VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE | DEPARTMENT OF COMPUTER SCIENCE

Algorithms – Maze Path Finding Animation

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Presentation status to date February 19, 2025

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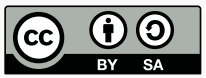
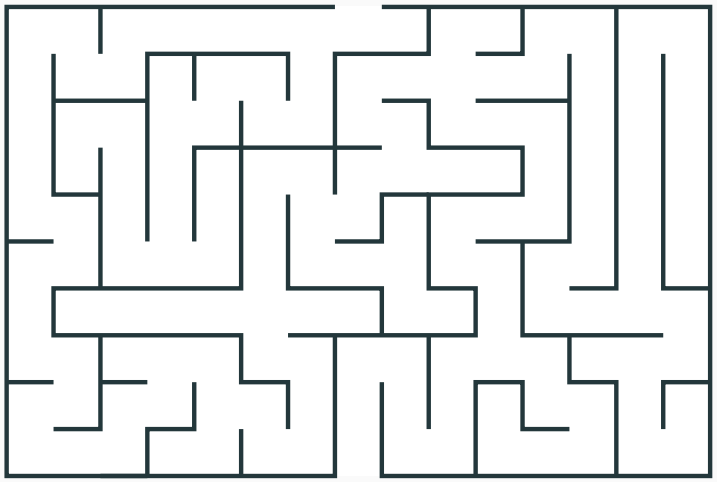
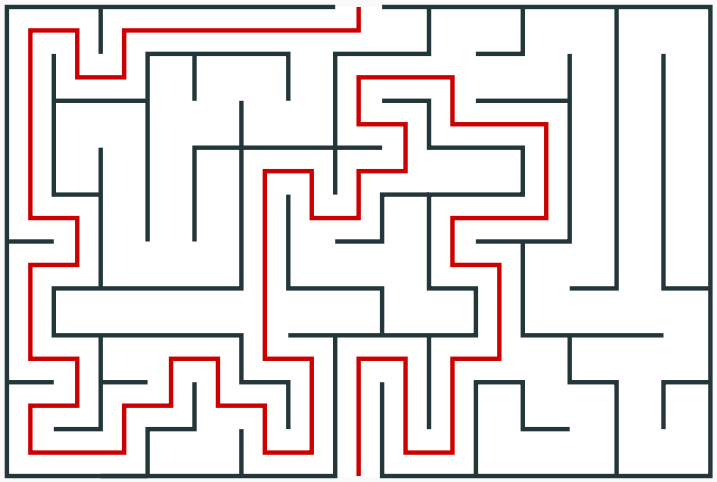


Maze Path Finding

Maze



Path through the maze

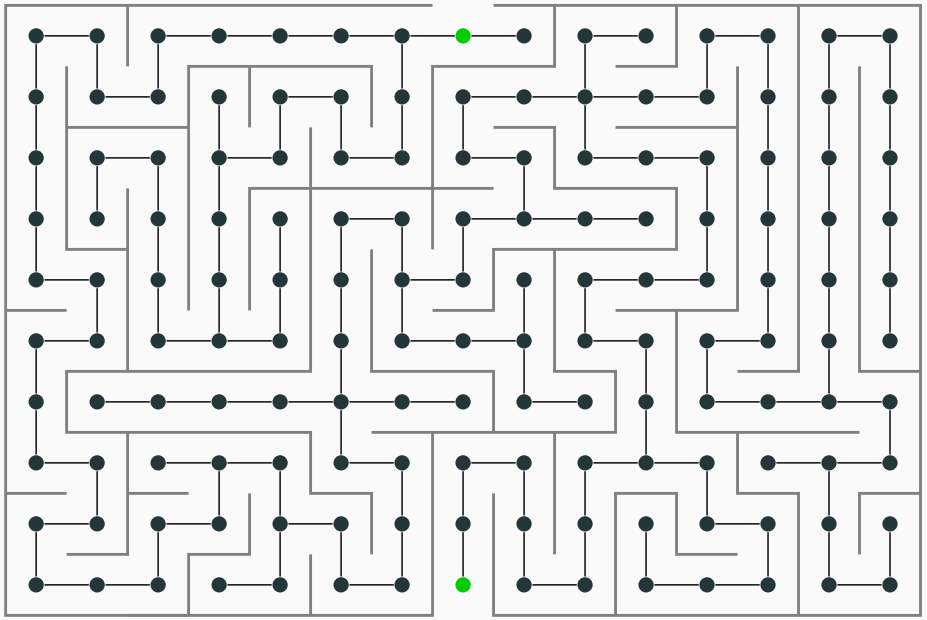


Task assignment

We have to find the way through a given maze from a given entrance to a given exit or conclude that there is no such path.

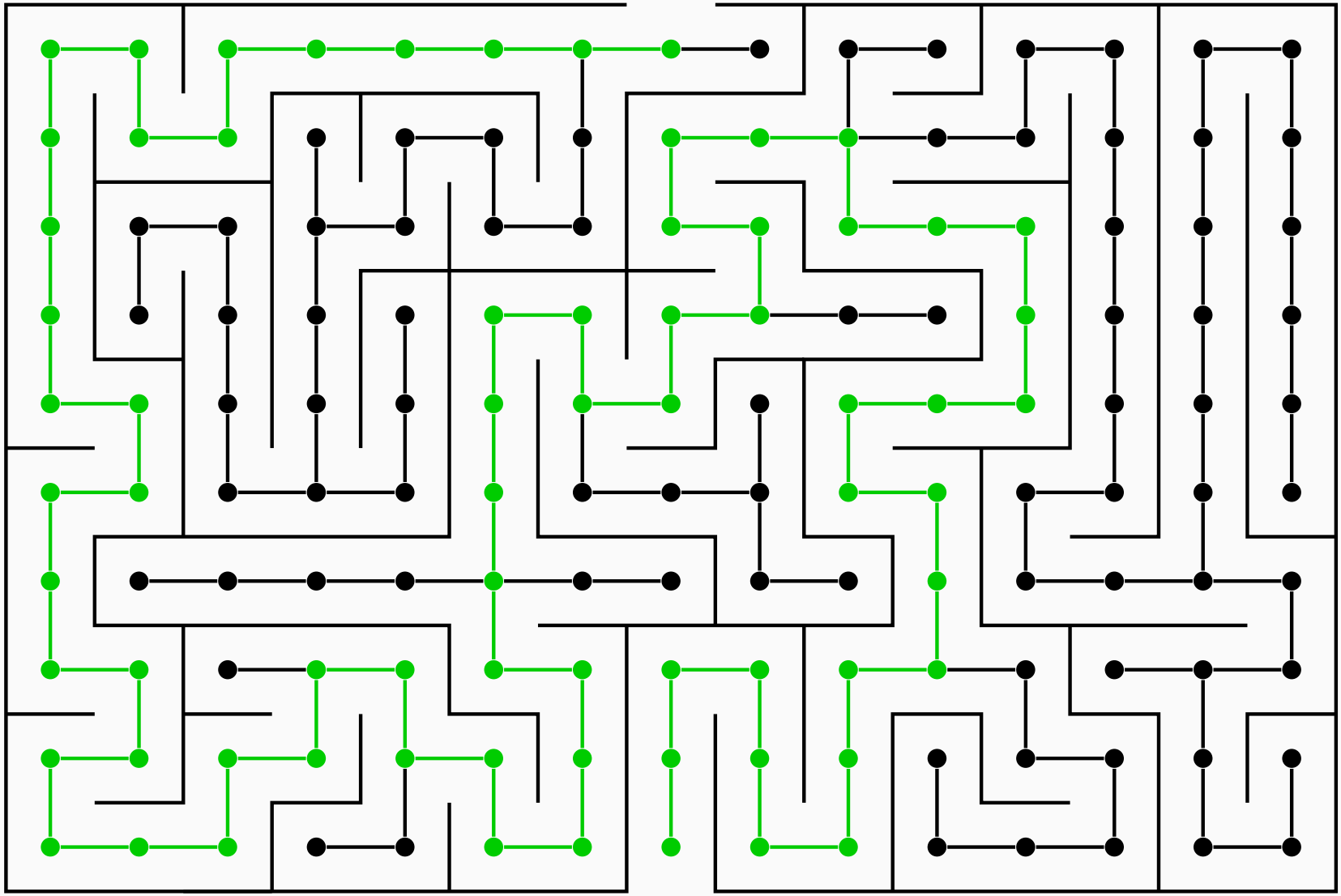
Maze Path Finding – Algorithm

Maze as graph



1. Convert the maze to a graph.
2. Mark the entrance and exit.
3. Perform the selected graph traversal algorithm.
4. Use the π links to build a path from the exit to the entrance.

Maze Path Finding – Solution



Breadth First Traversal – Legend

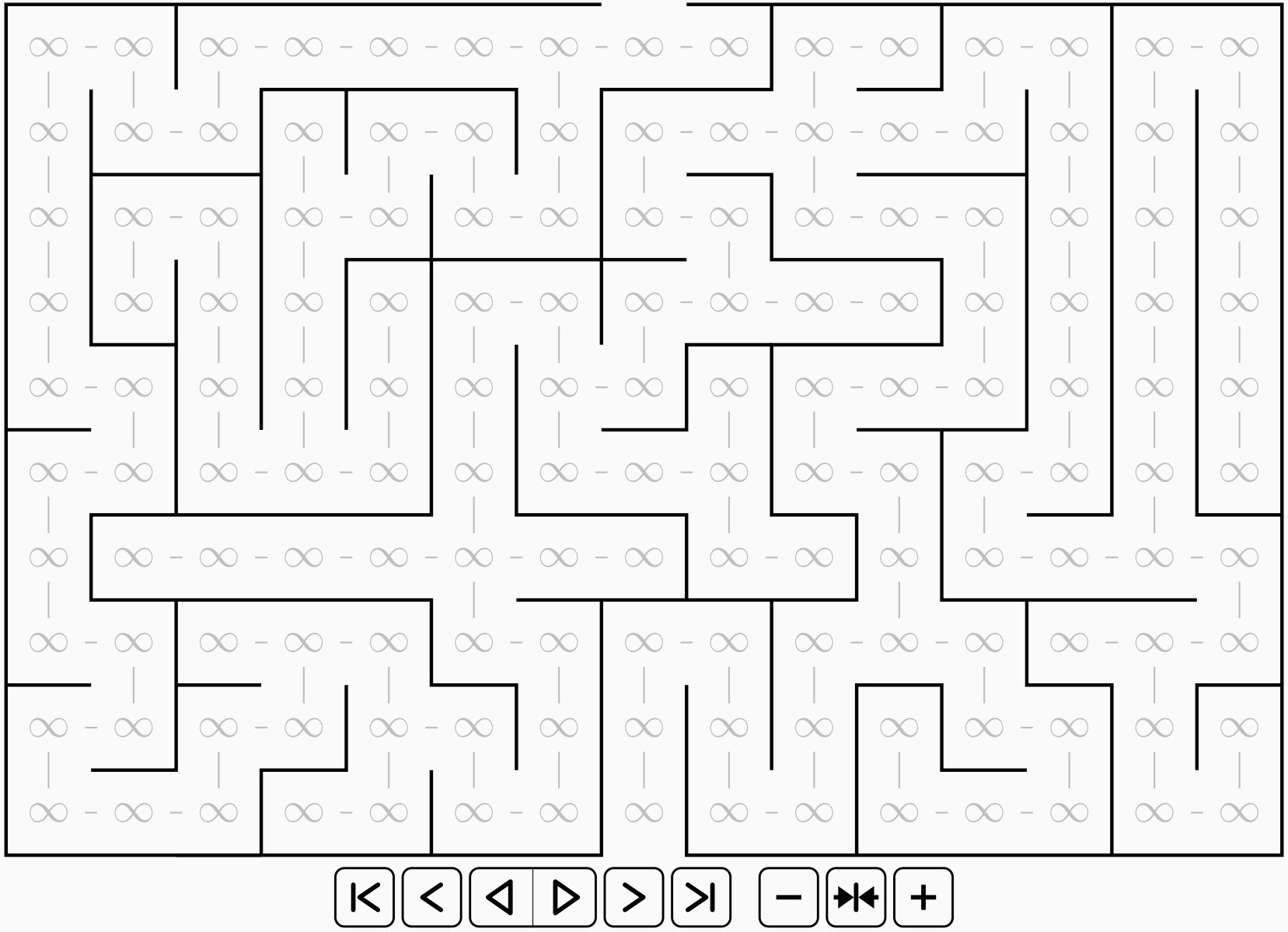
Graph vertices:

gray	unvisited vertex
yellow	vertex waiting in the processing queue
red	currently processed vertex
blue	finished vertex
green	vertex on the path between the maze entrance and exit
n	distance from the entrance to the maze

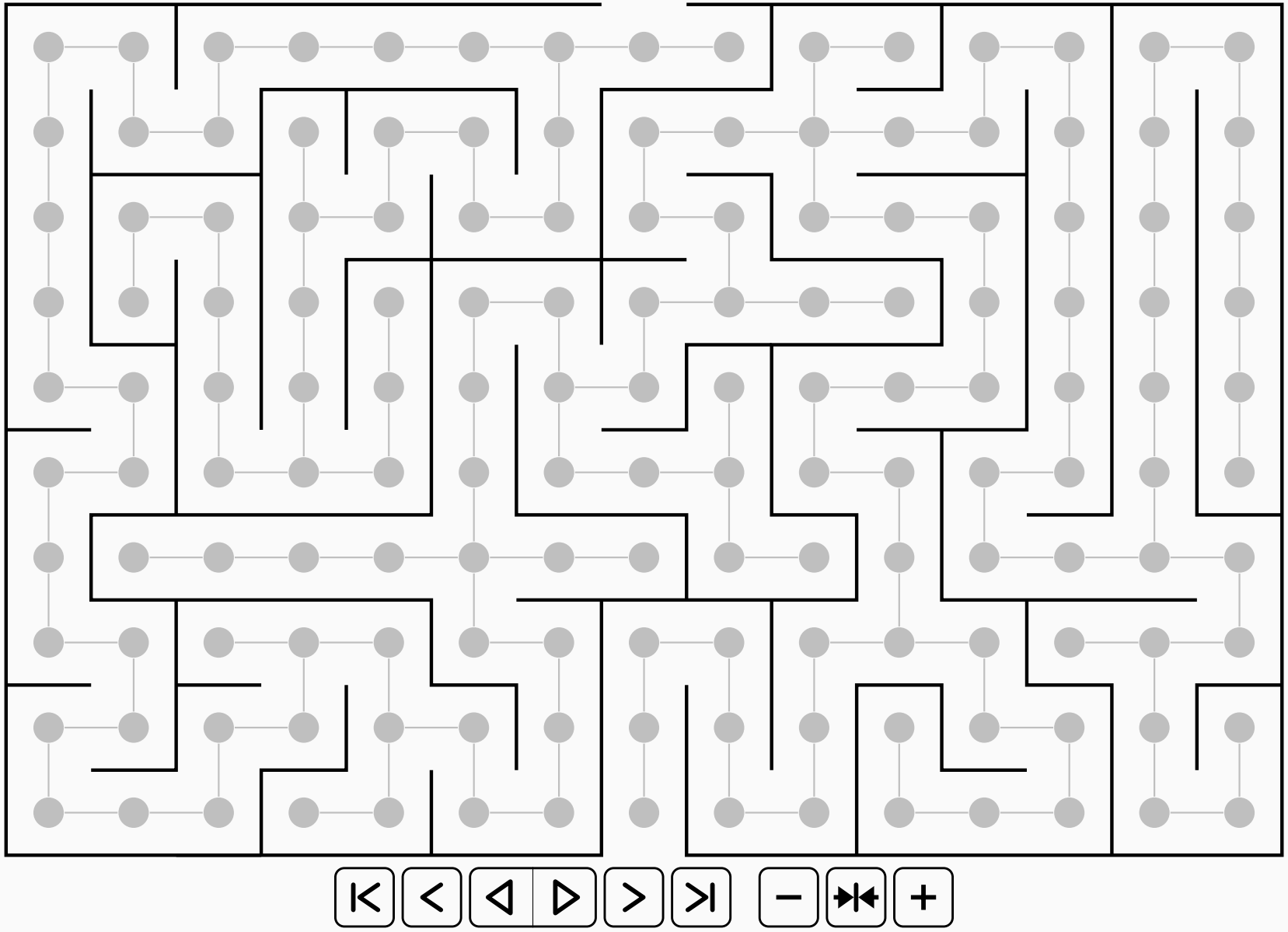
Graph edges:

gray	edge between unvisited vertices
yellow	edge incident with vertex waiting for processing
red	edge incident with currently processed vertex
blue	edge between finished vertices
green	edge on the path between the maze entrance and exit
$u \rightarrow v$	$\pi[u] = v$

Animation of Breadth First Traversal



Animation of Breadth First Traversal – Colors Only



Animation of Depth First Traversal – Legend

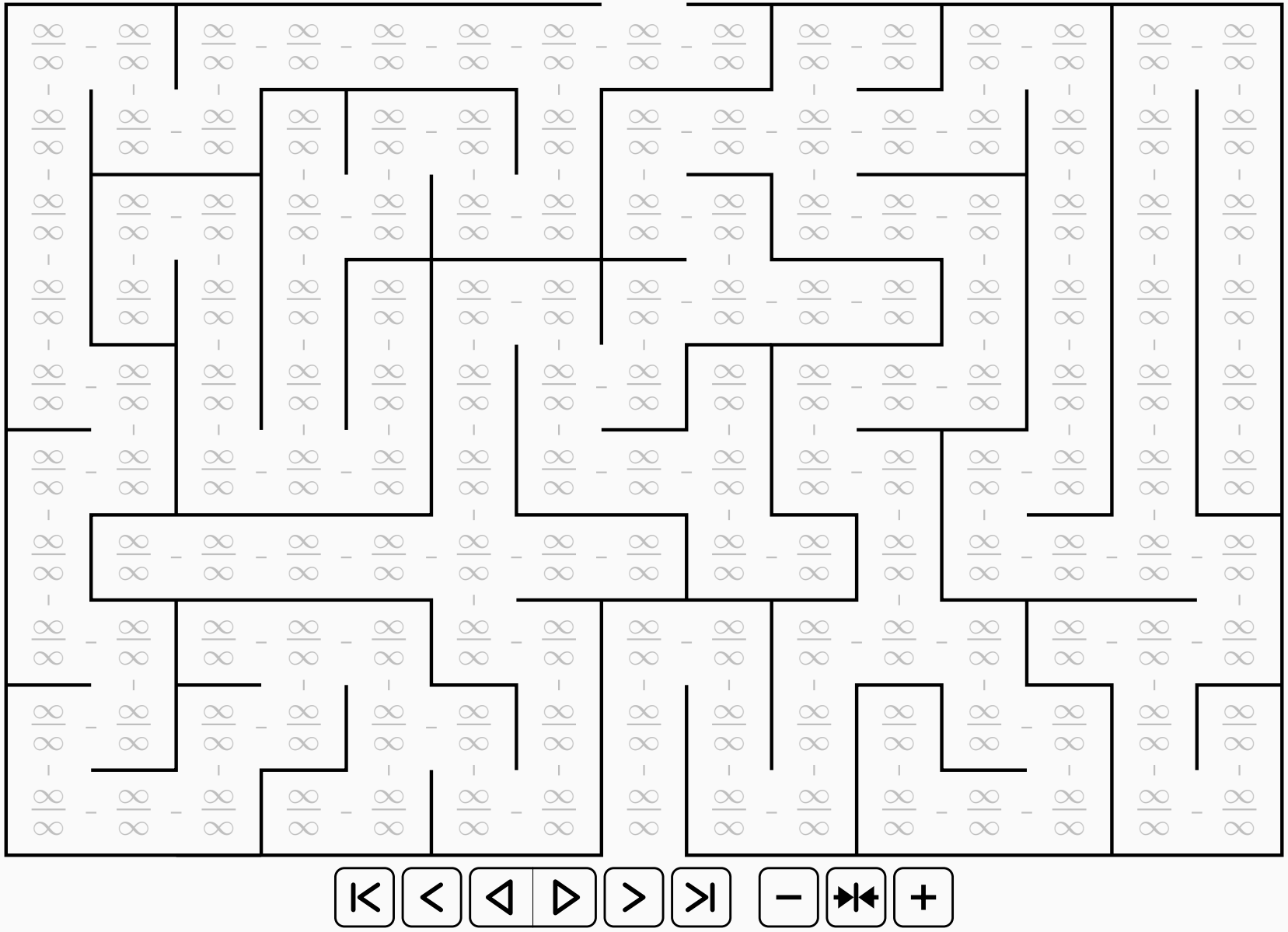
Graph vertices:

gray	unvisited vertex
yellow	vertex waiting in the stack for processing
red	currently processed vertices
blue	finished vertex
green	vertex on the path between the maze entrance and exit
$\frac{d[u]}{f[u]}$	logical time of visiting and finishing of vertex u

Graph edges:

gray	edge between unvisited vertices
yellow	edge incident with vertex waiting for processing
red	edge incident with currently processed vertex
blue	edge between finished vertices
green	edge on the path between the maze entrance and exit
$u \to v$	$\pi[u] = v$

Animation of Depth First Traversal



Animation of Depth First Traversal – Colors Only