

CS 134

Jump Point Search
(10x faster than pure A*)

Today in Video Games



Get a job: Visual Concepts is hiring a Sr. Tools Software Engineer

The Gamasutra Job Board is the most diverse, active and established board of its kind for the video game industry!

Here is just one of the [many, many positions](#) being advertised right now.

[Sr. Software Tools Engineer, Visual Concepts](#)

Location: Agoura Hills, California

Visual Concepts is one of the world's top game development studios with a flat, entrepreneurial, and non-corporate work environment. We have a proven track record having shipped over 100 multi-SKU titles to great critical acclaim.

Our studios in Agoura Hills, CA and Novato, CA are committed to gaming and technical innovation and offer top candidates the opportunity to learn and grow with some of the smartest and most creative minds in the industry.

We're seeking an experienced Senior Software Engineer, focused on tools development.

April 6, 2018 | By Staff

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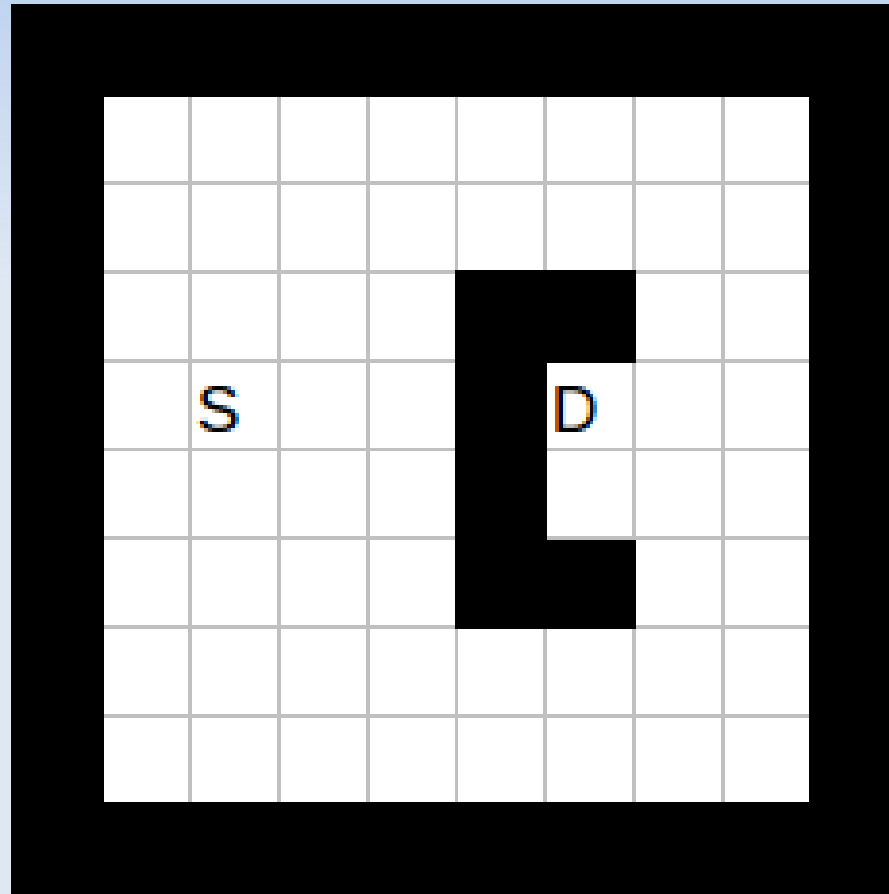


Jump Point Search

- This is based on a webpage that goes into much more detail. I recommend reading it!
- <http://zerowidth.com/2013/05/05/jump-point-search-explained.html>

Jump Point Search

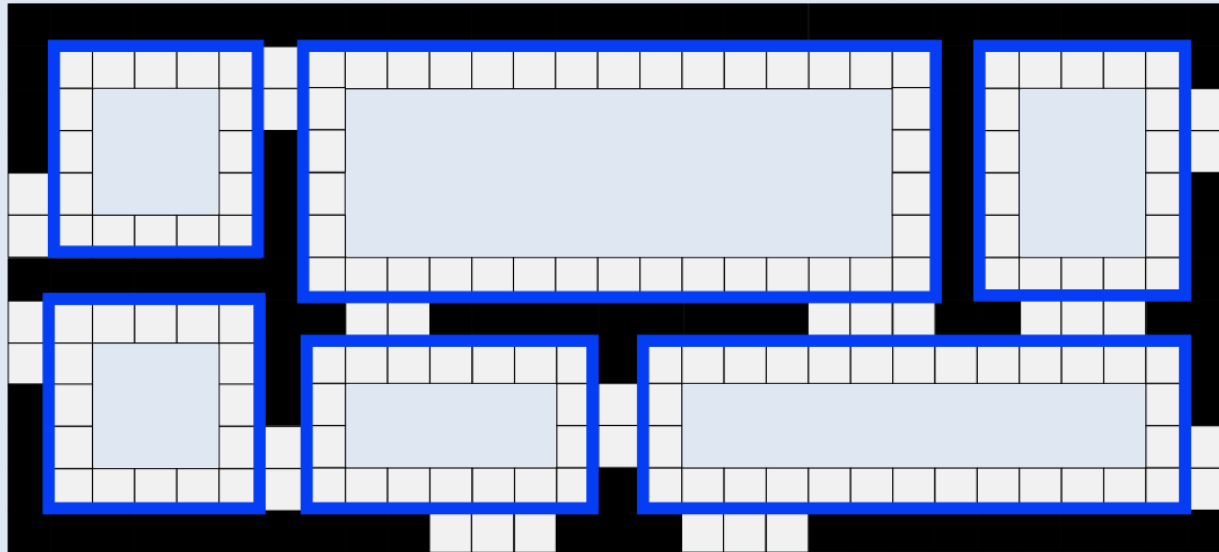
Remember how many cells were visited for A*?



It was still nearly all of them... we can do better.

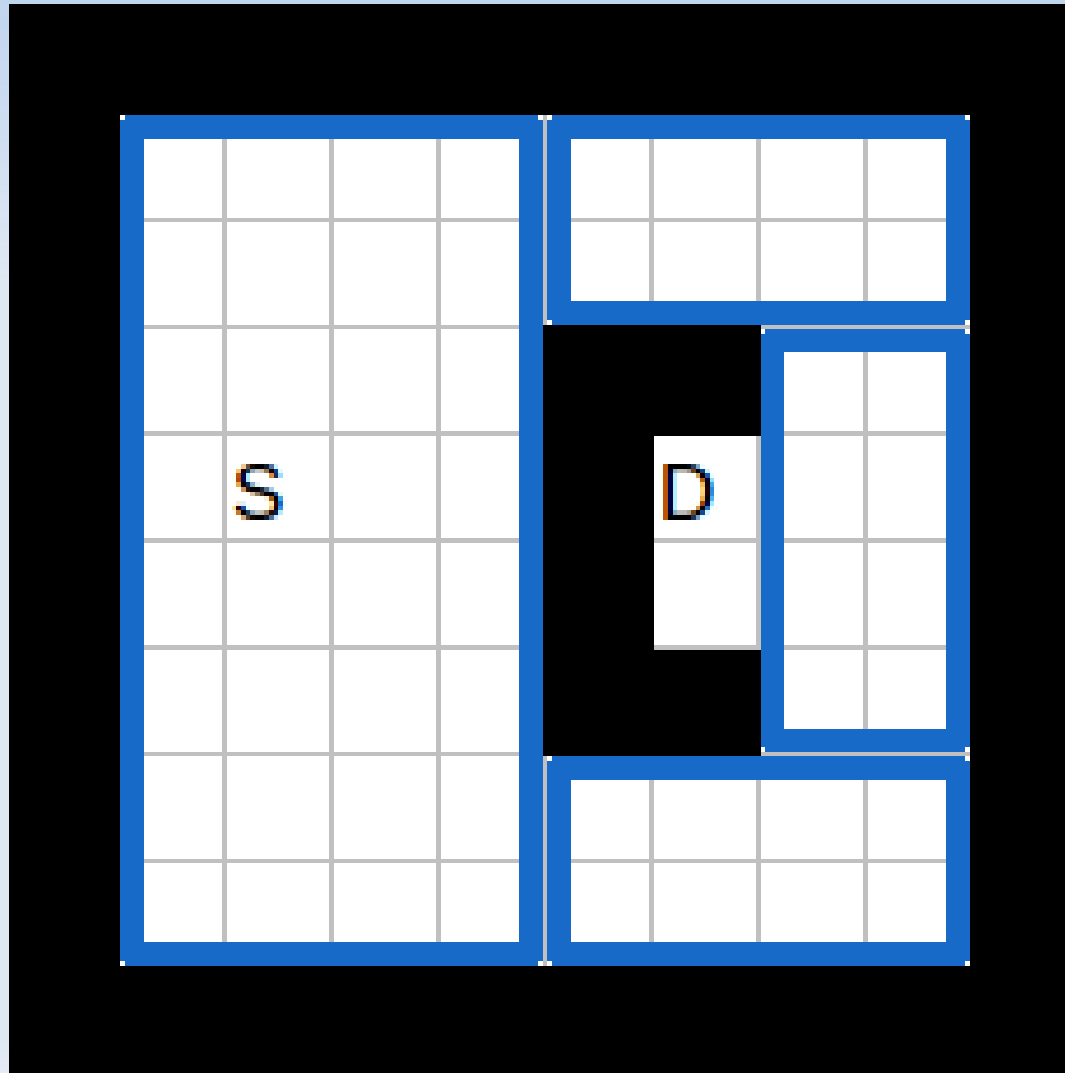
Jump Point Search

- Optimization:
 - For any clear rectangle area, you can assume all nodes are connected to each other.
 - Only the boundaries are important!



Jump Point Search

Let's apply that optimization here!

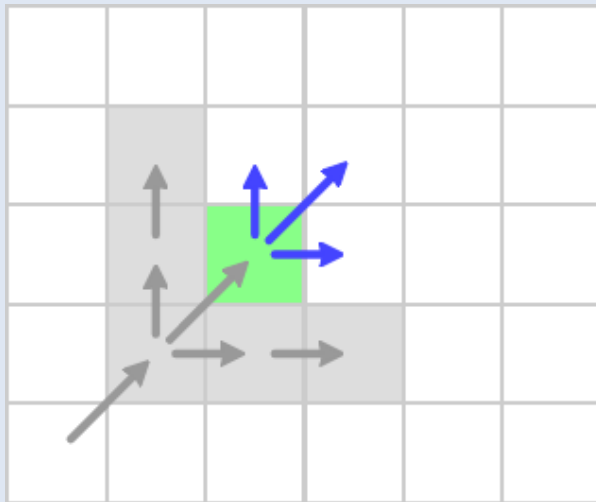
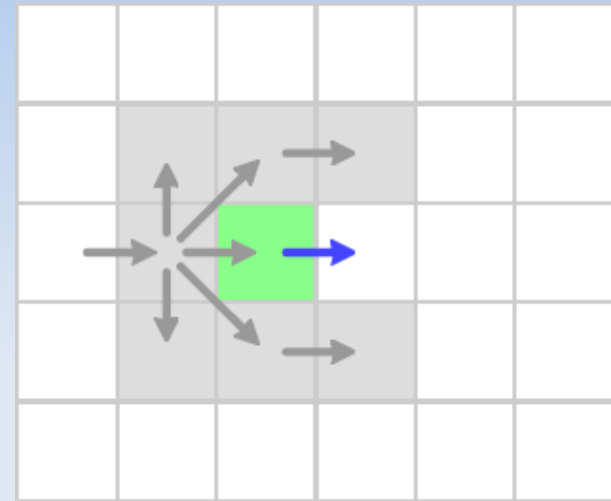


Jump Point Search

- To create these rectangles would require preprocessing.
- But we can do one better, we can build them “as necessary”
- And remember, the optimization needs to just include all “wide open” spaces.

Jump Point Search

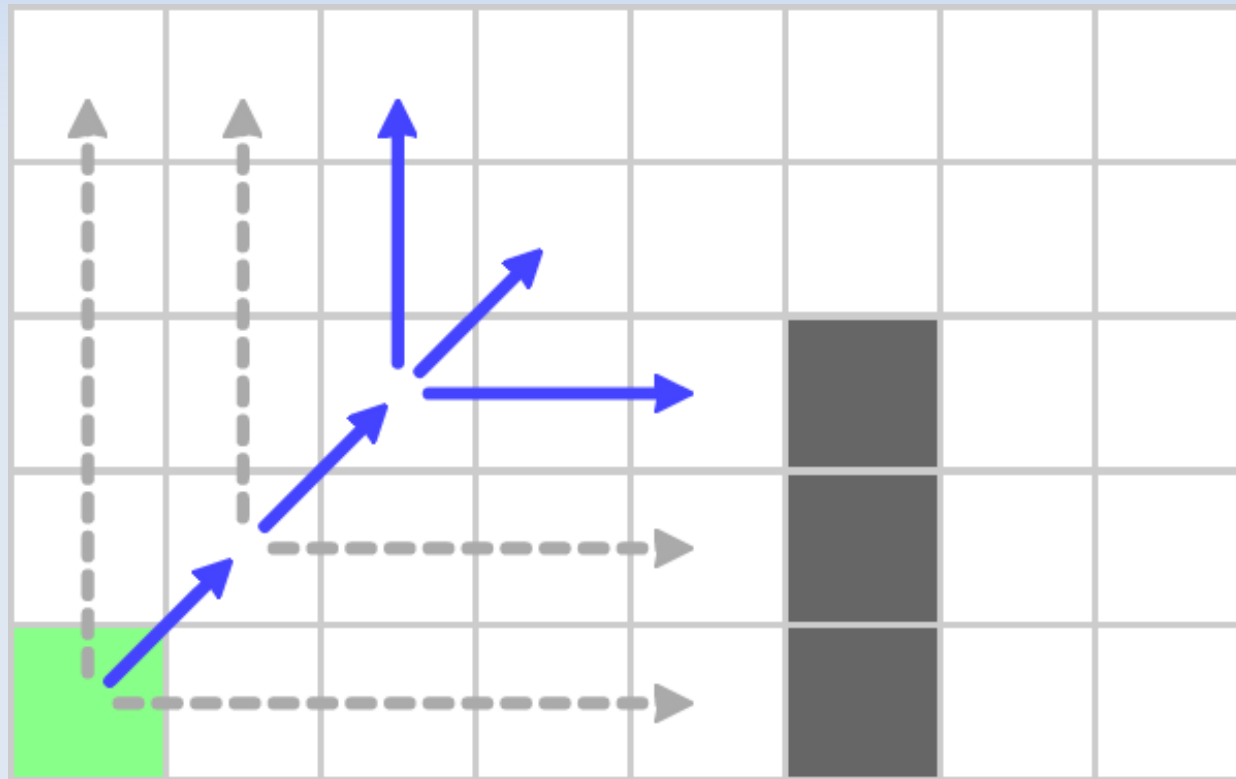
- For straight movement, you can ignore everything except going straight.



- For diagonal movement, you can go straight or diagonal in the same direction.

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Complete “rooms” get covered by combining the rules.



Jump Point Search

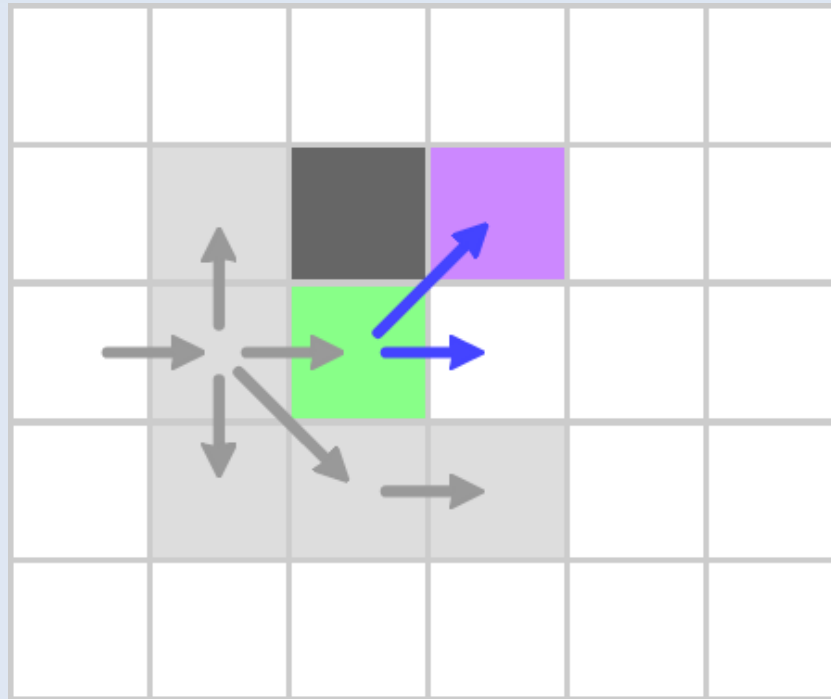
All of the above steps can be done without adding to the open set in A^*

Jump Point Search

Questions?

Jump Point Search

- If you encounter an obstacle, then you need to add an additional node to visit. This is called a **“forced neighbor”**.



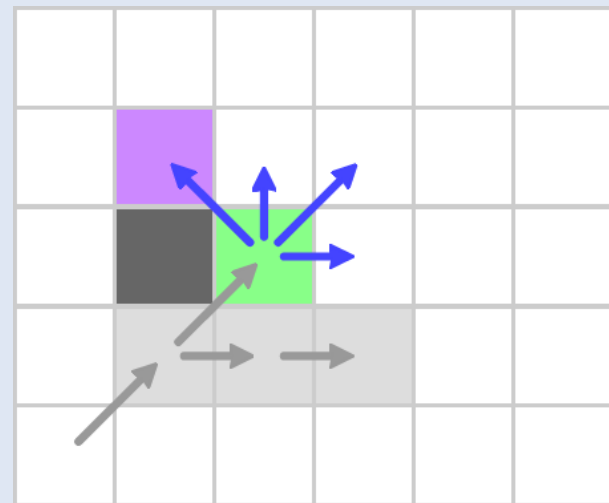
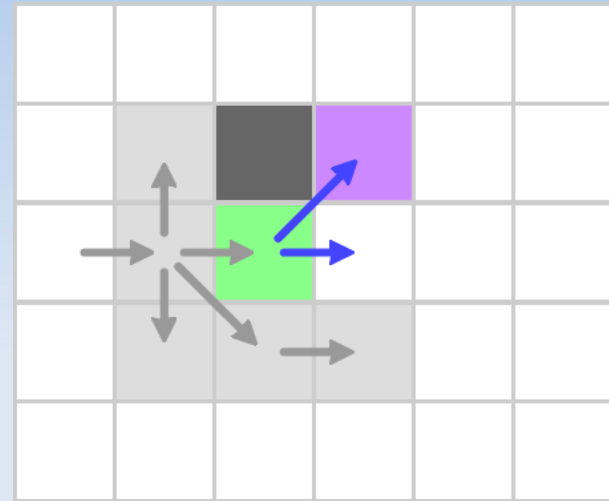
Jump Point Search

- Straight movement has diagonal forced neighbors.

(45 deg outside normal direction)

- Diagonal movement also has diagonal forced neighbors.

(45 deg outside normal direction)



Jump Point Search

If a node has a forced neighbor along its path, you add it to the A^* open list

Jump Point Search

That's it!

Jump Point Search

Interactive demo from the webpage

<http://zerowidth.com/2013/05/05/jump-point-search-explained.html>