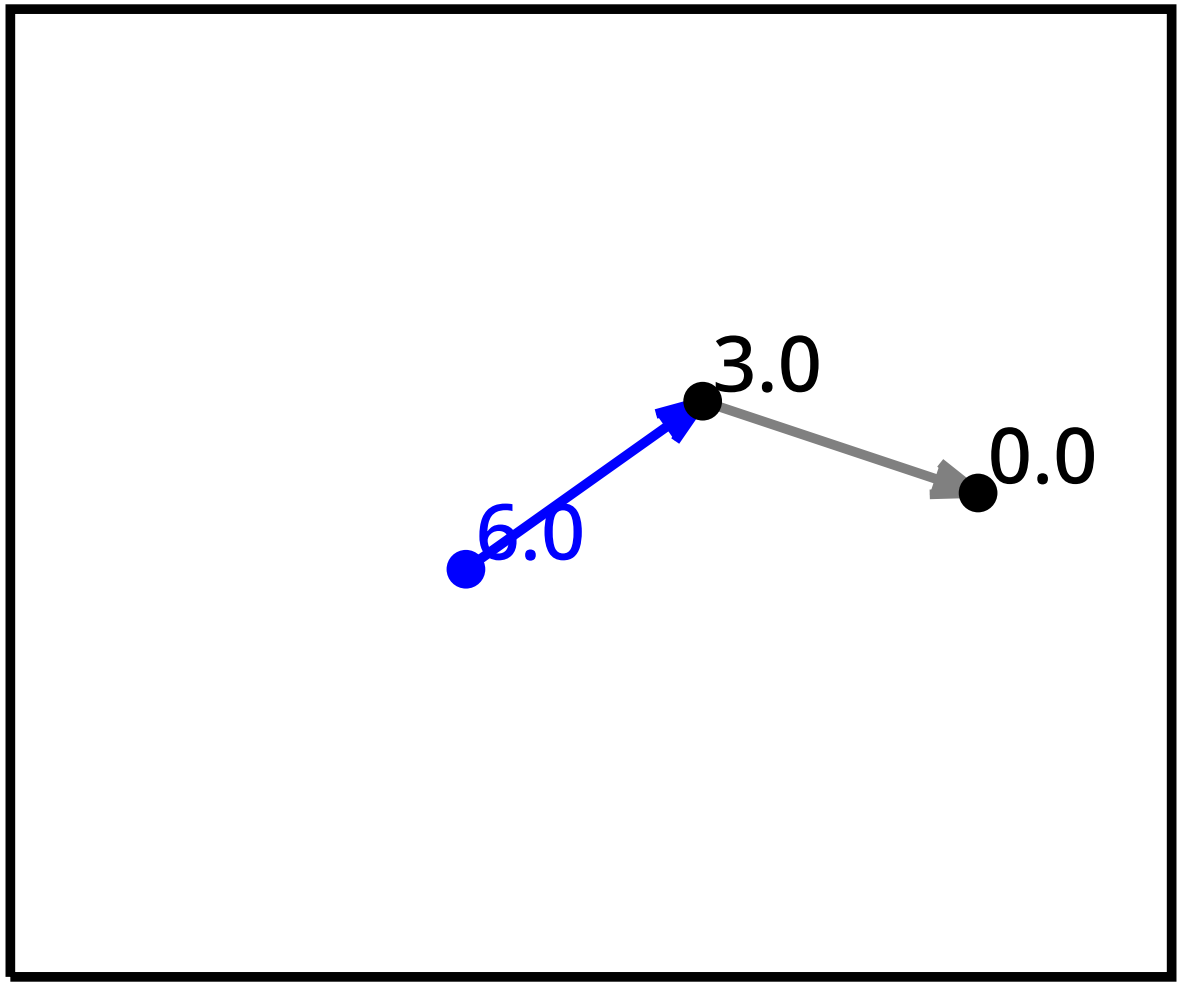
RRT*: Example 1

Find candidate parents for the new node; 1 candidate this time.



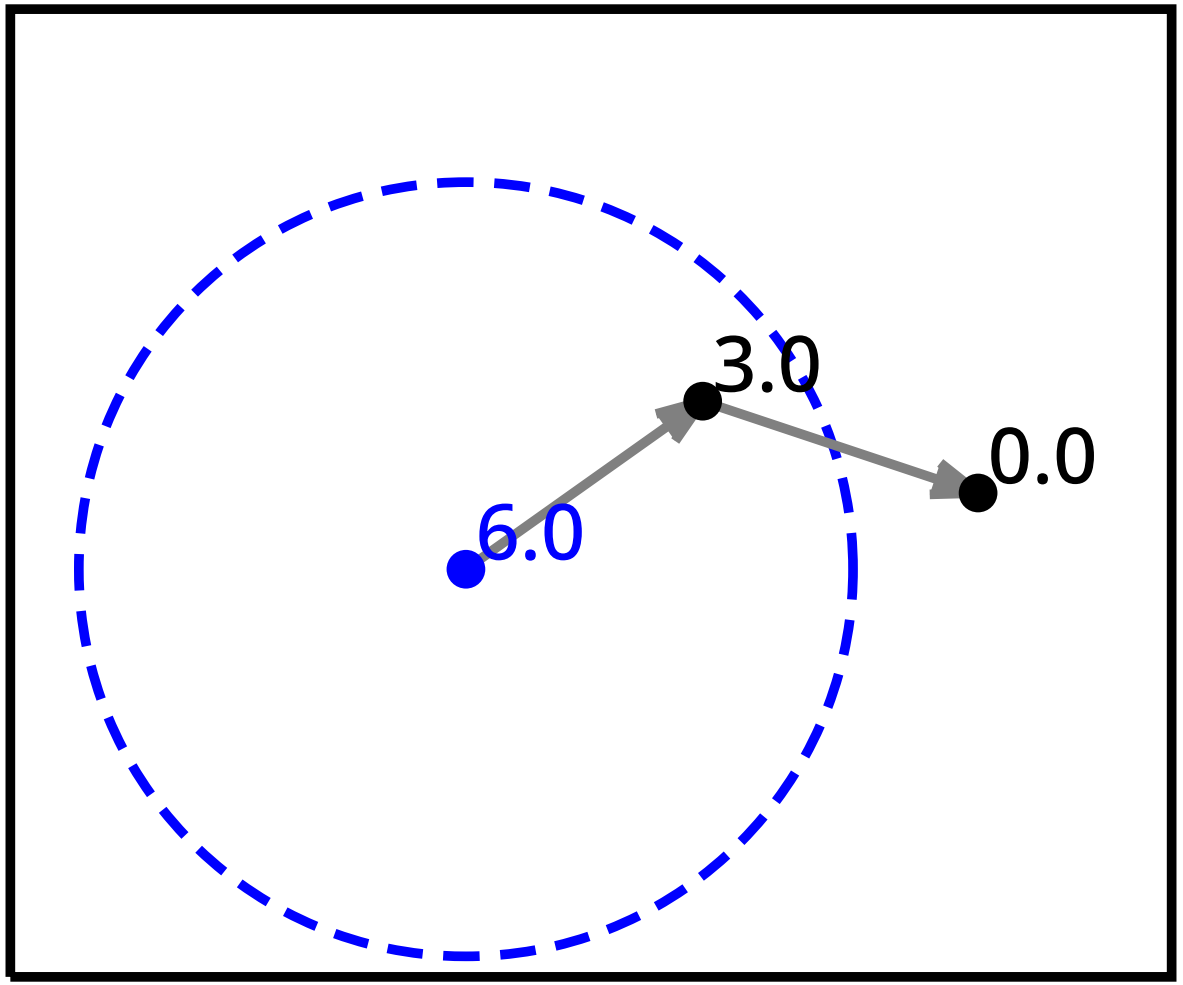
RRT*: Example 1

Choose the best parent for the new node.



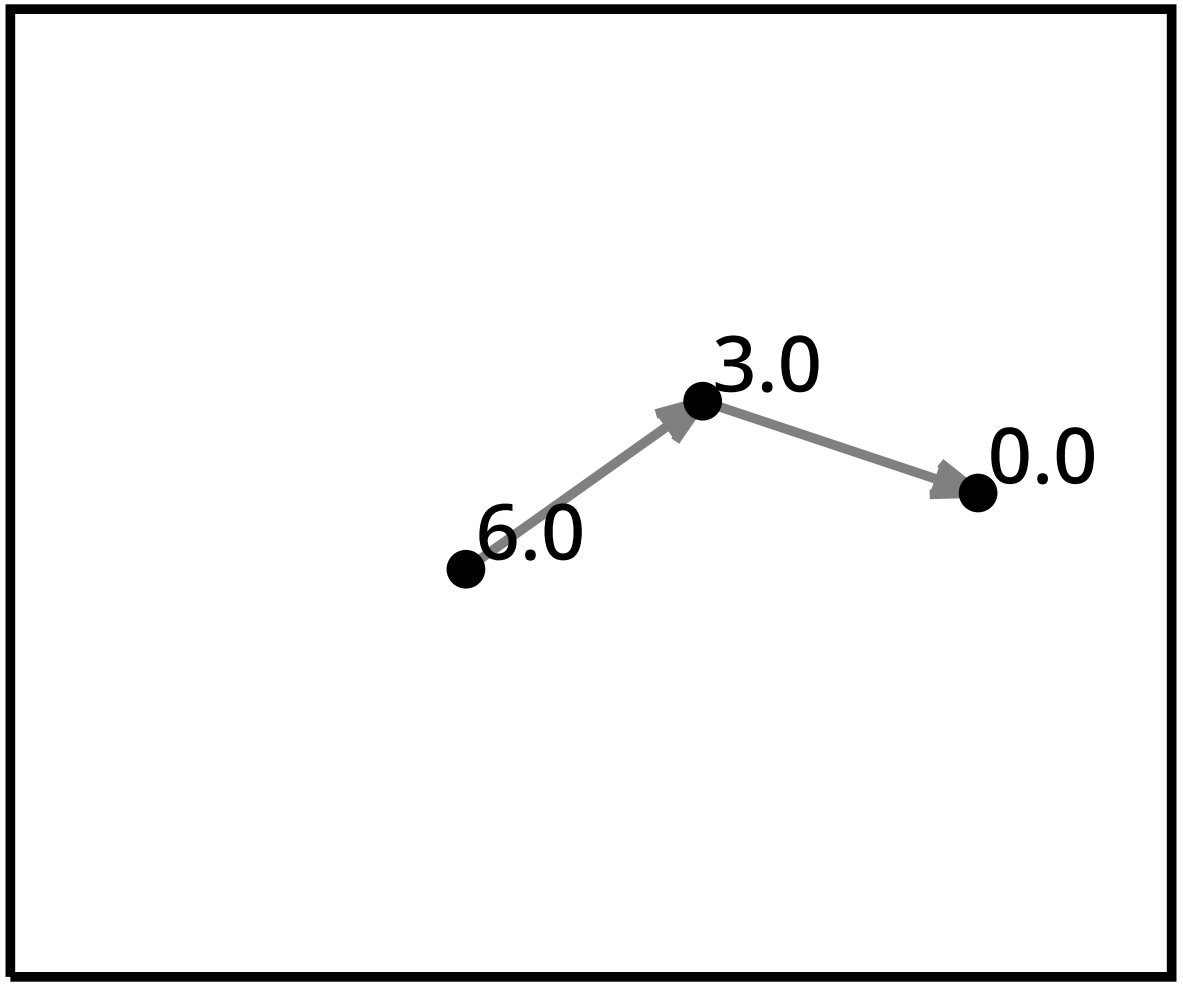
RRT*: Example 1

Find rewiring candidates near the new node; 0 candidates this time.



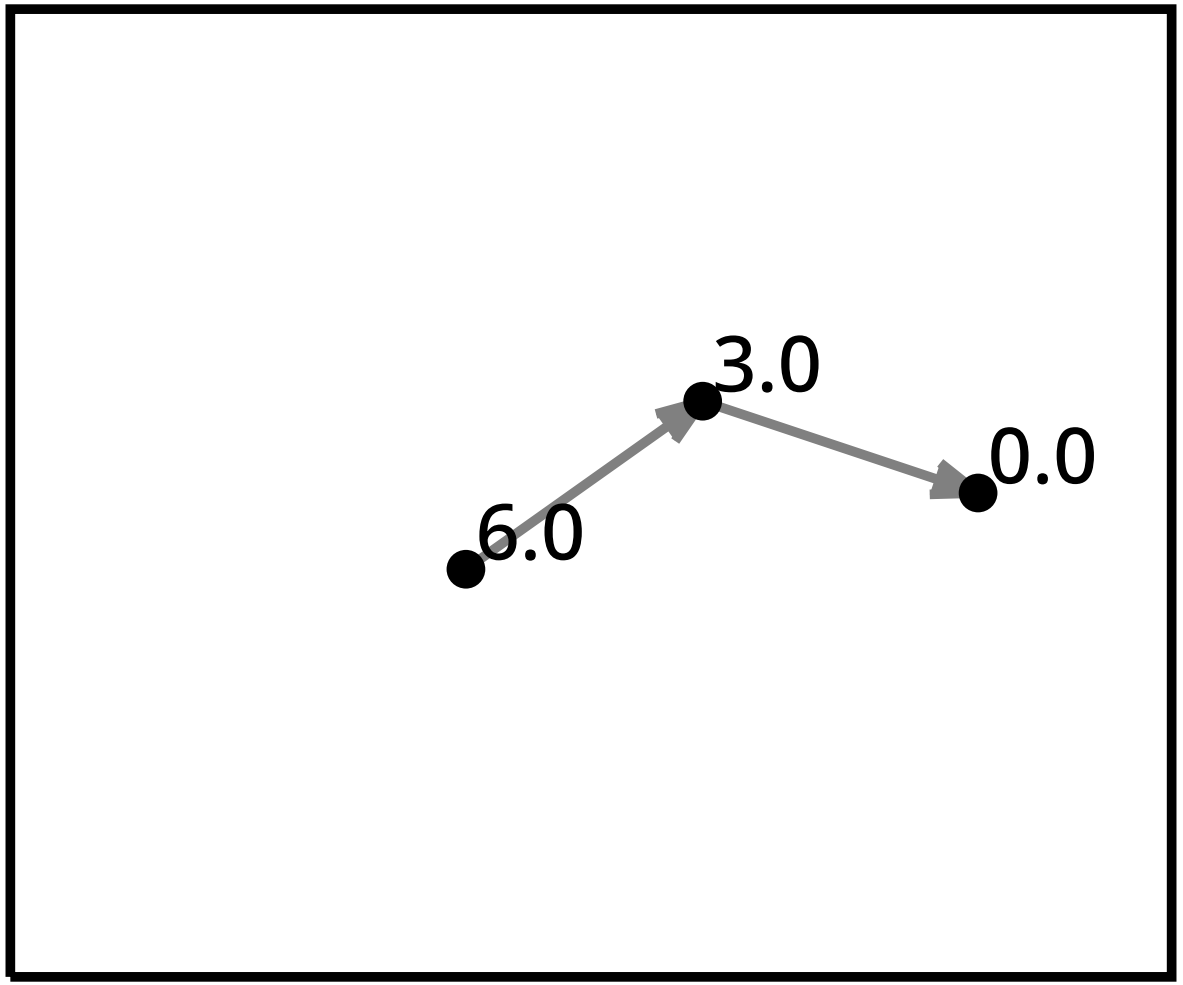
RRT*: Example 1

Rewire if needed; 0 changes this time.



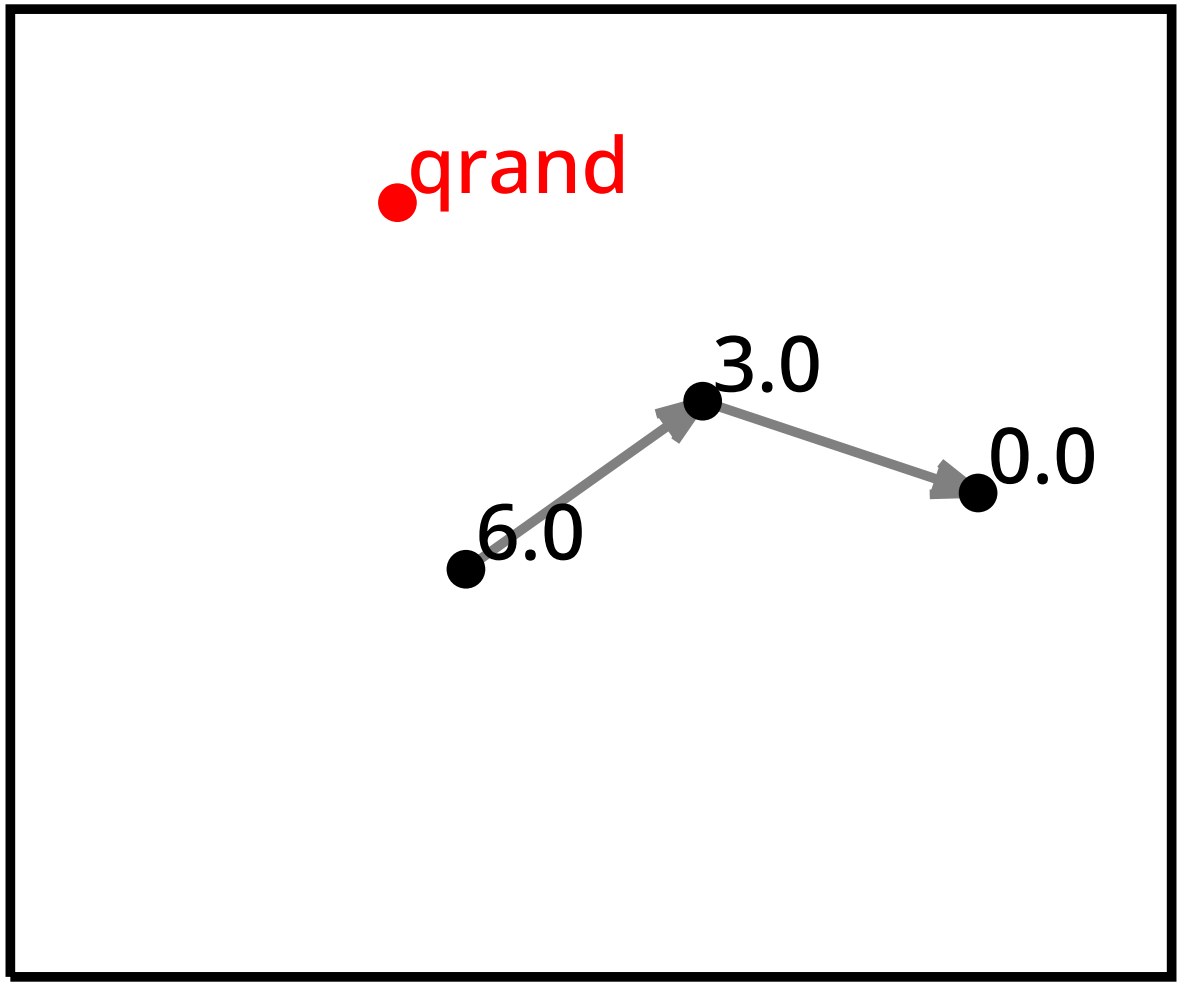
RRT*: Example 1

After 2 iterations.



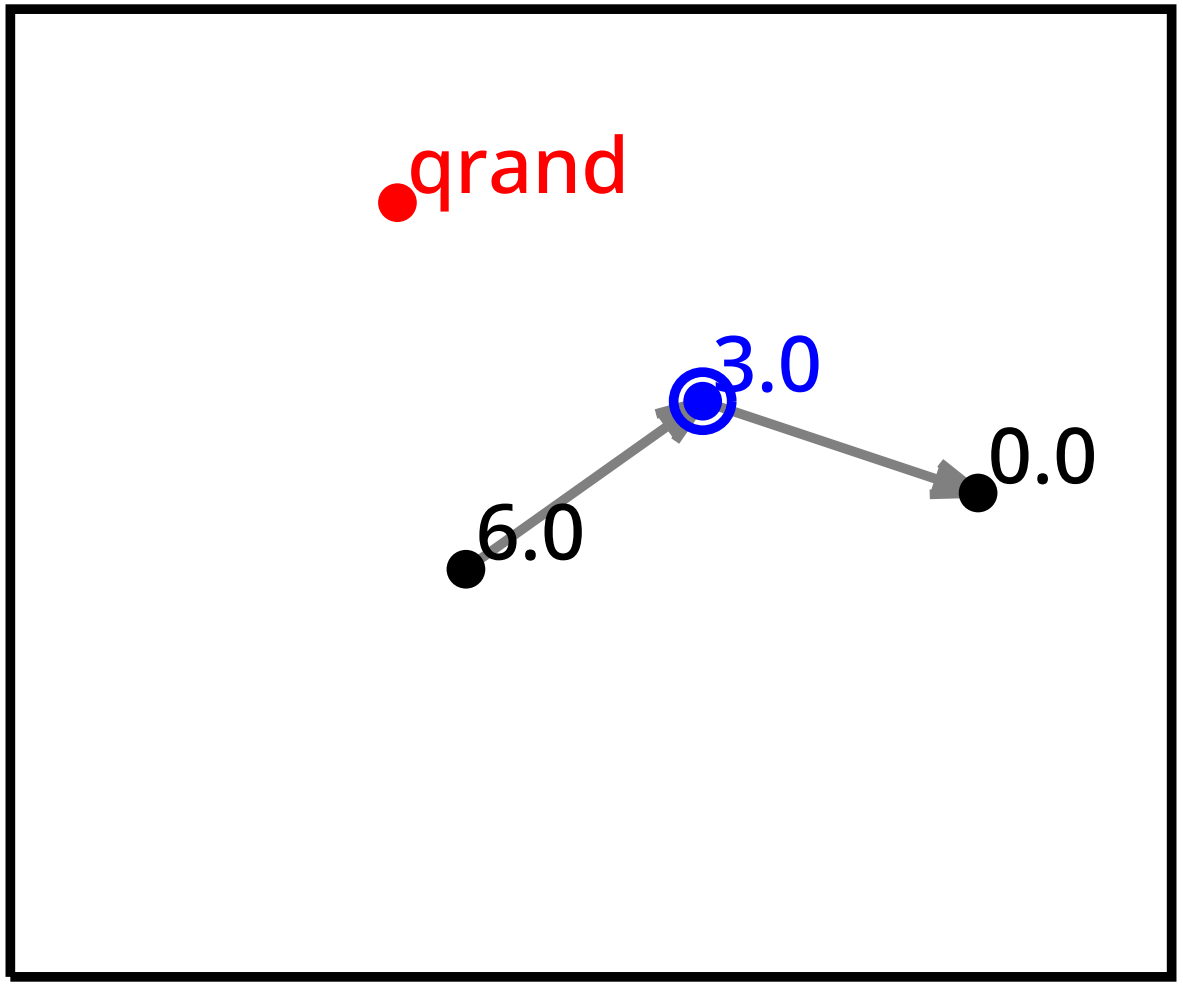
RRT*: Example 1

Choose a random sample.



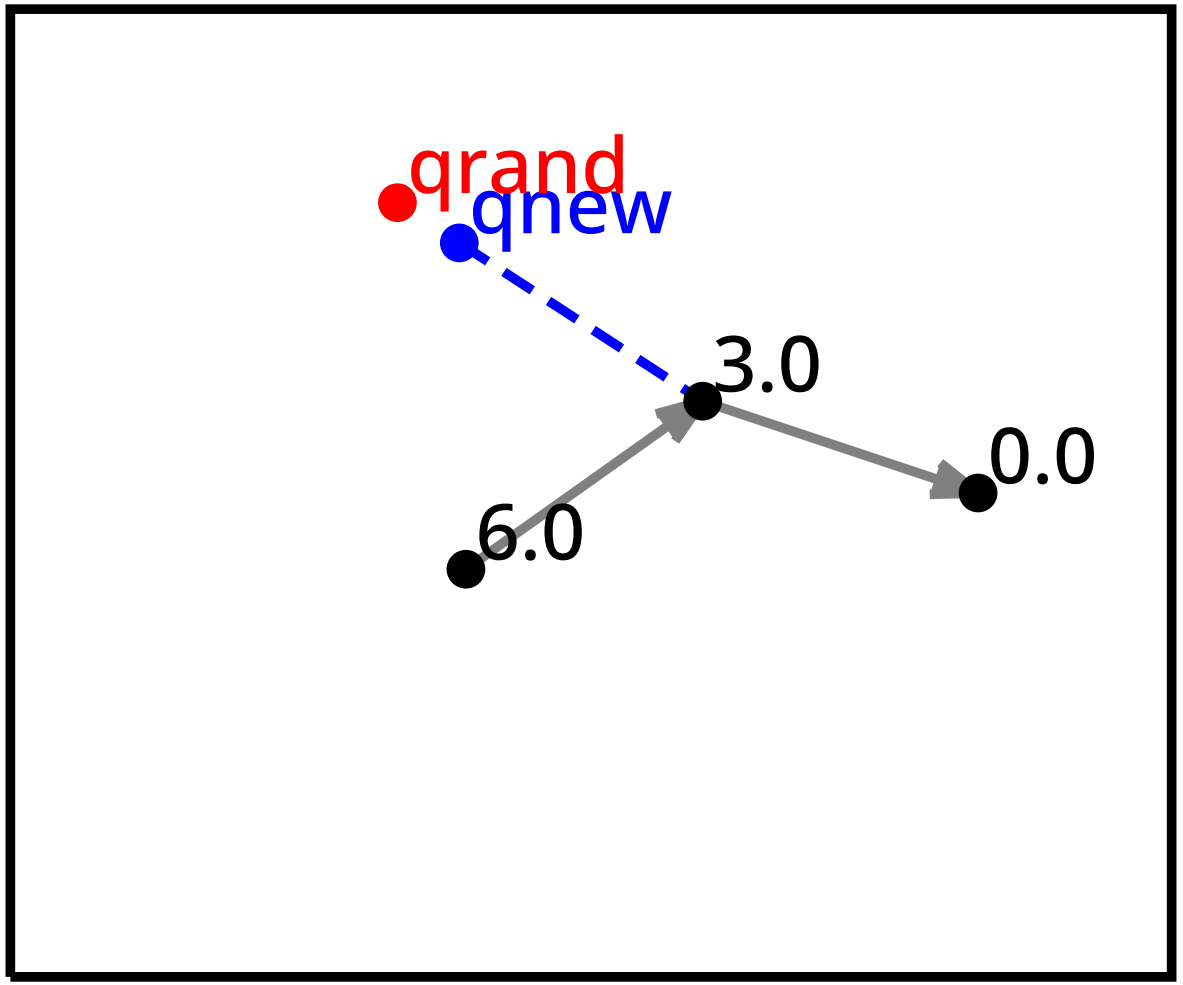
RRT*: Example 1

Find the nearest neighbor.



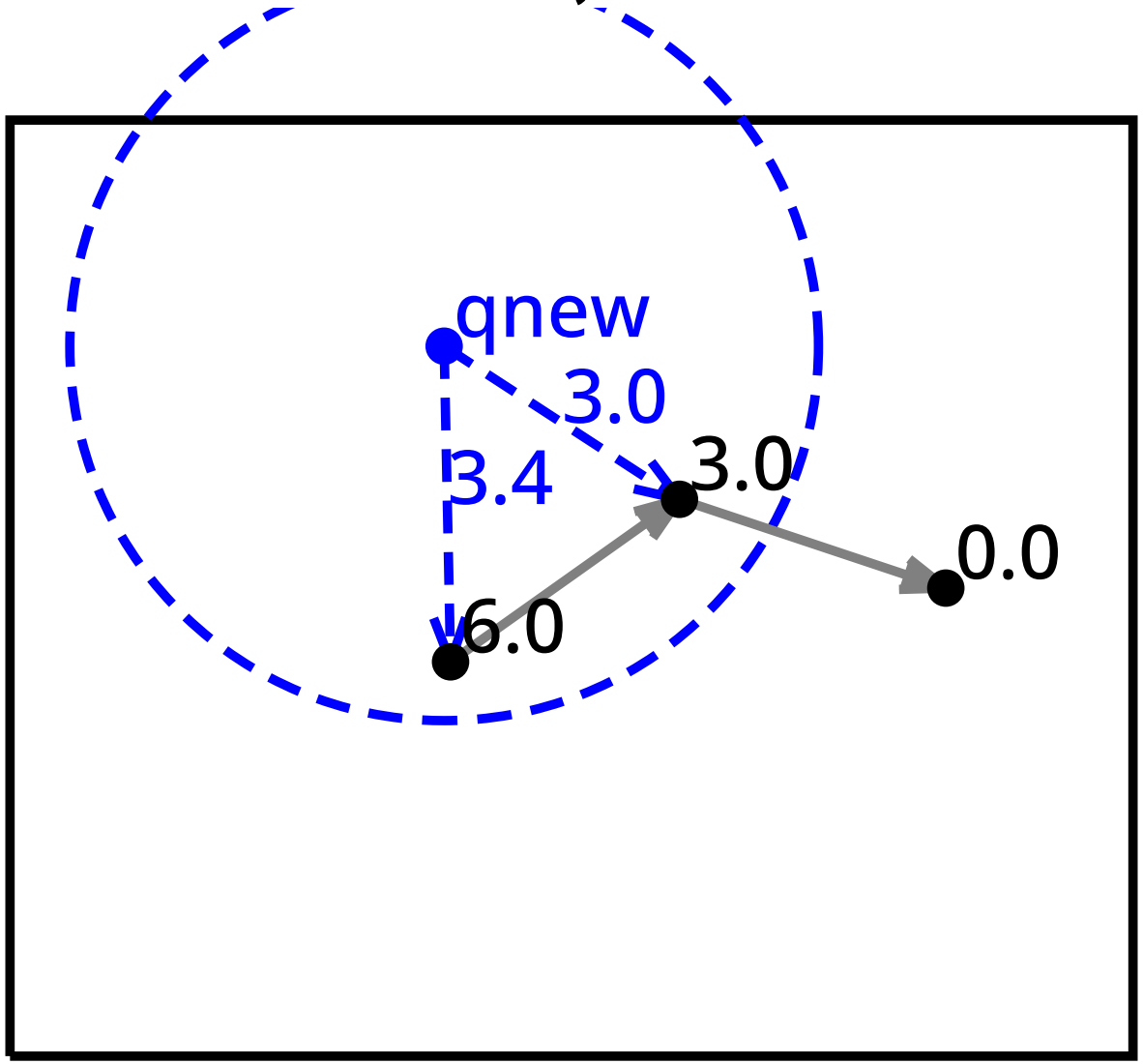
RRT*: Example 1

Extend from the nearest neighbor toward the sample.



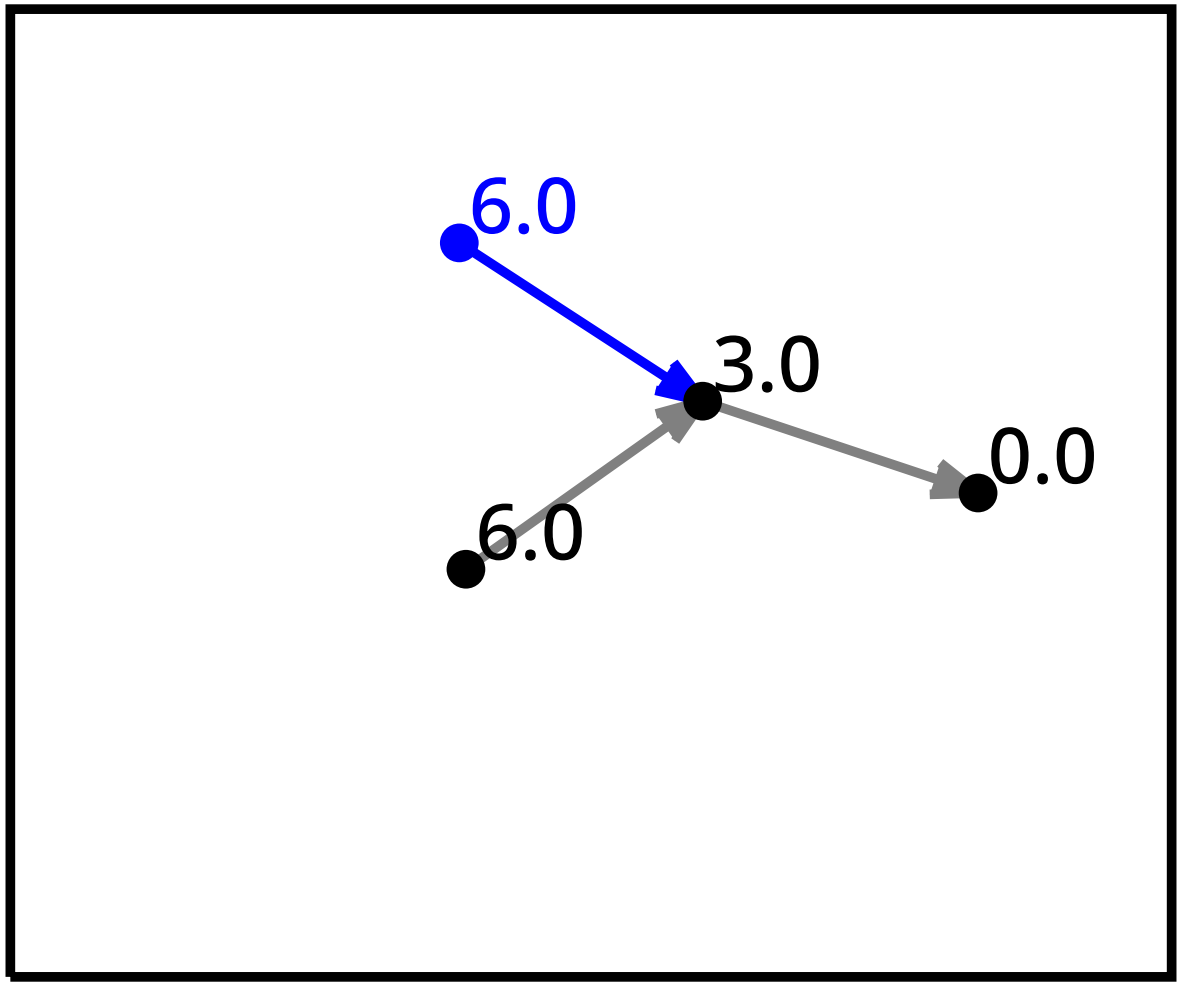
RRT*: Example 1

Find candidate parents for the new node; 2 candidates this time.



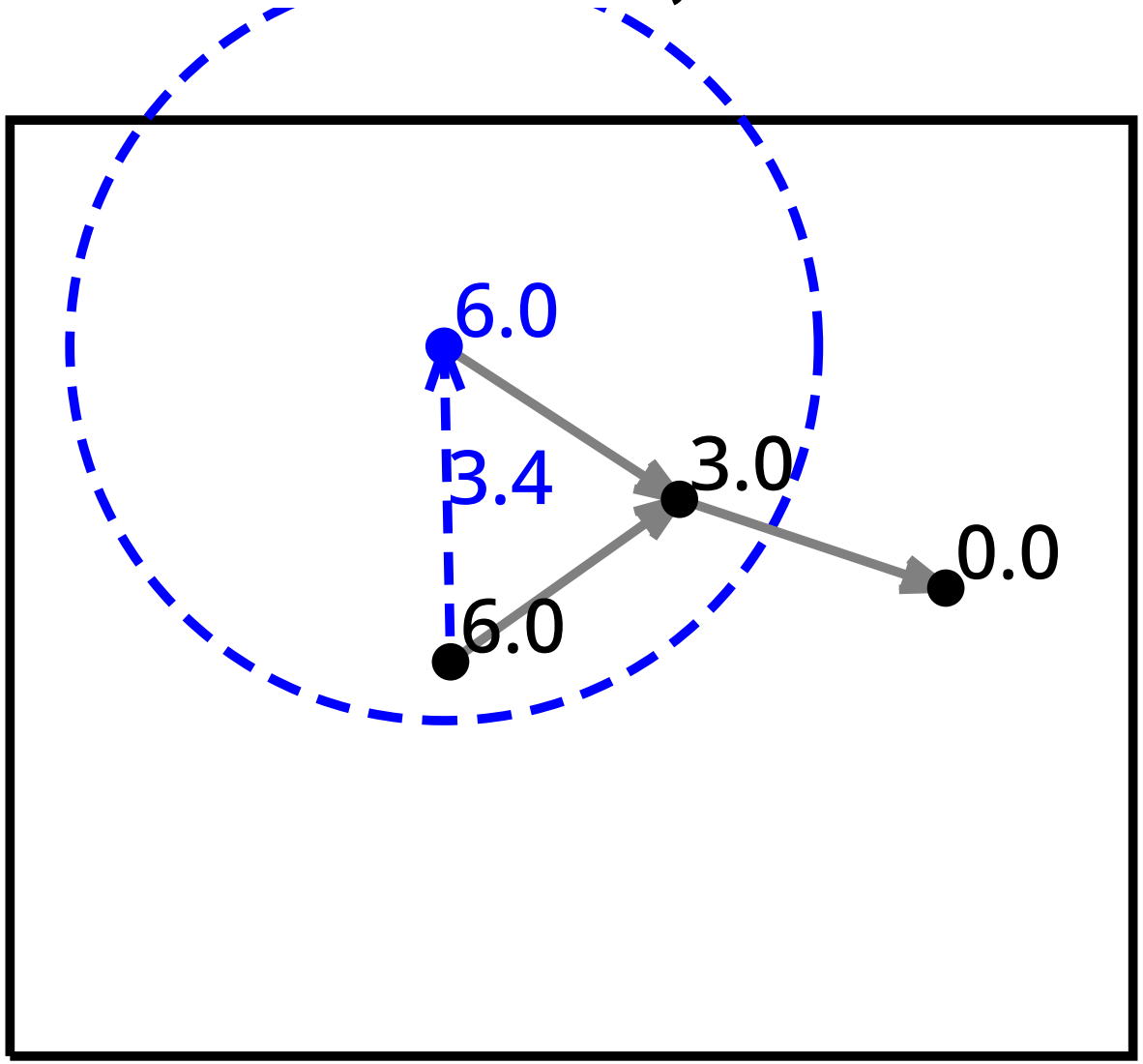
RRT*: Example 1

Choose the best parent for the new node.



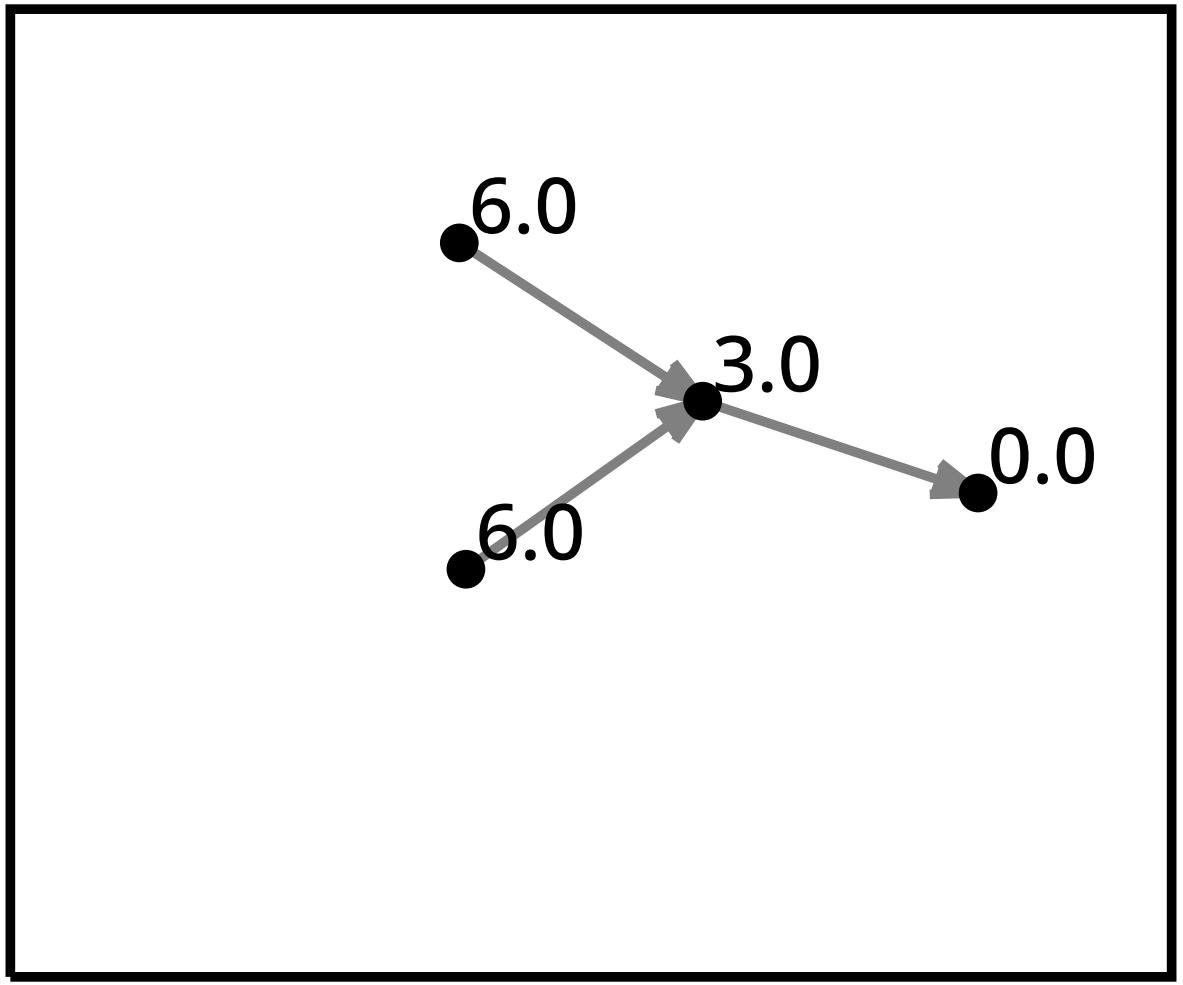
RRT*: Example 1

Find rewiring candidates near the new node; 1 candidate this time.



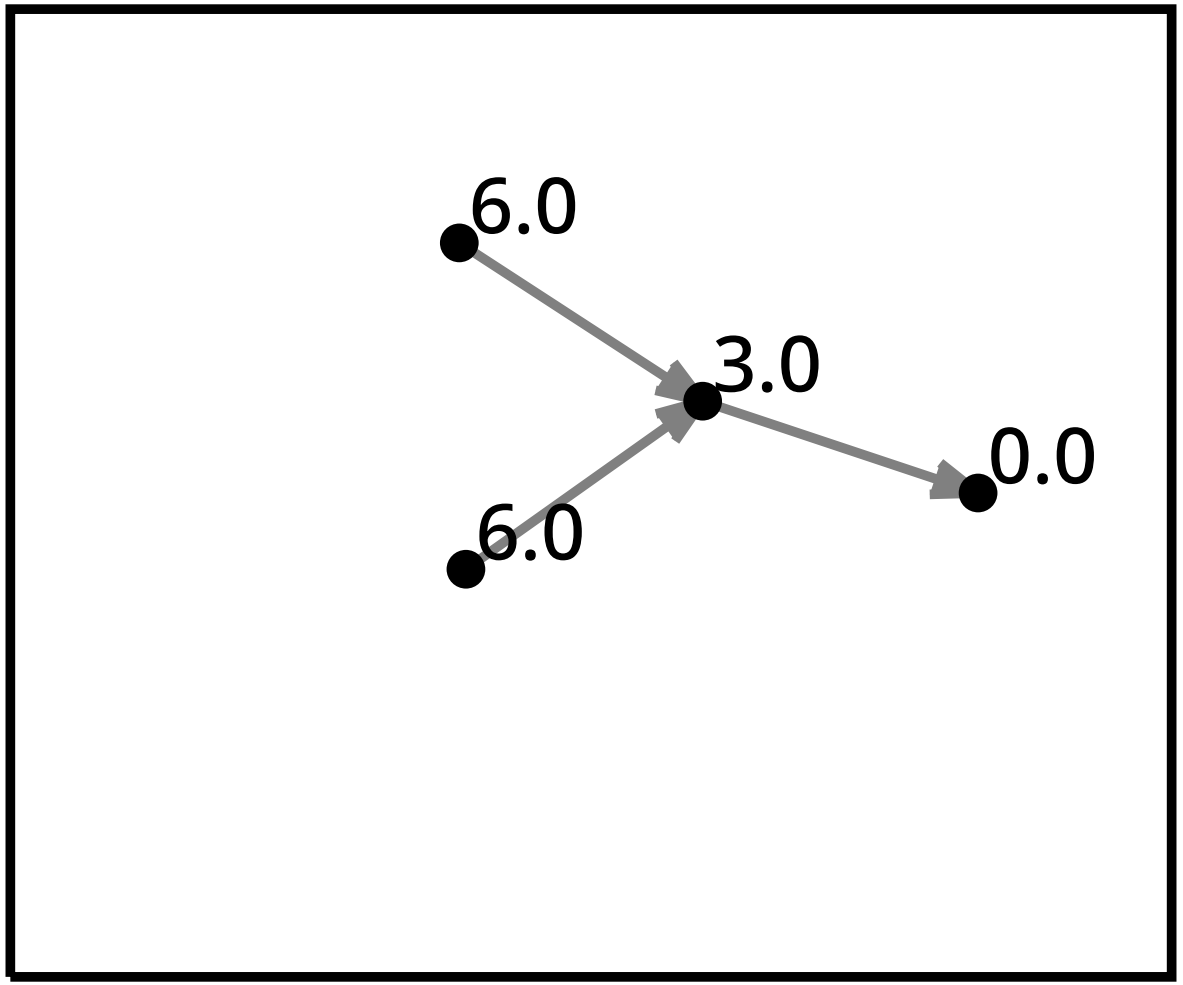
RRT*: Example 1

Rewire if needed; 0 changes this time.



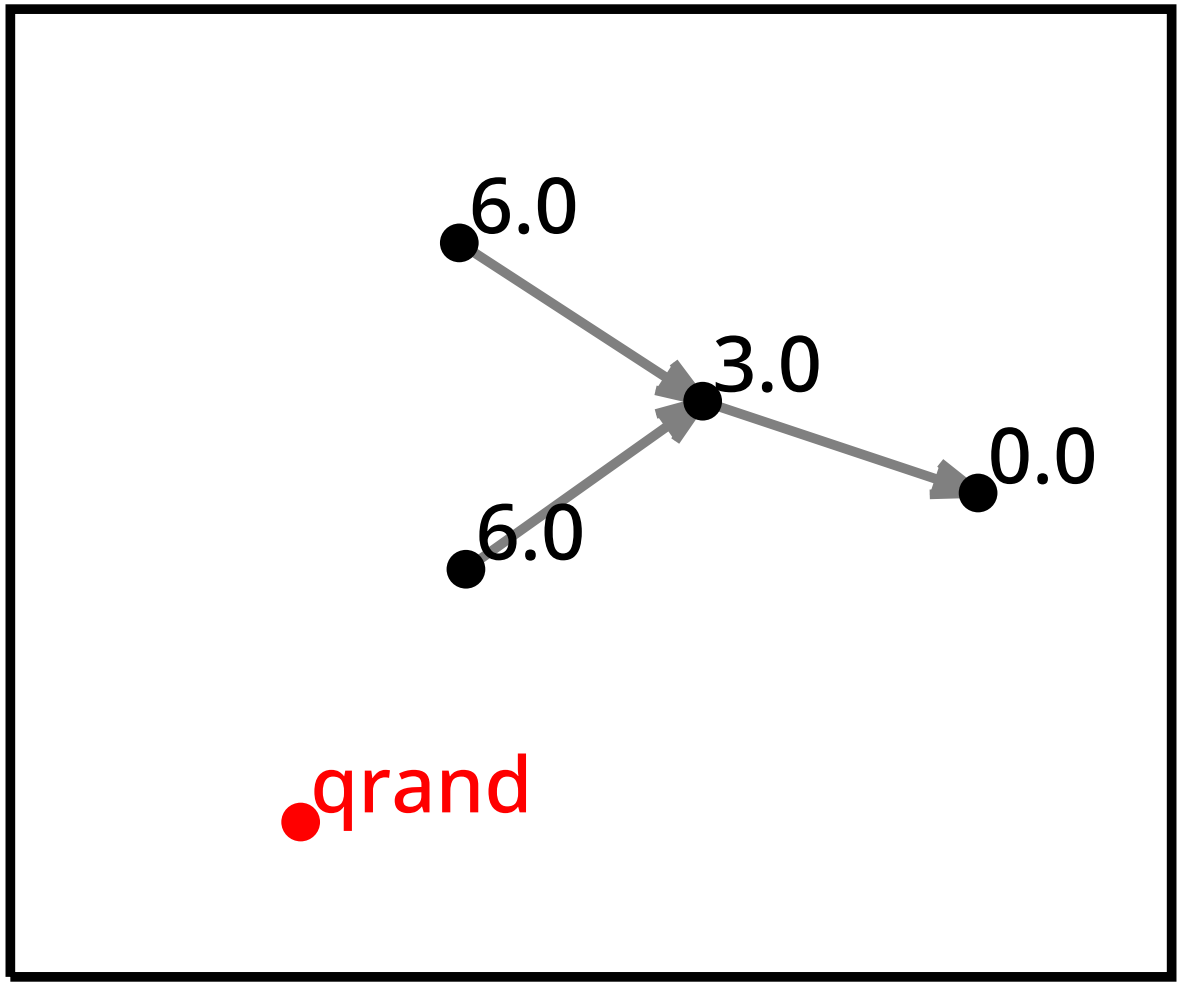
RRT*: Example 1

After 3 iterations.



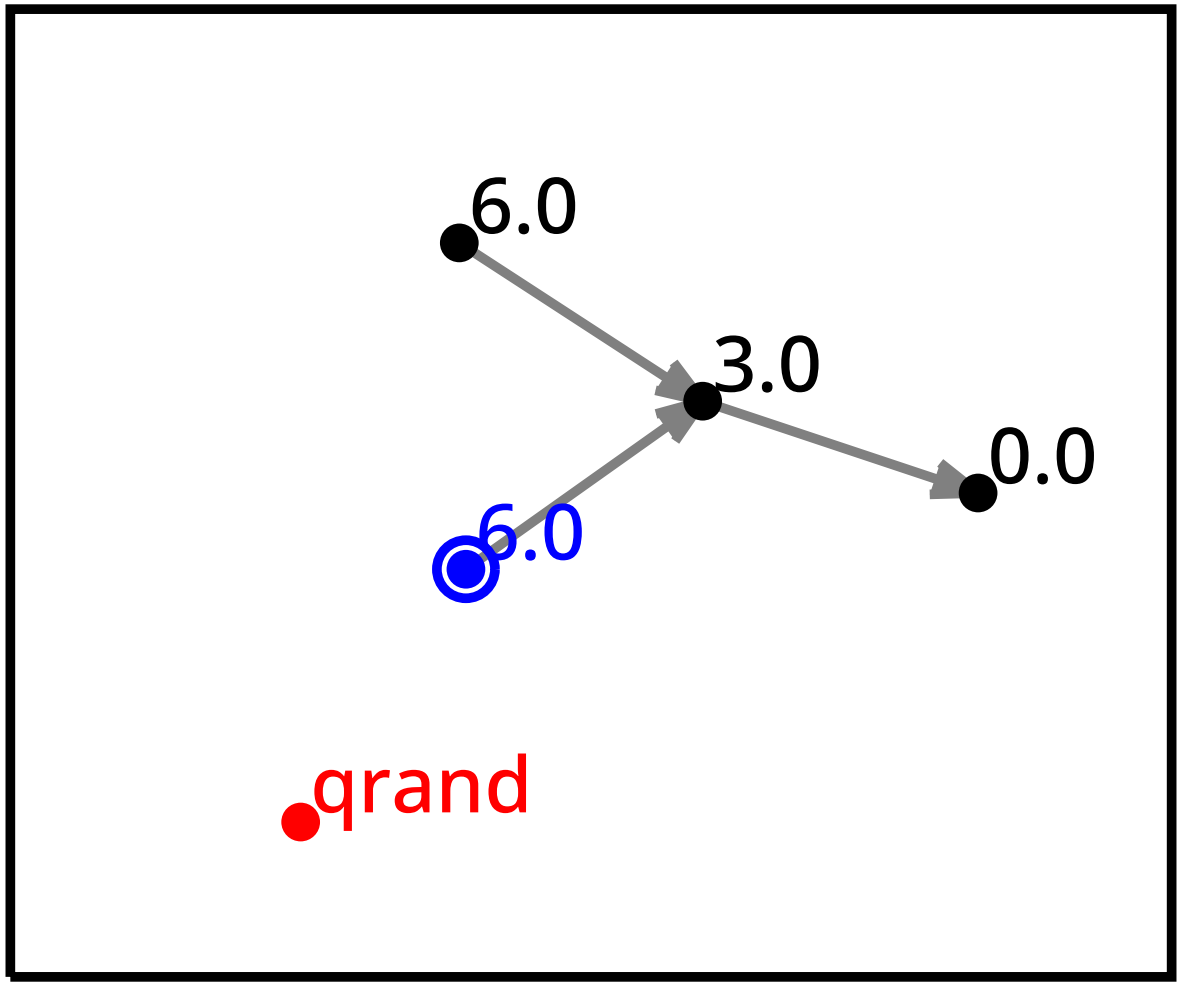
RRT*: Example 1

Choose a random sample.



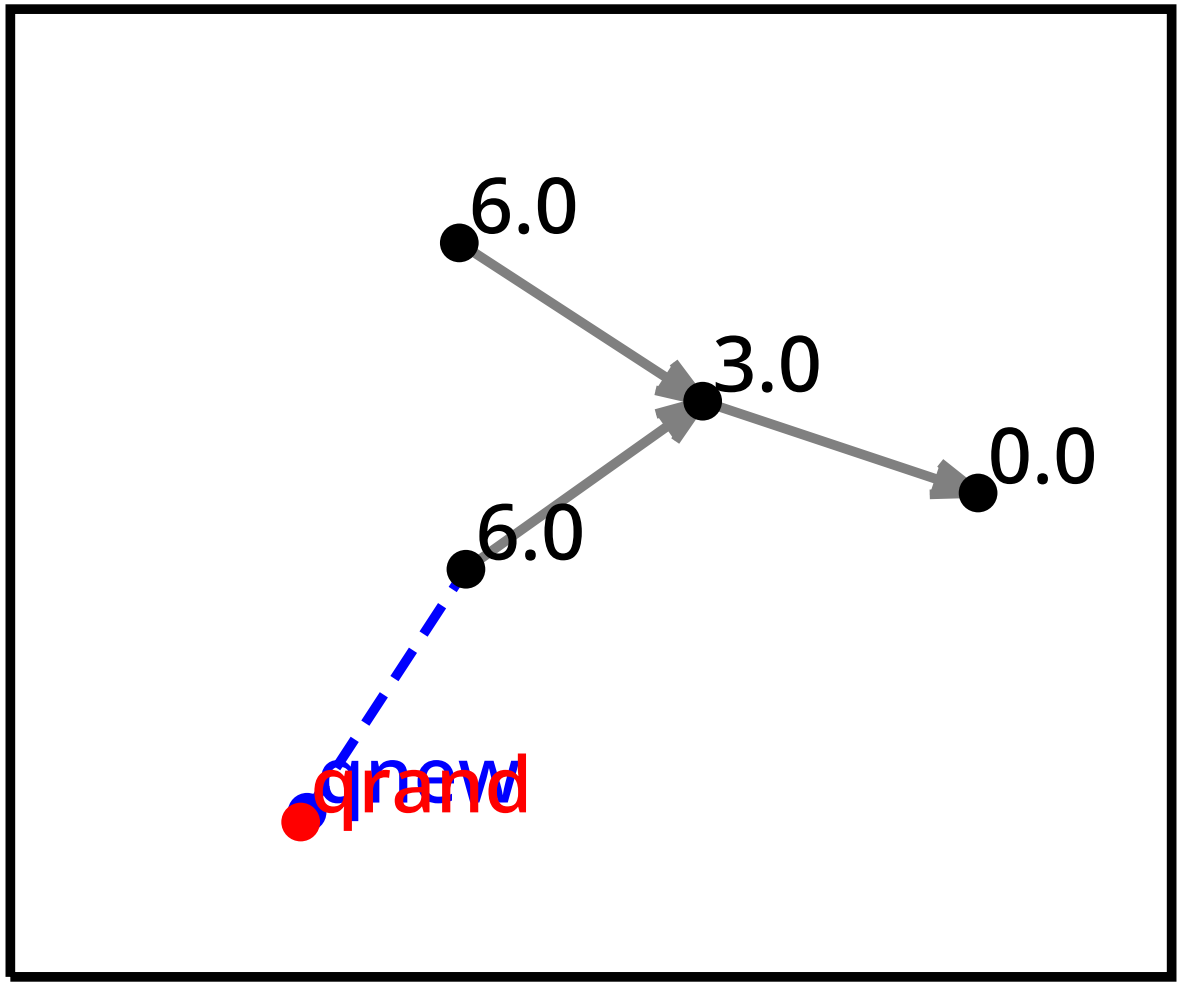
RRT*: Example 1

Find the nearest neighbor.



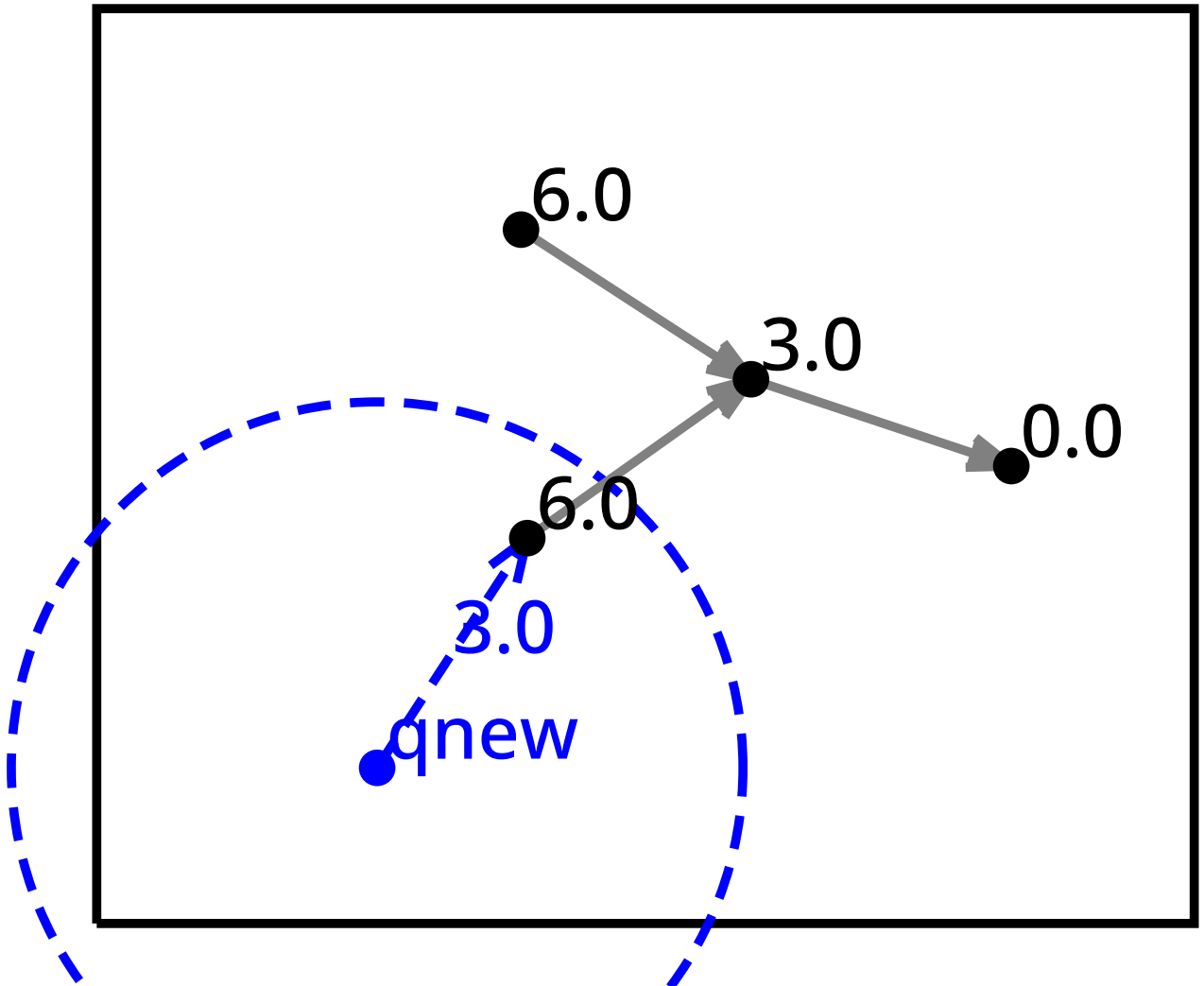
RRT*: Example 1

Extend from the nearest neighbor toward the sample.



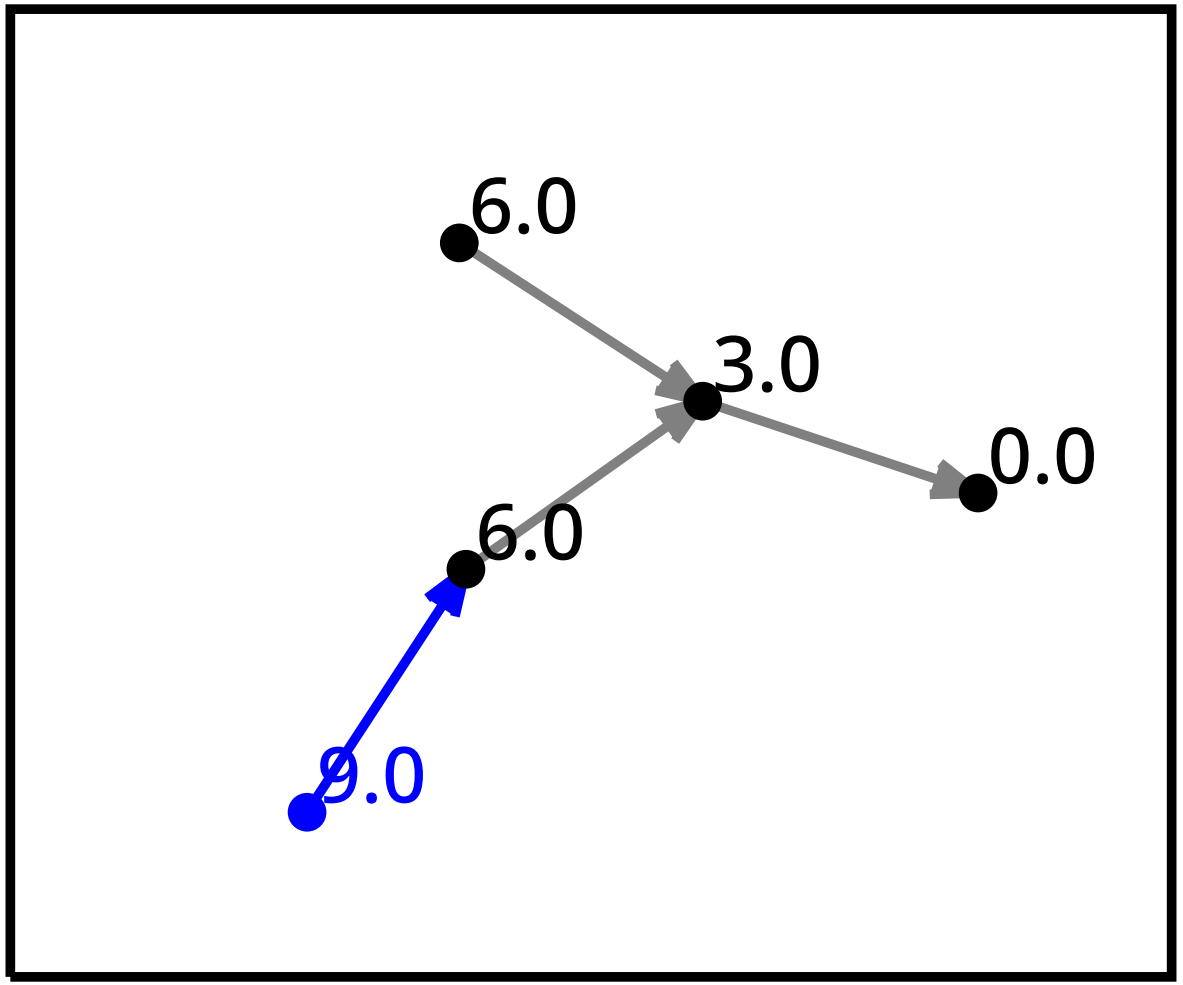
RRT*: Example 1

Find candidate parents for the new node; 1 candidate this time.



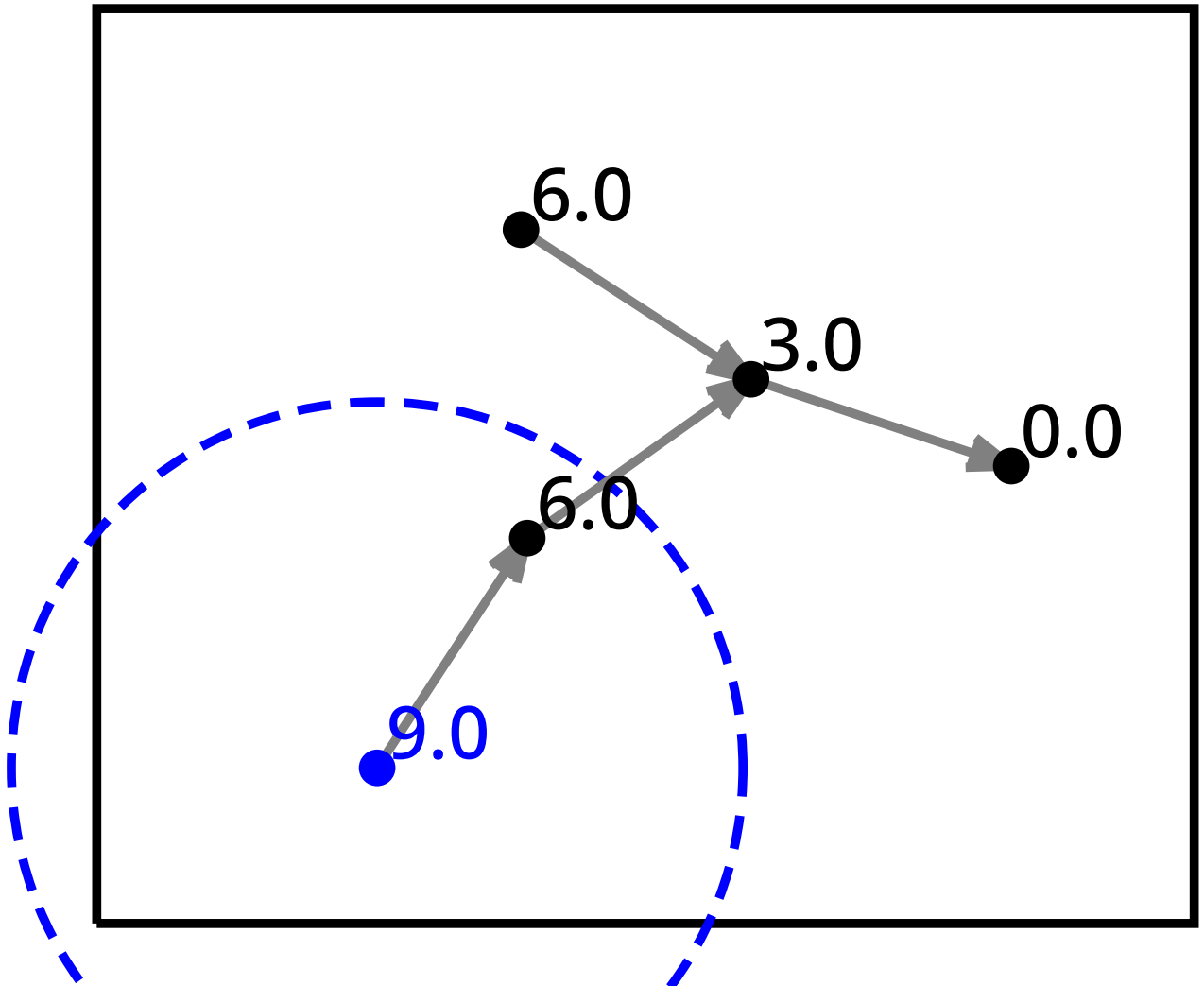
RRT*: Example 1

Choose the best parent for the new node.



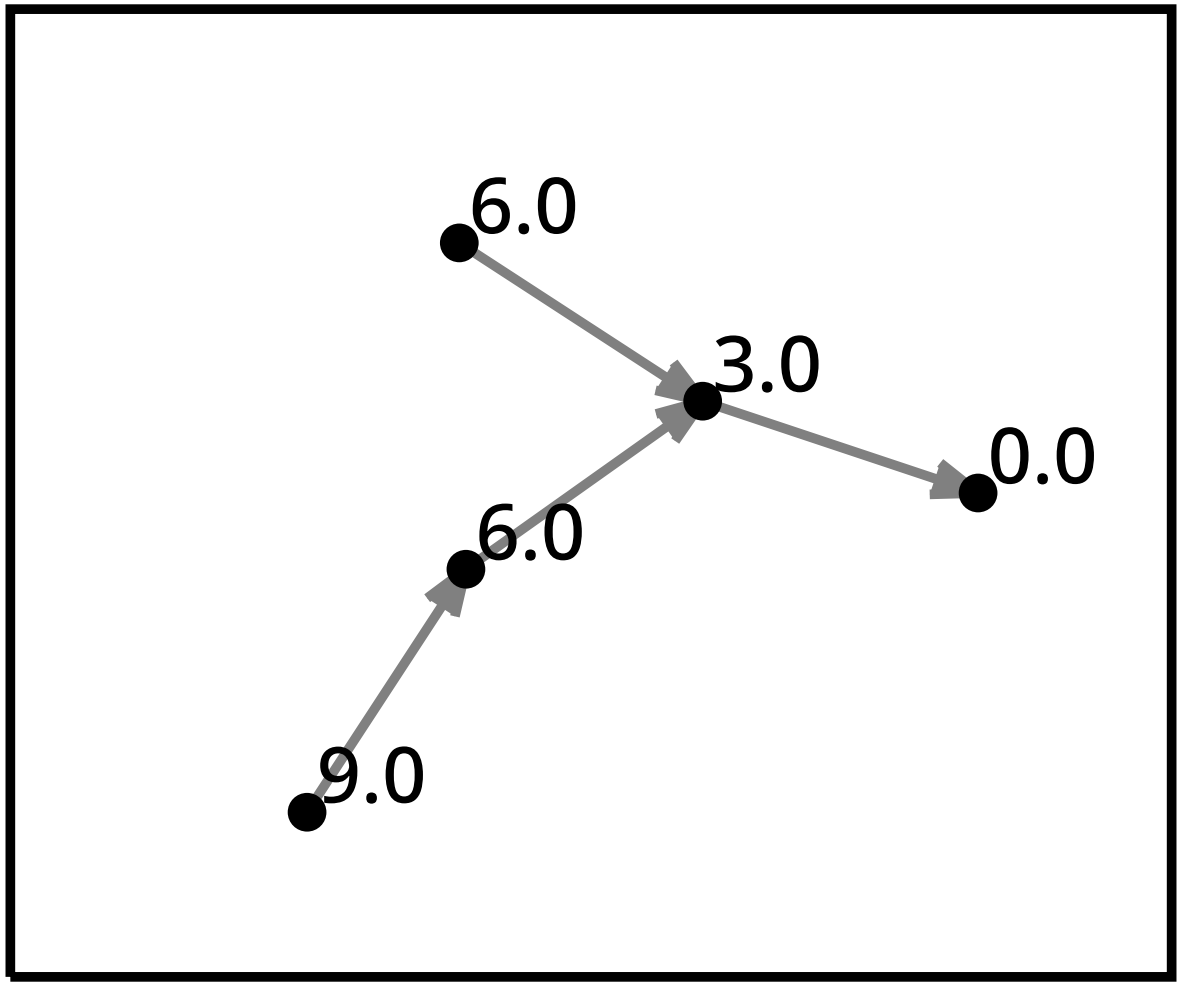
RRT*: Example 1

Find rewiring candidates near the new node; 0 candidates this time.



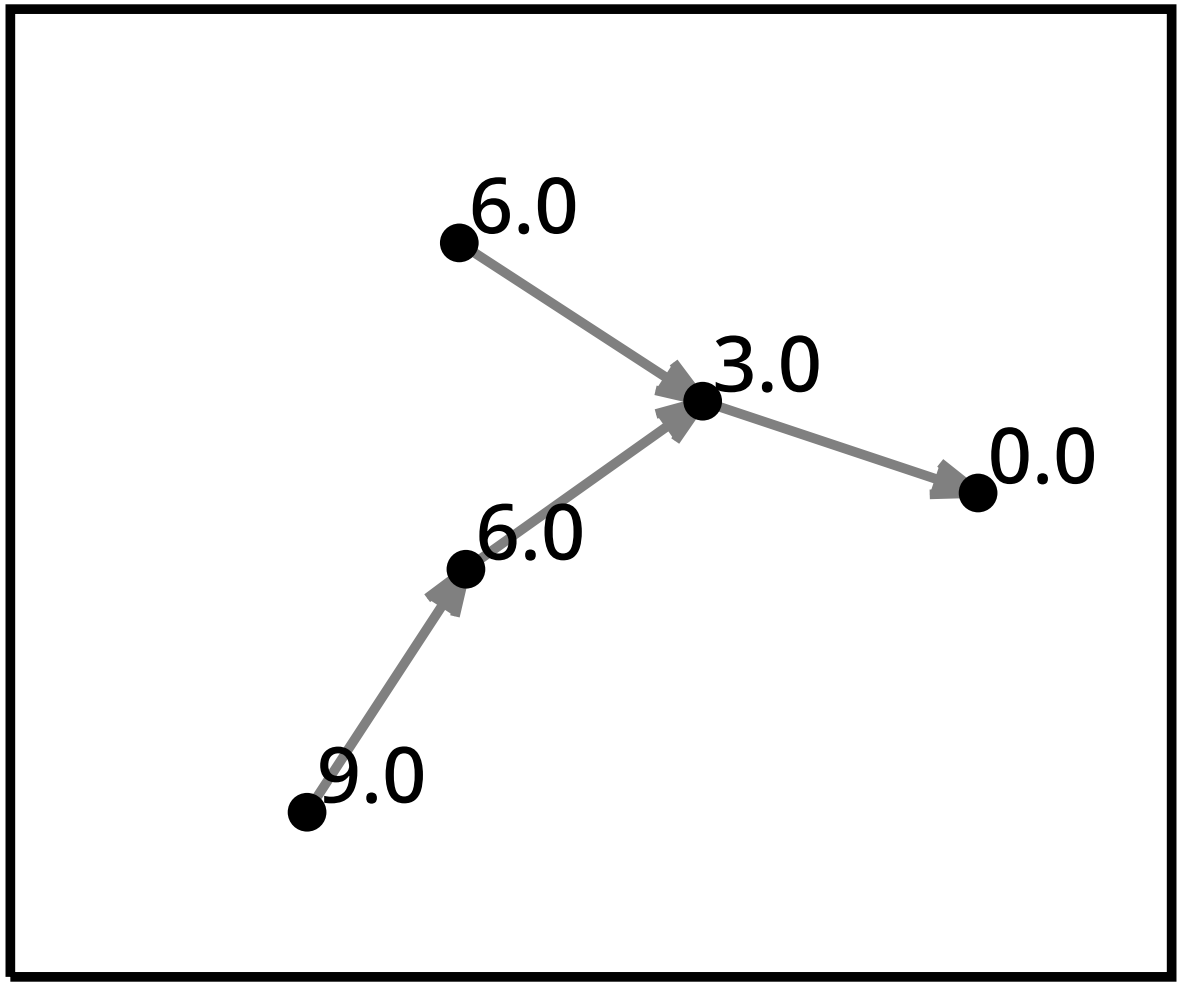
RRT*: Example 1

Rewire if needed; 0 changes this time.



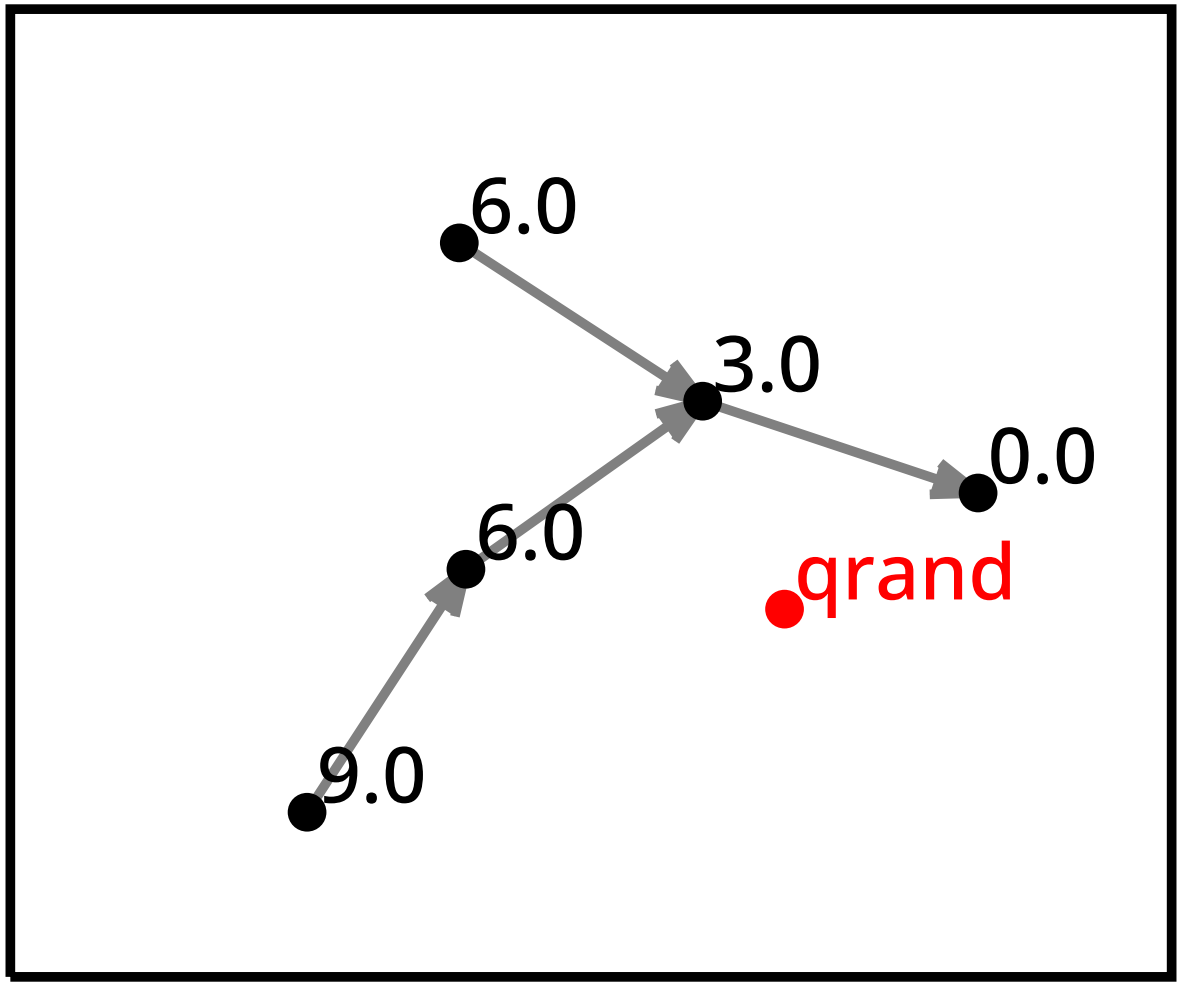
RRT*: Example 1

After 4 iterations.



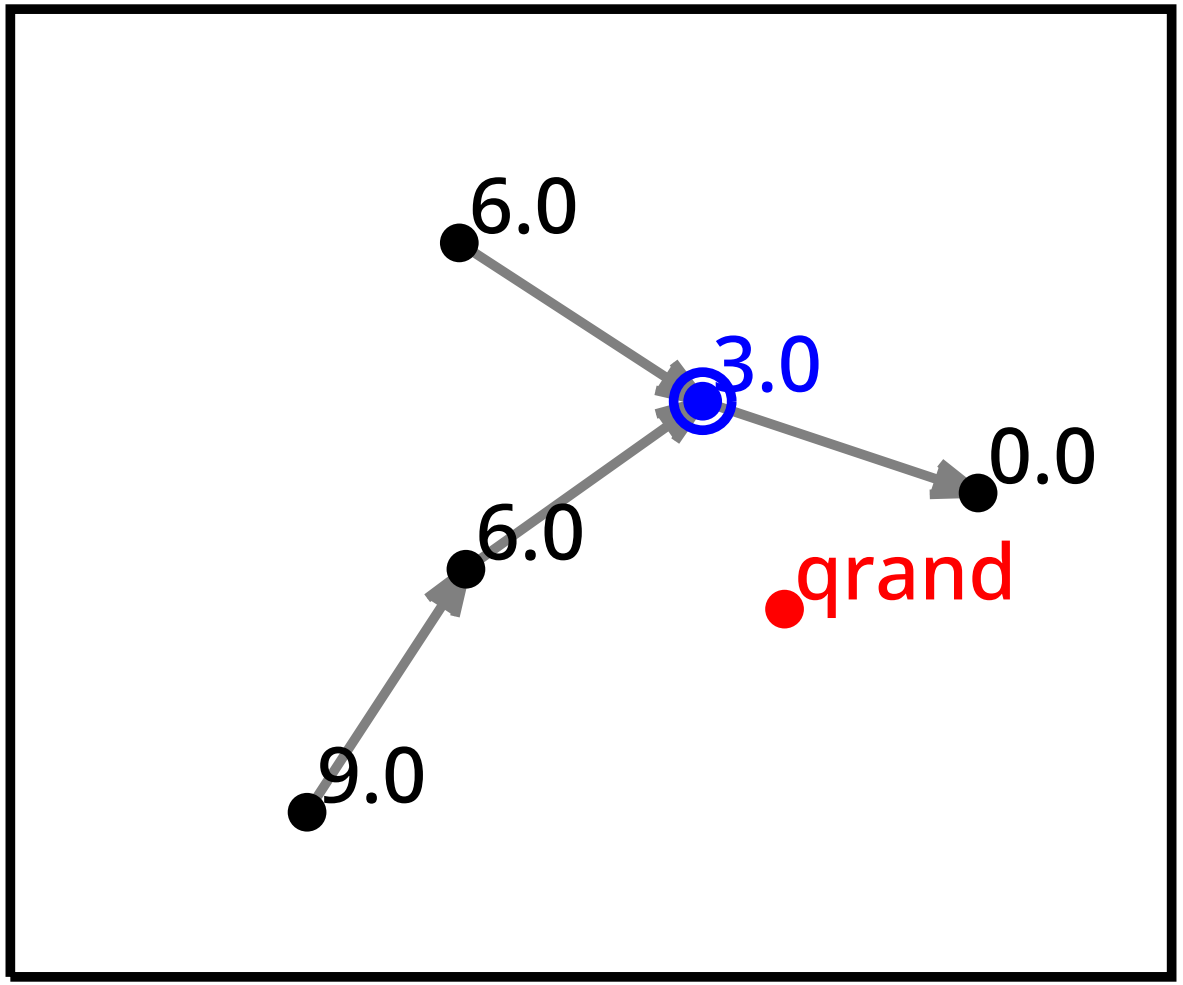
RRT*: Example 1

Choose a random sample.



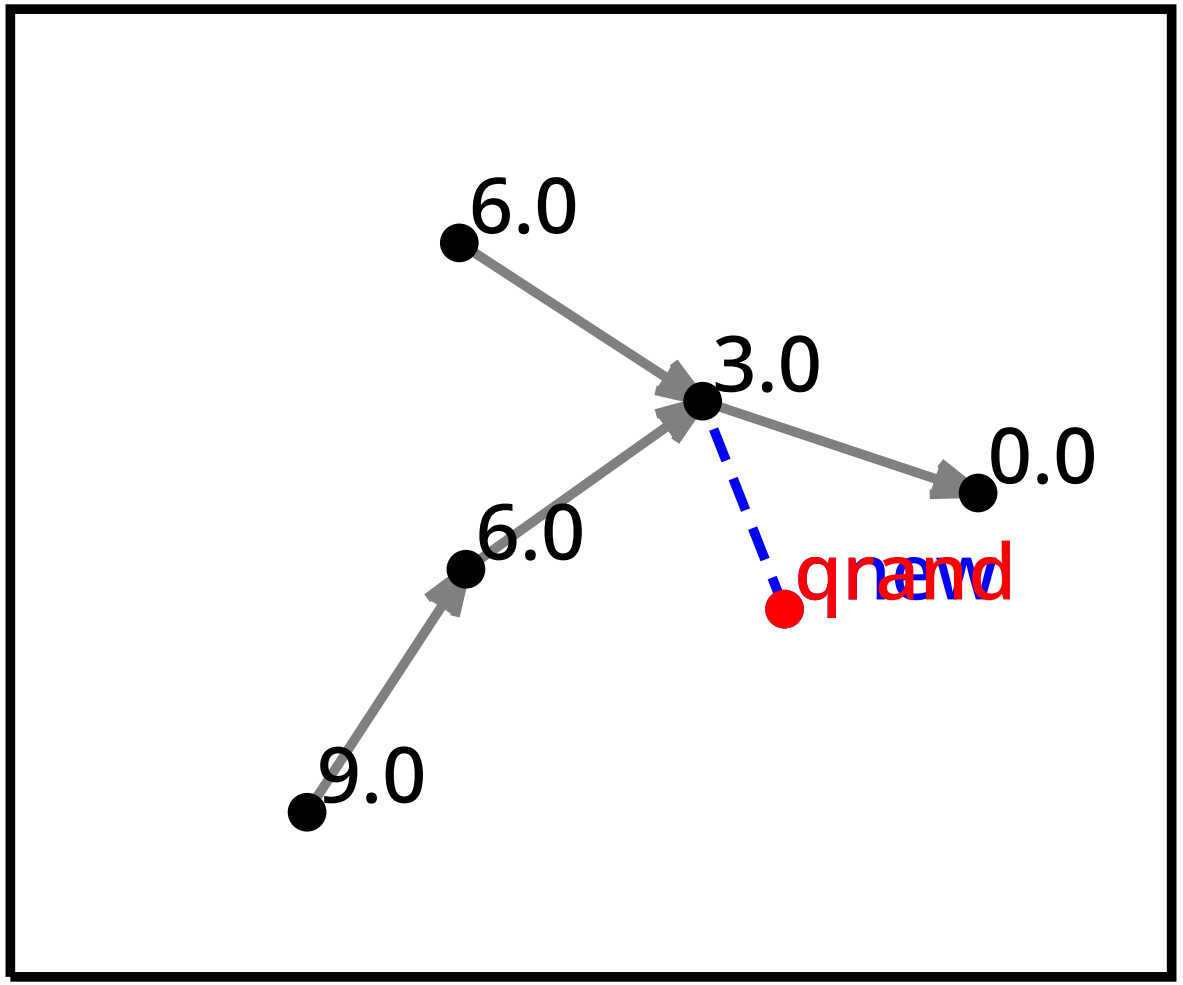
RRT*: Example 1

Find the nearest neighbor.



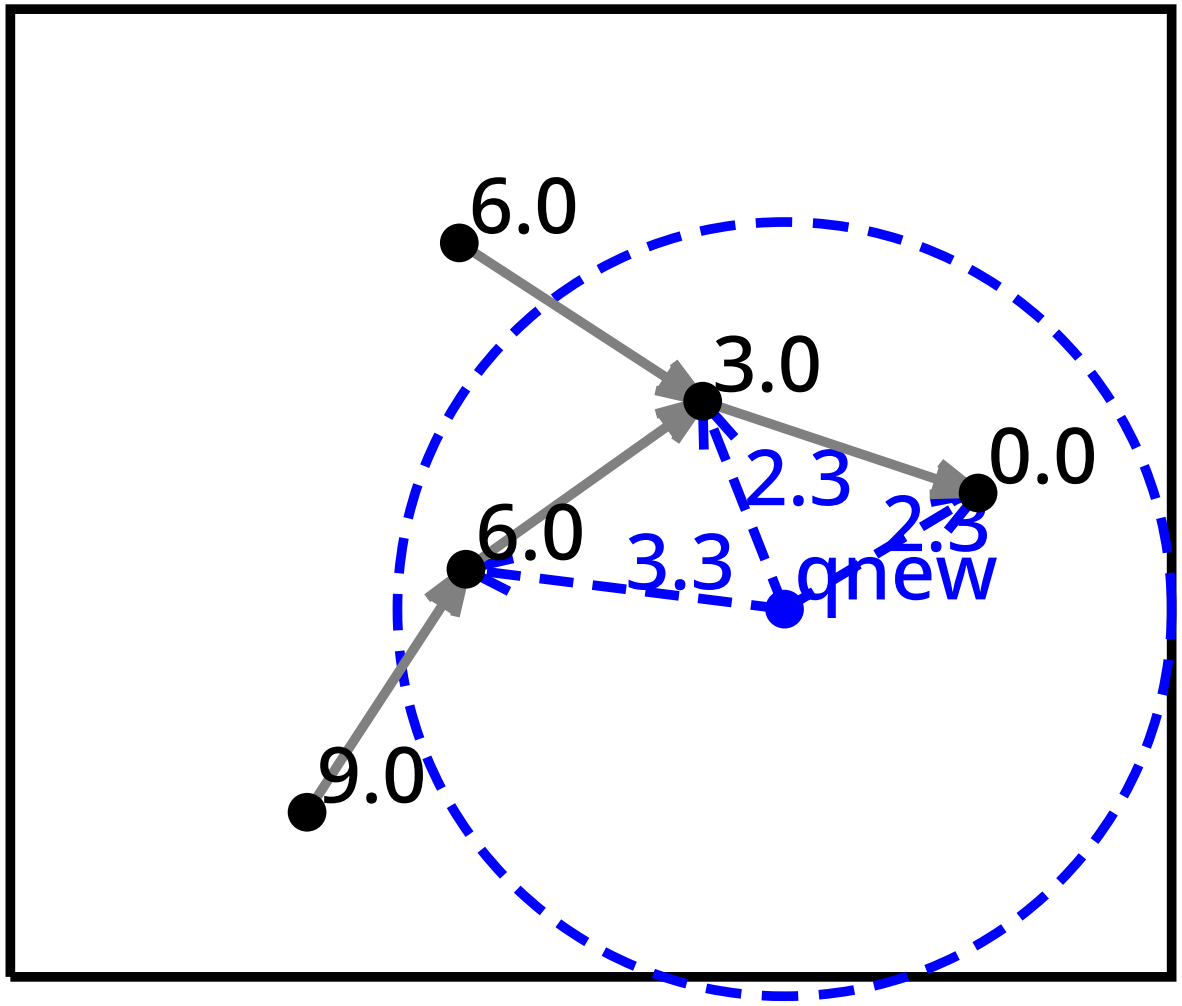
RRT*: Example 1

Extend from the nearest neighbor toward the sample.



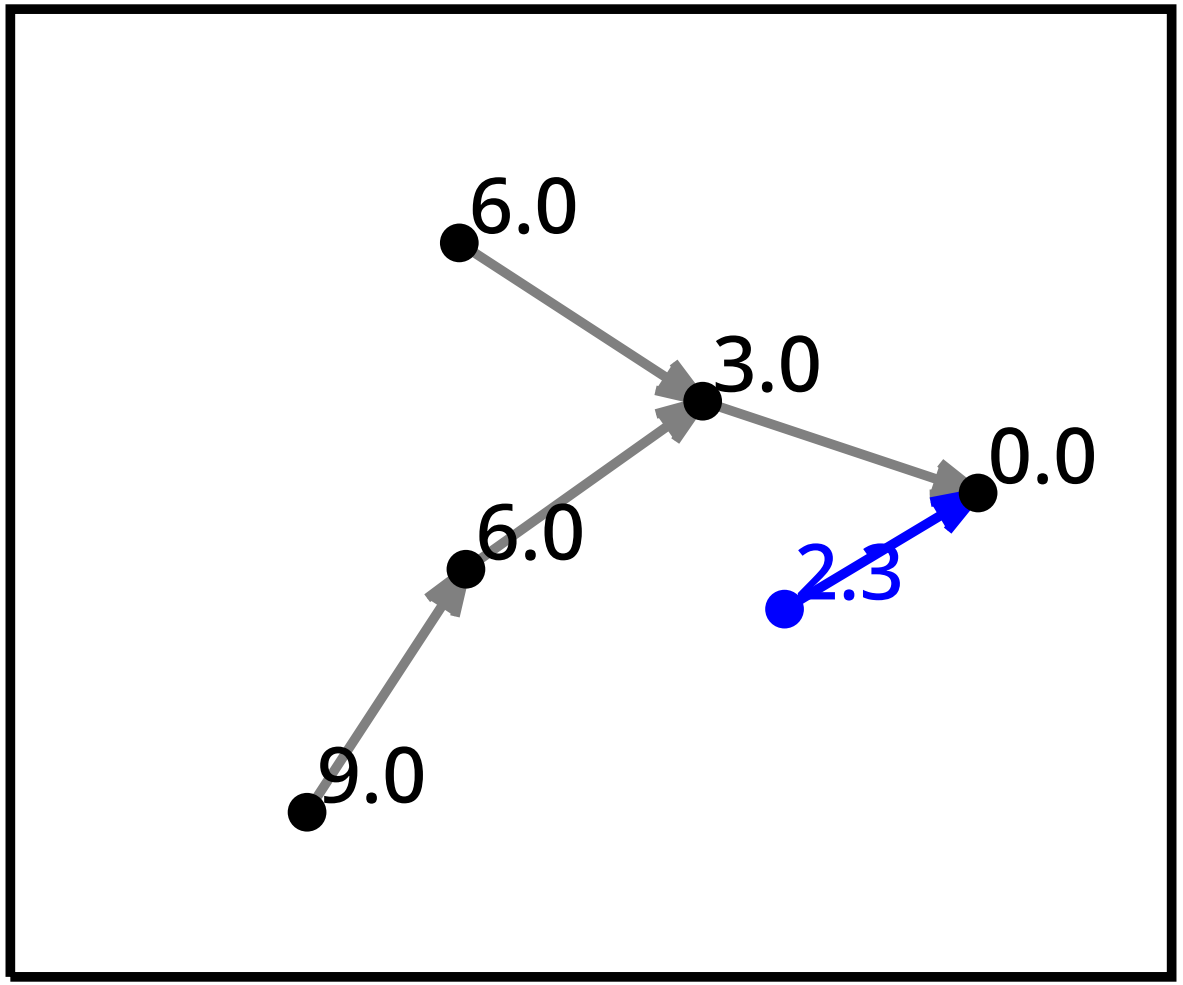
RRT*: Example 1

Find candidate parents for the new node; 3 candidates this time.



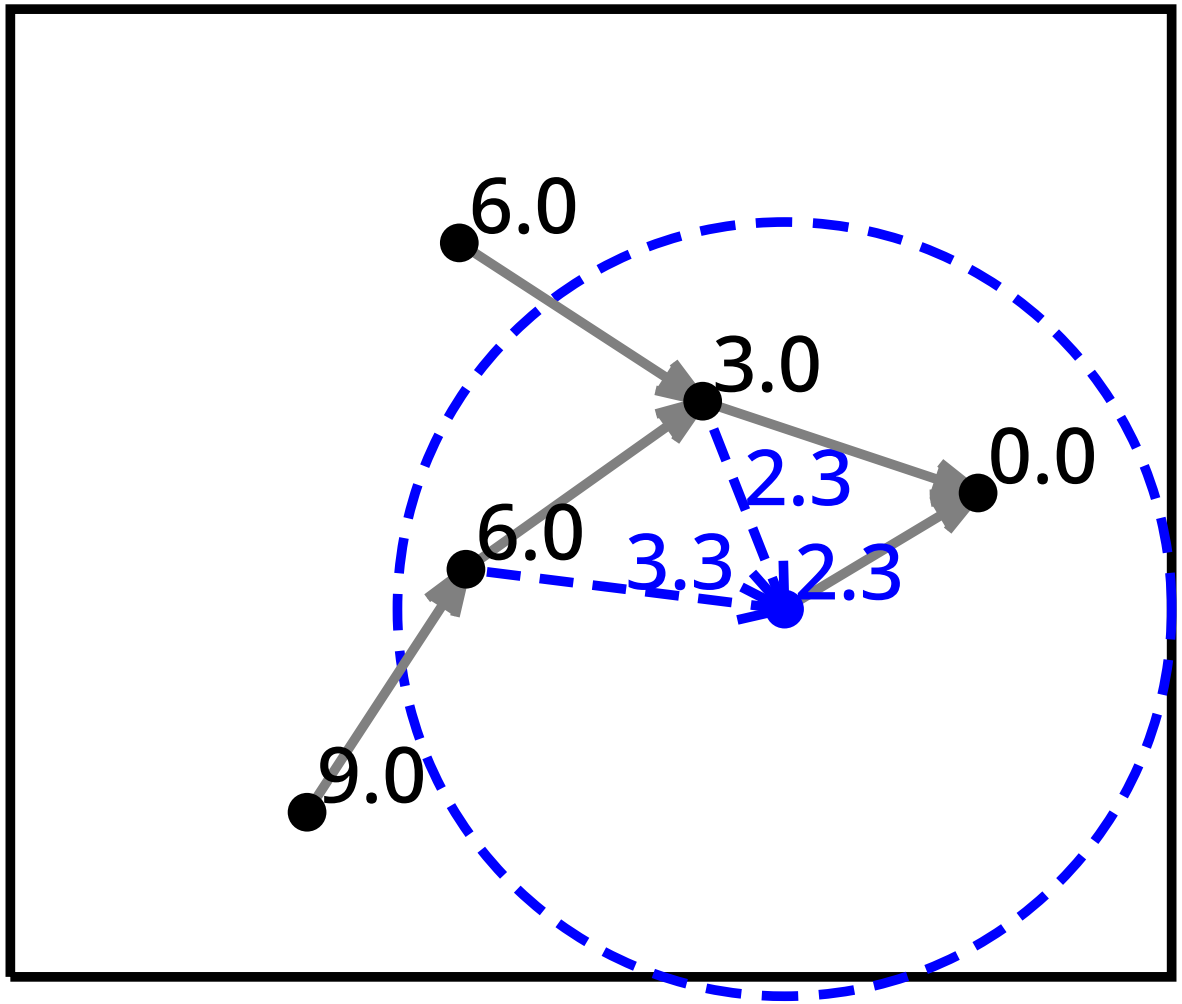
RRT*: Example 1

Choose the best parent for the new node.



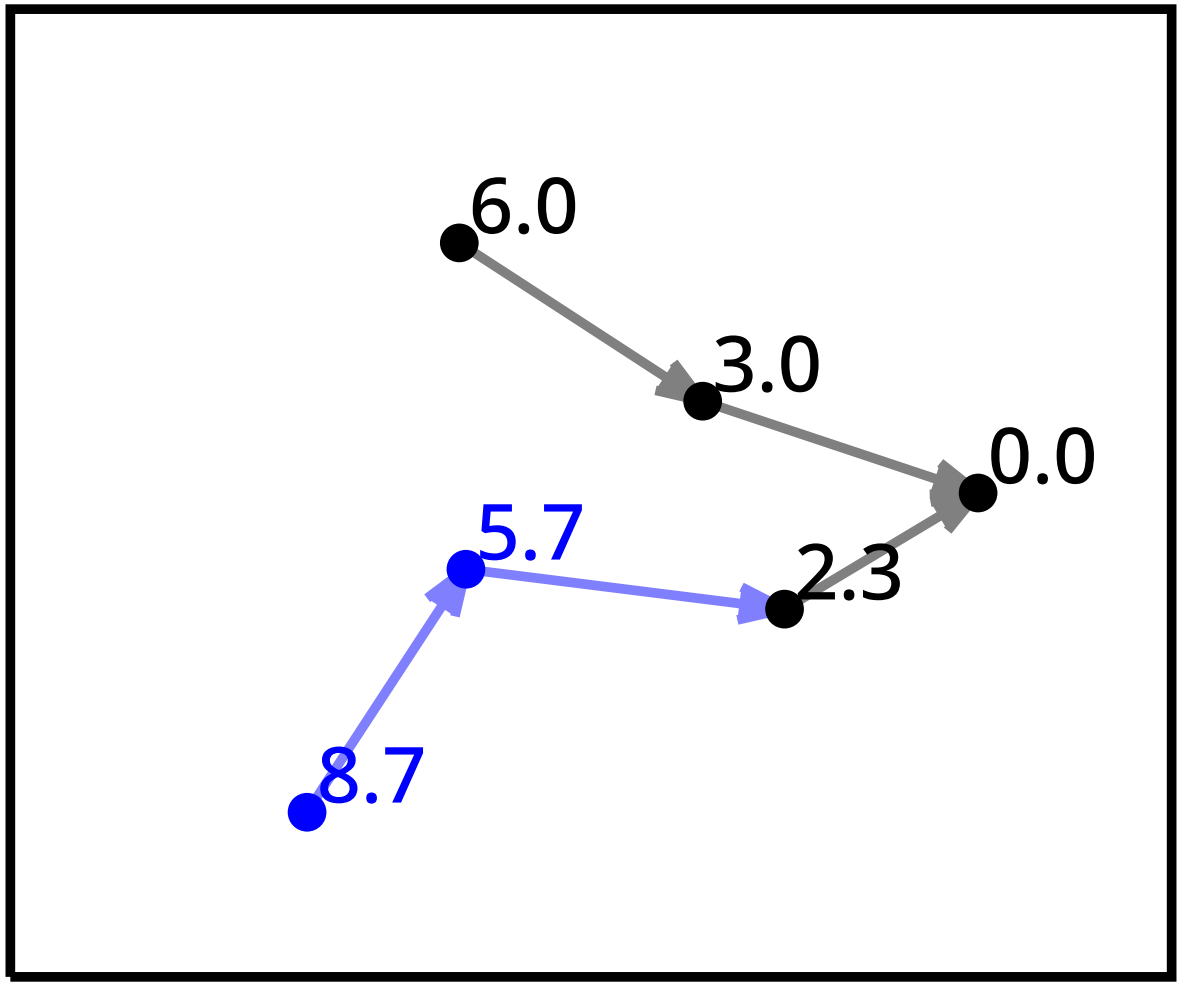
RRT*: Example 1

Find rewiring candidates near the new node; 2 candidates this time.



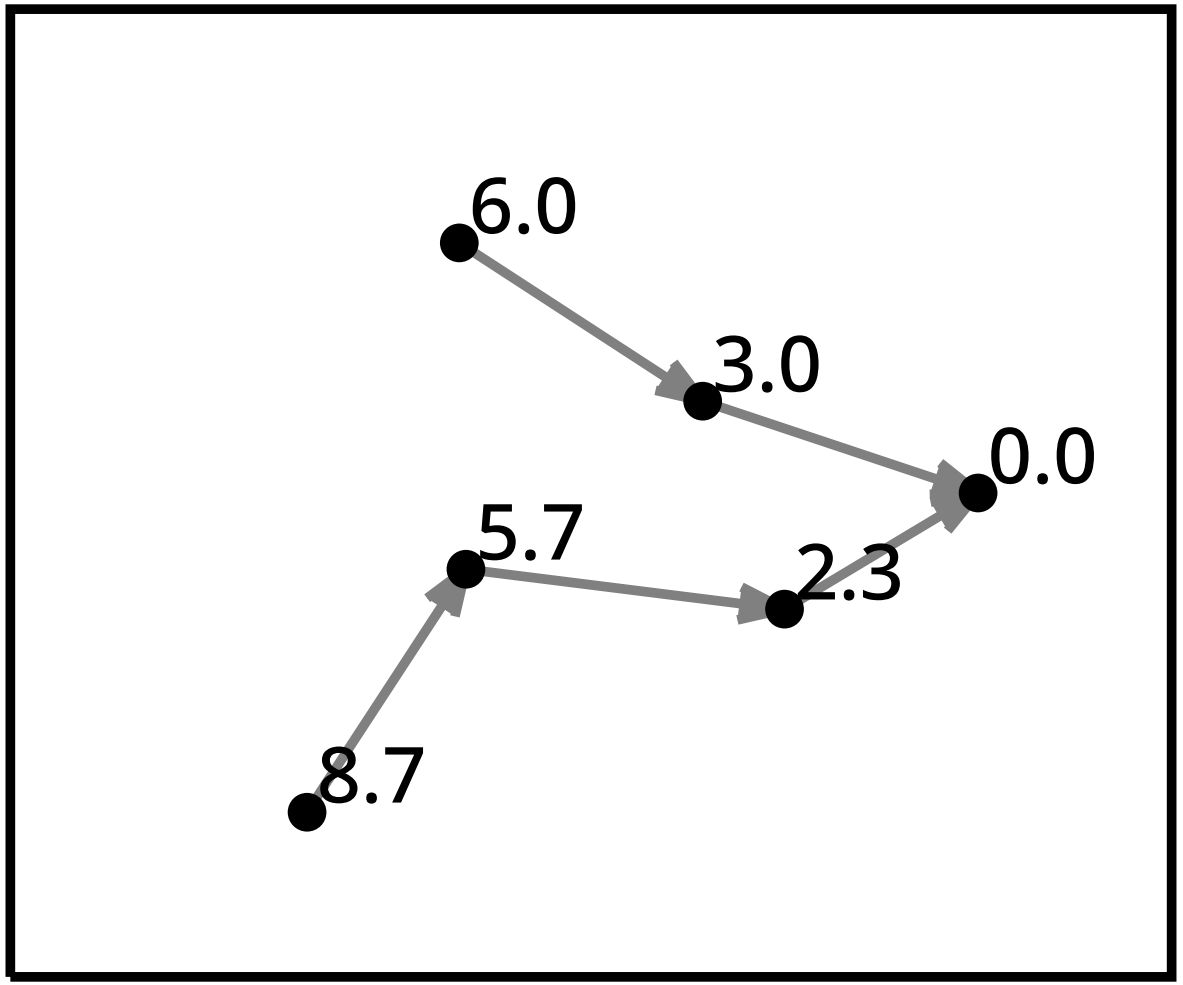
RRT*: Example 1

Rewire if needed; 2 changes this time.



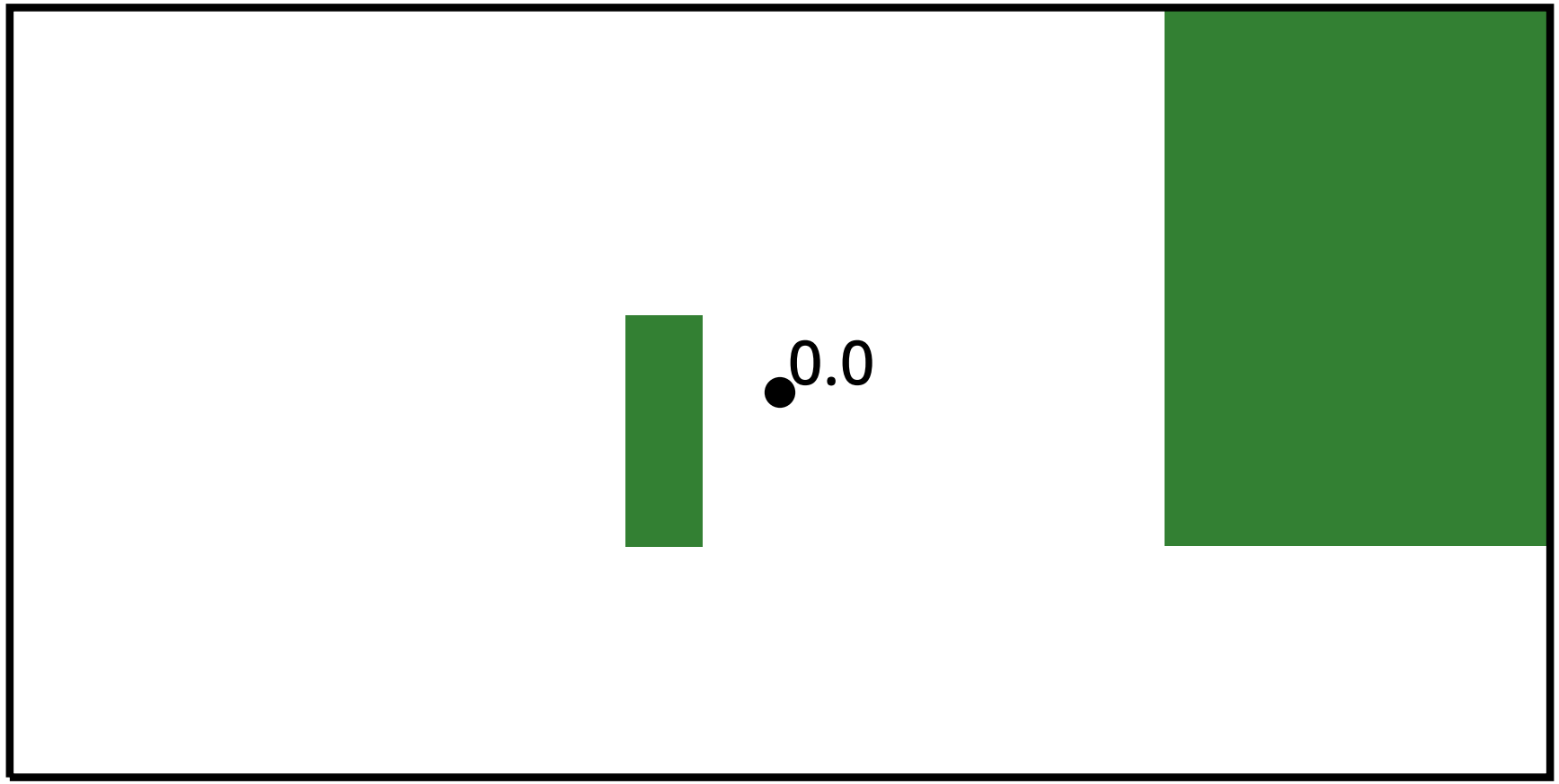
RRT*: Example 1

After 5 iterations.



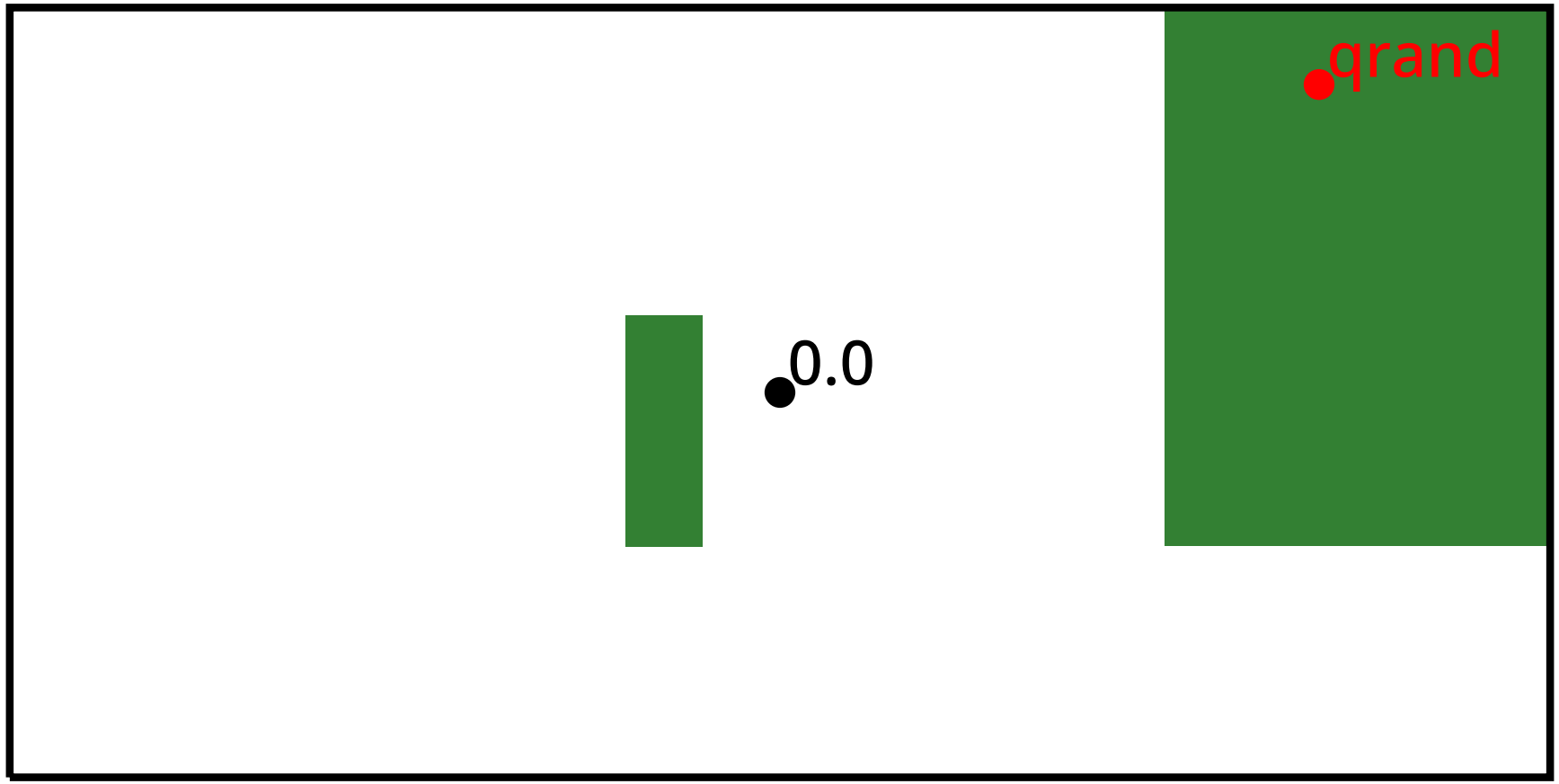
RRT*: Example 2

Start from a tree with just the start configuration.



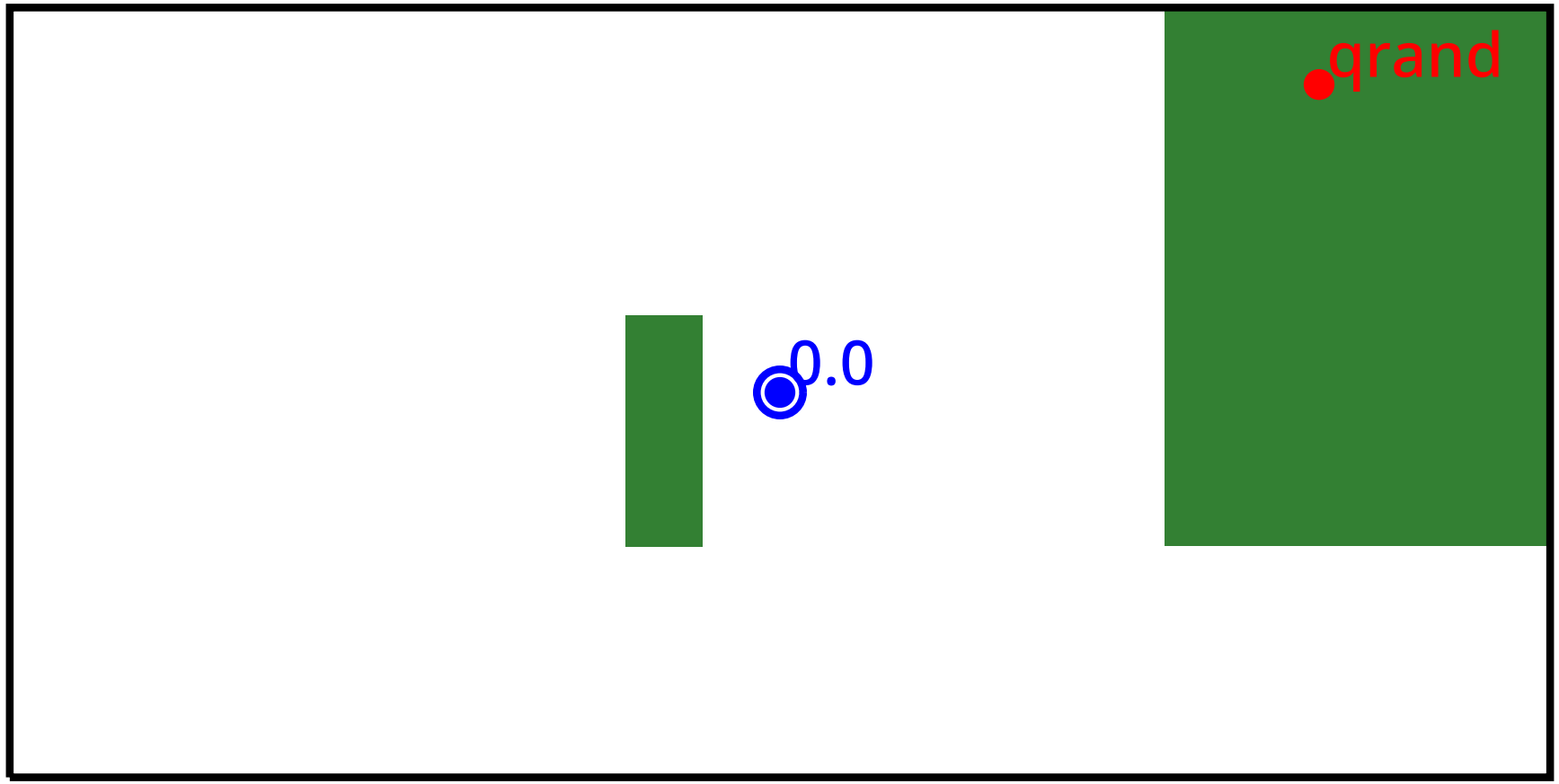
RRT*: Example 2

Choose a random sample.



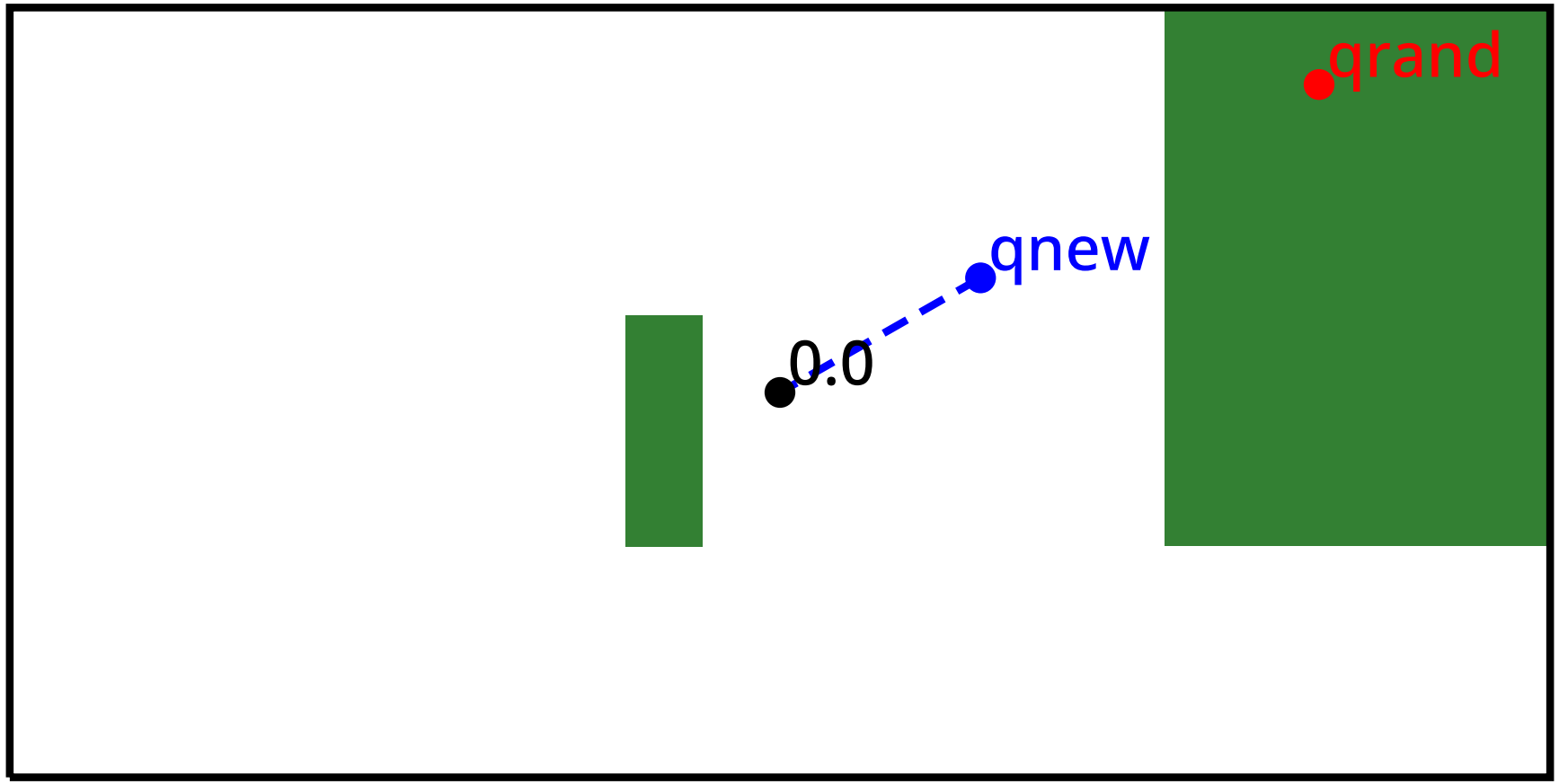
RRT*: Example 2

Find the nearest neighbor.



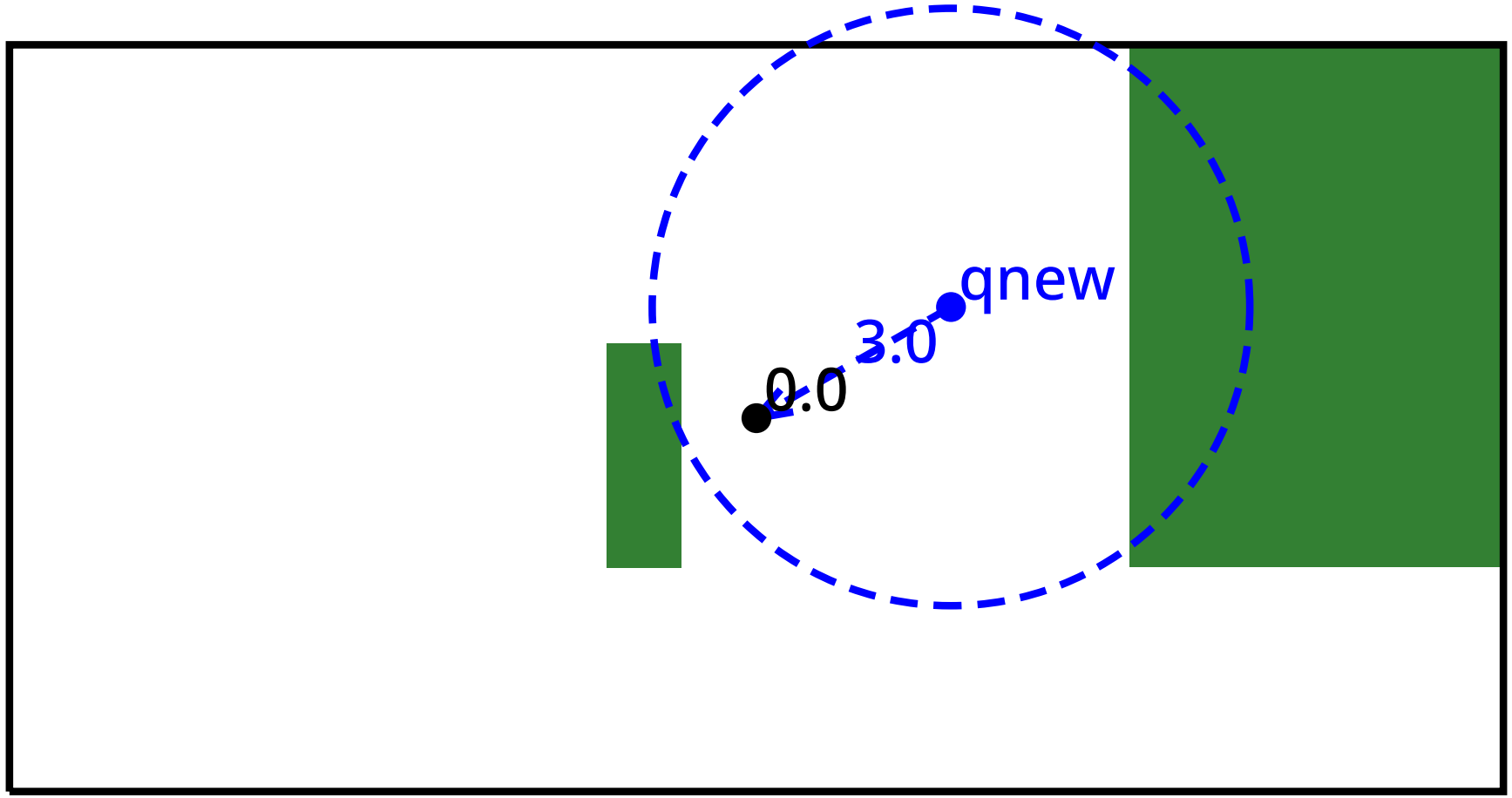
RRT*: Example 2

Extend from the nearest neighbor toward the sample.



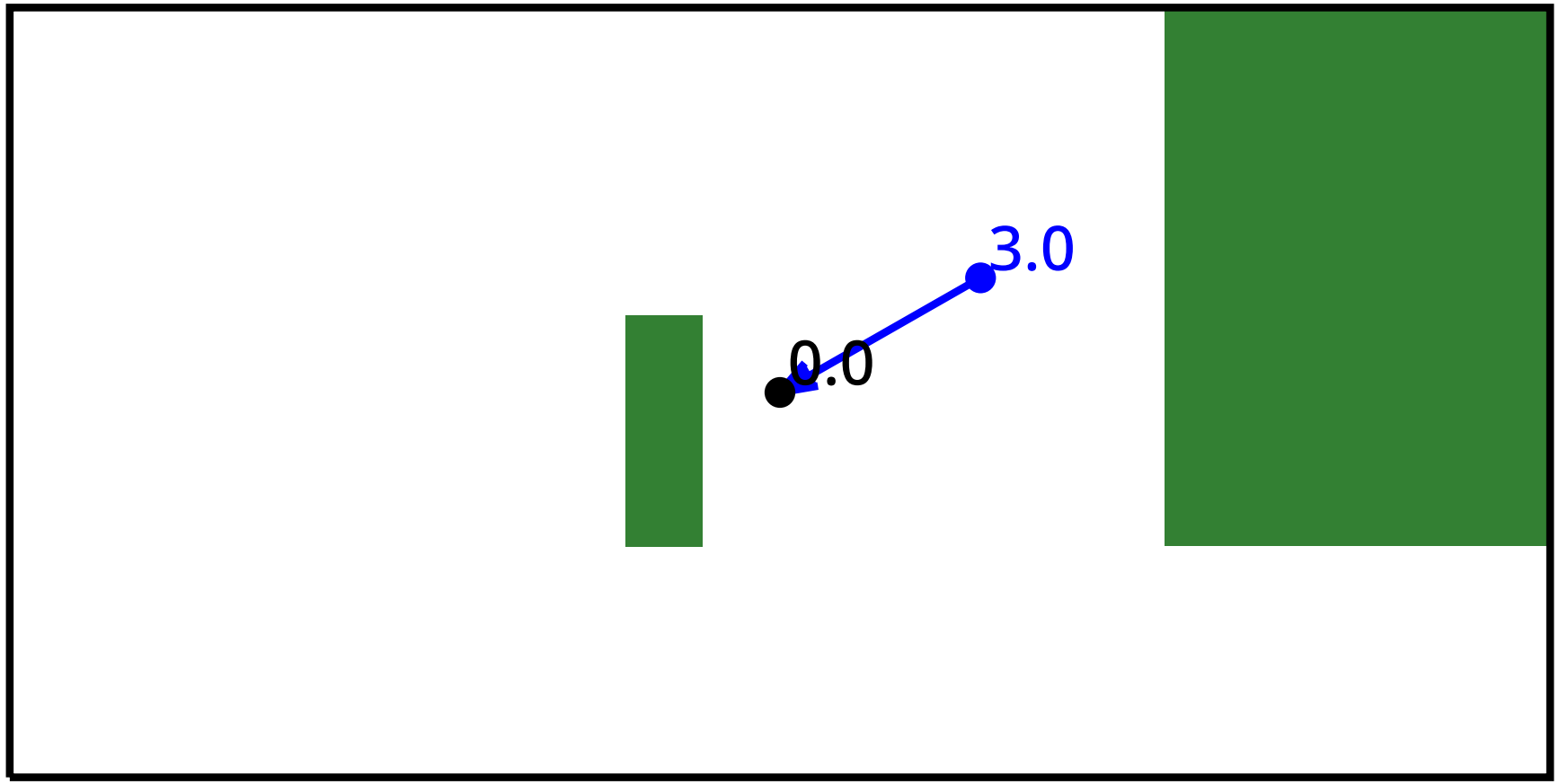
RRT*: Example 2

Find candidate parents for the new node; 1 candidate this time.



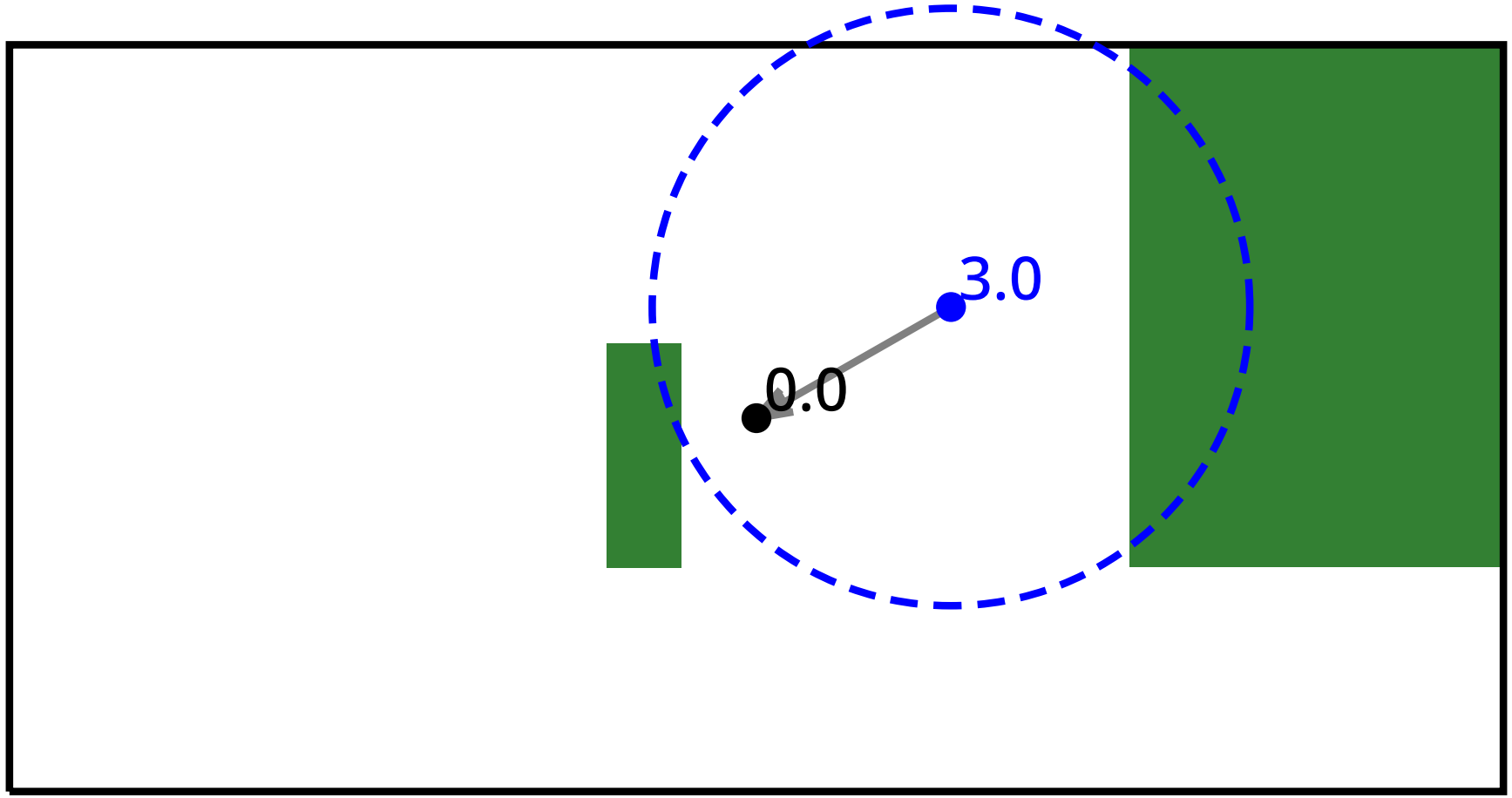
RRT*: Example 2

Choose the best parent for the new node.



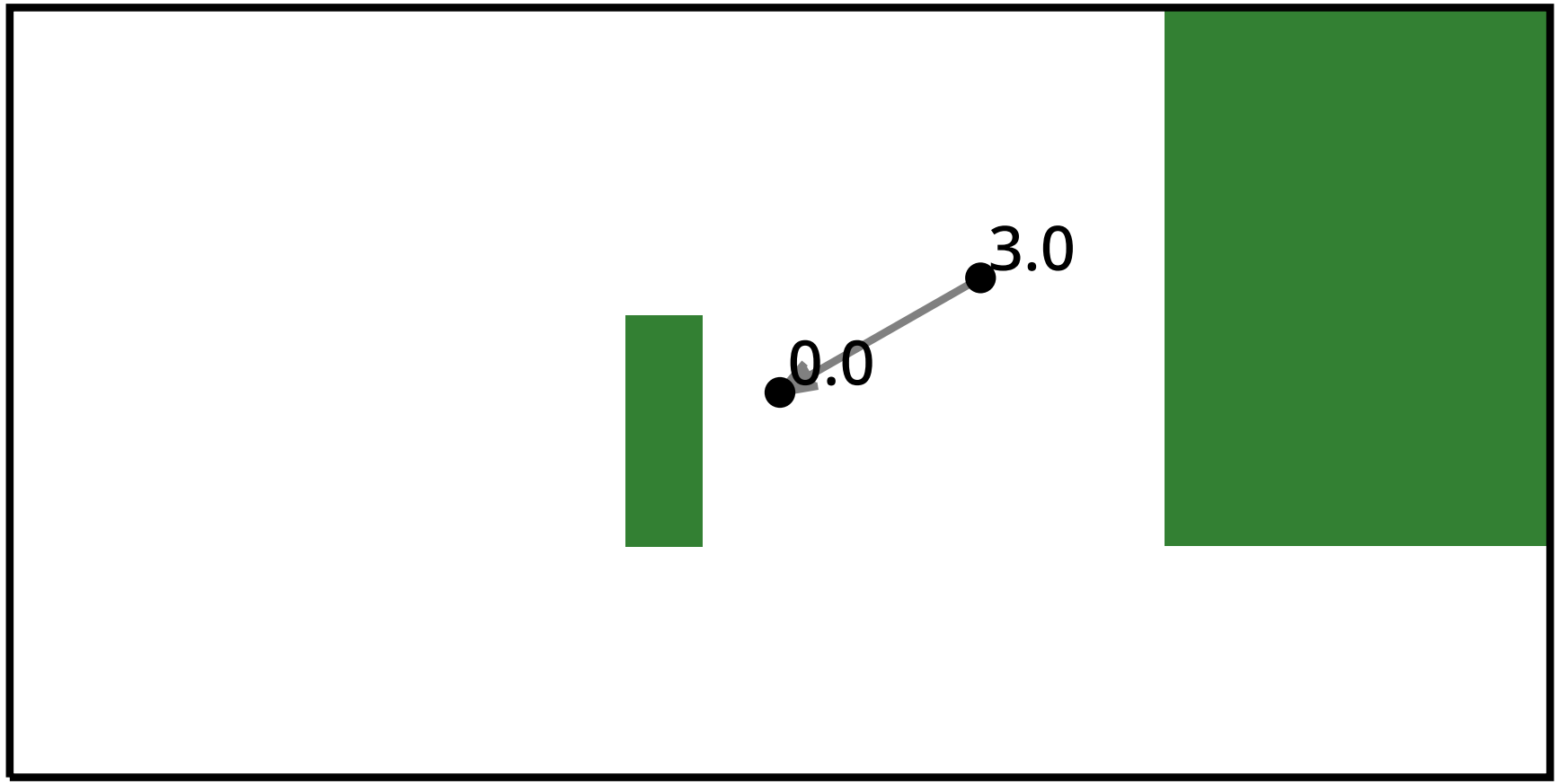
RRT*: Example 2

Find rewiring candidates near the new node; 0 candidates this time.



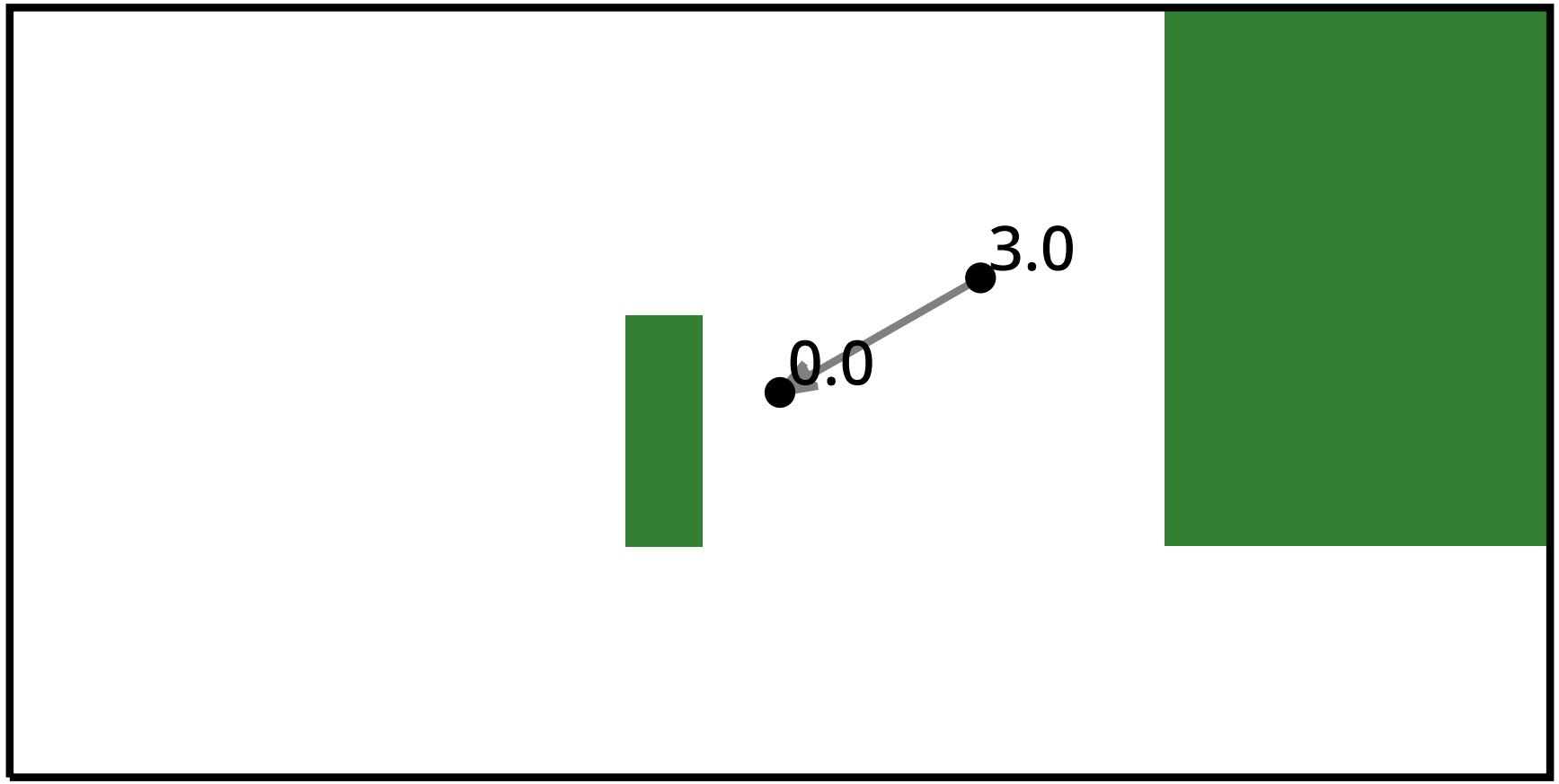
RRT*: Example 2

Rewire if needed; 0 changes this time.



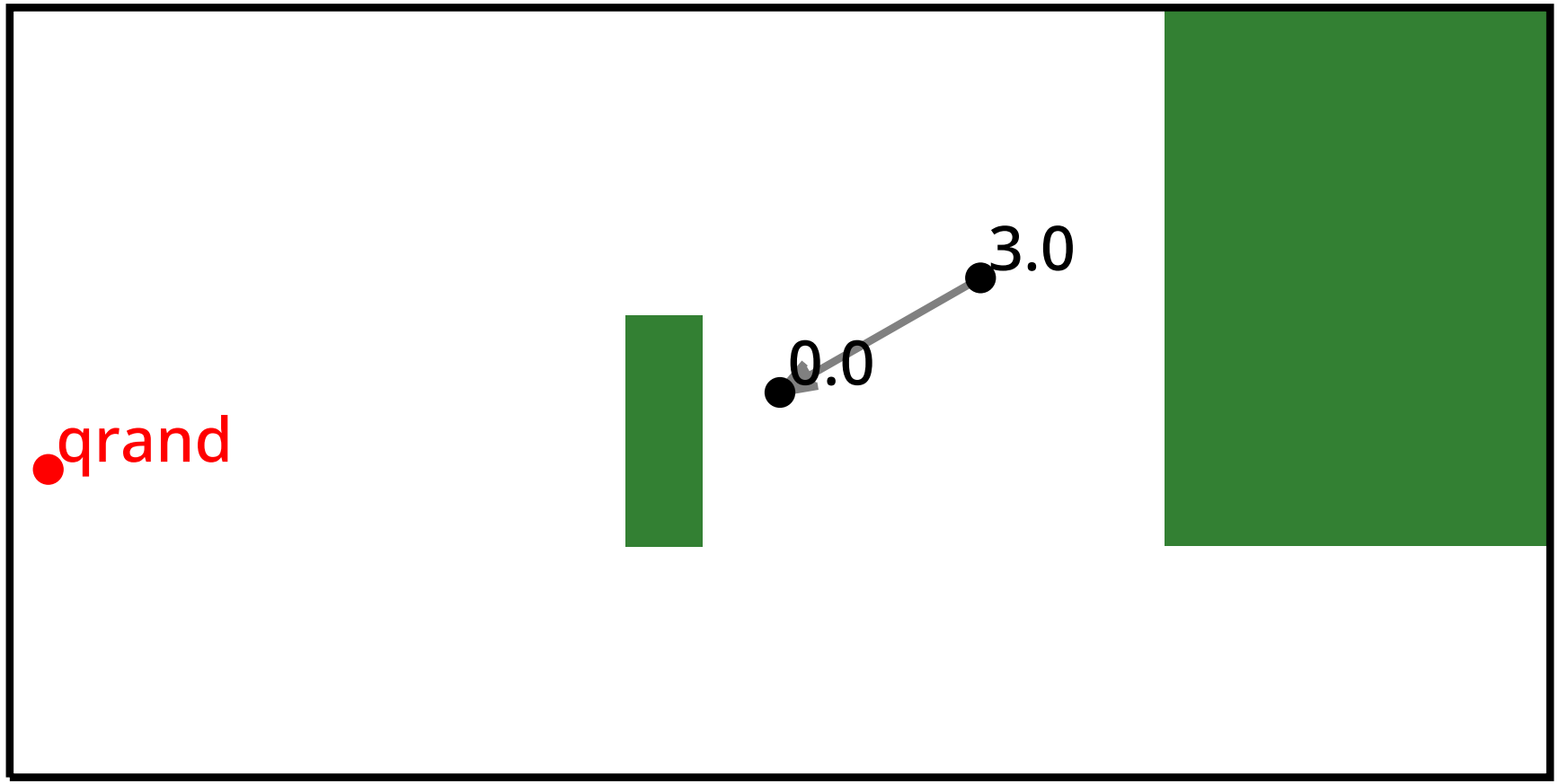
RRT*: Example 2

After 1 iterations.



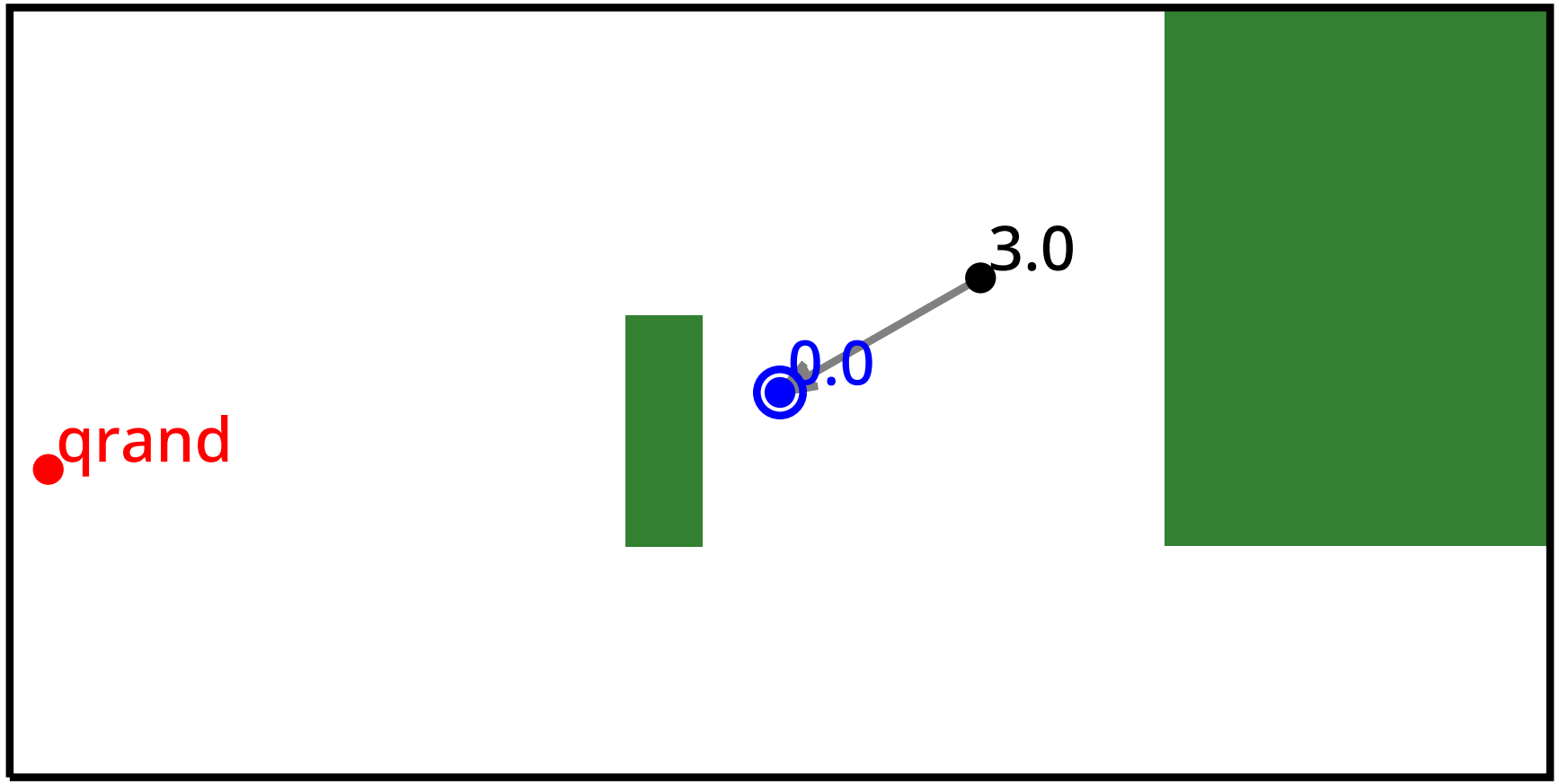
RRT*: Example 2

Choose a random sample.



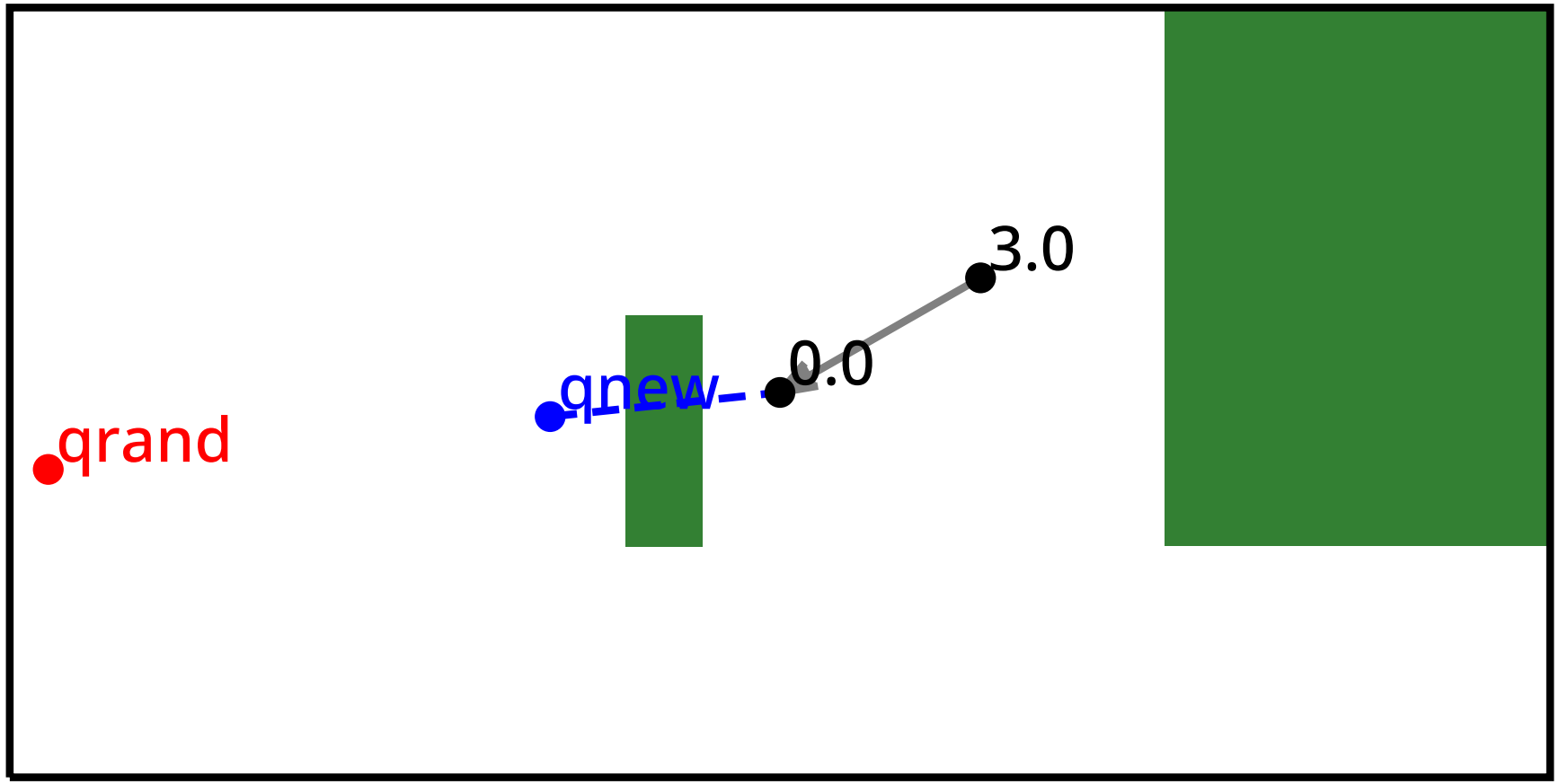
RRT*: Example 2

Find the nearest neighbor.



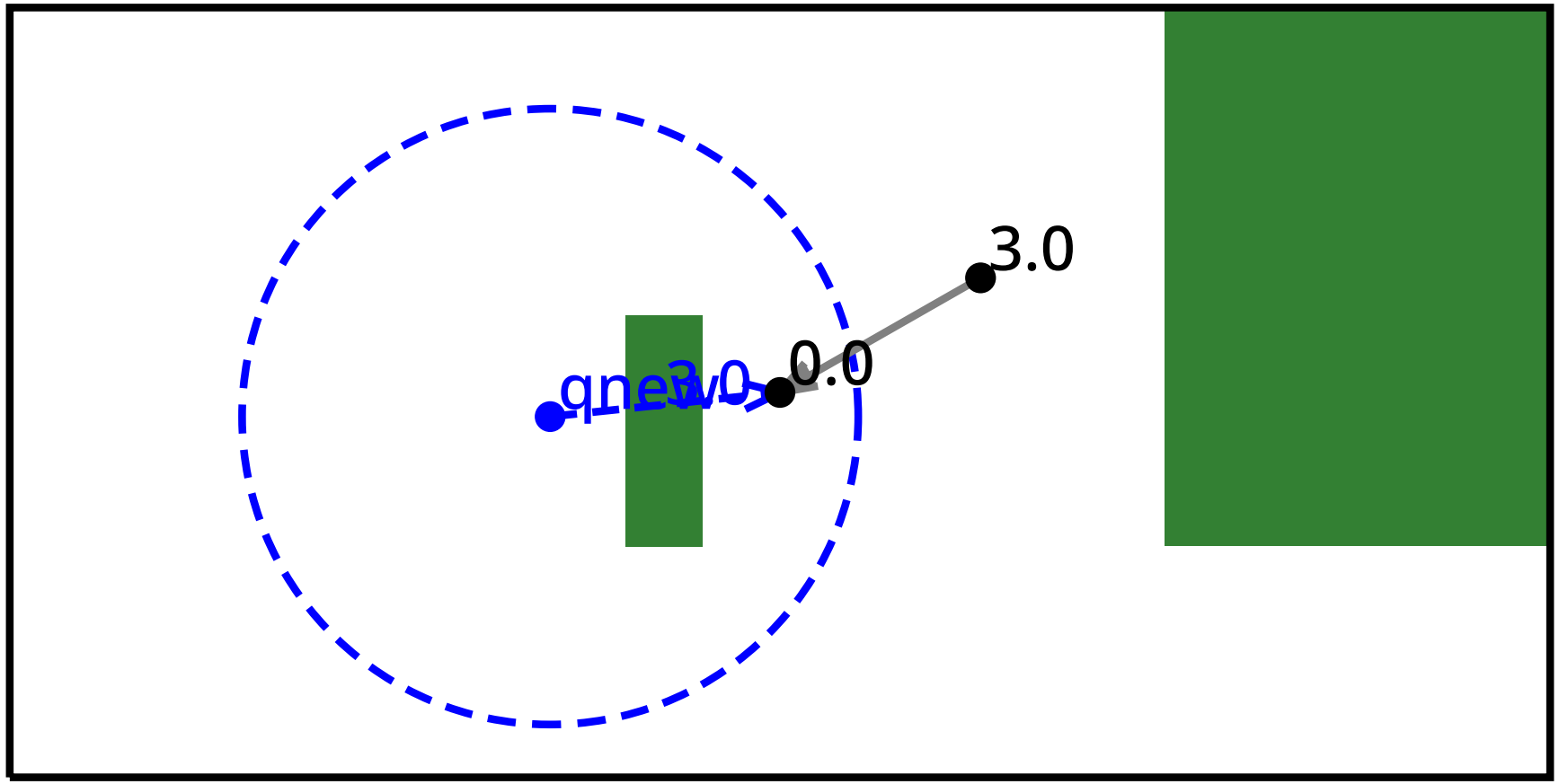
RRT*: Example 2

Extend from the nearest neighbor toward the sample.



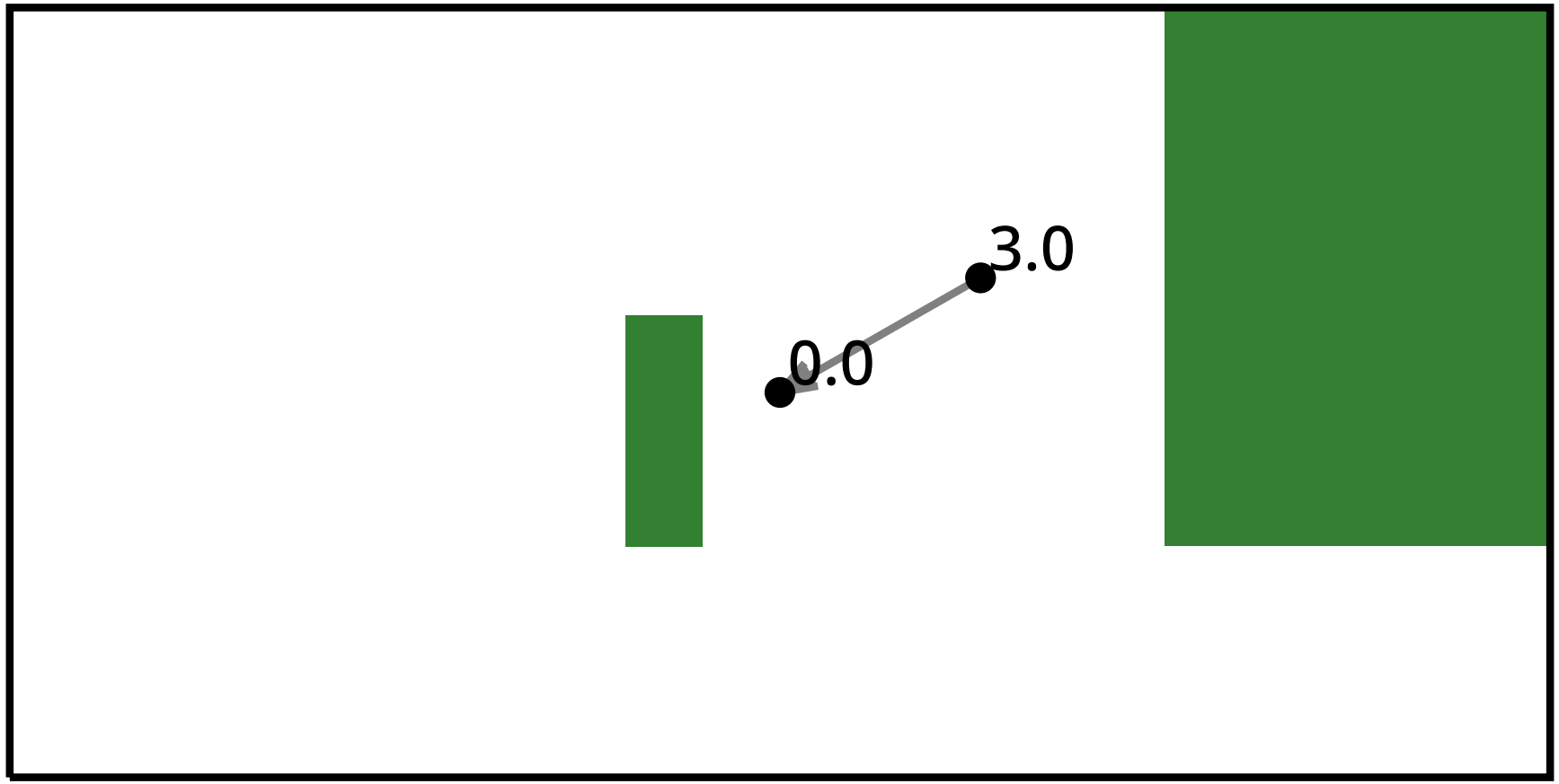
RRT*: Example 2

Find candidate parents for the new node; 1 candidate this time.



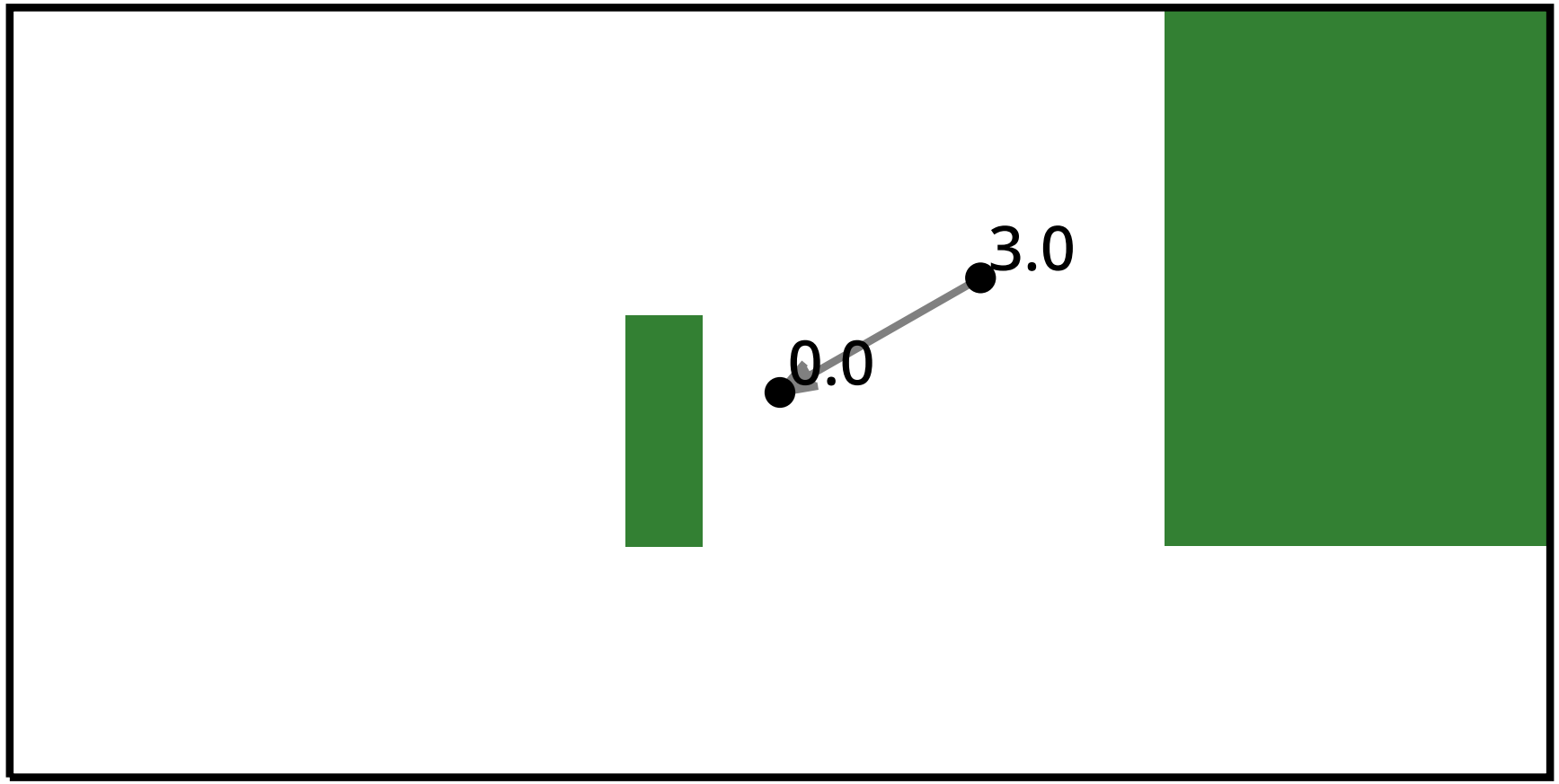
RRT*: Example 2

No valid parent available for the new node.



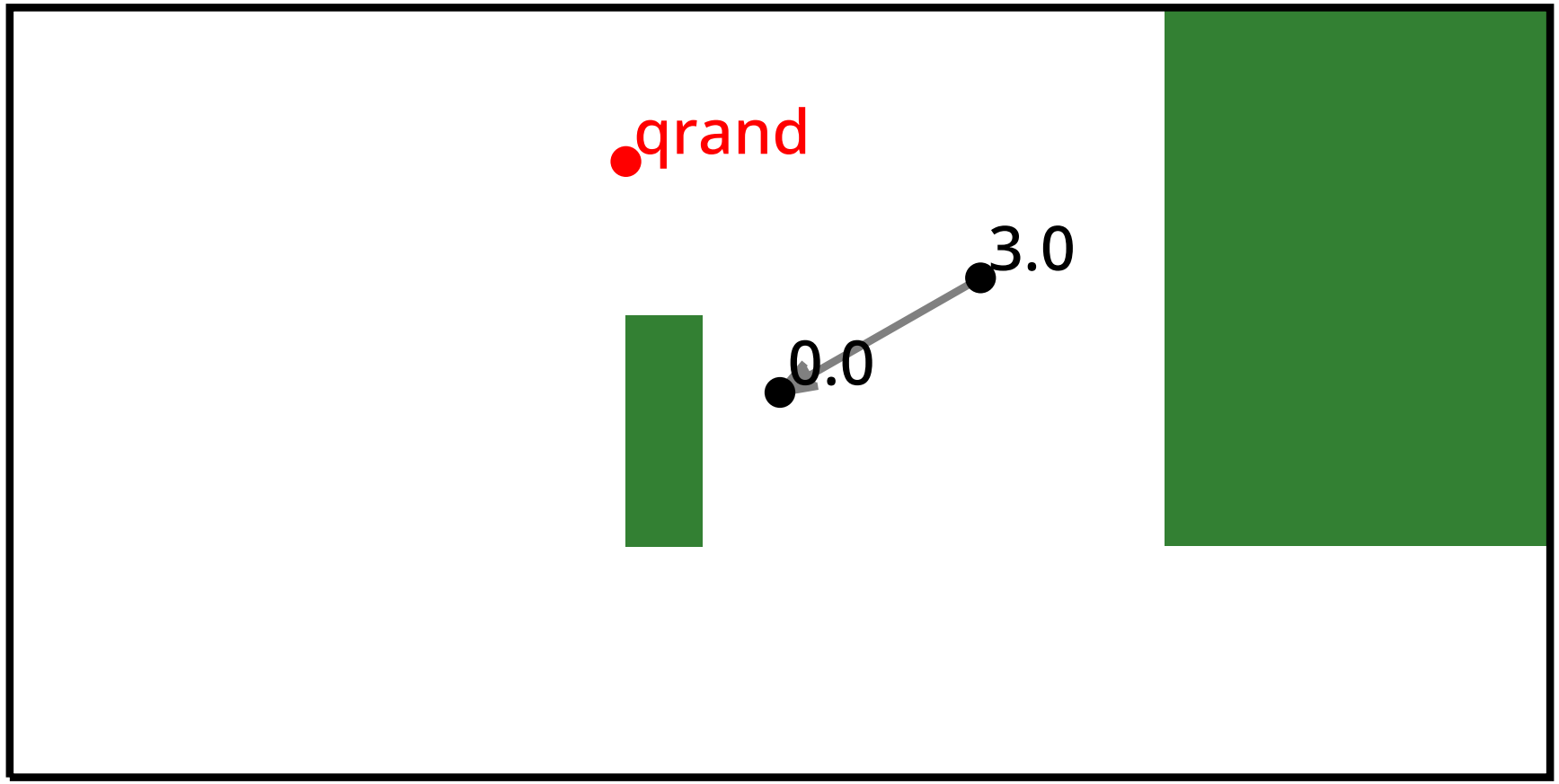
RRT*: Example 2

After 2 iterations.



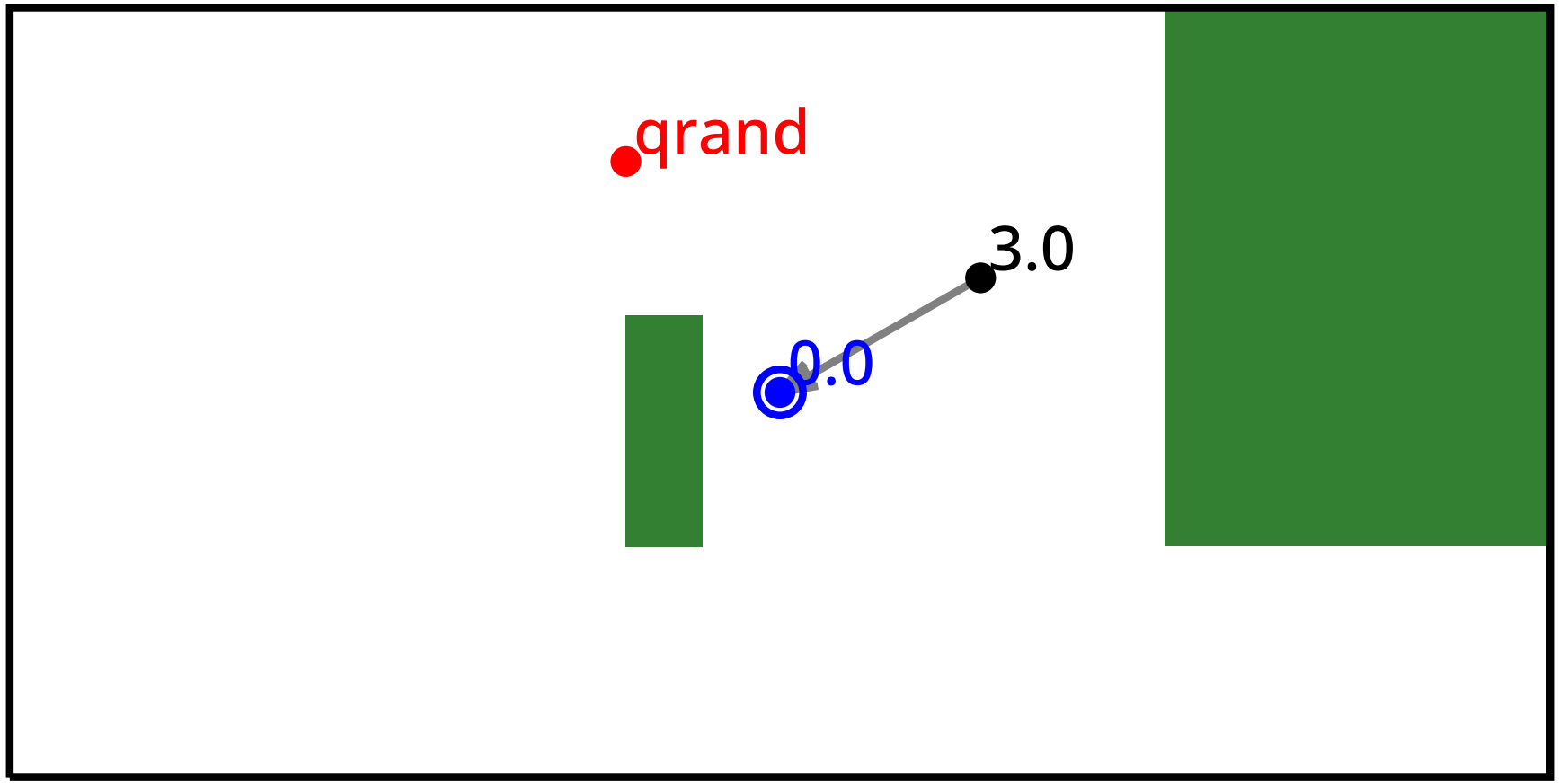
RRT*: Example 2

Choose a random sample.



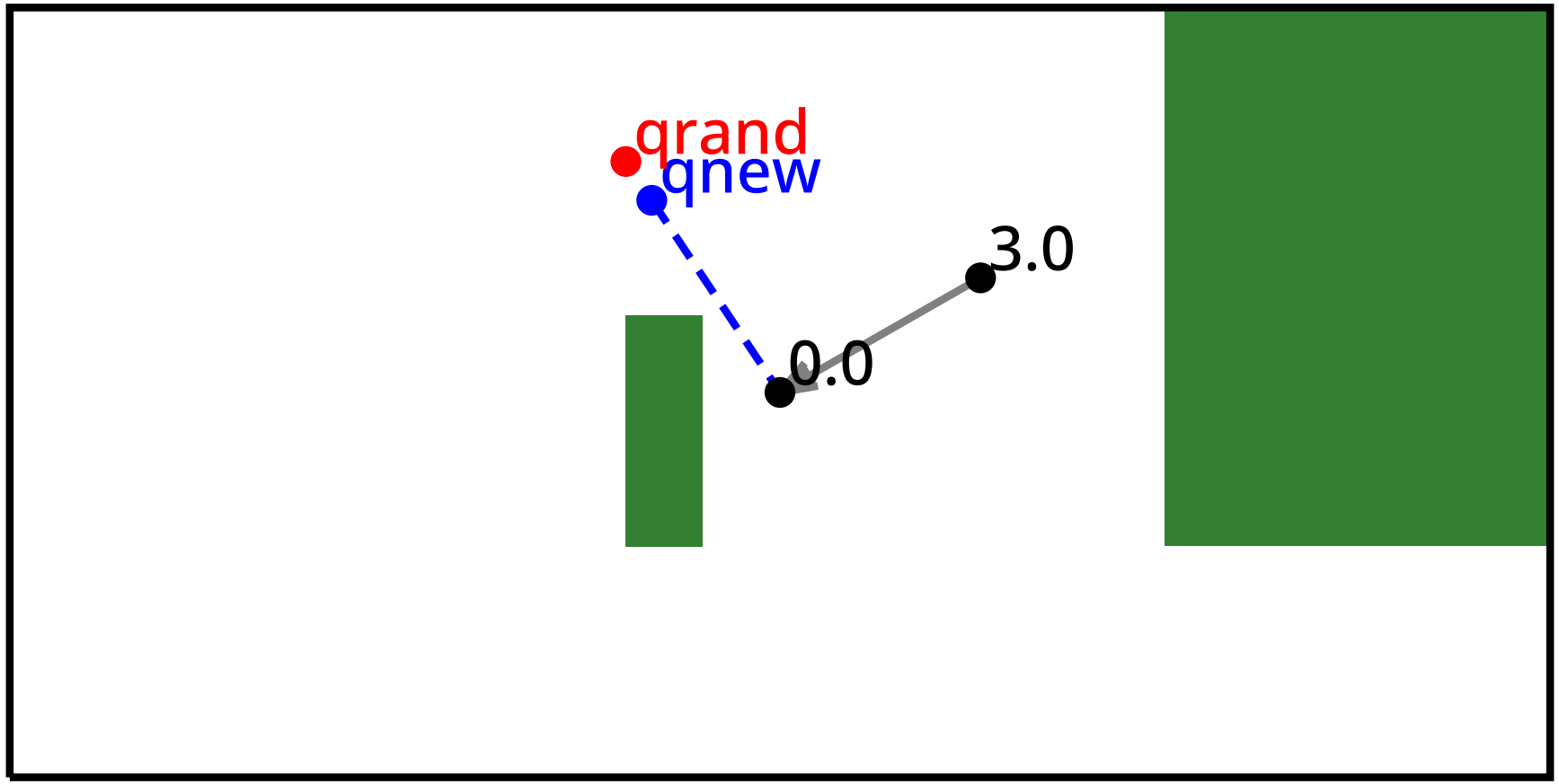
RRT*: Example 2

Find the nearest neighbor.



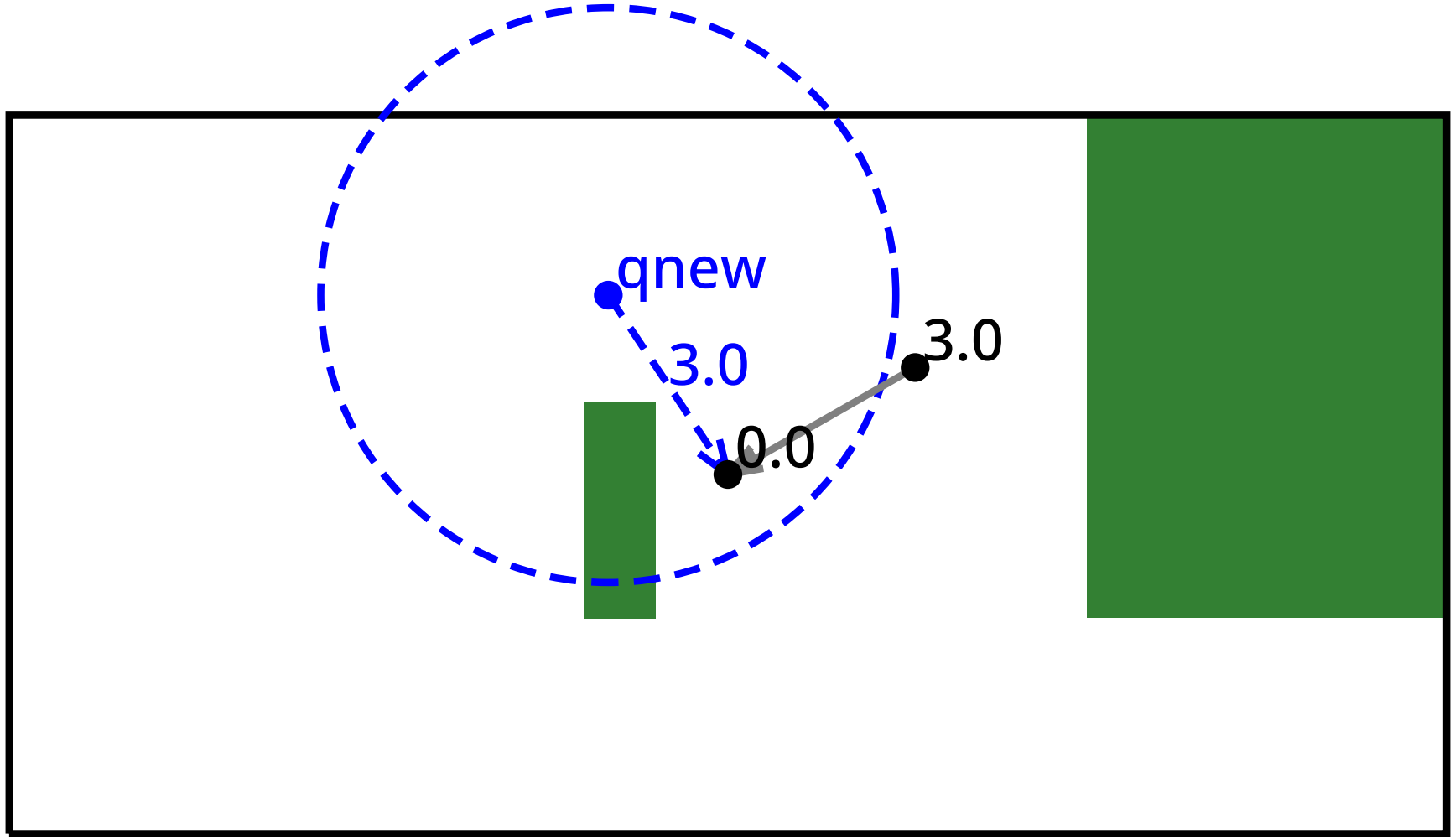
RRT*: Example 2

Extend from the nearest neighbor toward the sample.



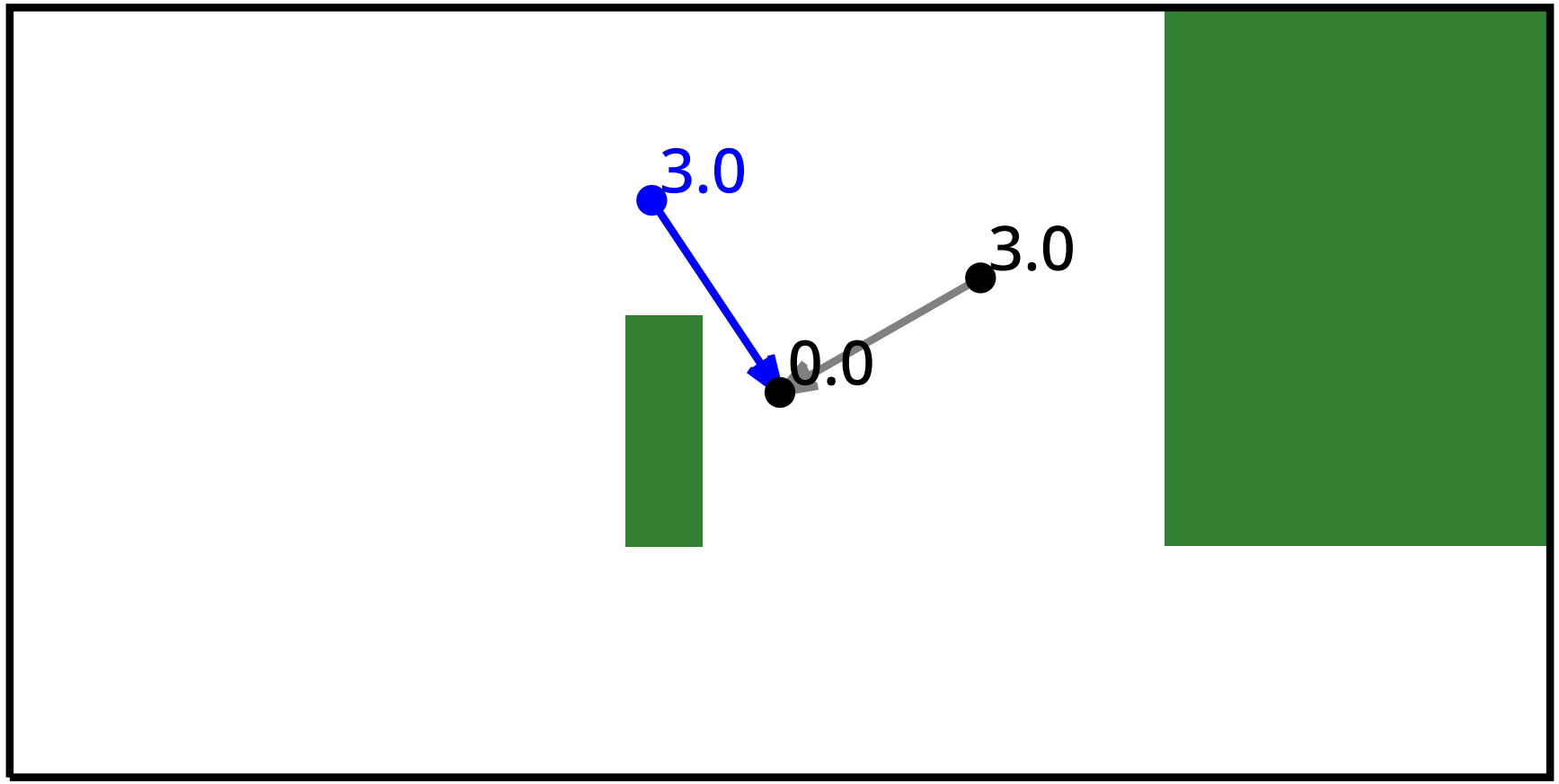
RRT*: Example 2

Find candidate parents for the new node; 1 candidate this time.



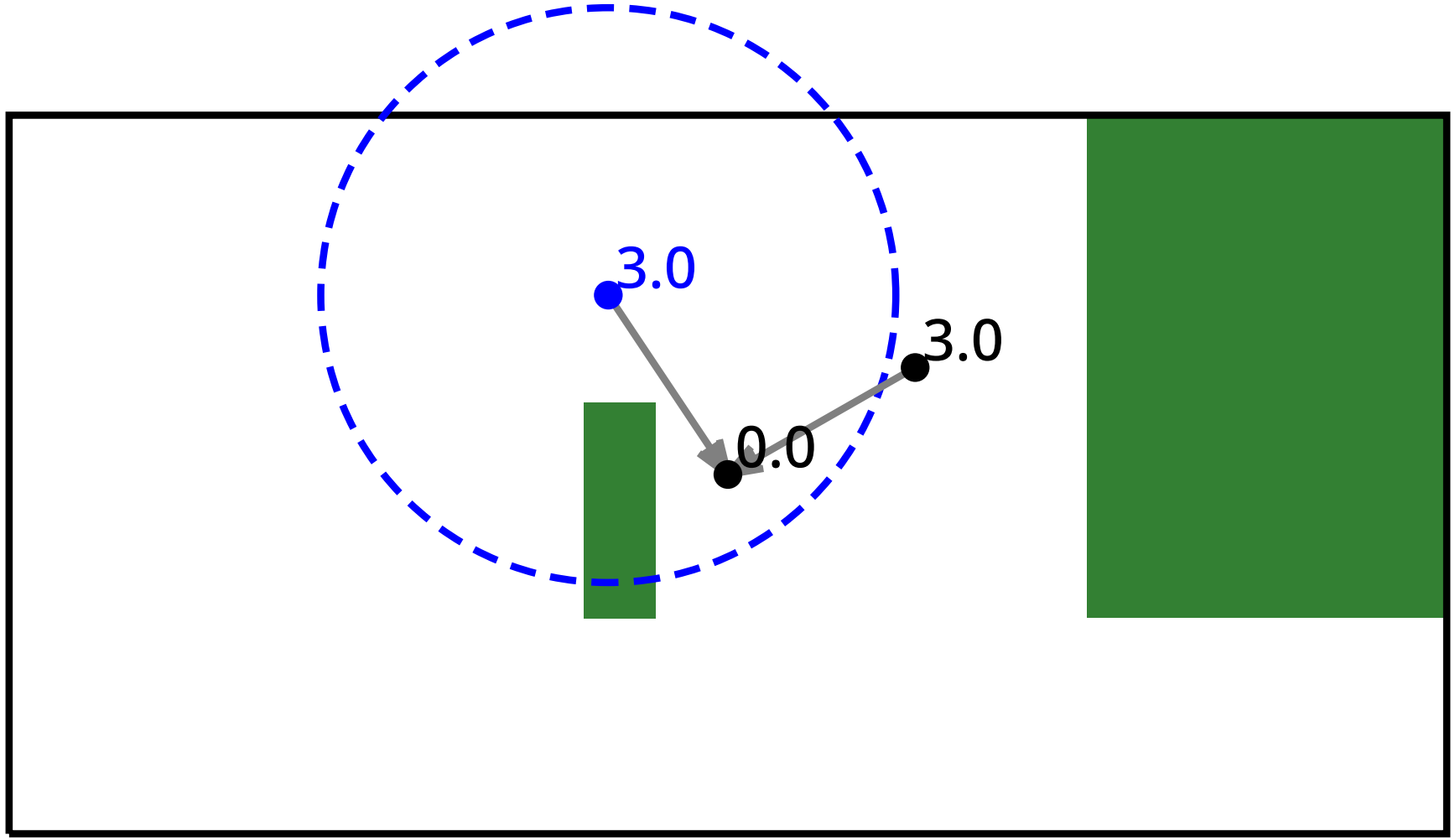
RRT*: Example 2

Choose the best parent for the new node.



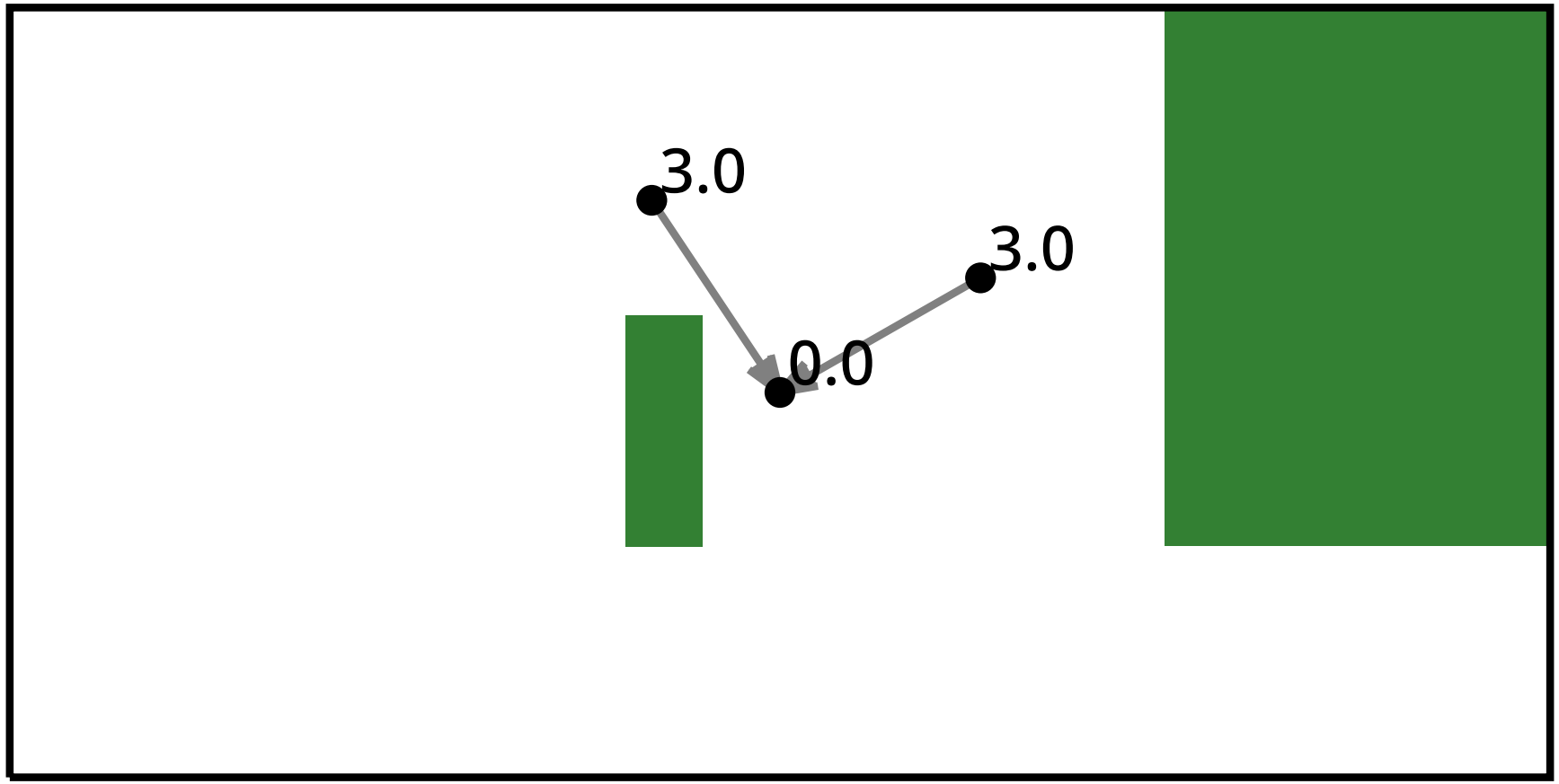
RRT*: Example 2

Find rewiring candidates near the new node; 0 candidates this time.



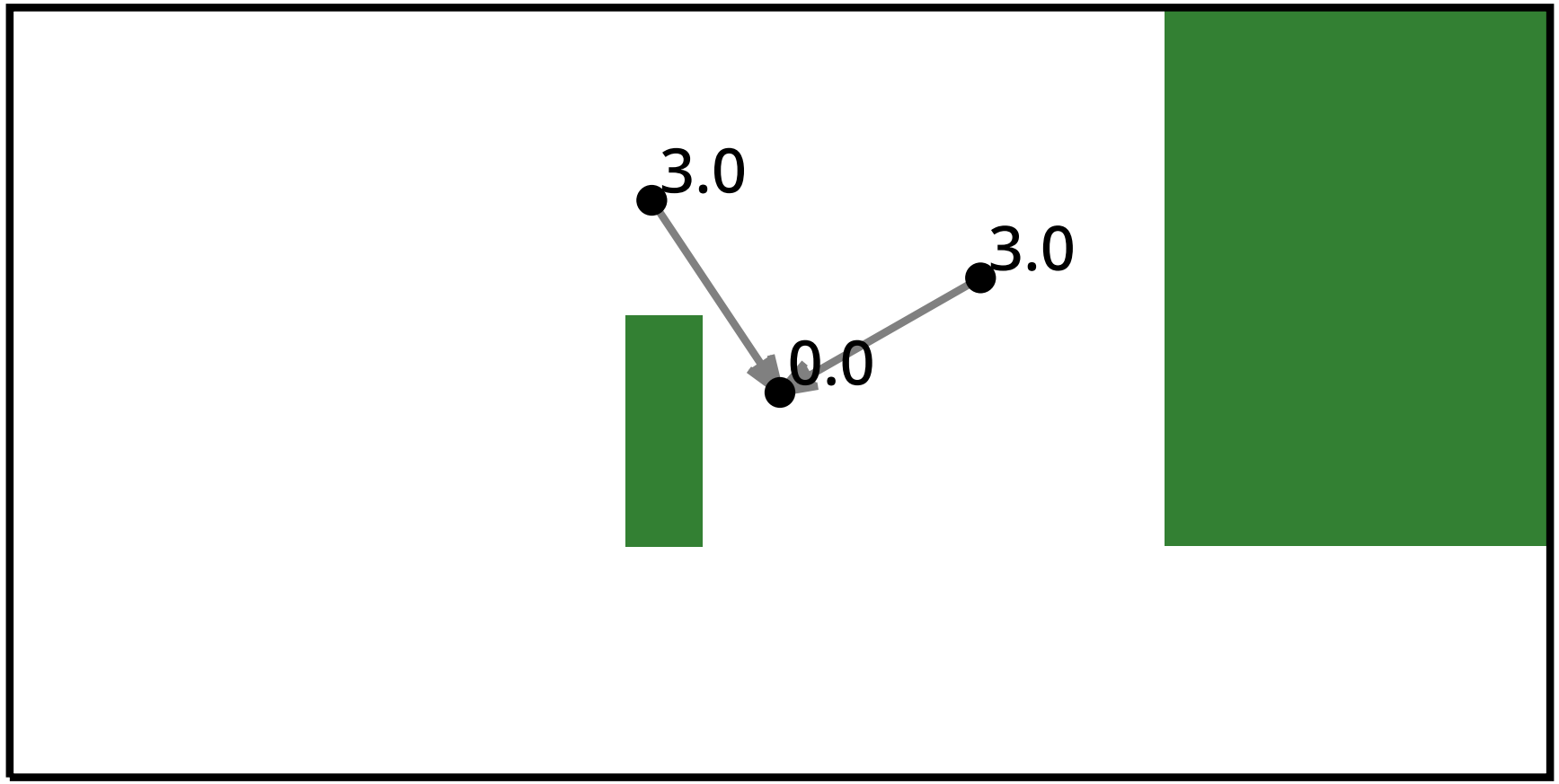
RRT*: Example 2

Rewire if needed; 0 changes this time.



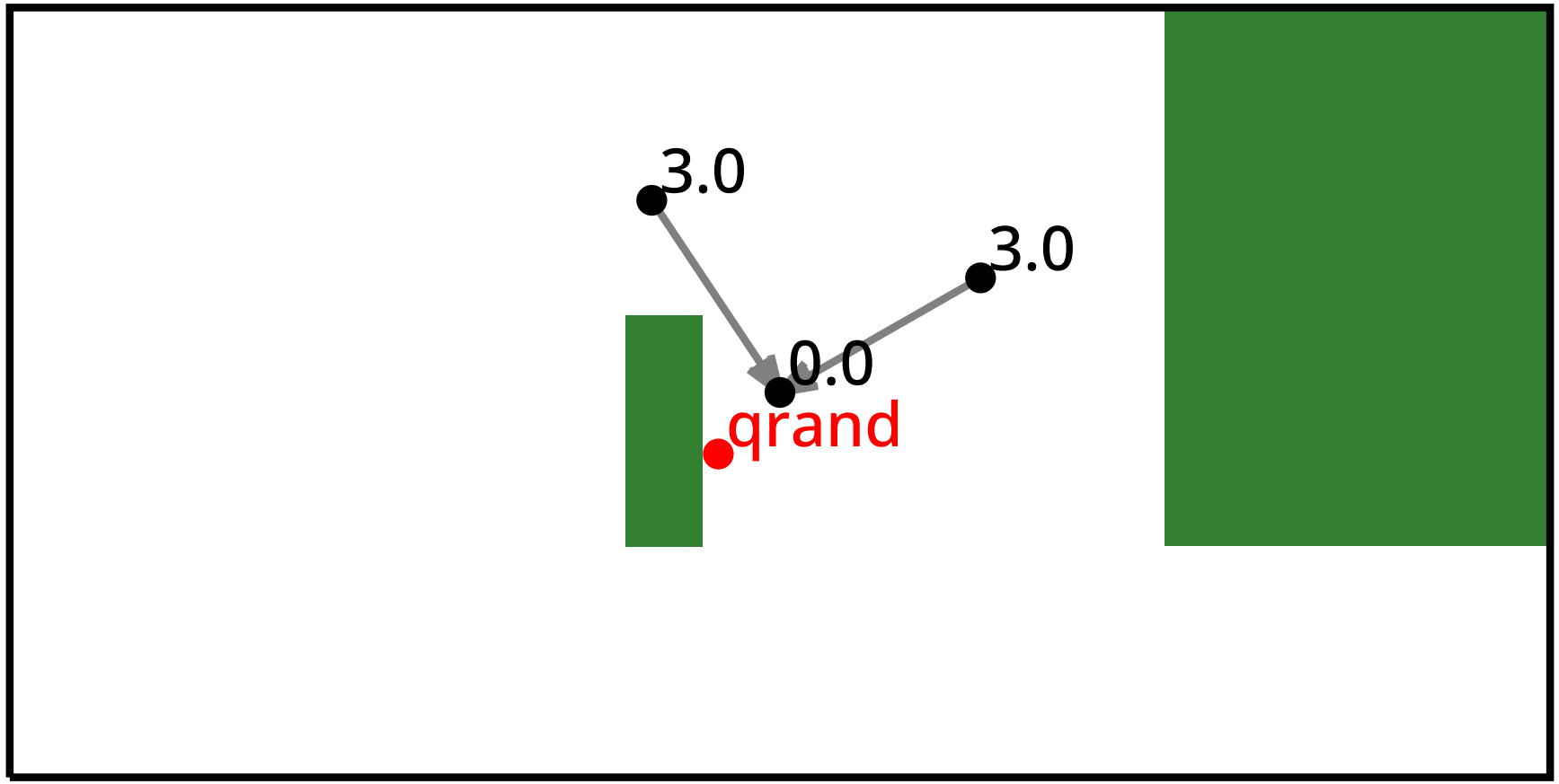
RRT*: Example 2

After 3 iterations.



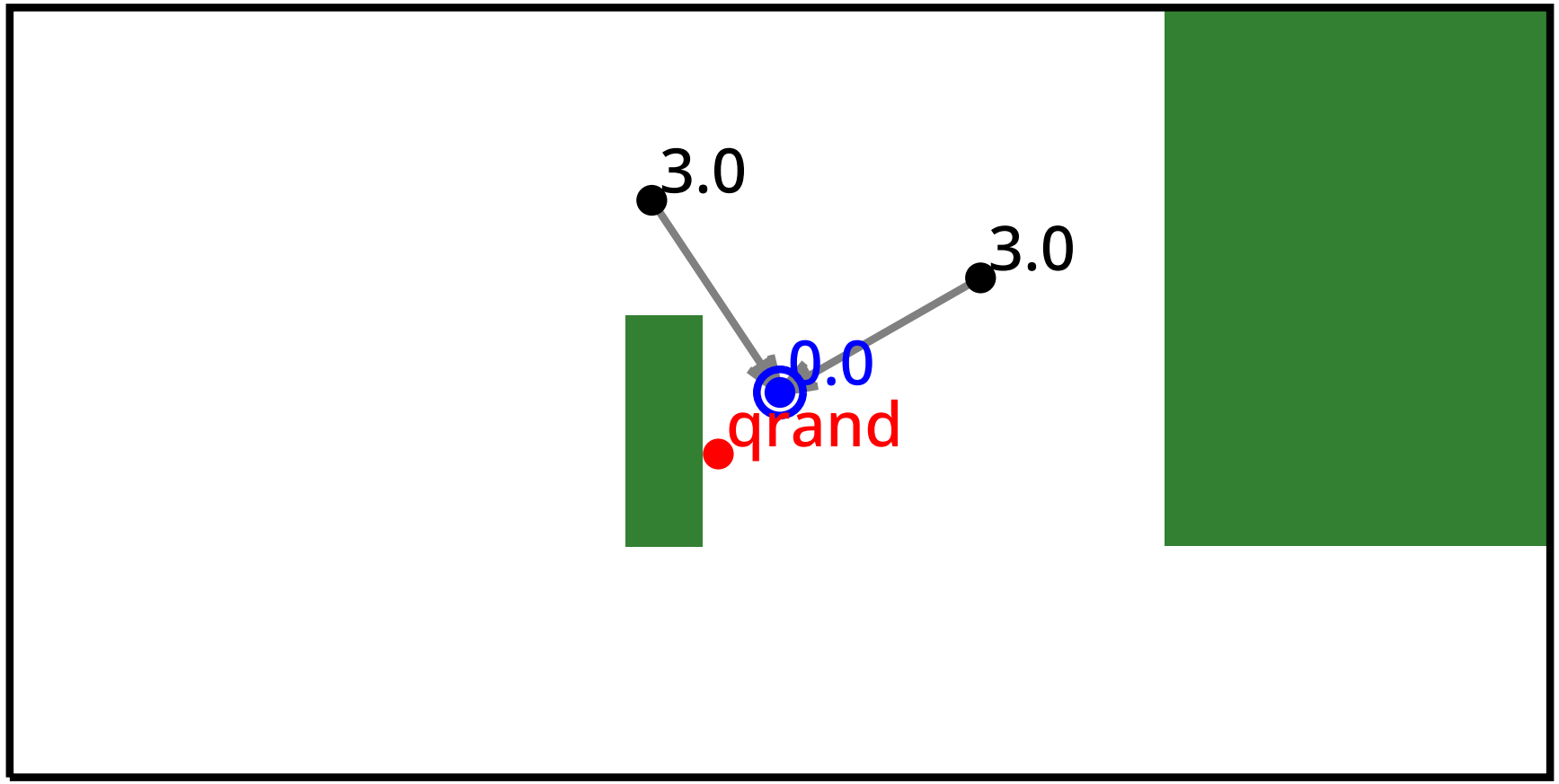
RRT*: Example 2

Choose a random sample.



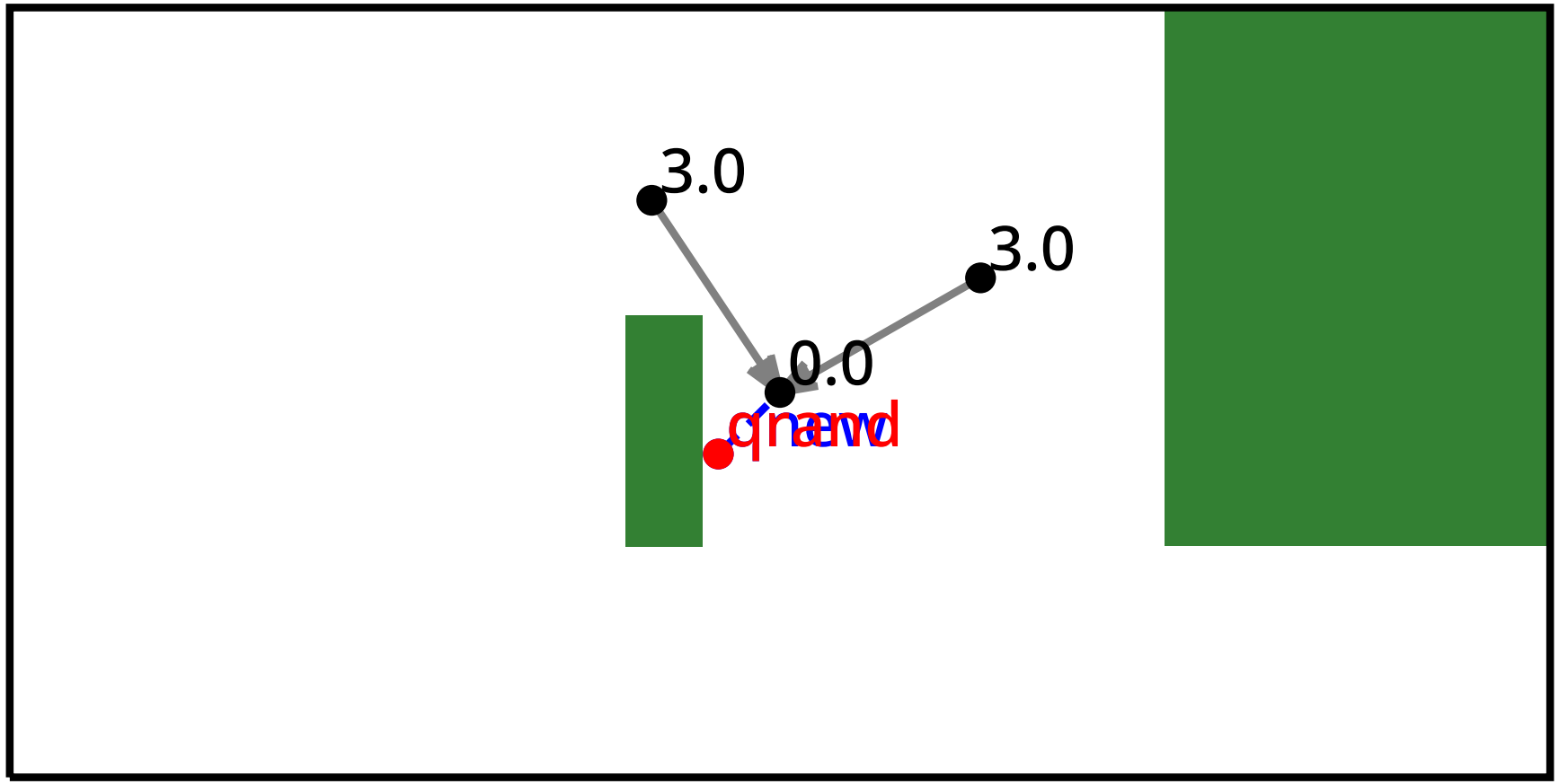
RRT*: Example 2

Find the nearest neighbor.



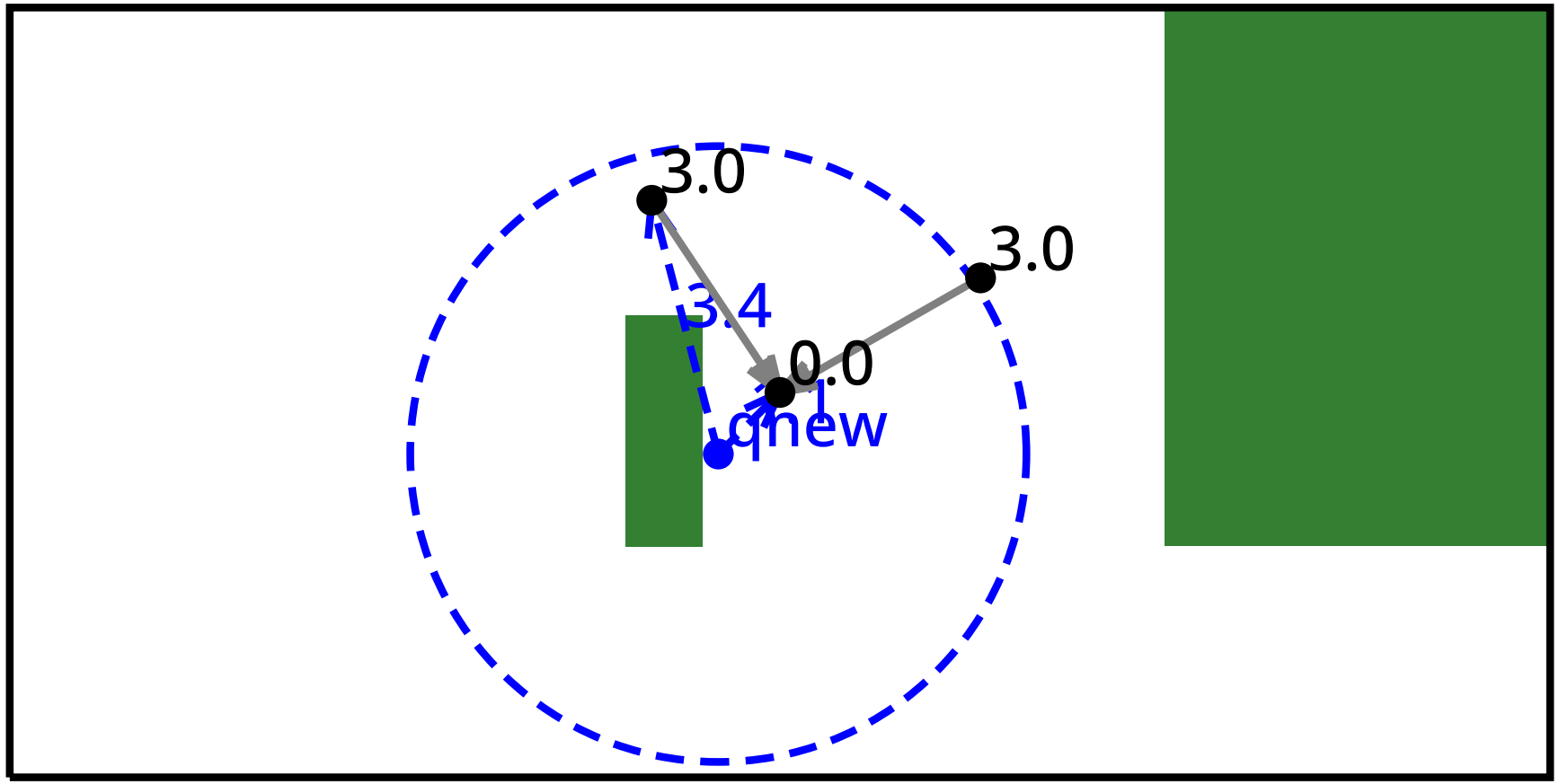
RRT*: Example 2

Extend from the nearest neighbor toward the sample.



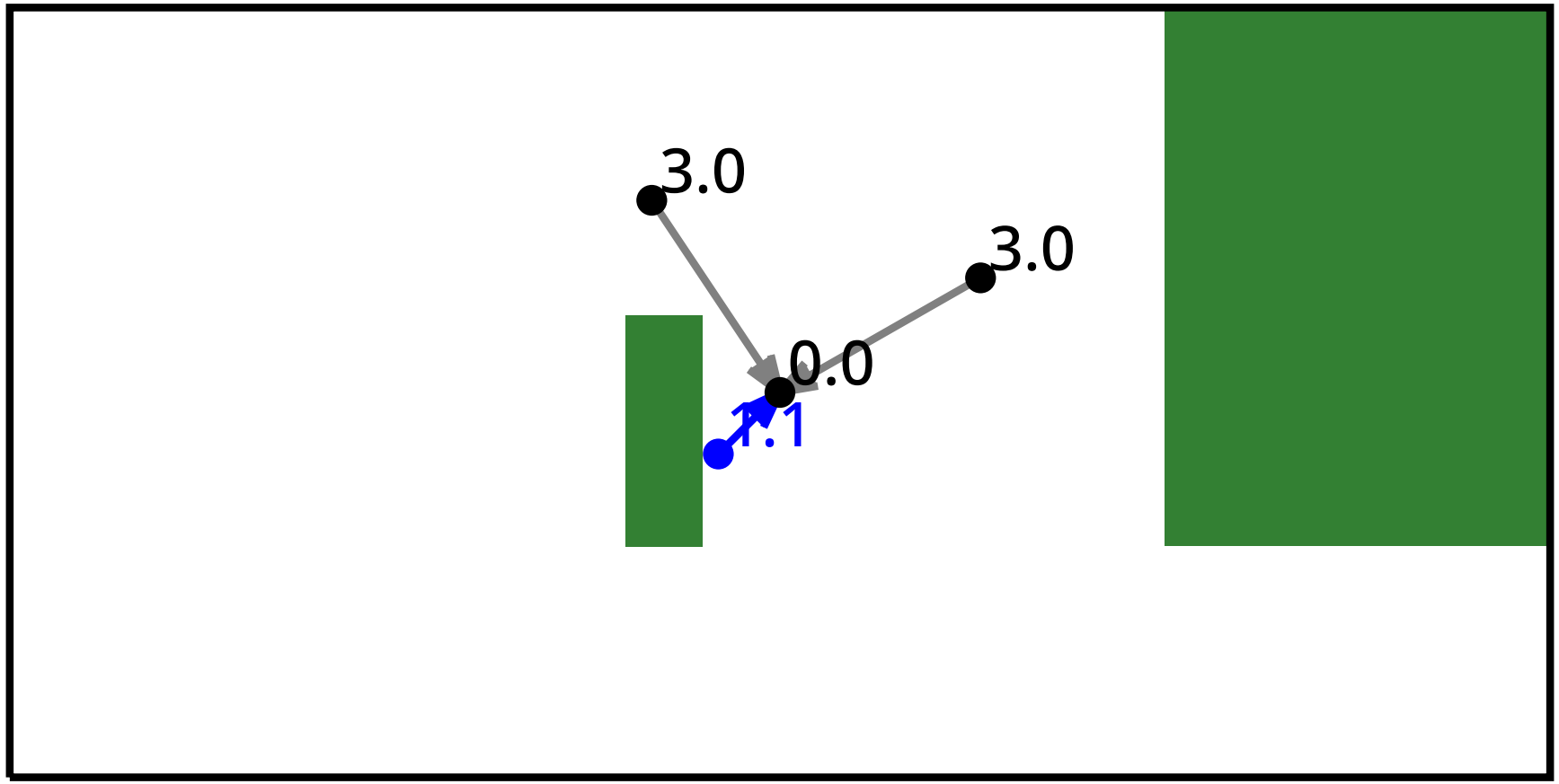
RRT*: Example 2

Find candidate parents for the new node; 2 candidates this time.



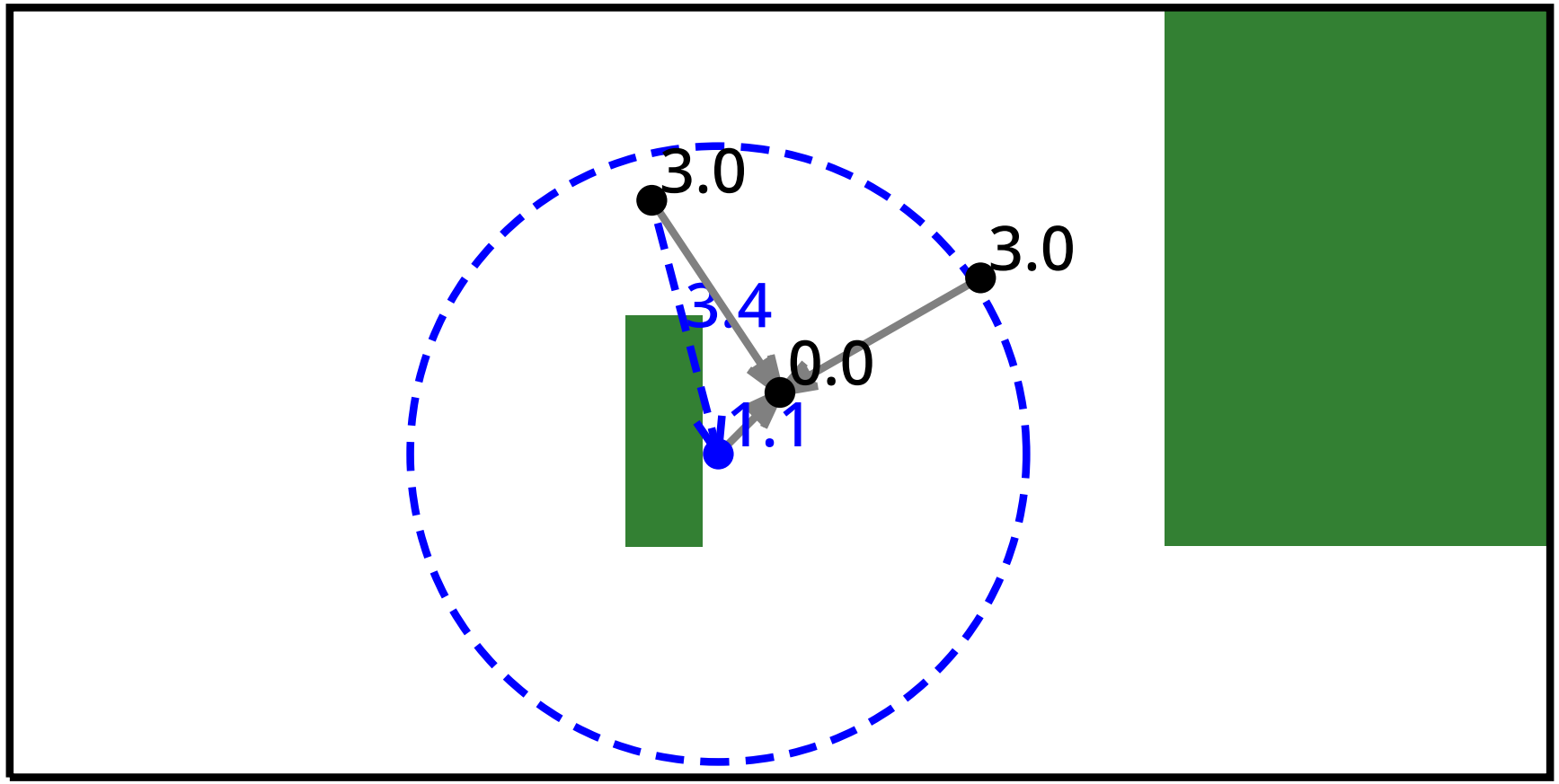
RRT*: Example 2

Choose the best parent for the new node.



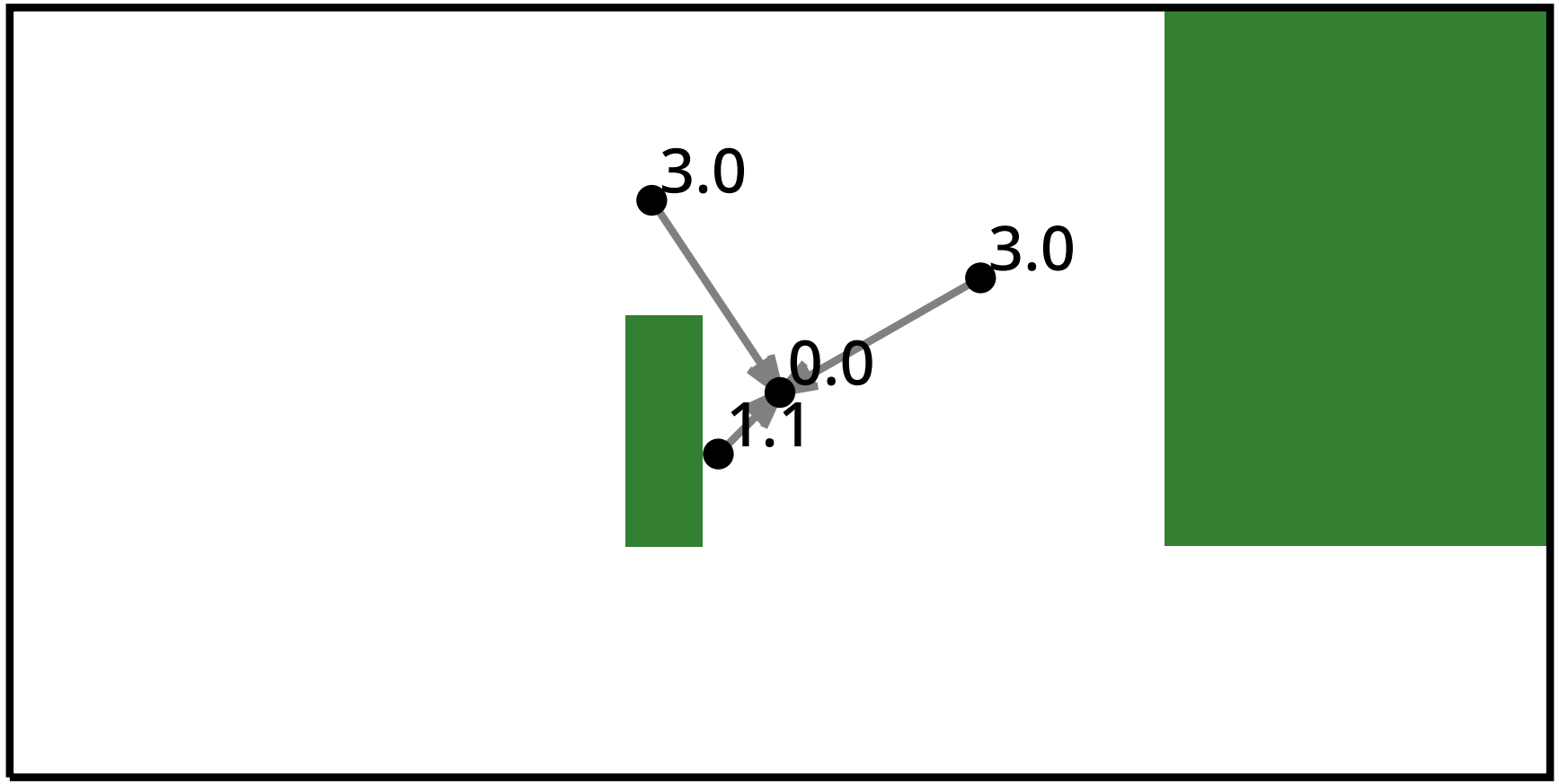
RRT*: Example 2

Find rewiring candidates near the new node; 1 candidate this time.



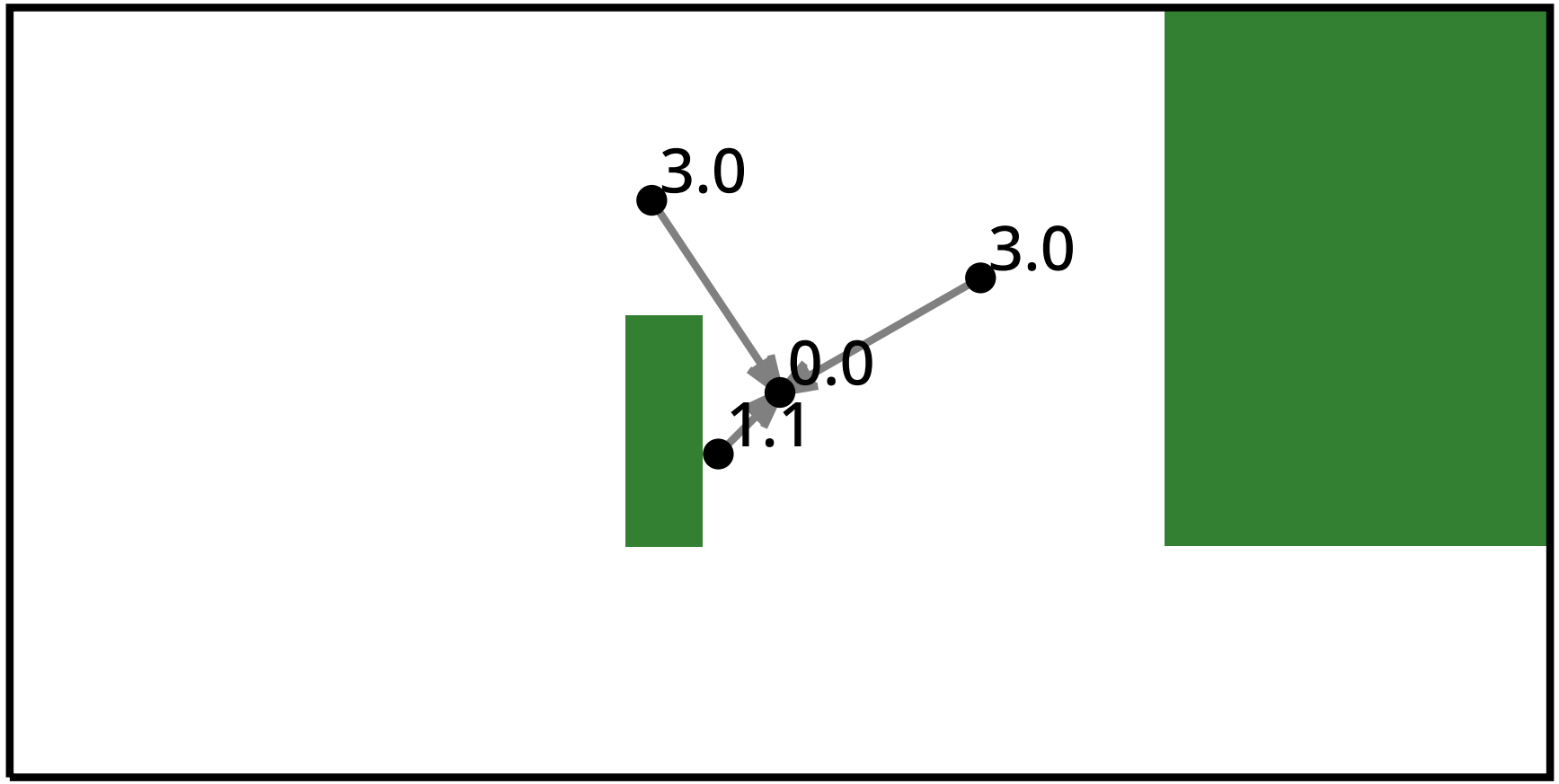
RRT*: Example 2

Rewire if needed; 0 changes this time.



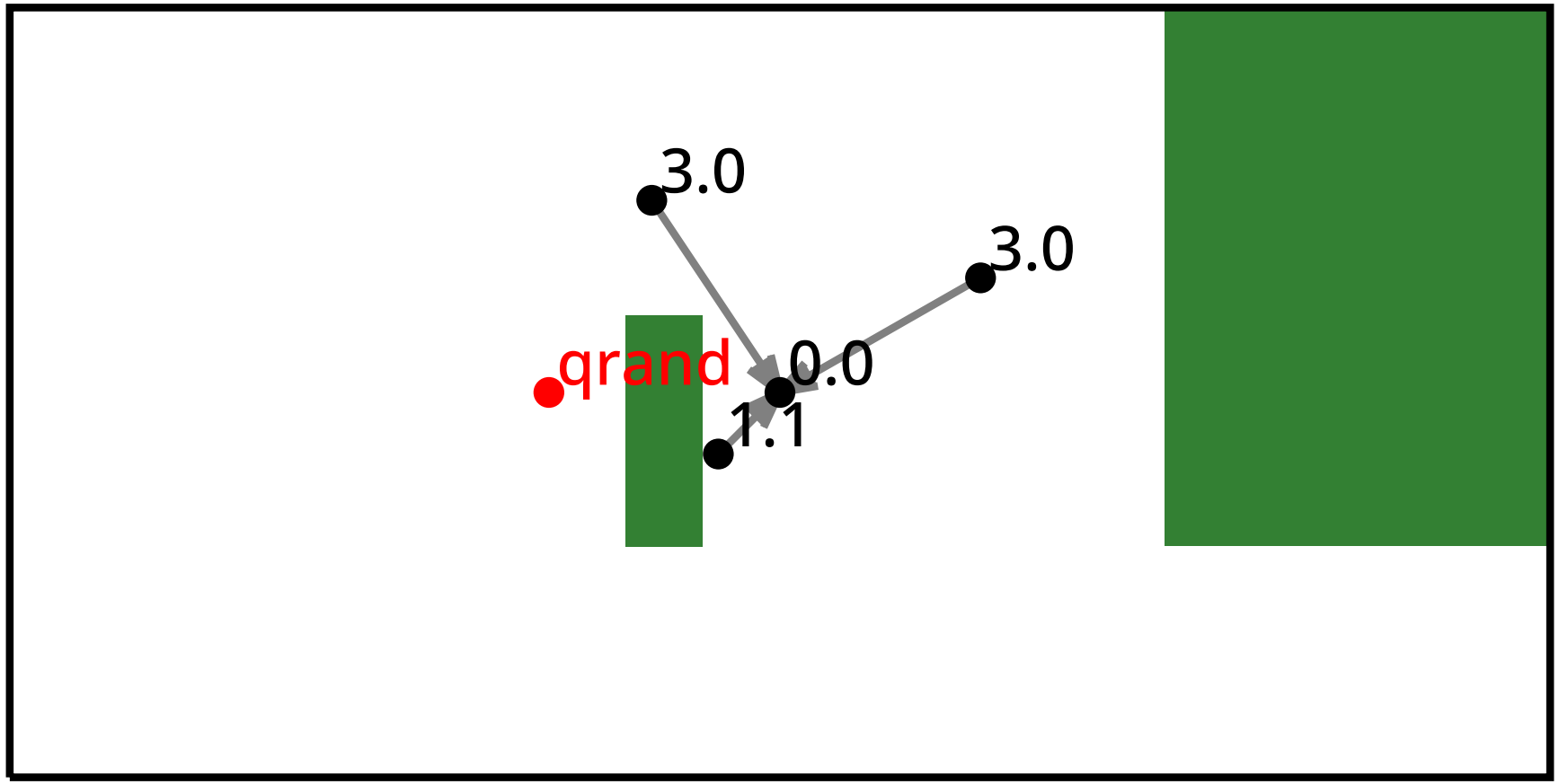
RRT*: Example 2

After 4 iterations.



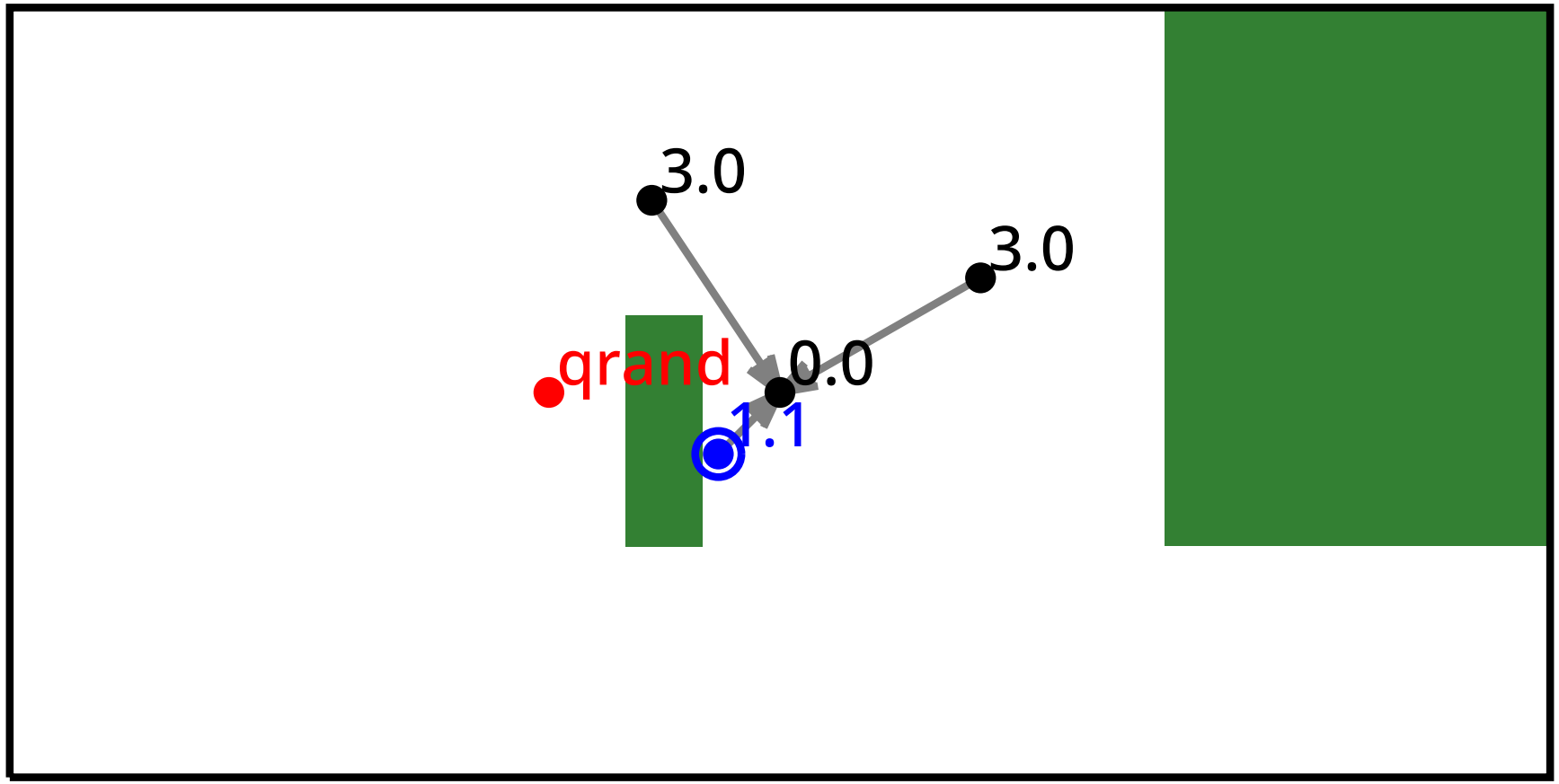
RRT*: Example 2

Choose a random sample.



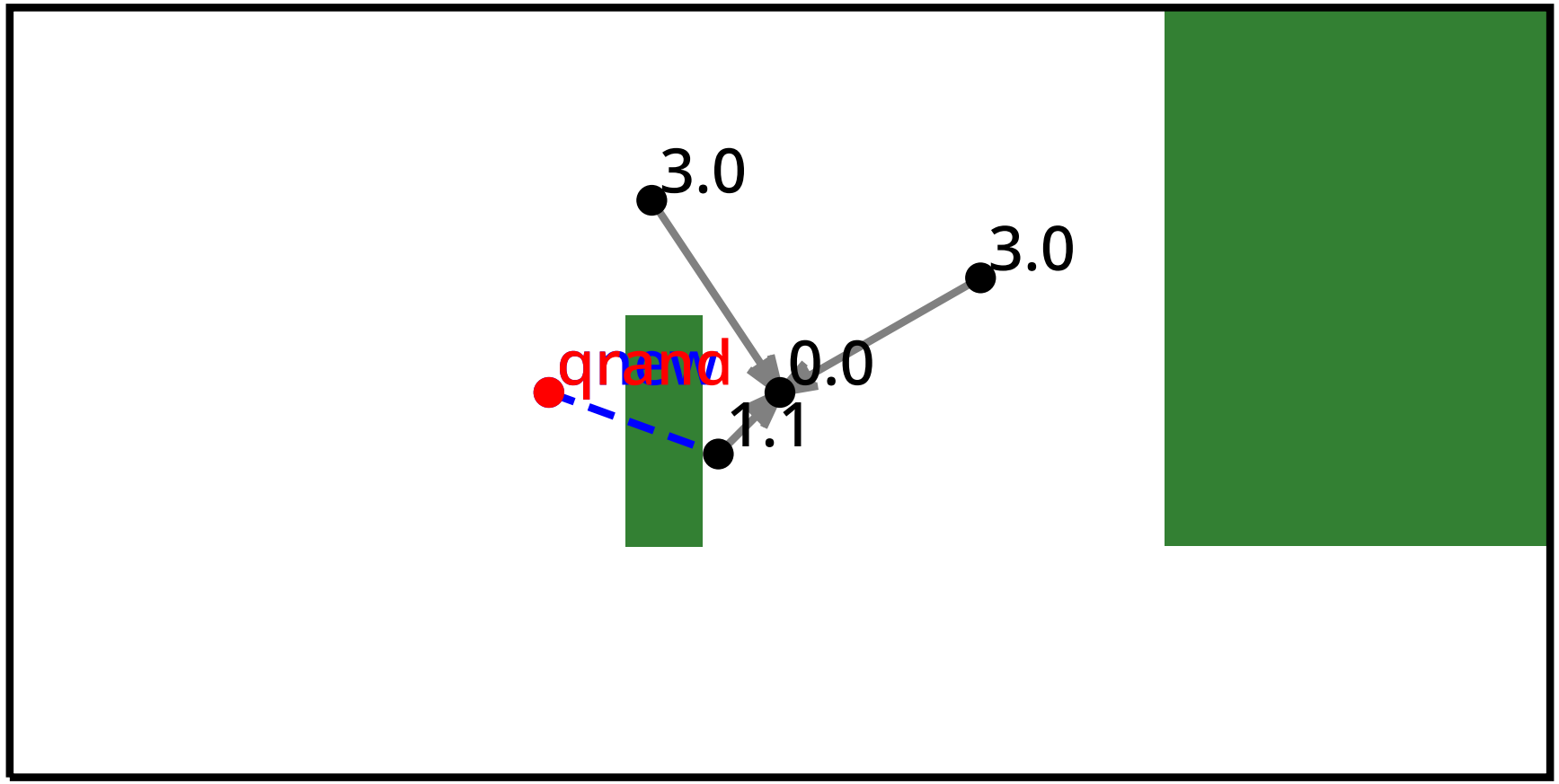
RRT*: Example 2

Find the nearest neighbor.



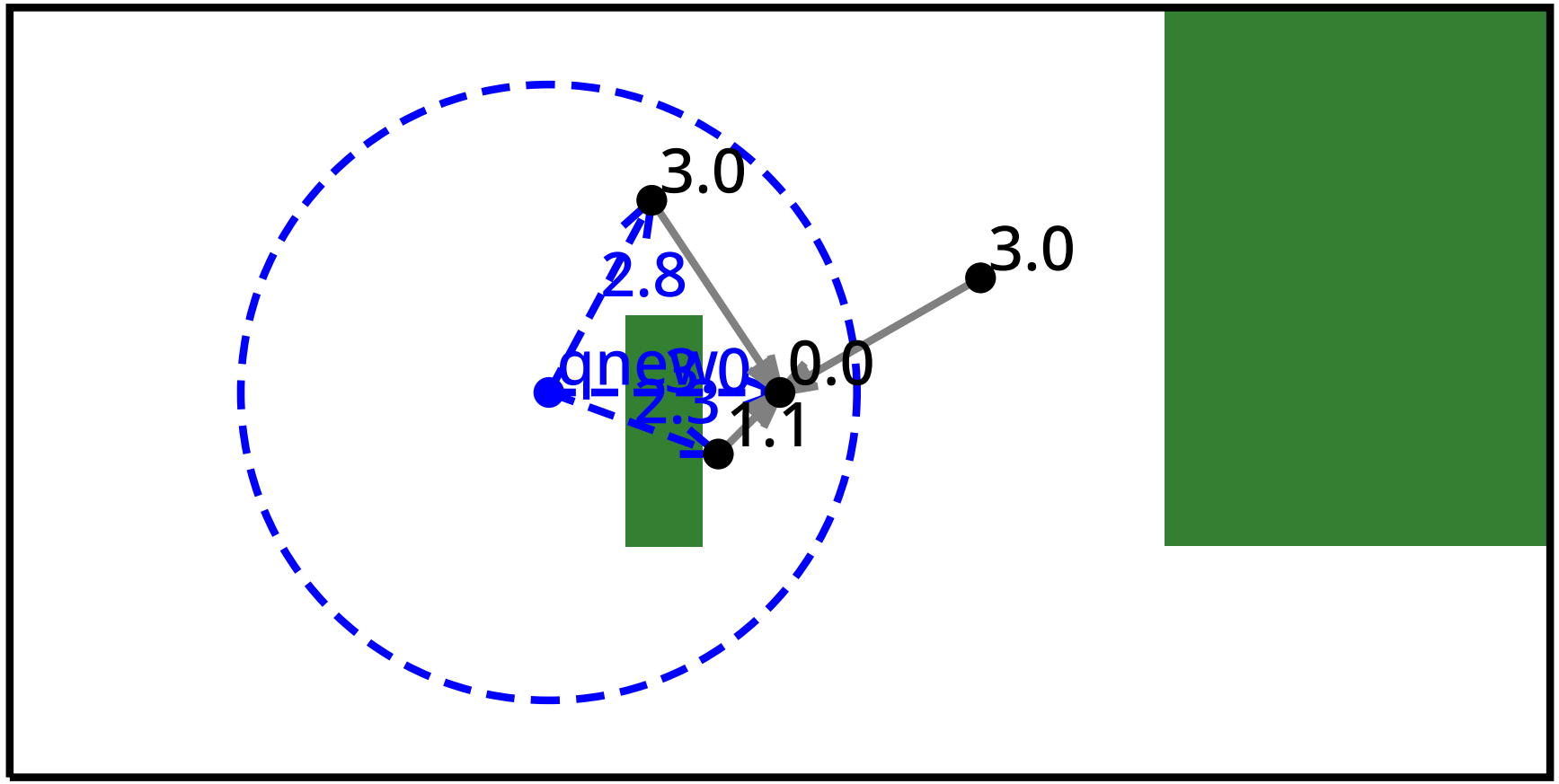
RRT*: Example 2

Extend from the nearest neighbor toward the sample.



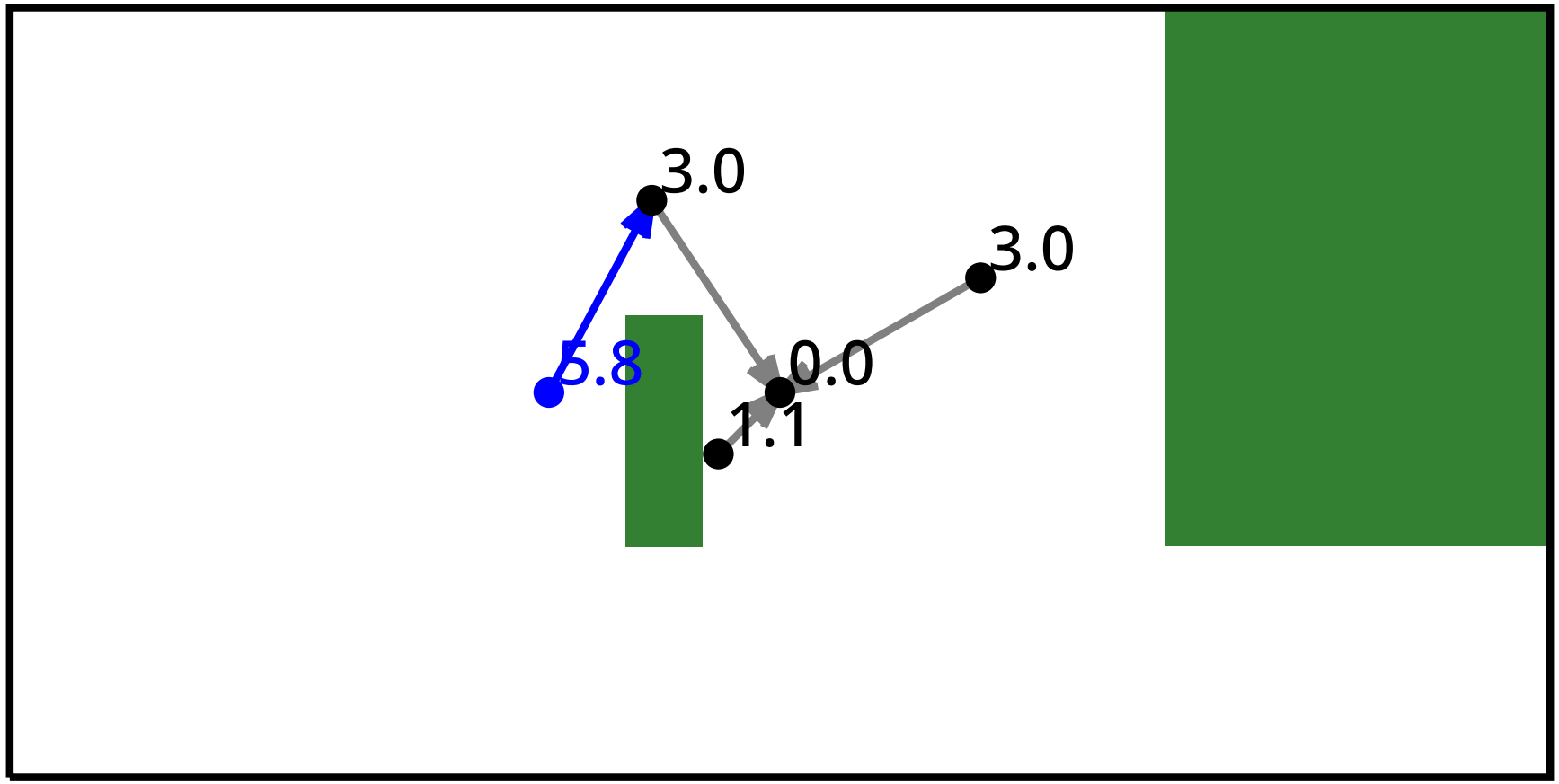
RRT*: Example 2

Find candidate parents for the new node; 3 candidates this time.



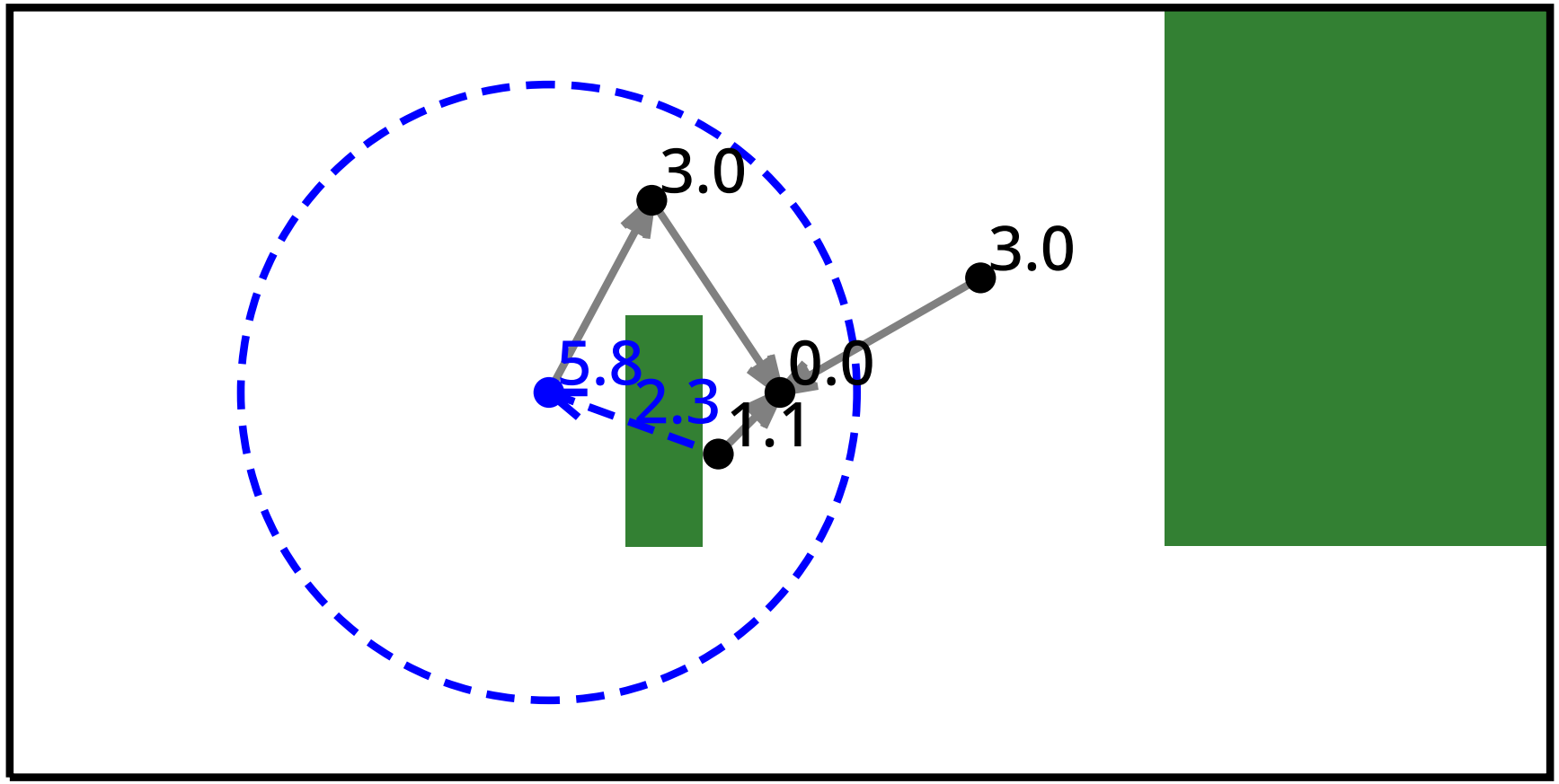
RRT*: Example 2

Choose the best parent for the new node.



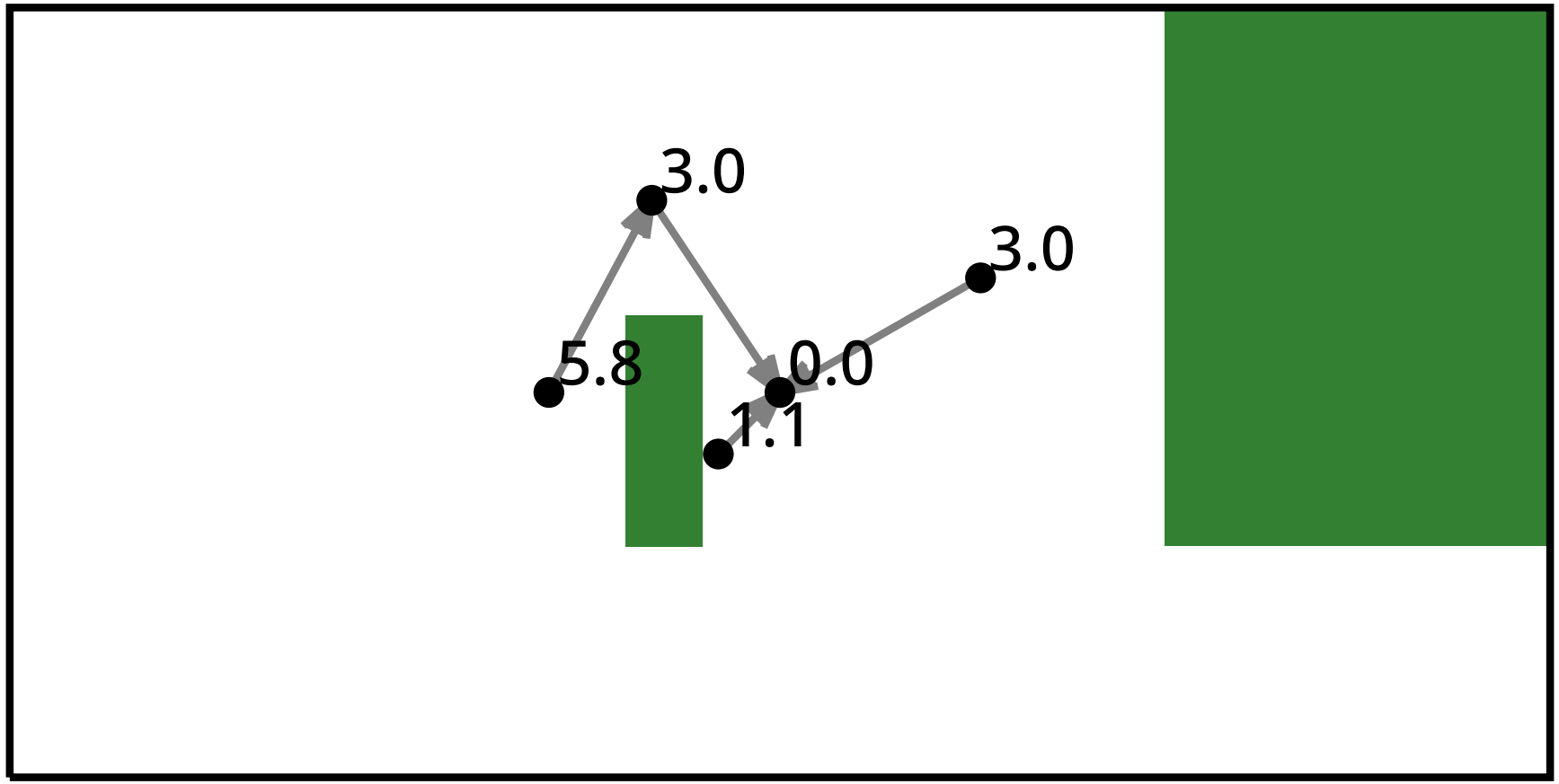
RRT*: Example 2

Find rewiring candidates near the new node; 1 candidate this time.



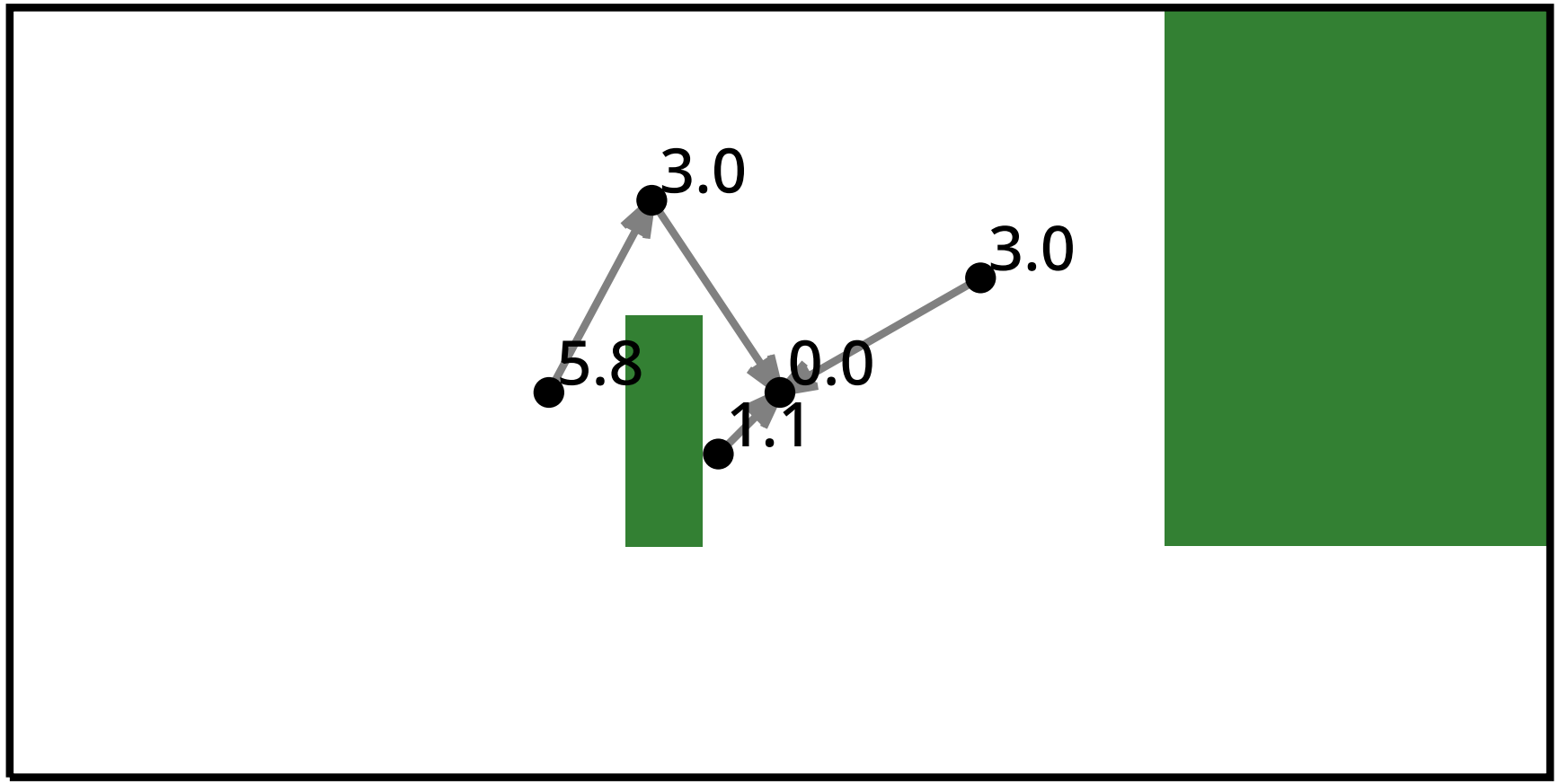
RRT*: Example 2

Rewire if needed; 0 changes this time.



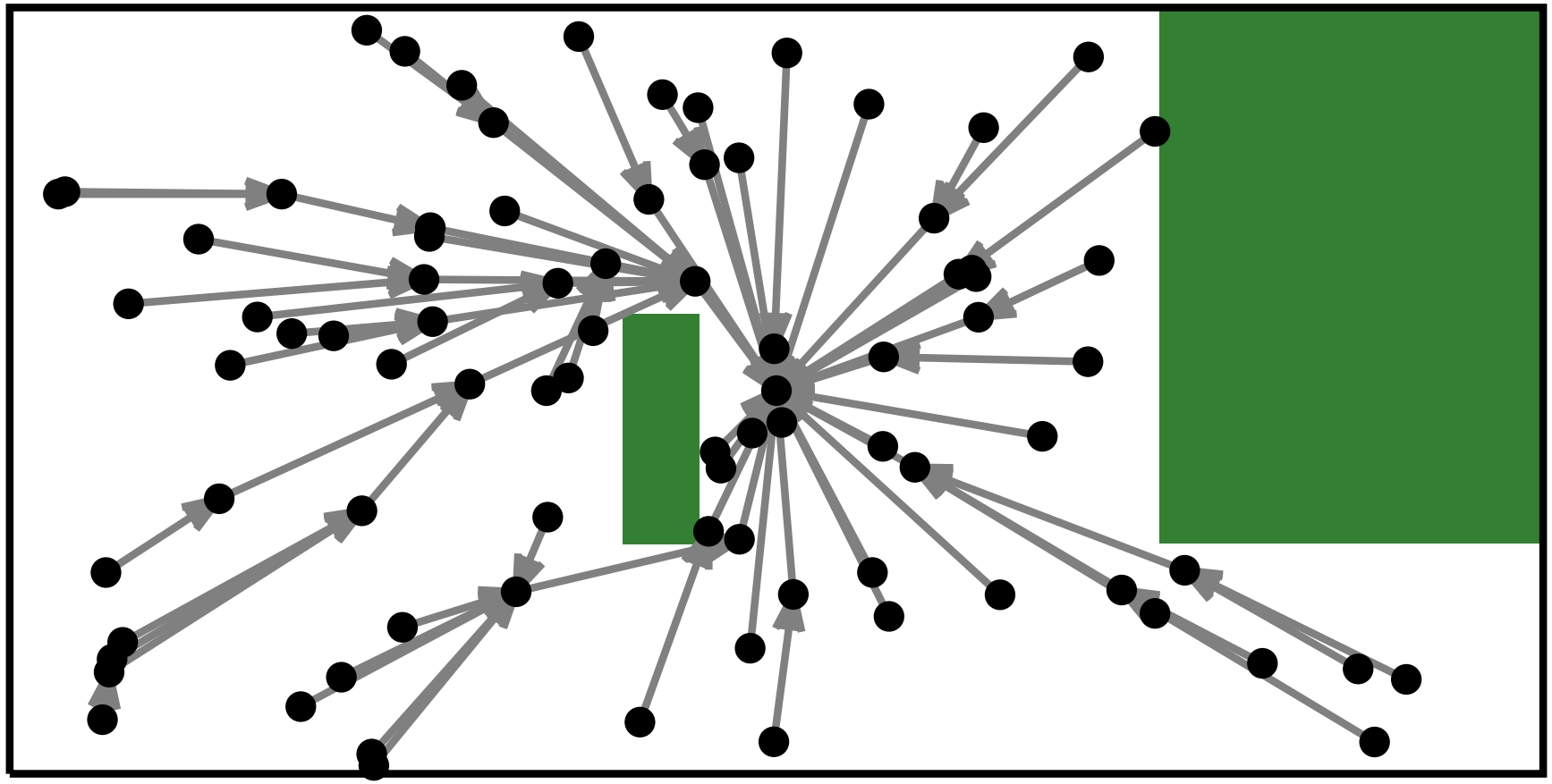
RRT*: Example 2

After 5 iterations.



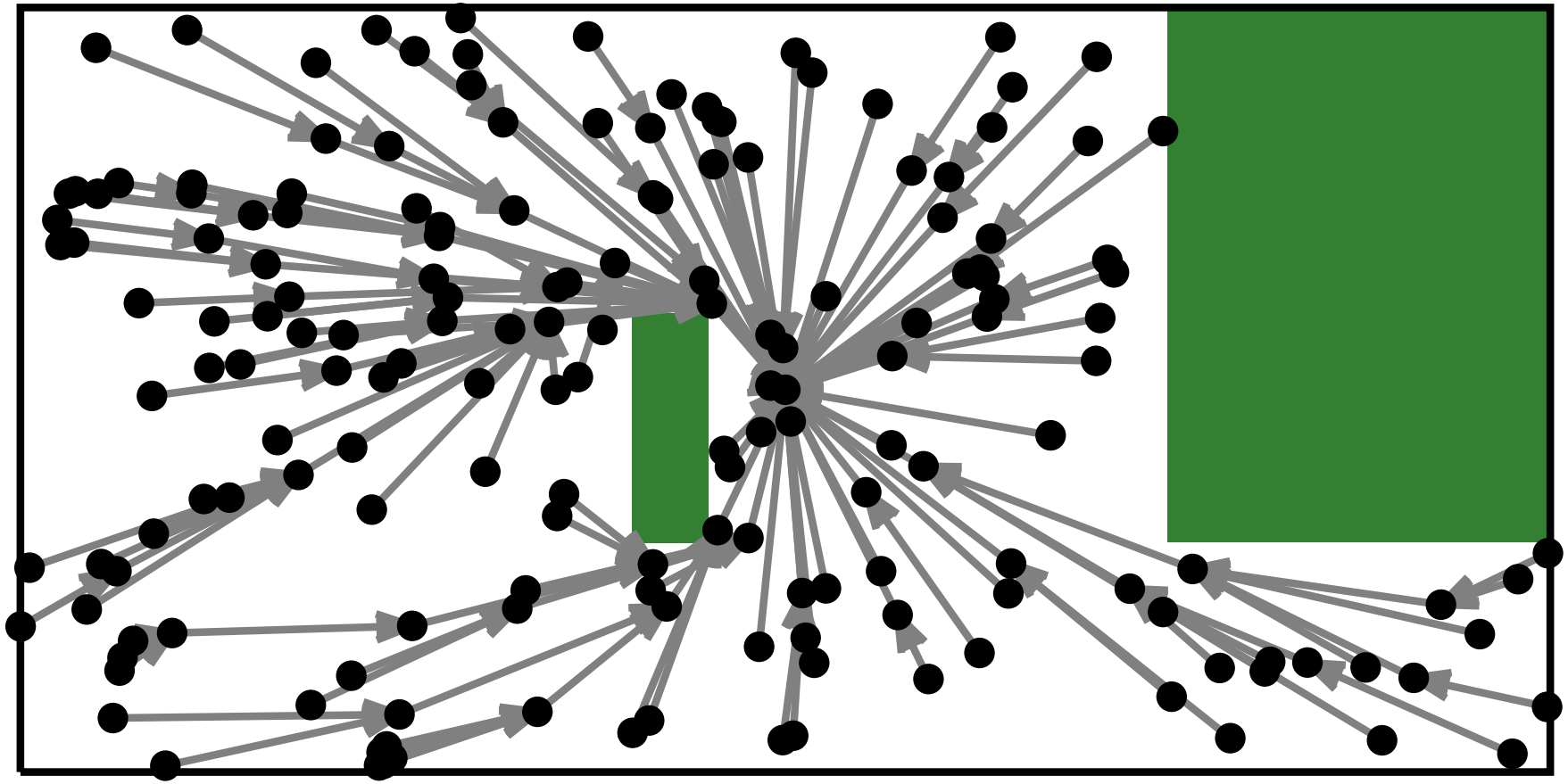
RRT*: Example 2

After 100 iterations.



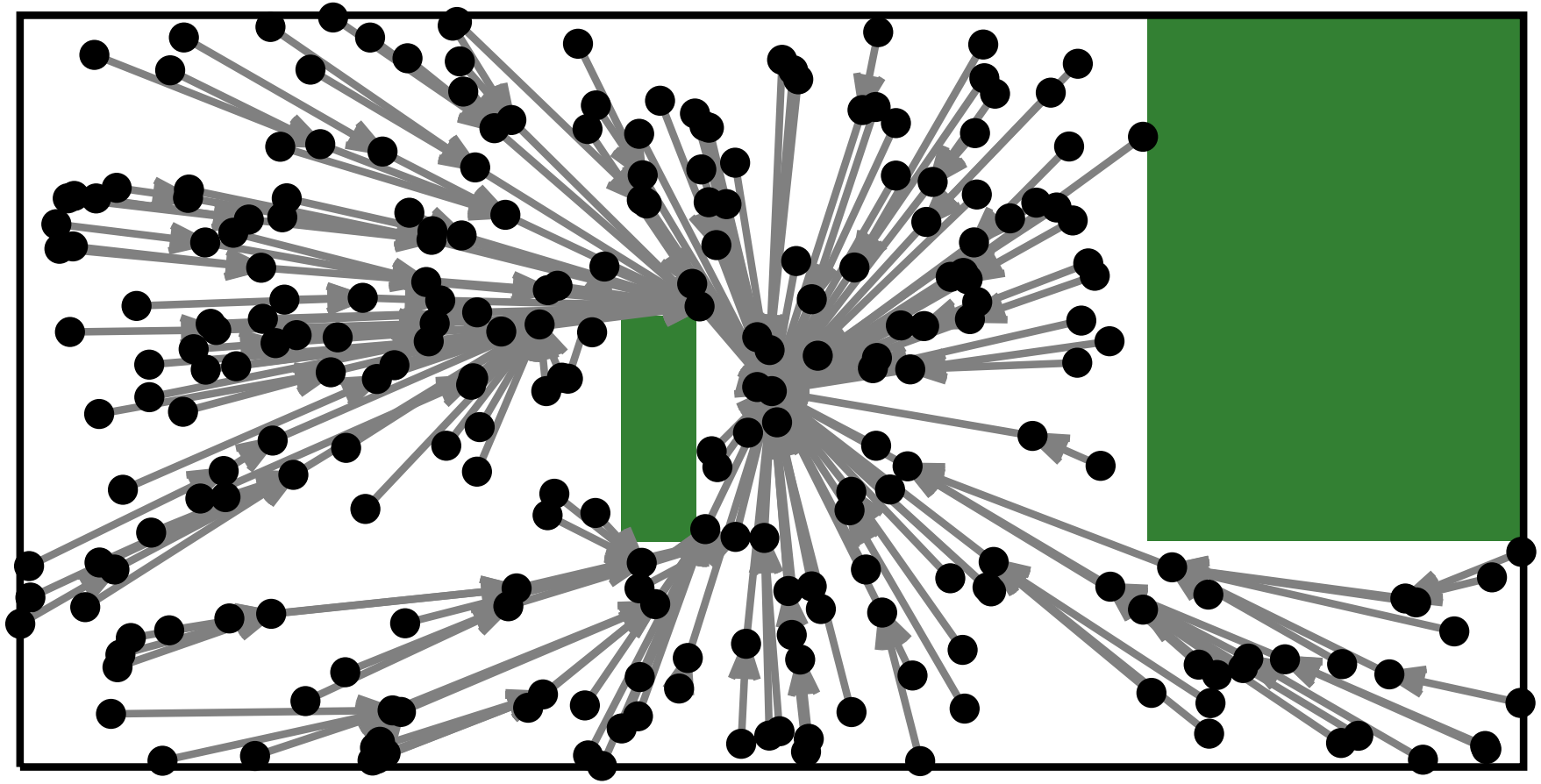
RRT*: Example 2

After 200 iterations.



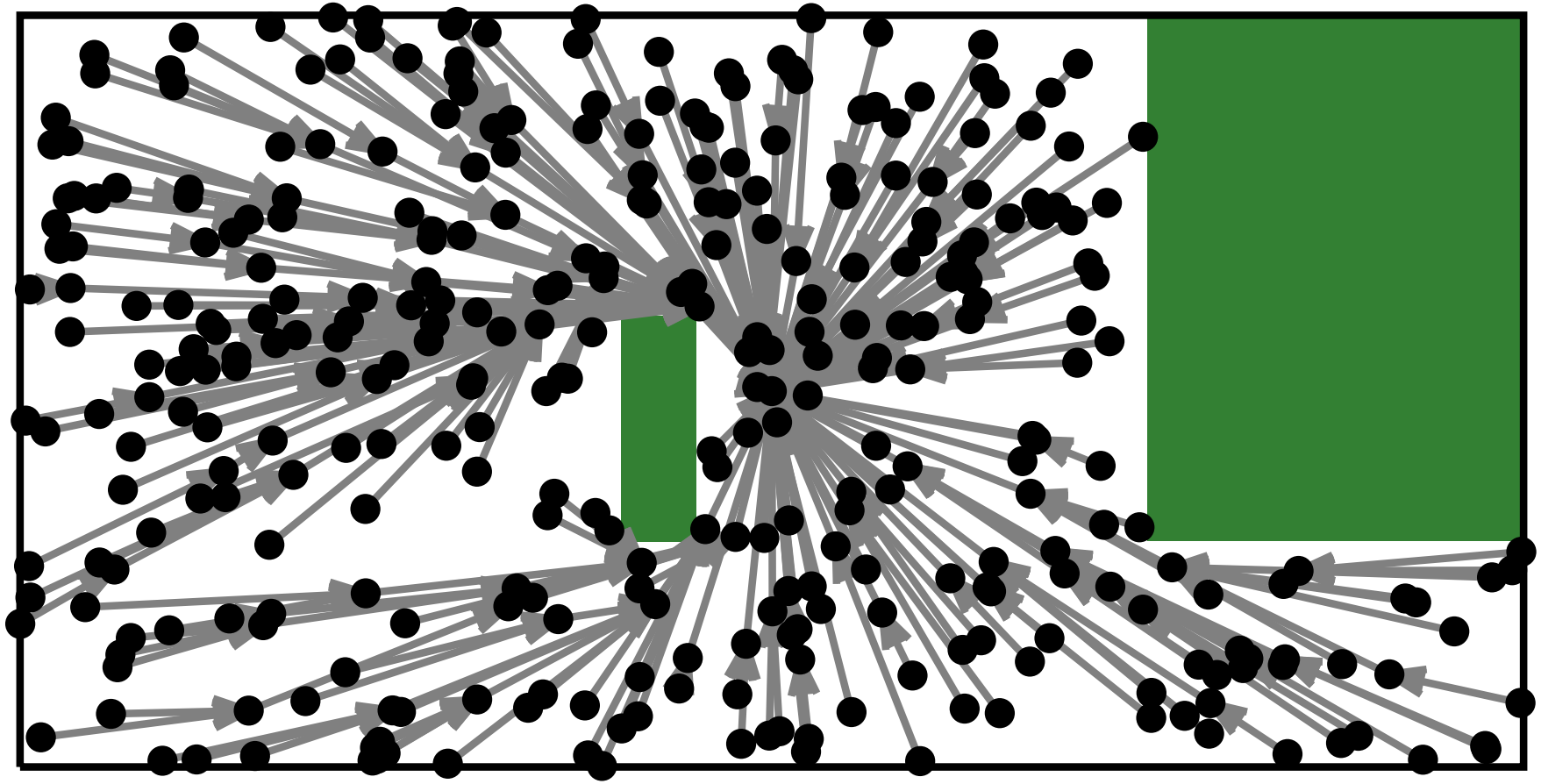
RRT*: Example 2

After 300 iterations.



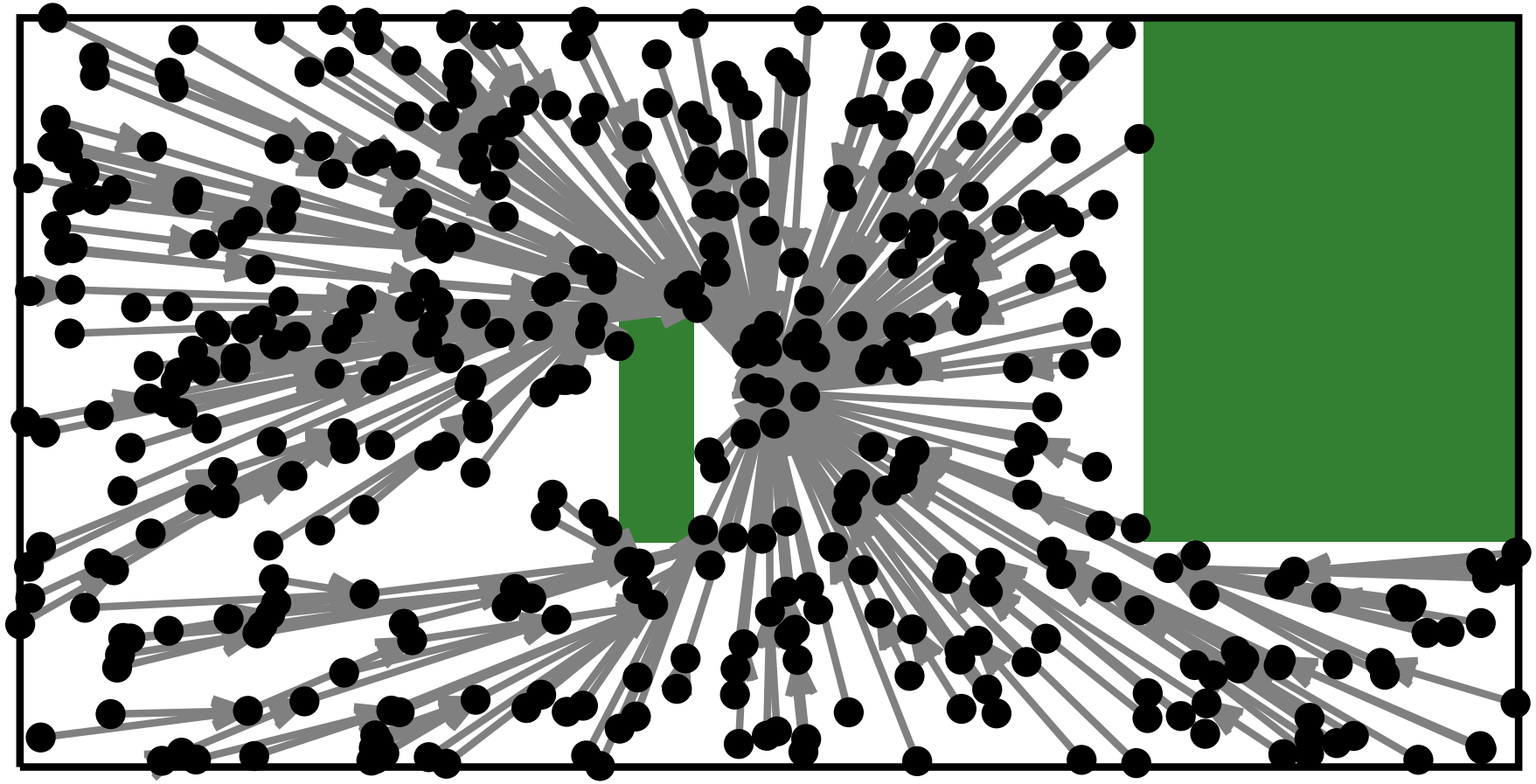
RRT*: Example 2

After 400 iterations.



RRT*: Example 2

After 500 iterations.



RRT*: Example 3

After 3000 iterations.