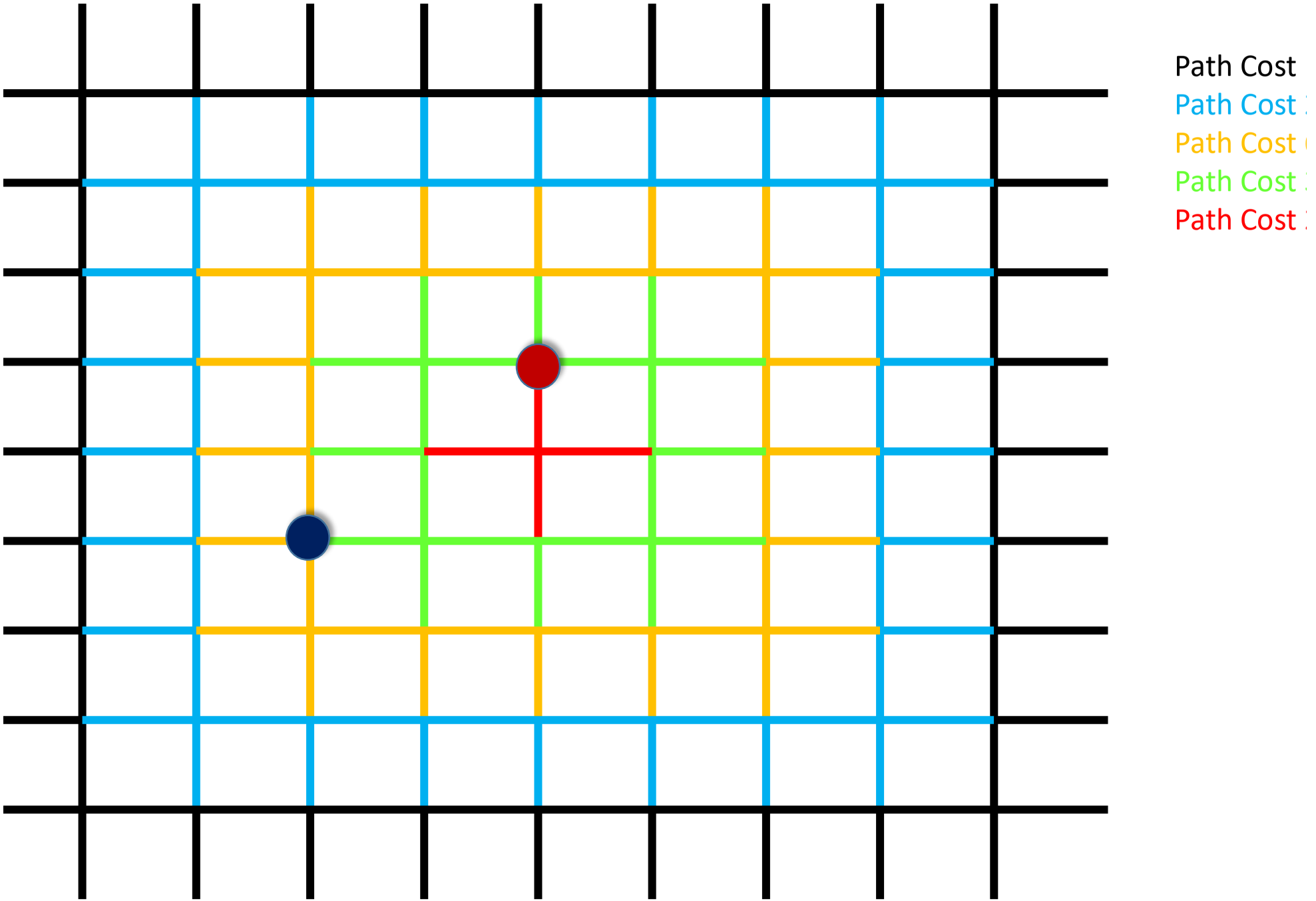
Search Algorithms

niform Cost Search

```
e = start
ıtier = heap({node})
.ored = {}
.e not empty(frontier):
    node = frontier.pop()
    if IS_GOAL(node): return SOLUTION(node)
    explored.add(node)
    for action in node.get_actions():
            child = APPLY(node, action)
            if child not in union(frontier, explored):
                    frontier.add(child)
            else if child in frontier:
                    frontier.decide_and_replace(child)
```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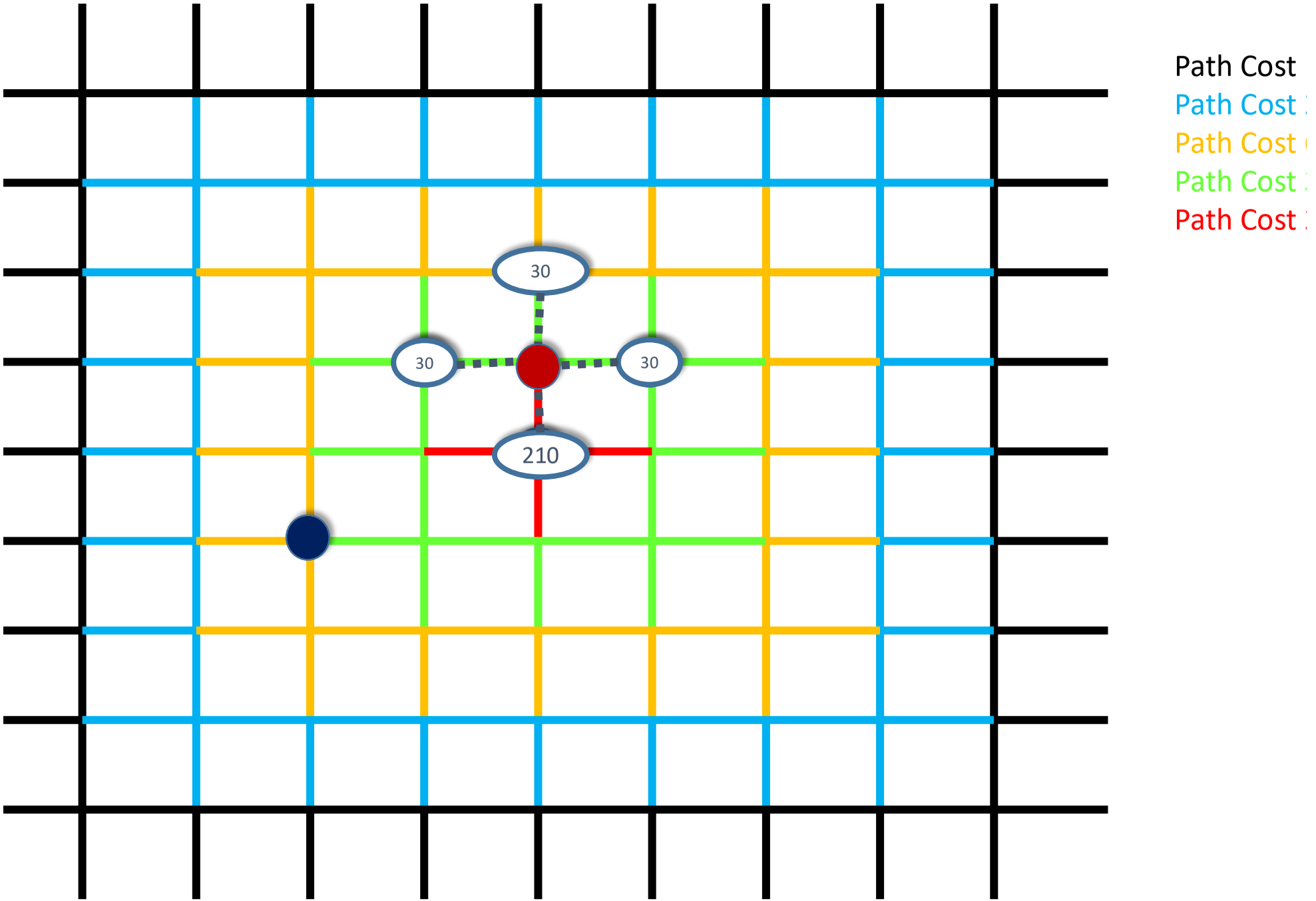
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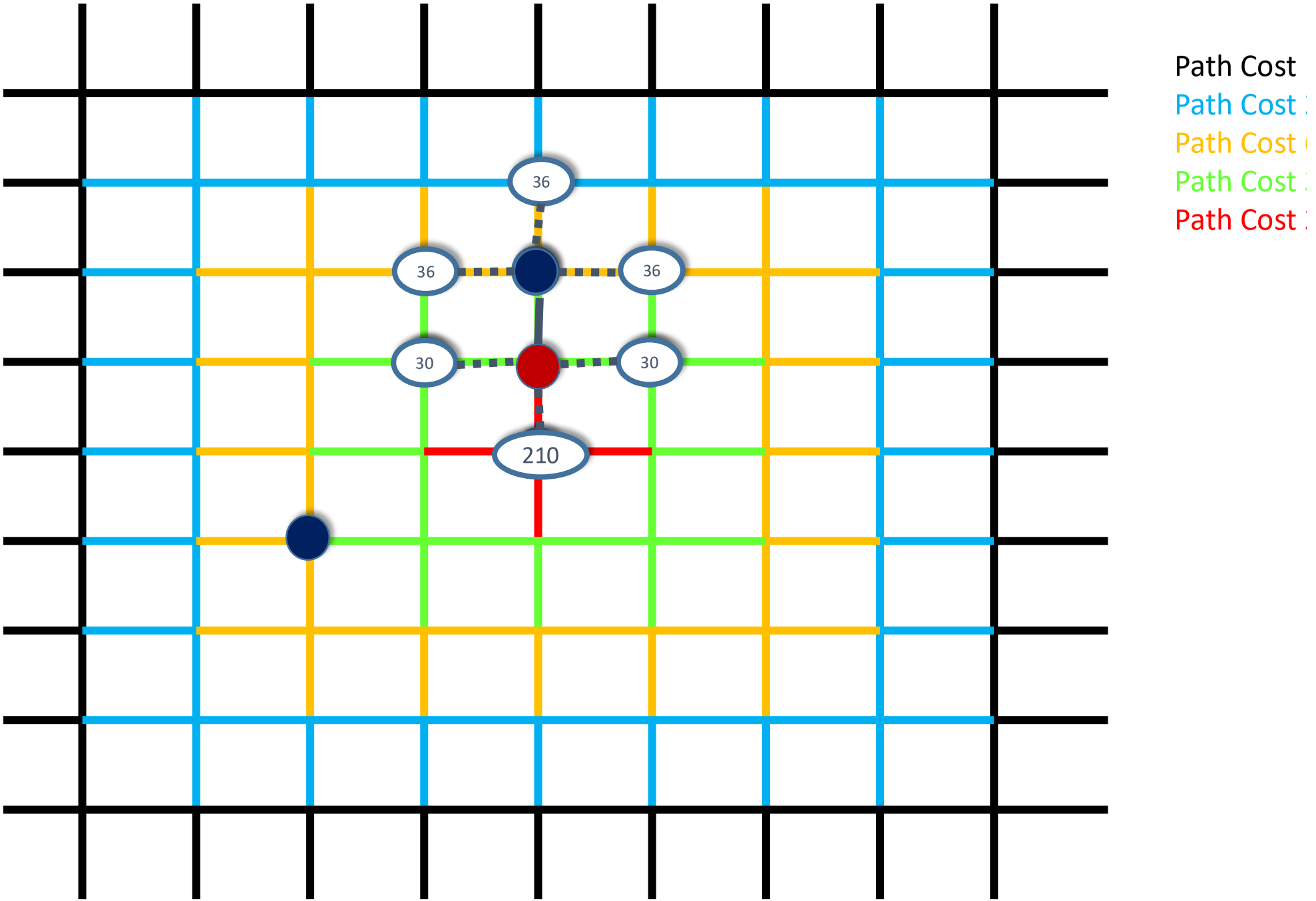
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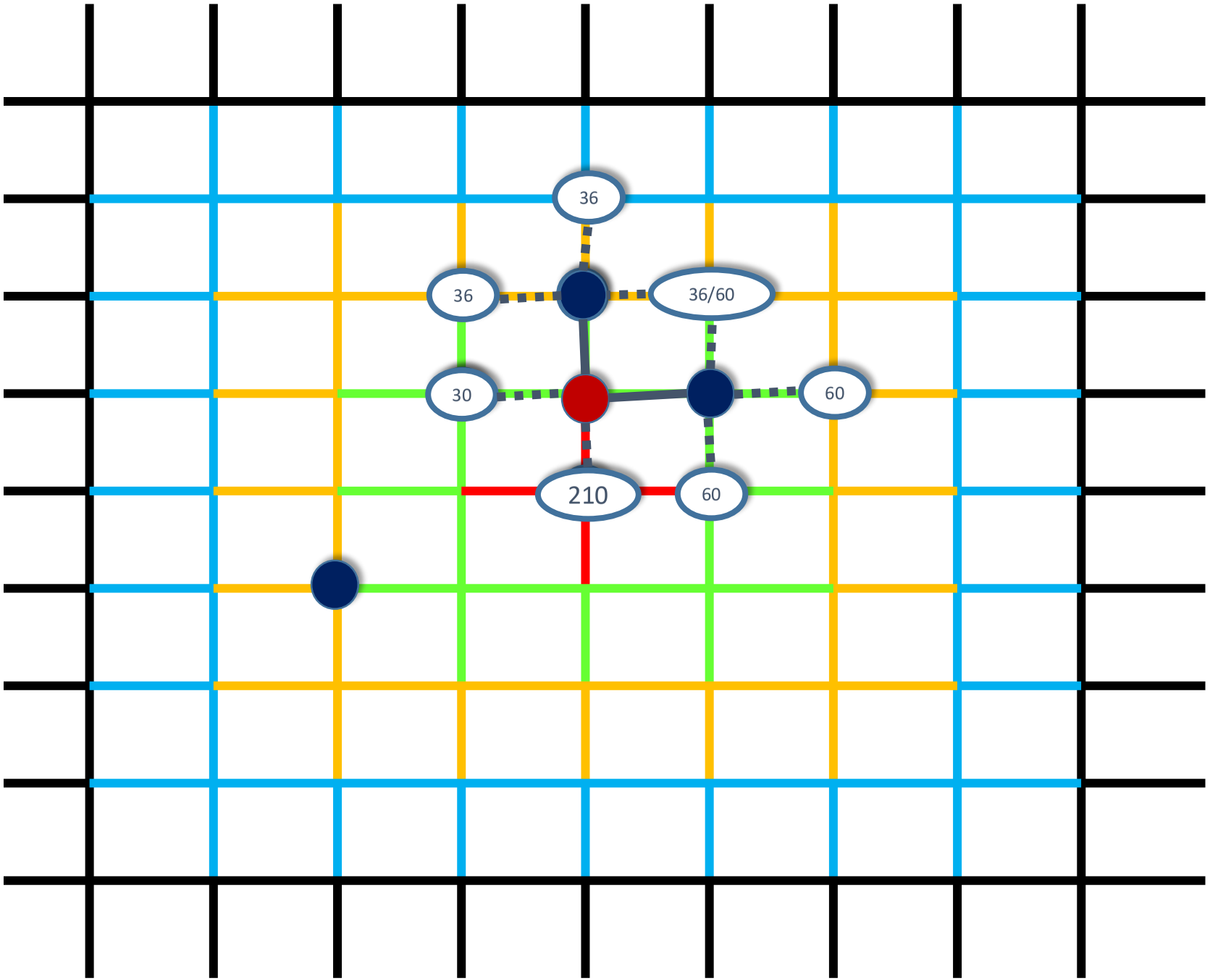

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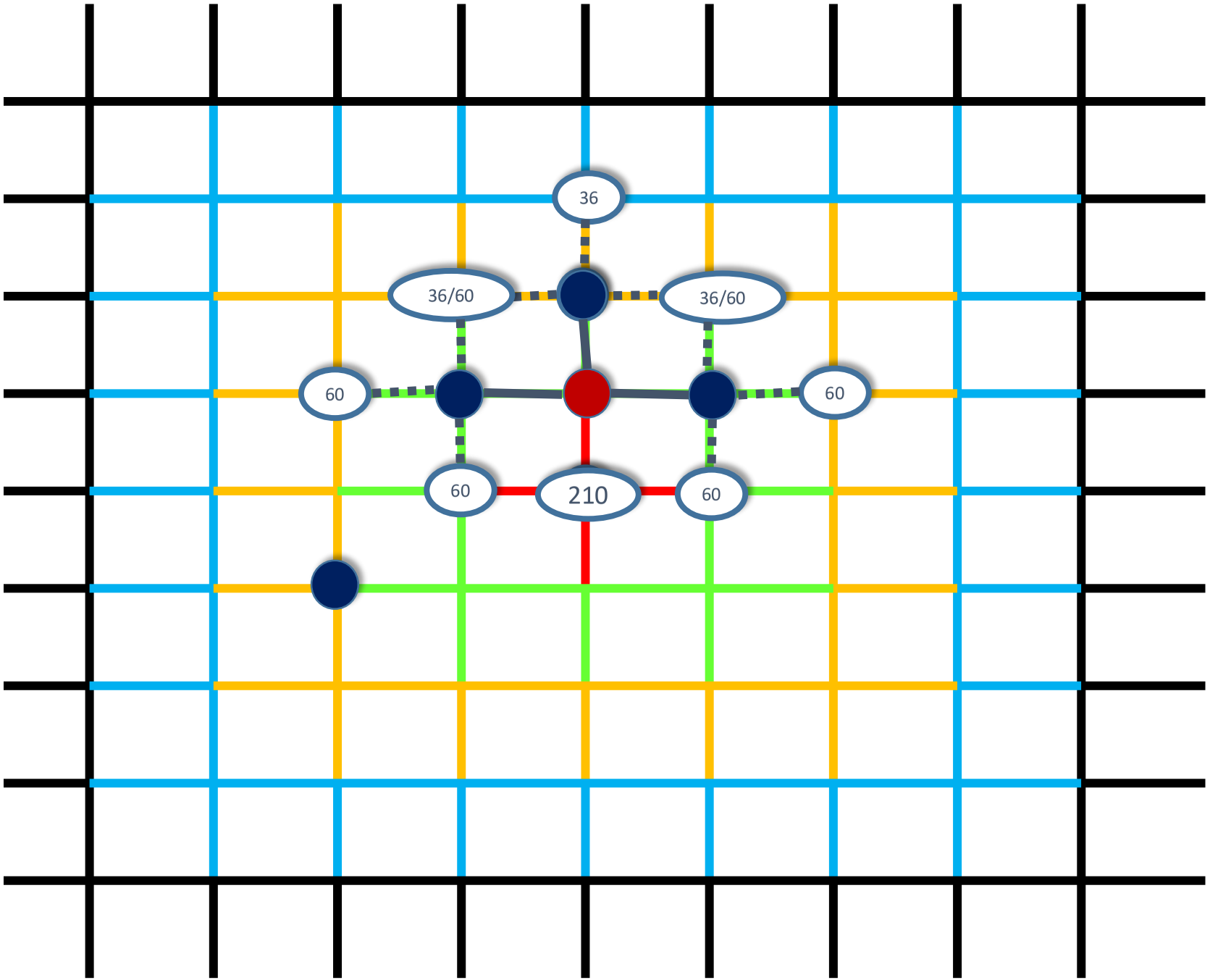

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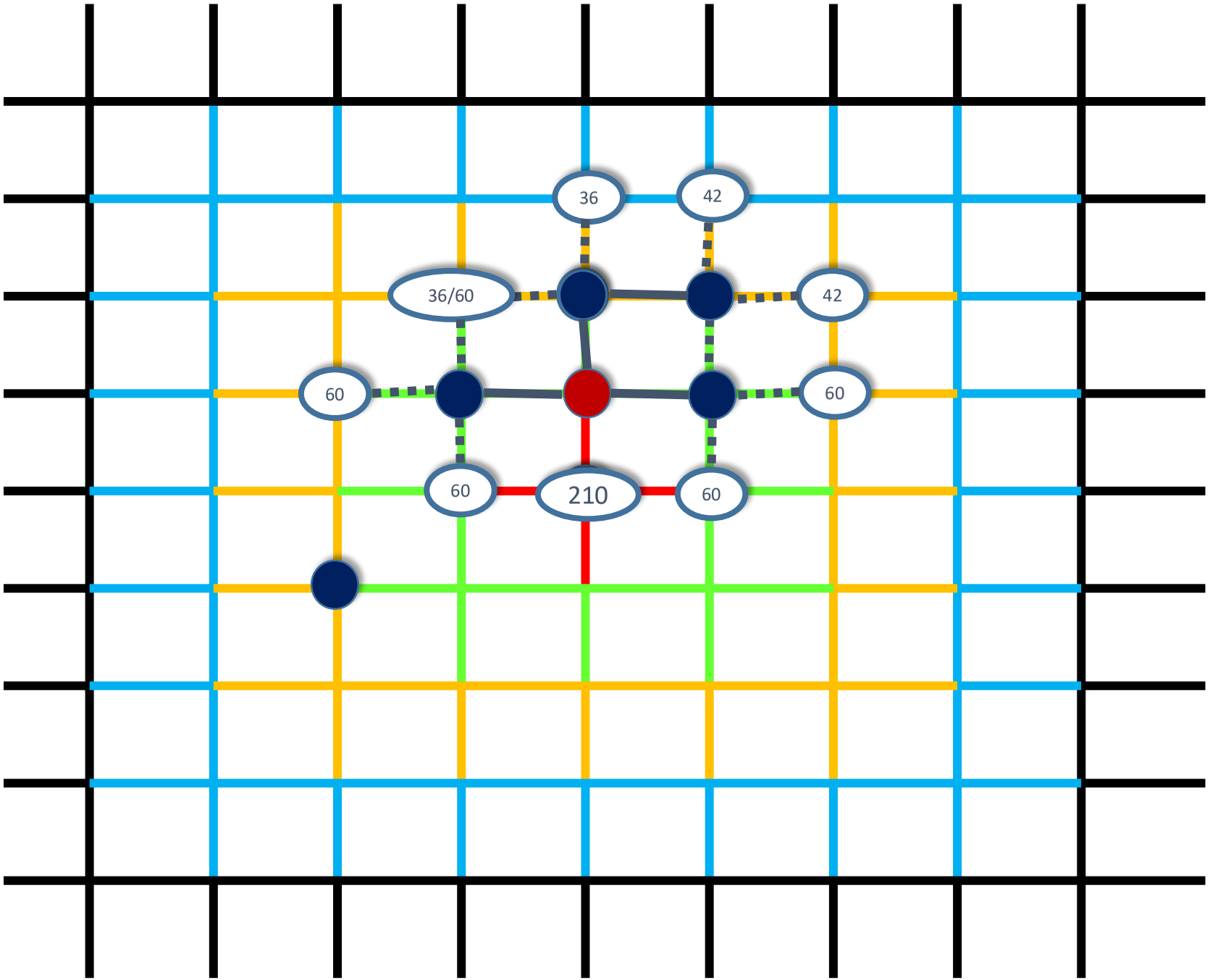

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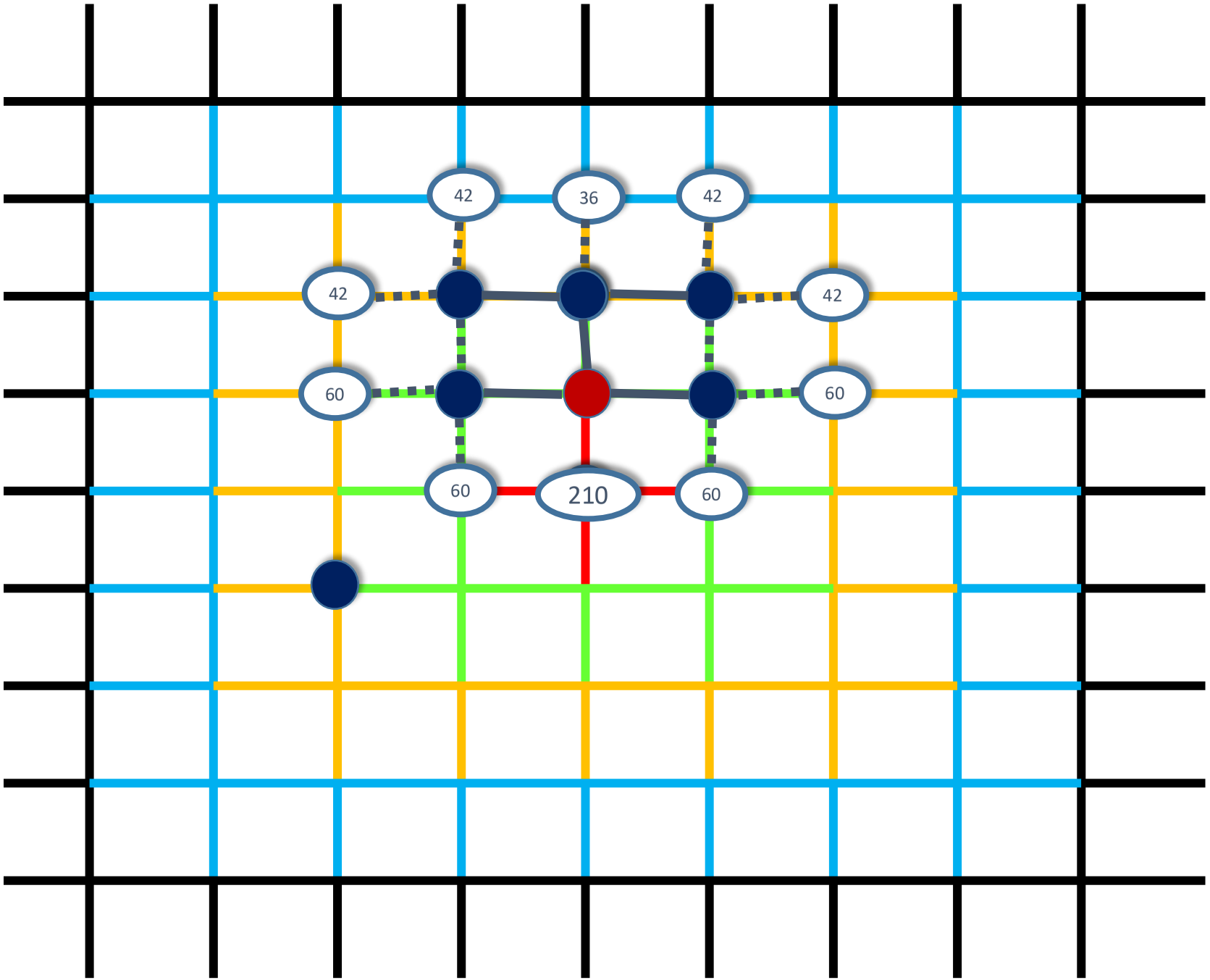

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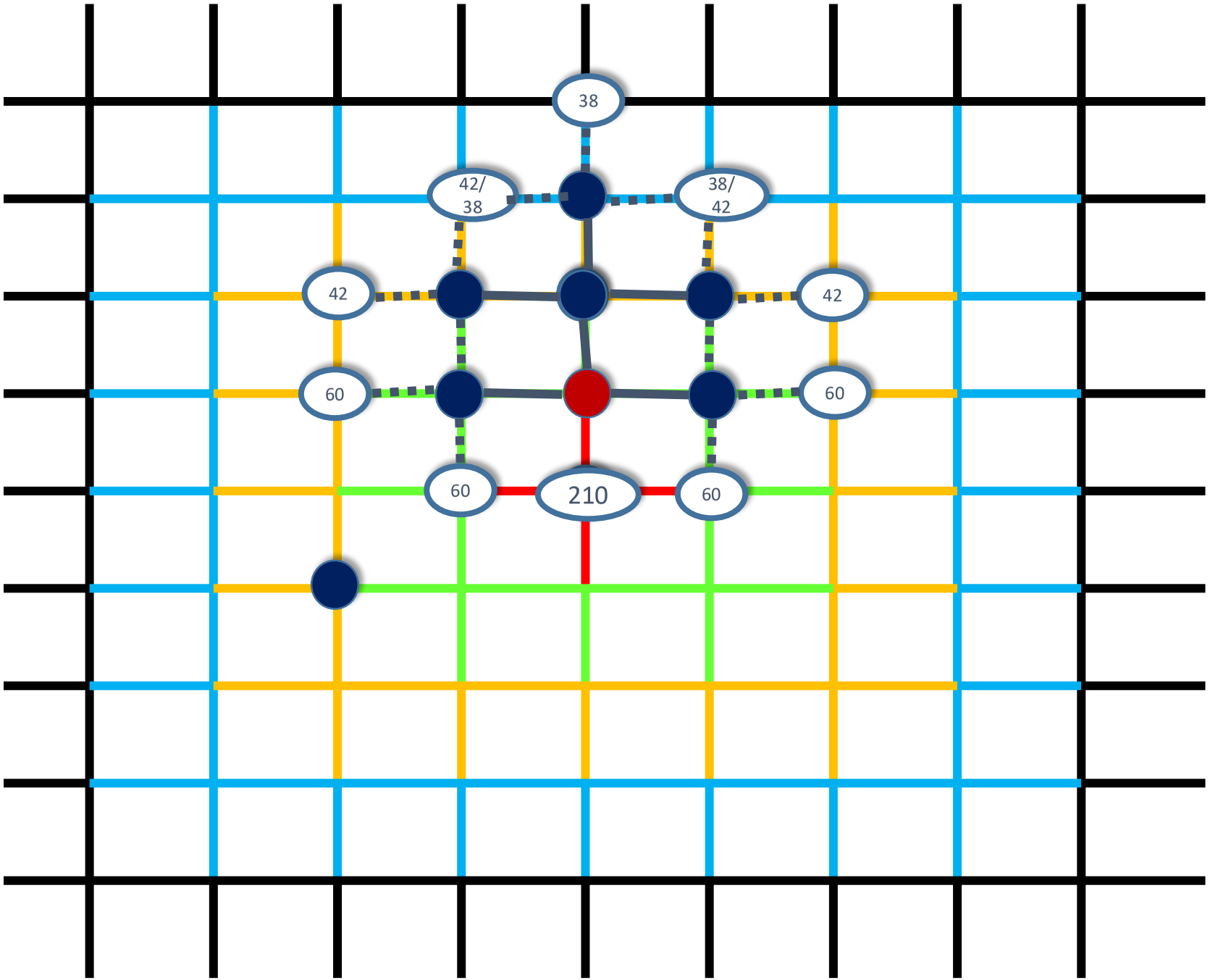

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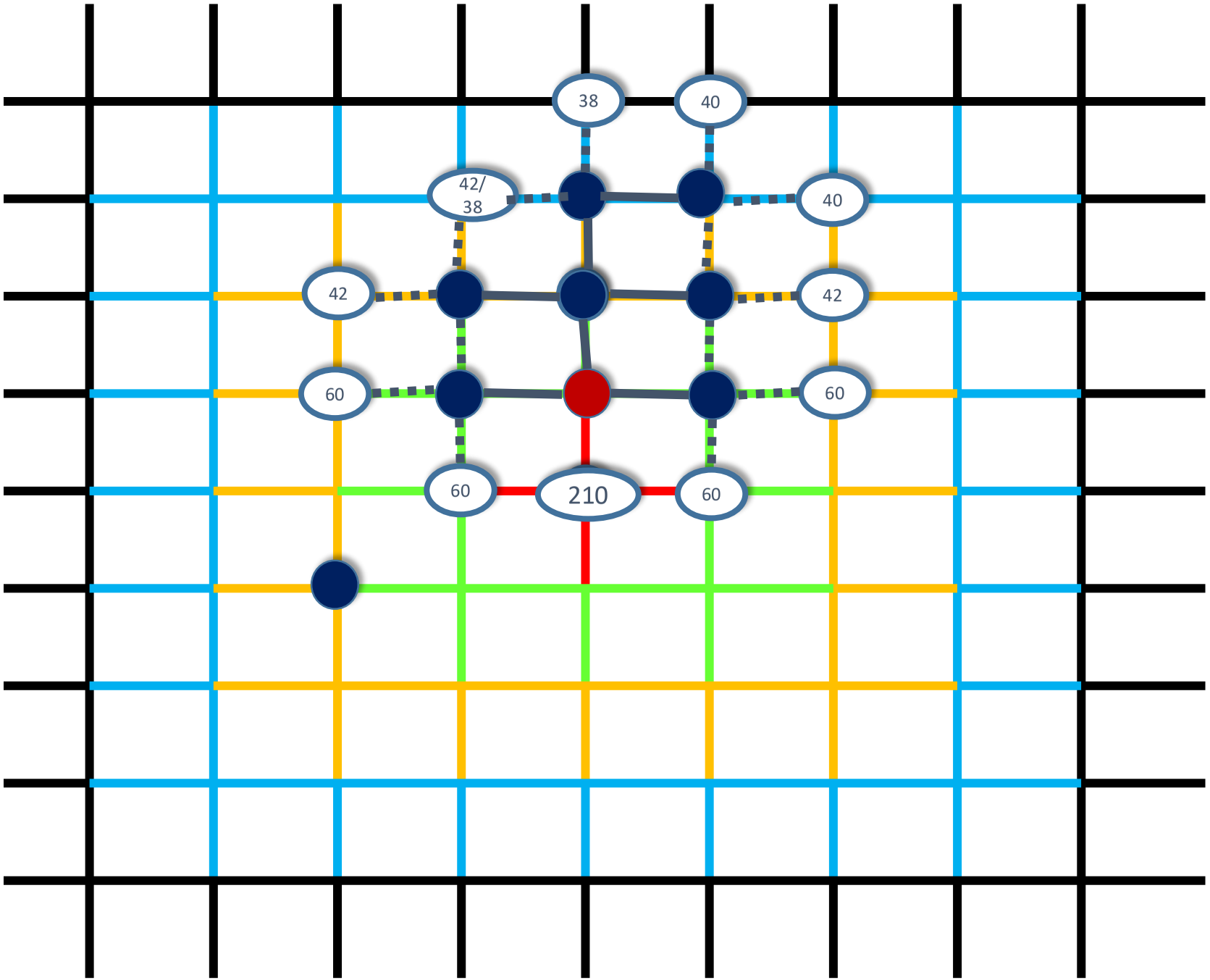

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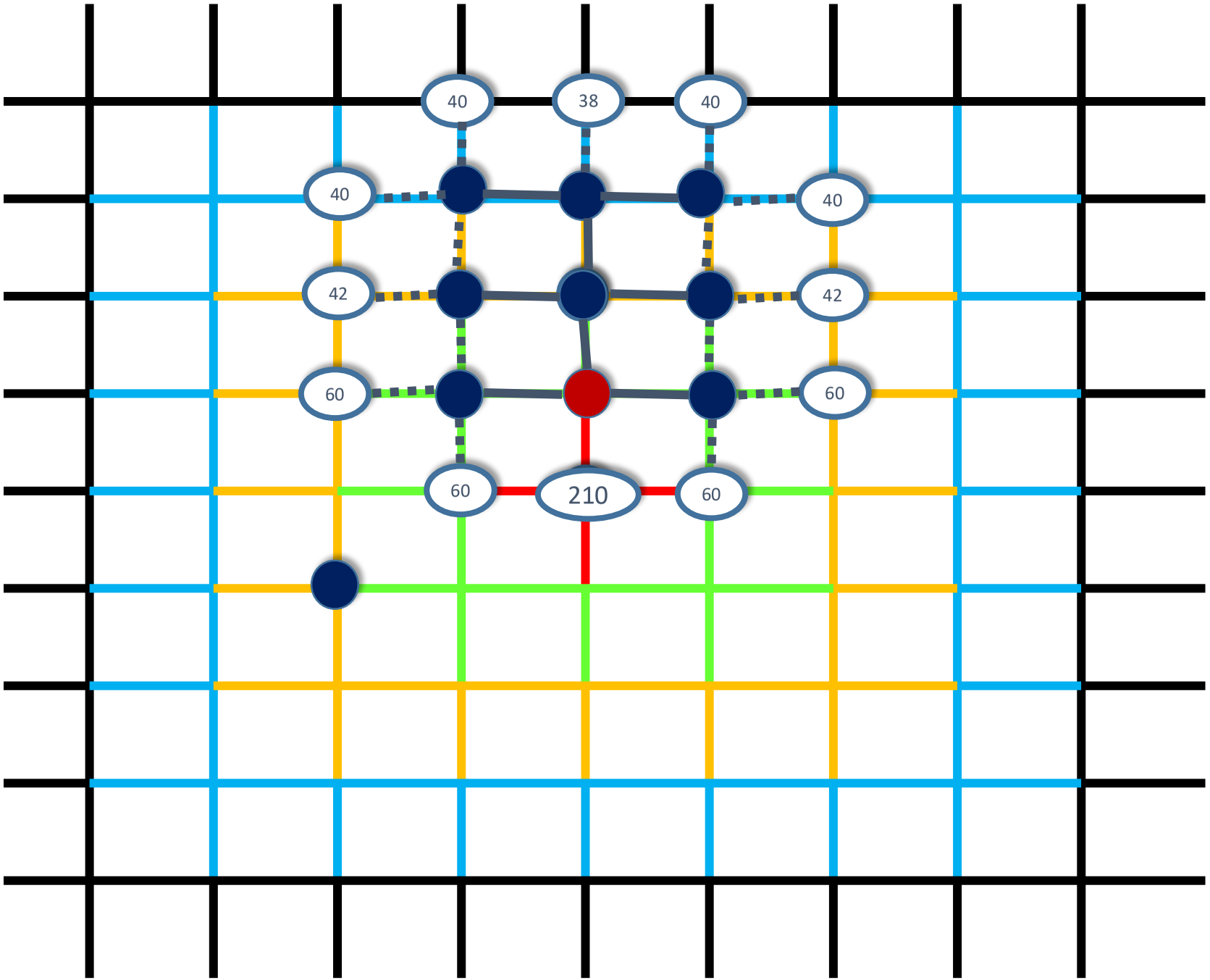

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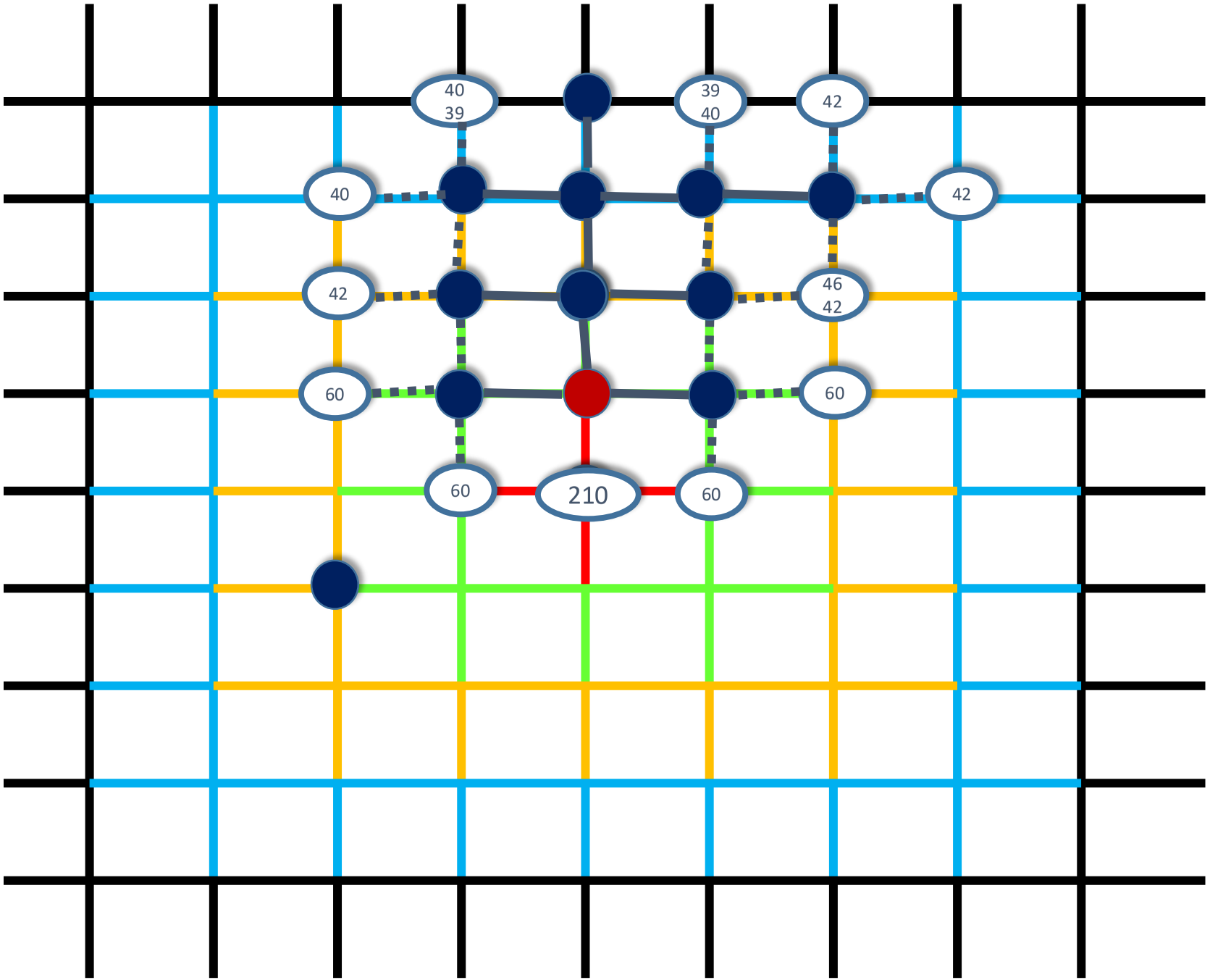

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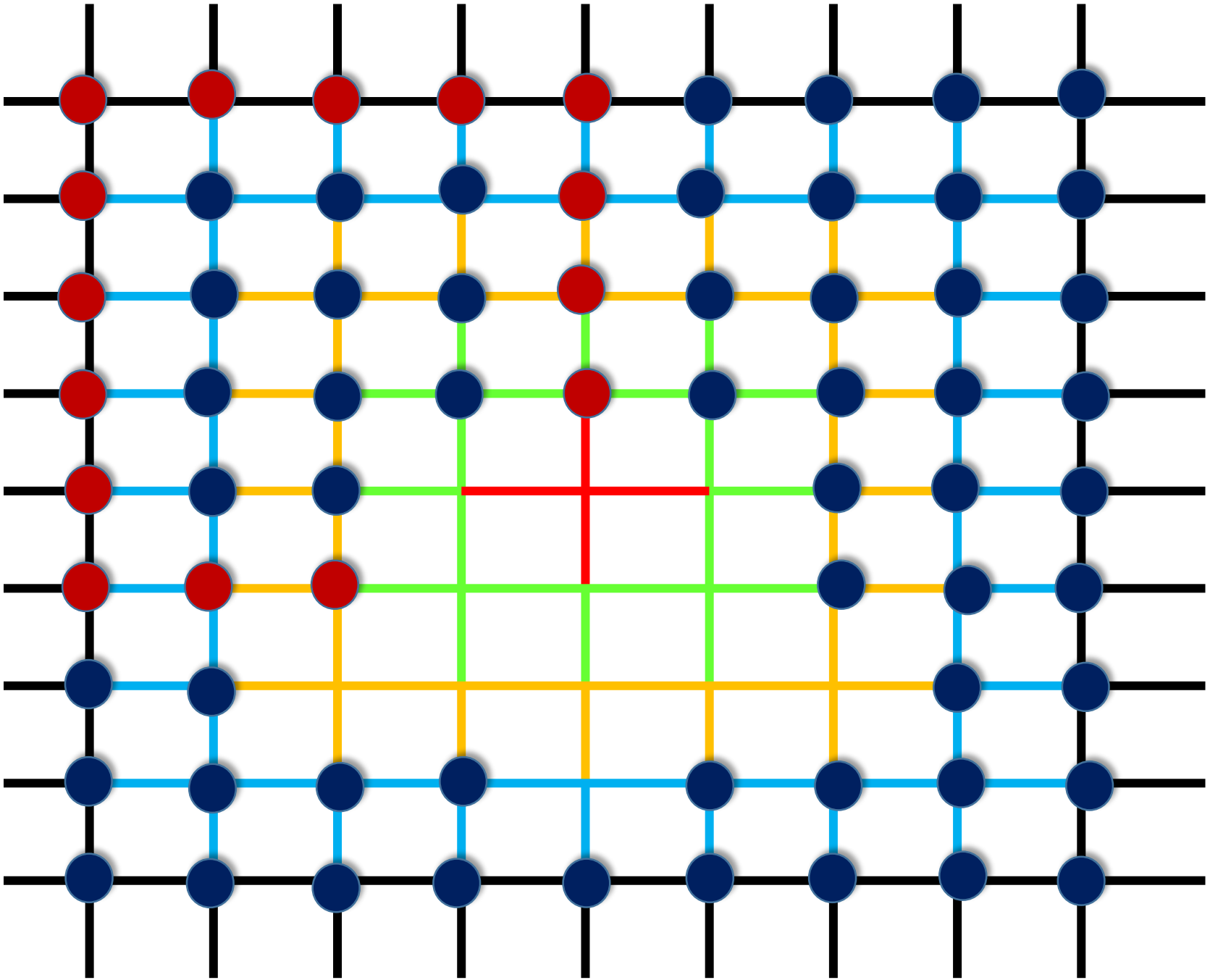
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Conventio
Clockwise
Number E
Shortest C

directional Uniform Cost Search

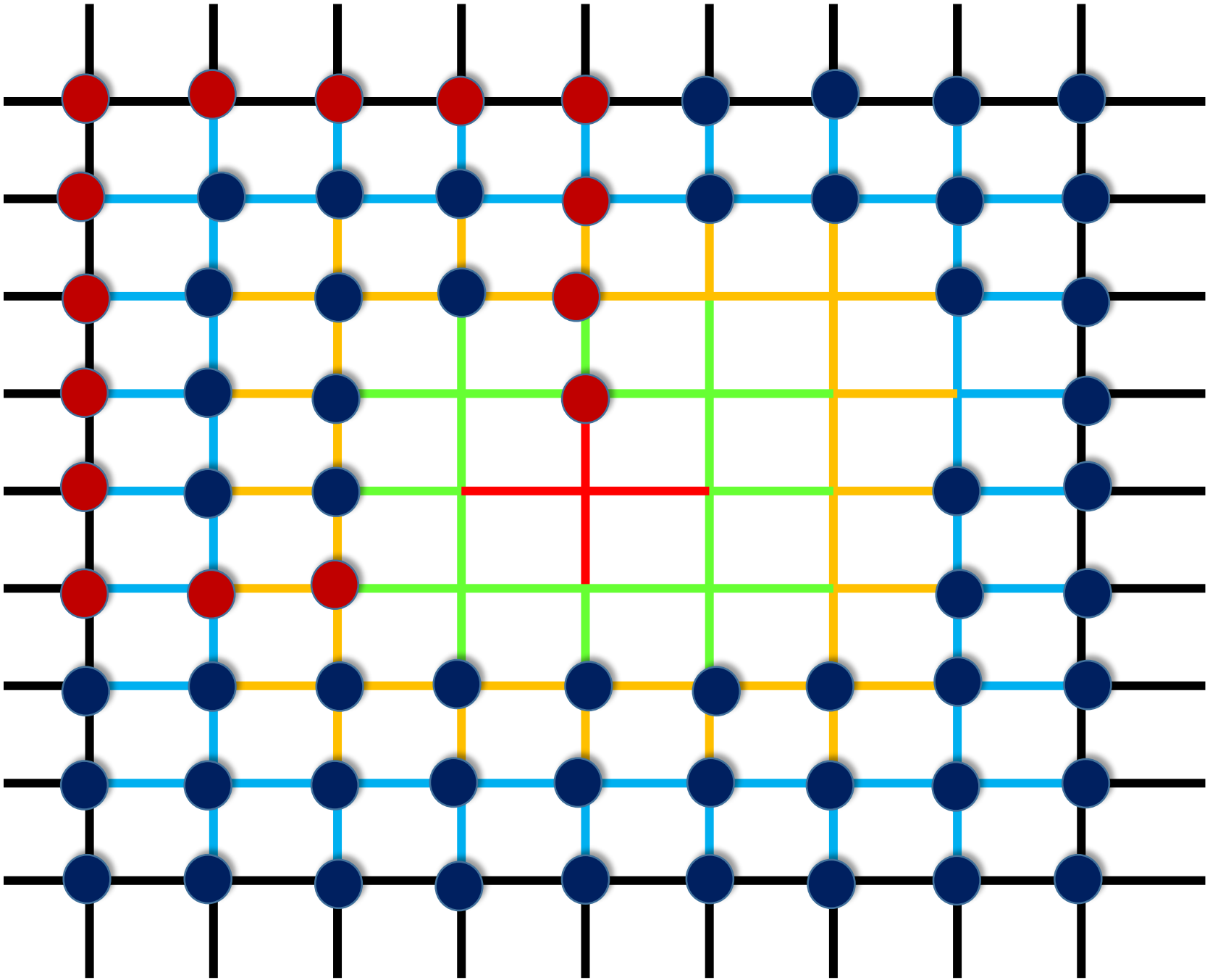
ny manner of expanding frontiers is OK

- Alternating both frontiers – good for parallel computing
- Taking the min – good in weighted graphs where hubs have high cost

opping criterion:

- `min(forward) + min(reverse) > shortest_path_in_graph`

- Note: intersection of explored sets, means you check for your stopping criterion when you POP from the queue.



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Number E
Shortest C

Notes:
- Expand
  of front
- Clockw
  breaks

: Search

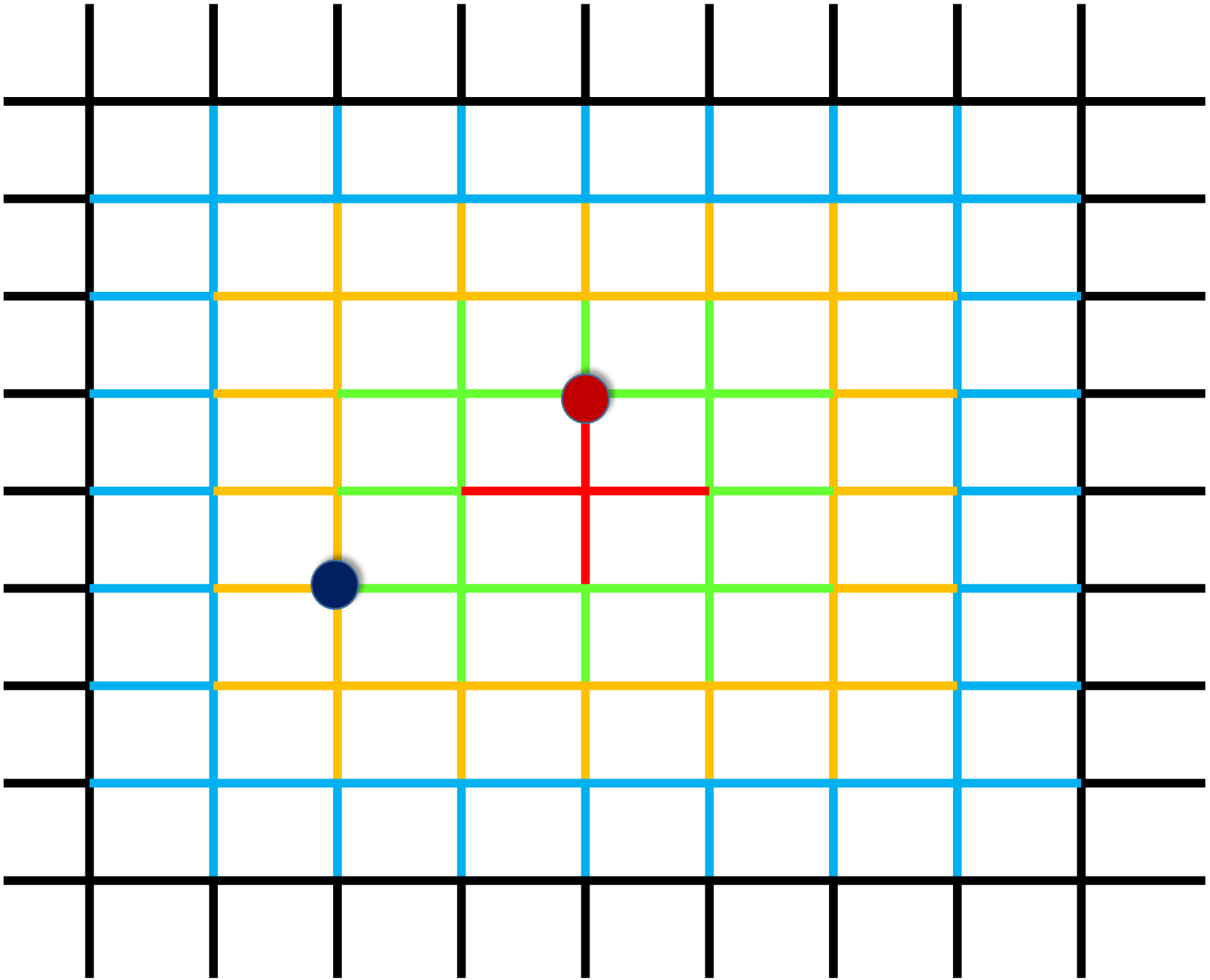
ıange the heap sort to include a heuristic function

```
f(state) = h(state) + g(state)
```

ıoice of a good heuristic:

- Admissible: underestimates
- Consistent (strict): monotonic

ıe better the heuristic, the quicker the search



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Notes:
- Manha
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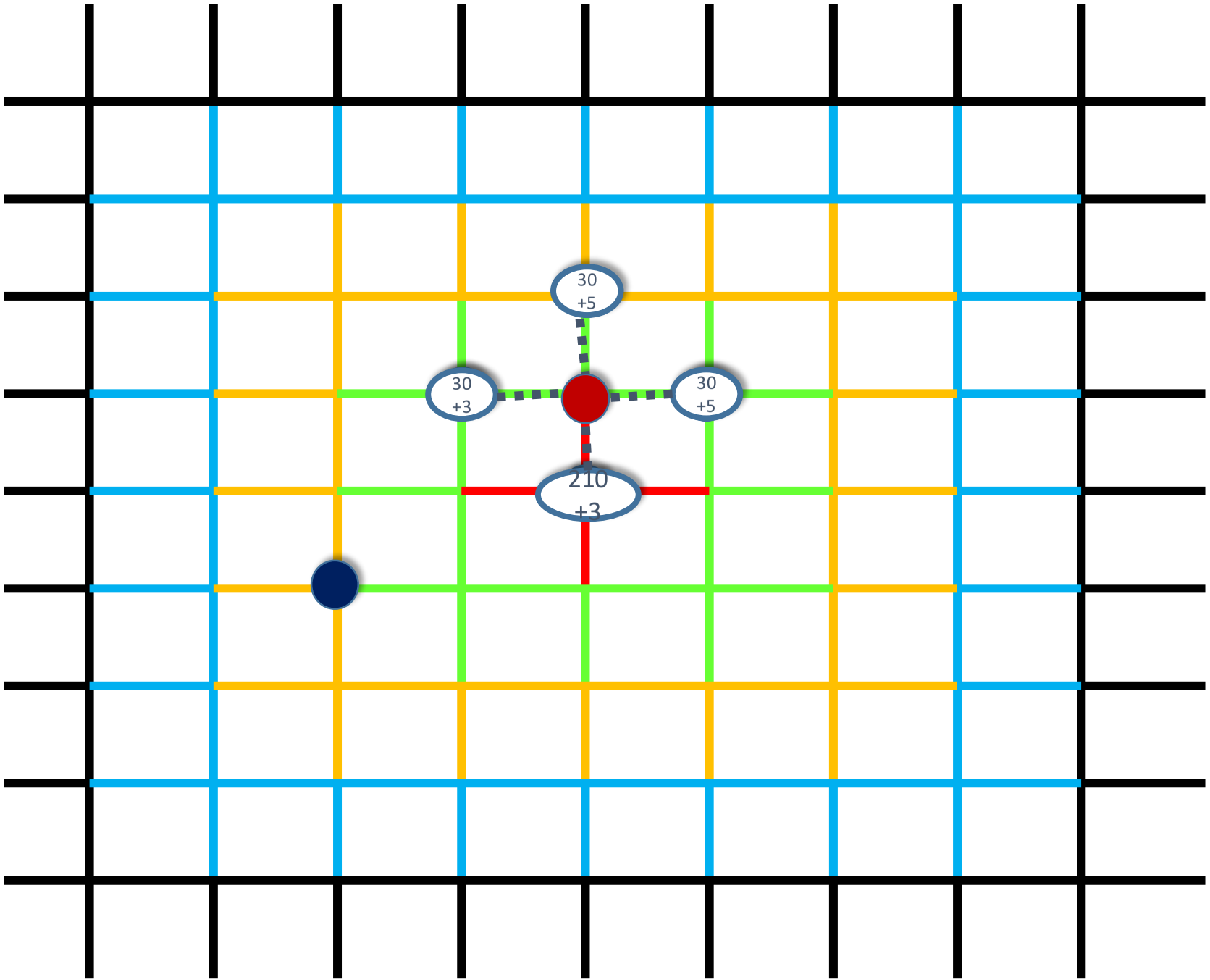
  Heurist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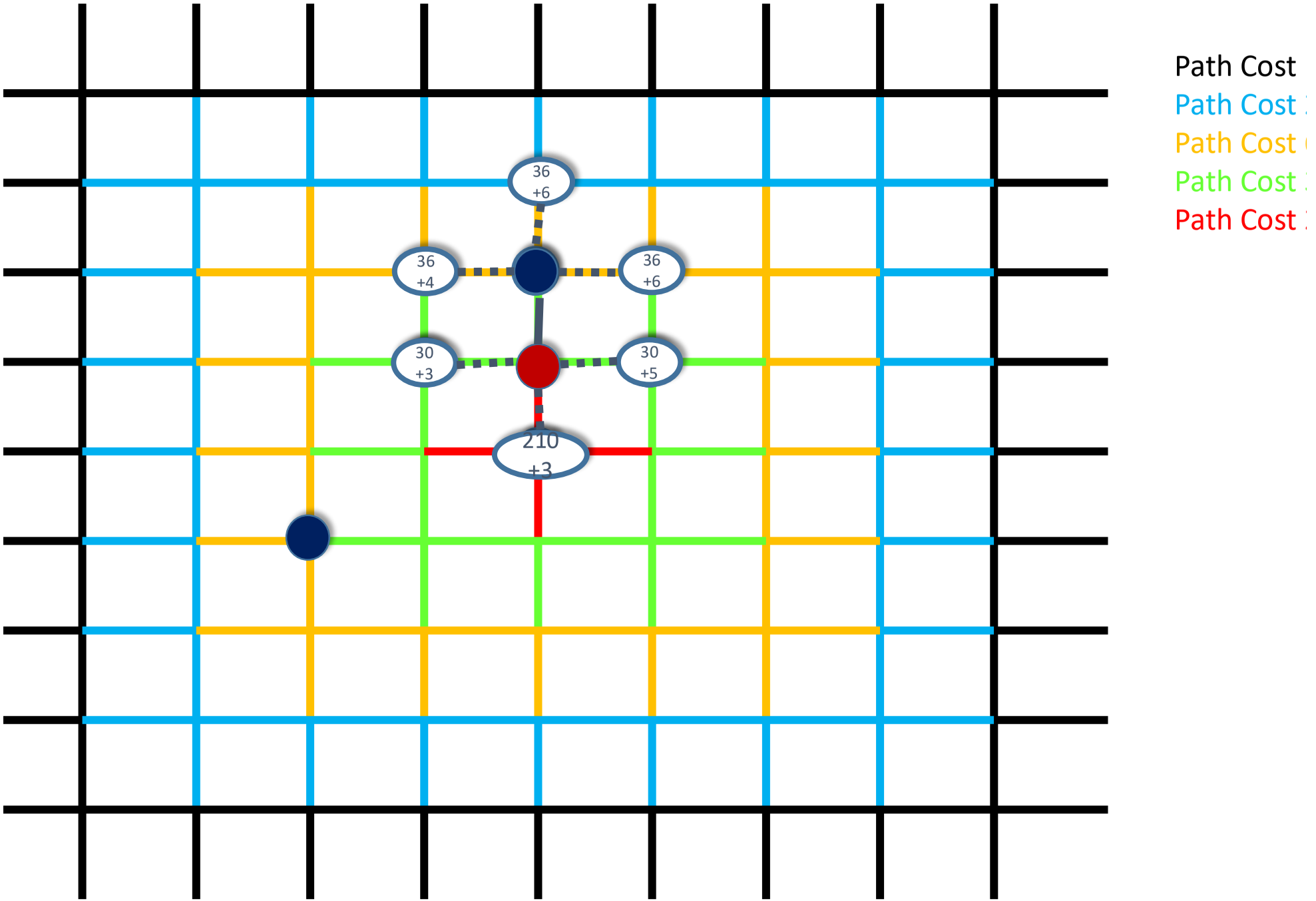
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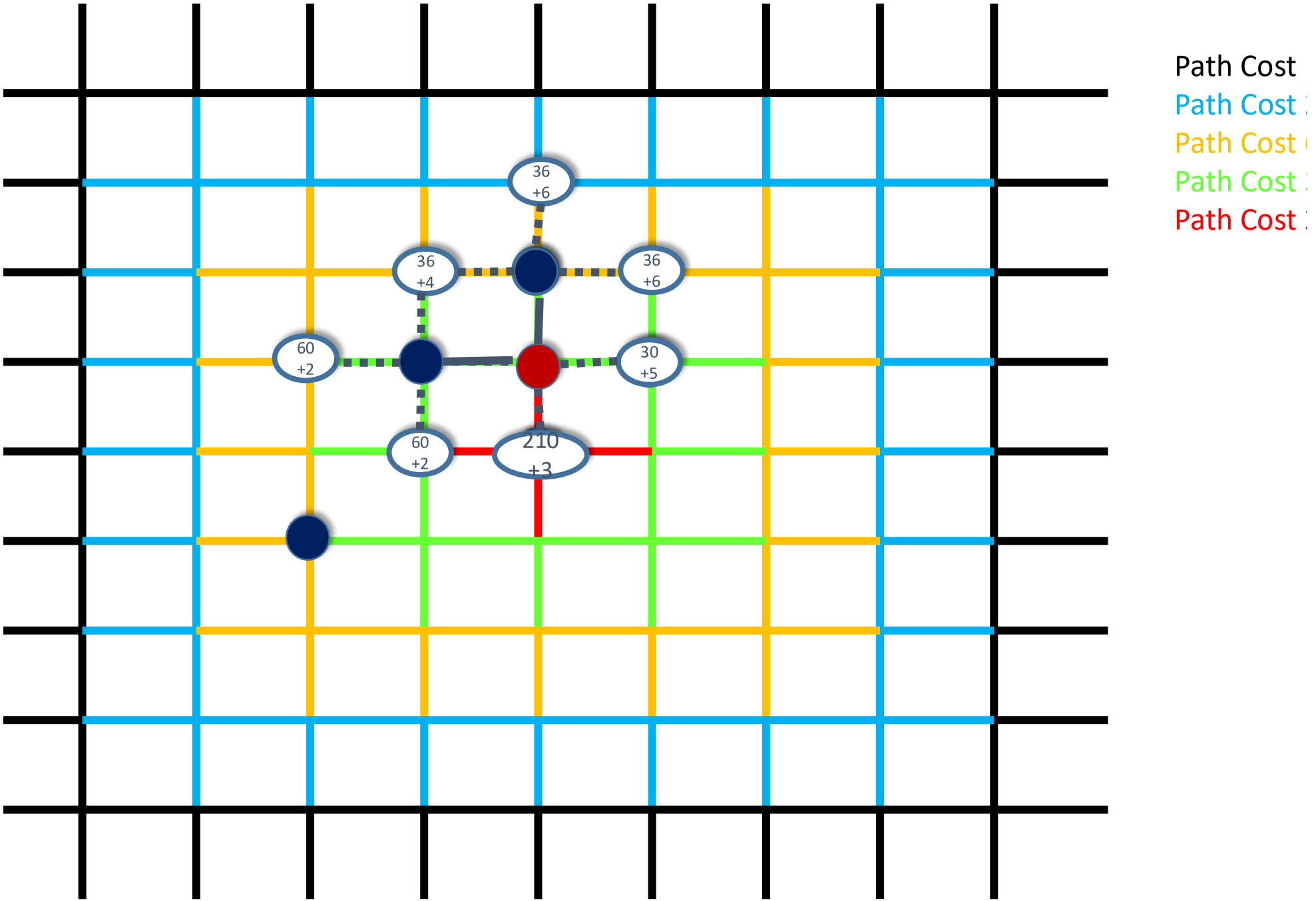
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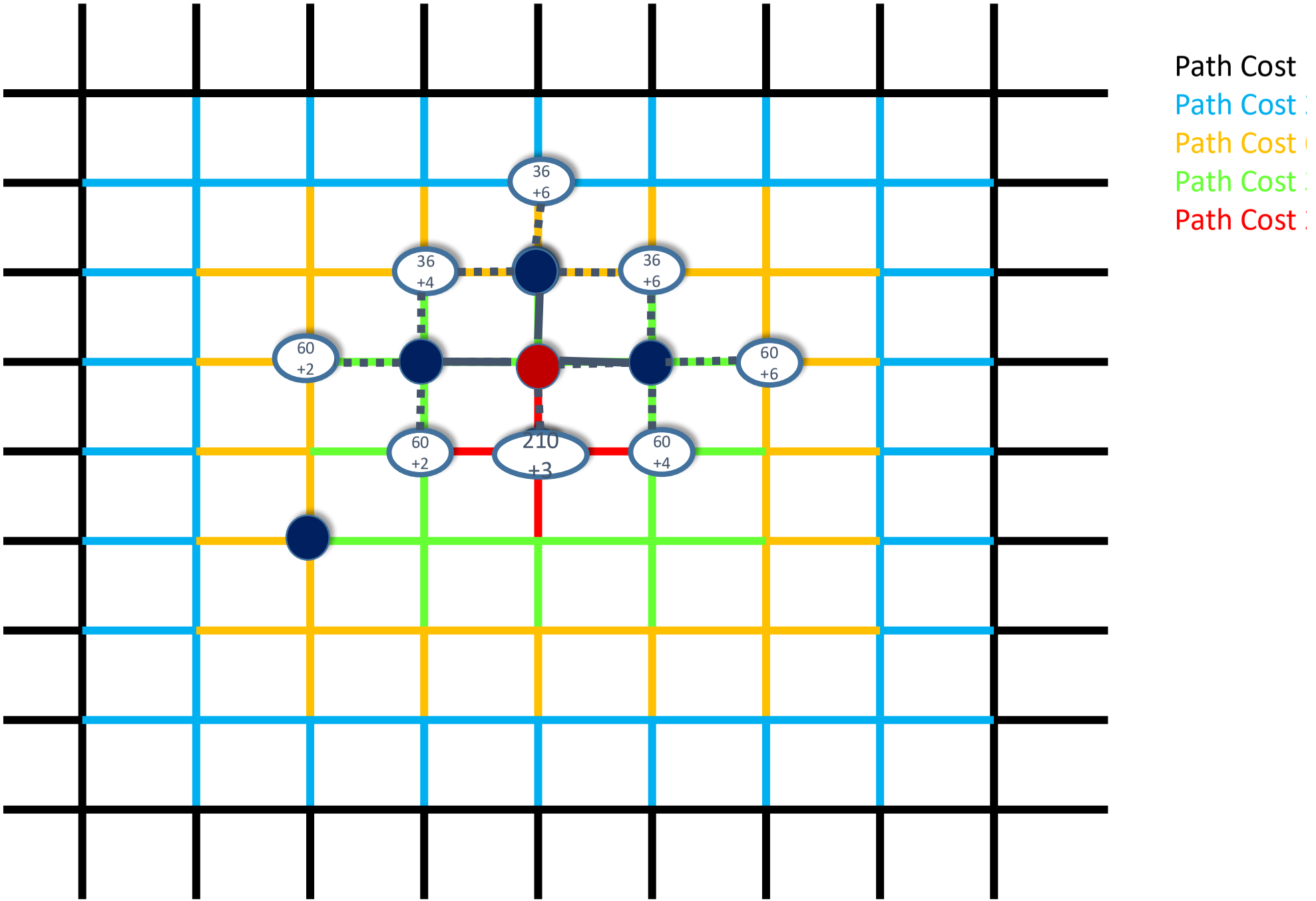
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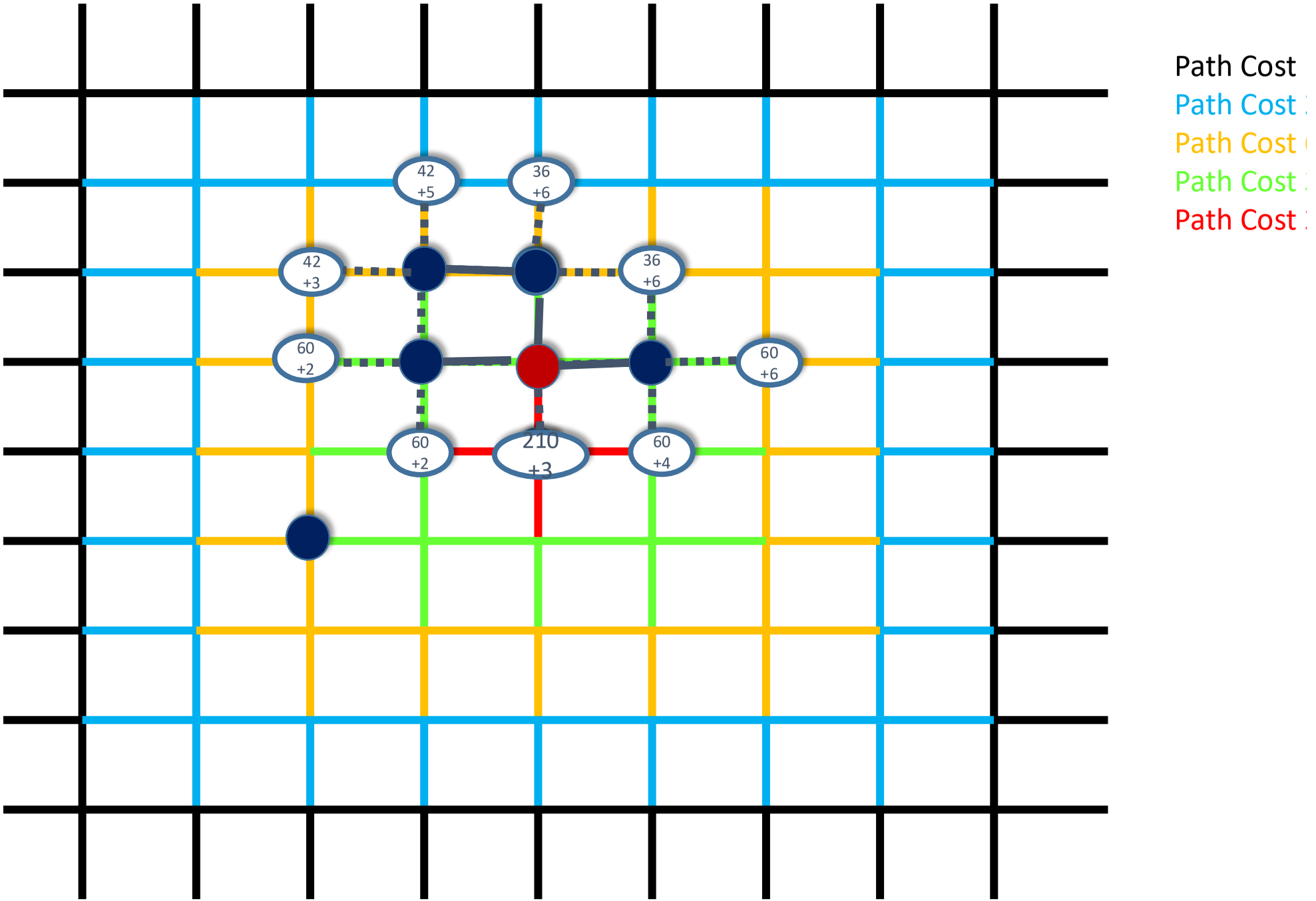
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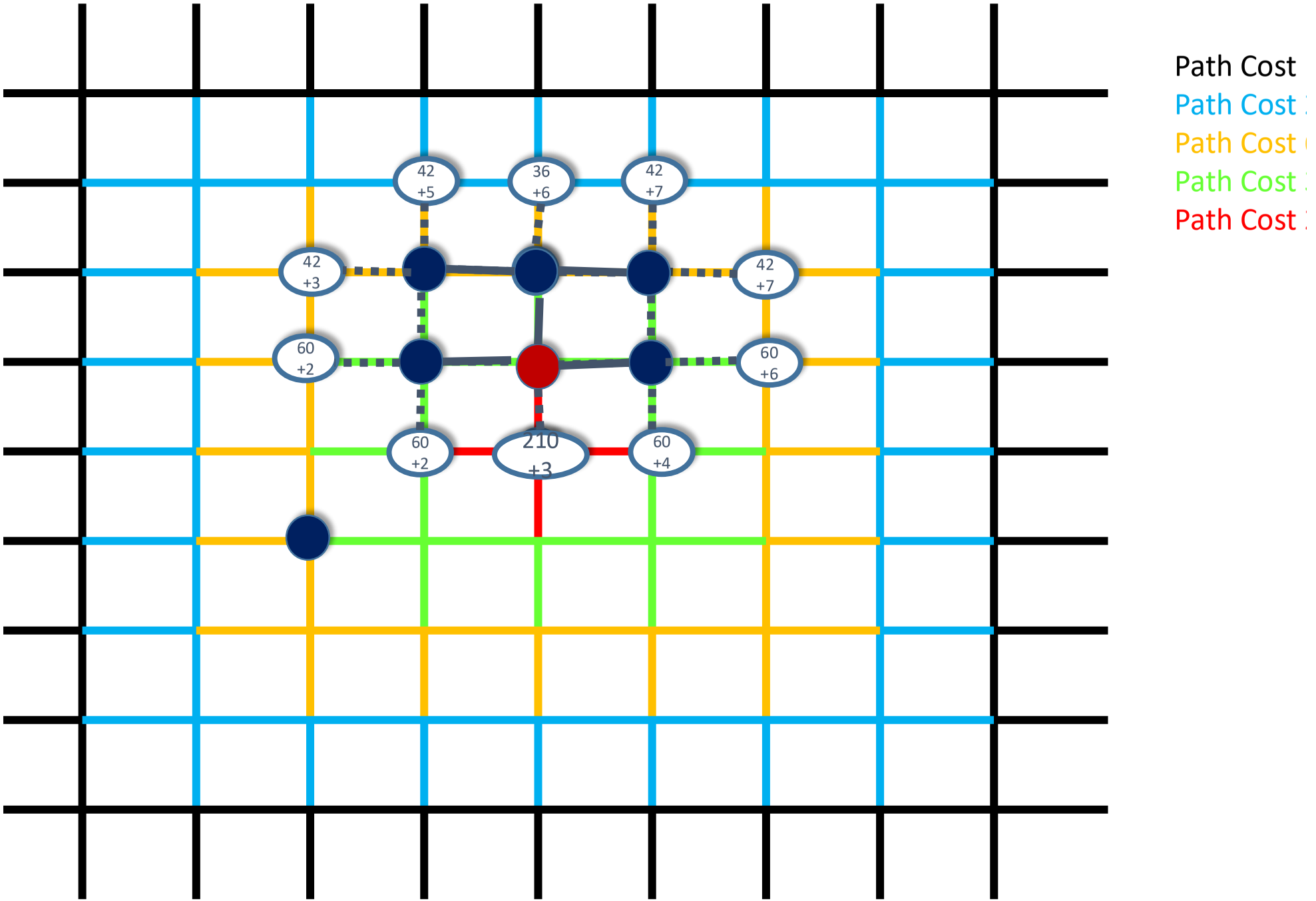
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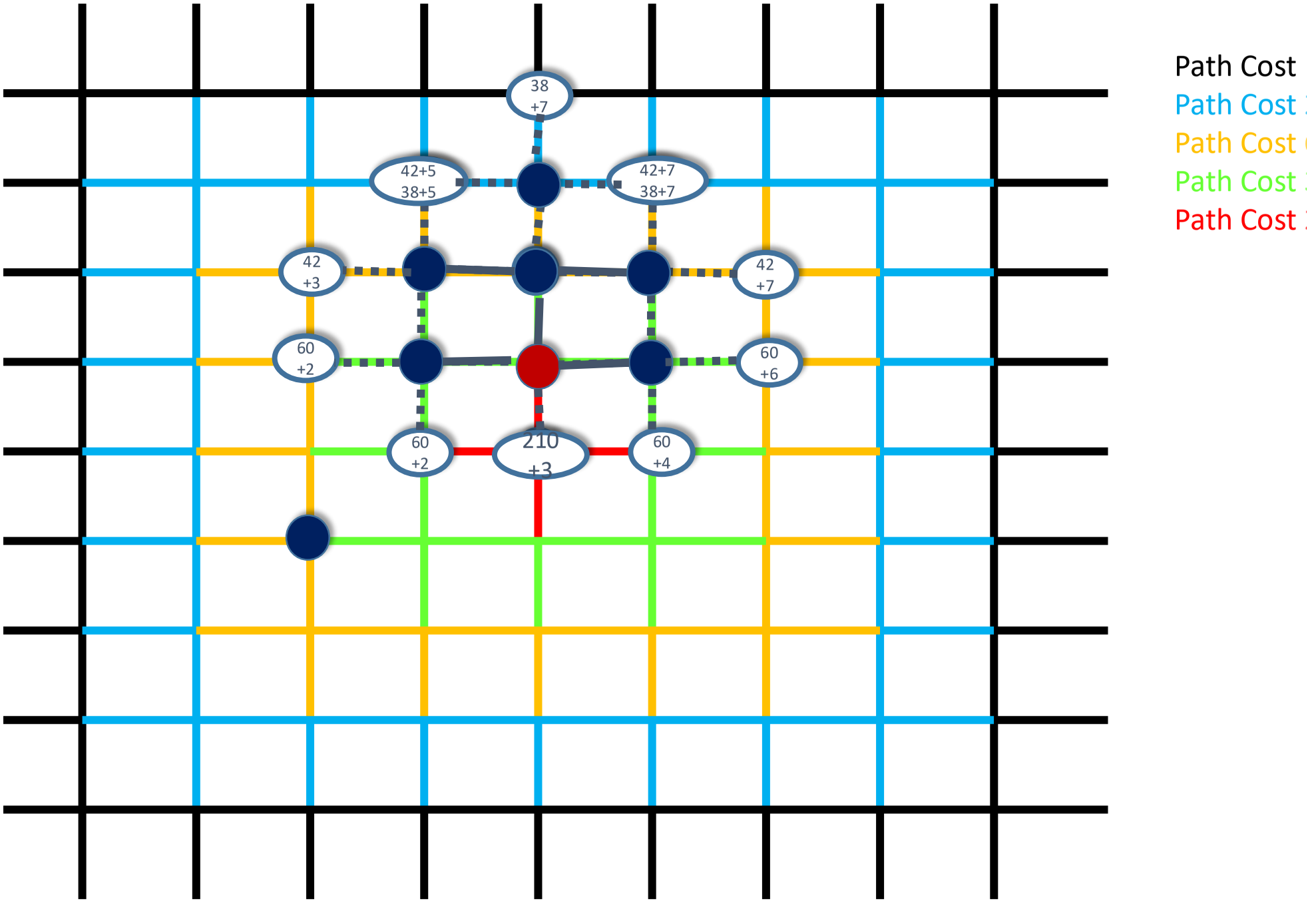
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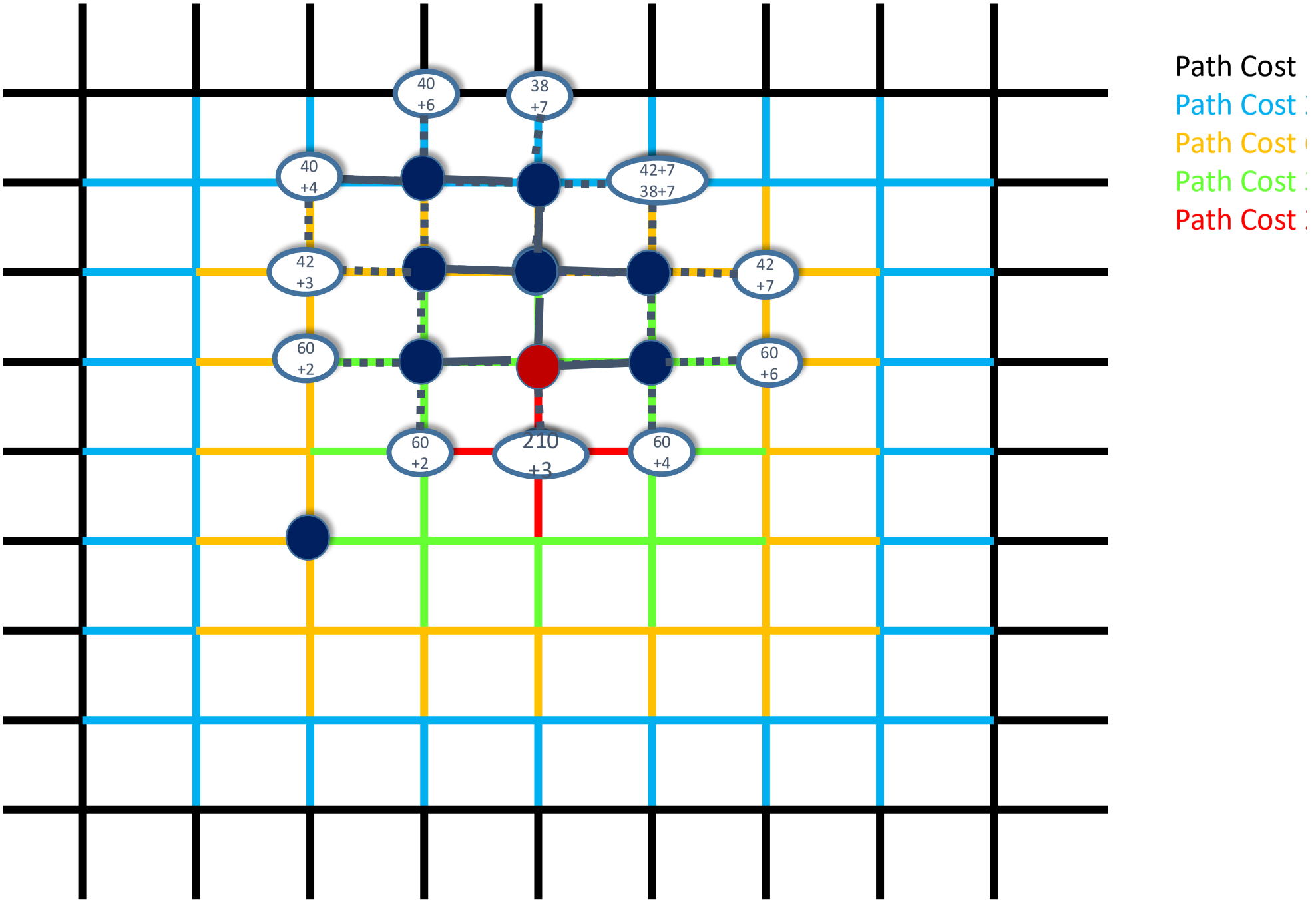
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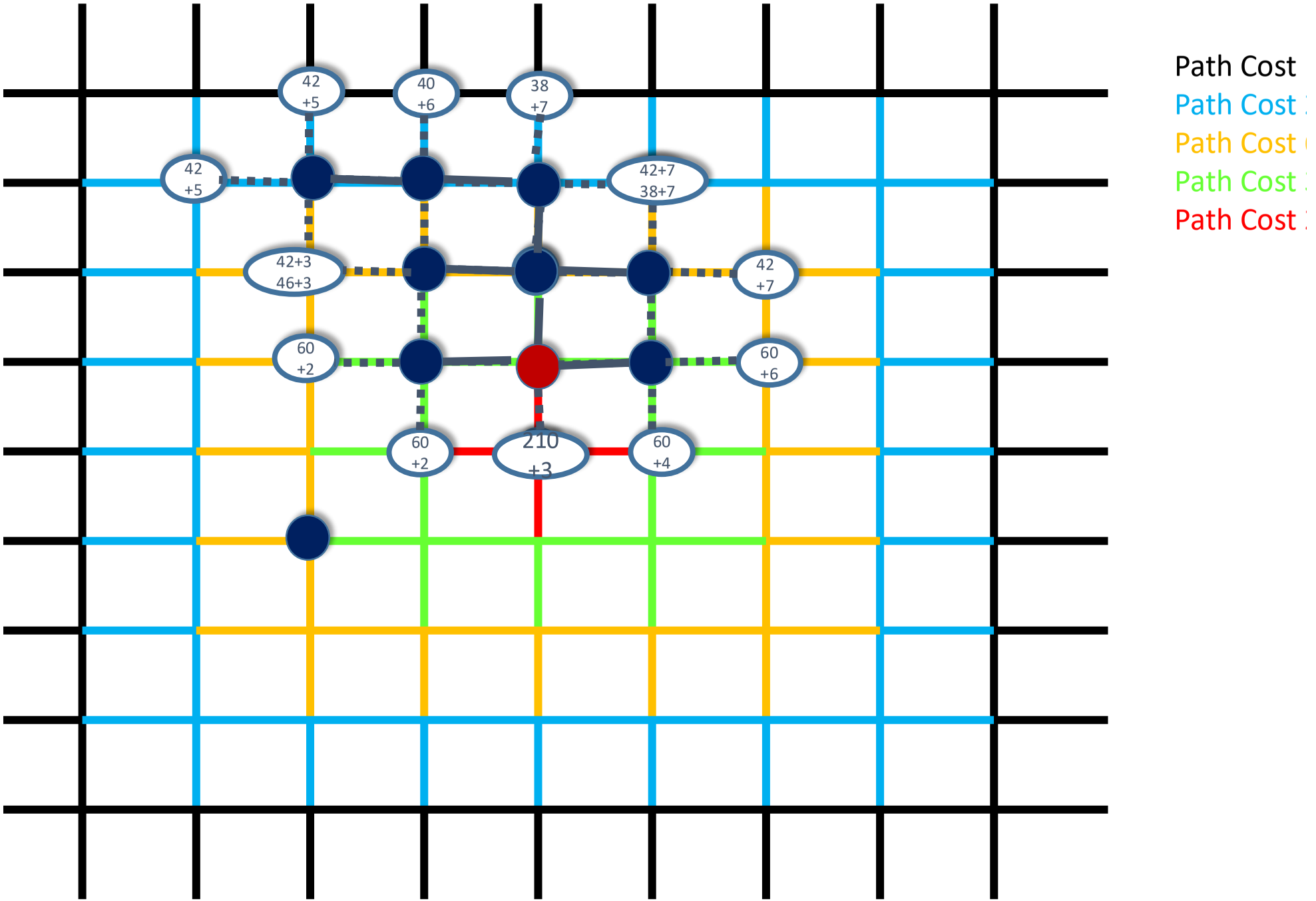
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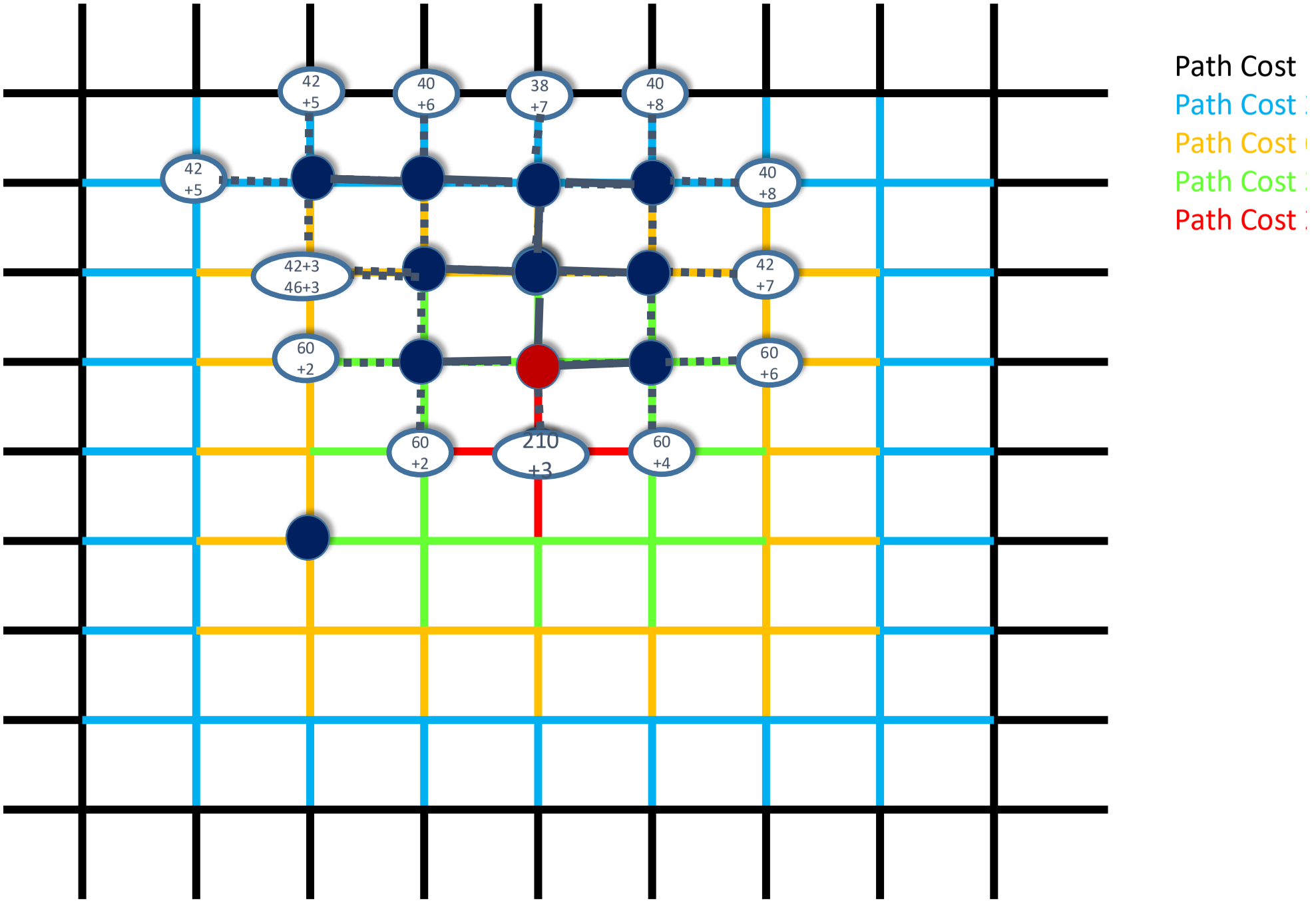
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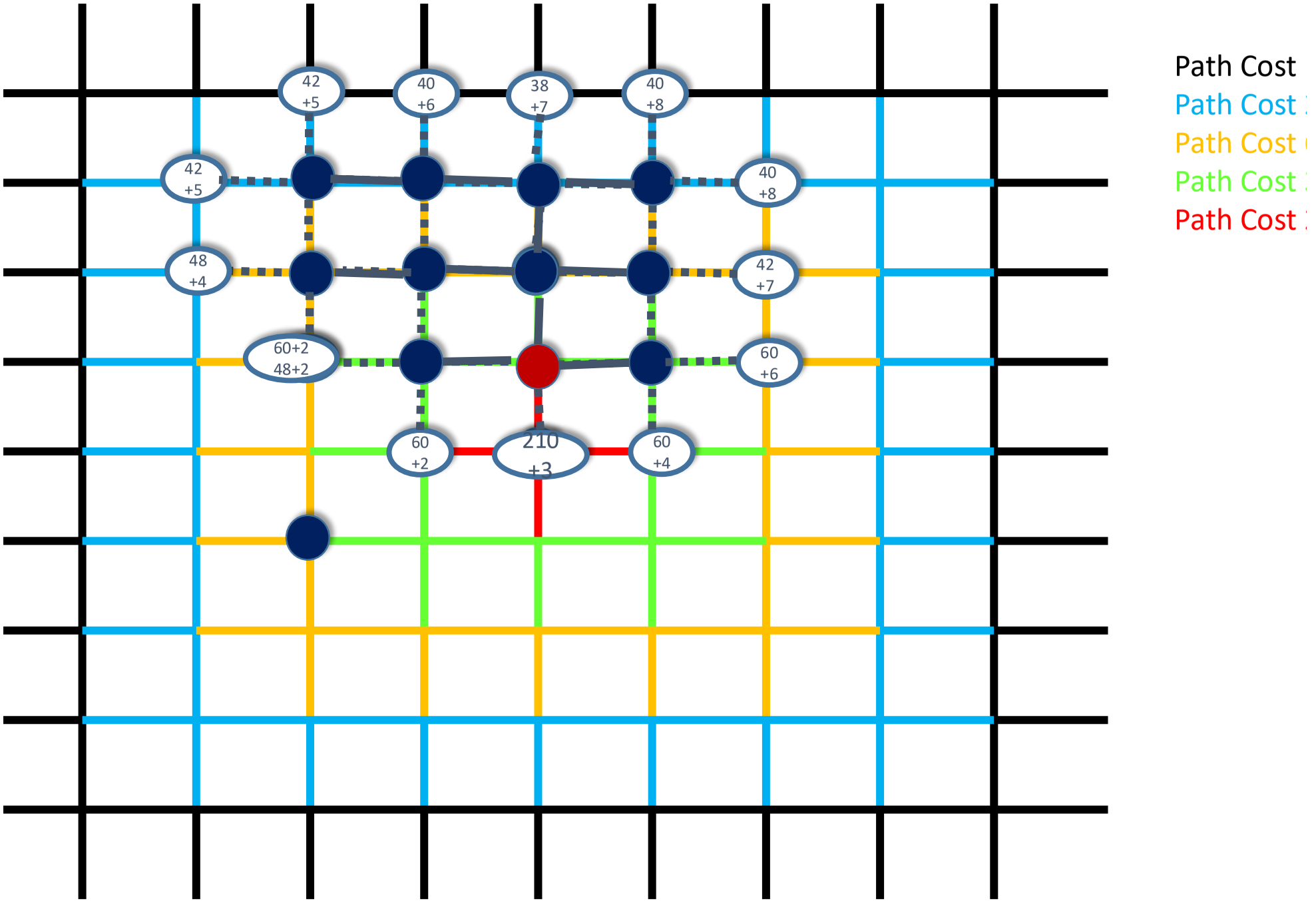
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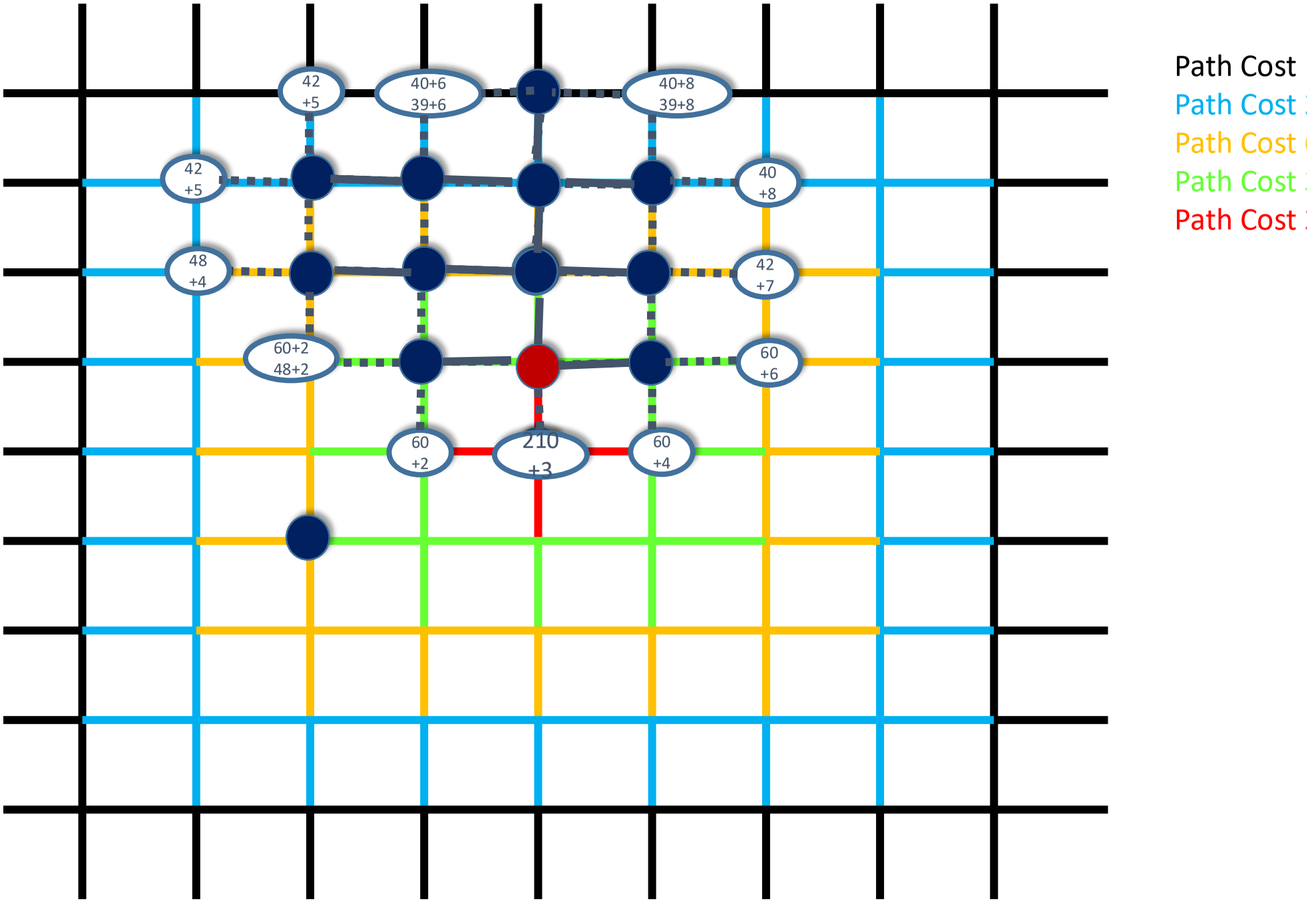
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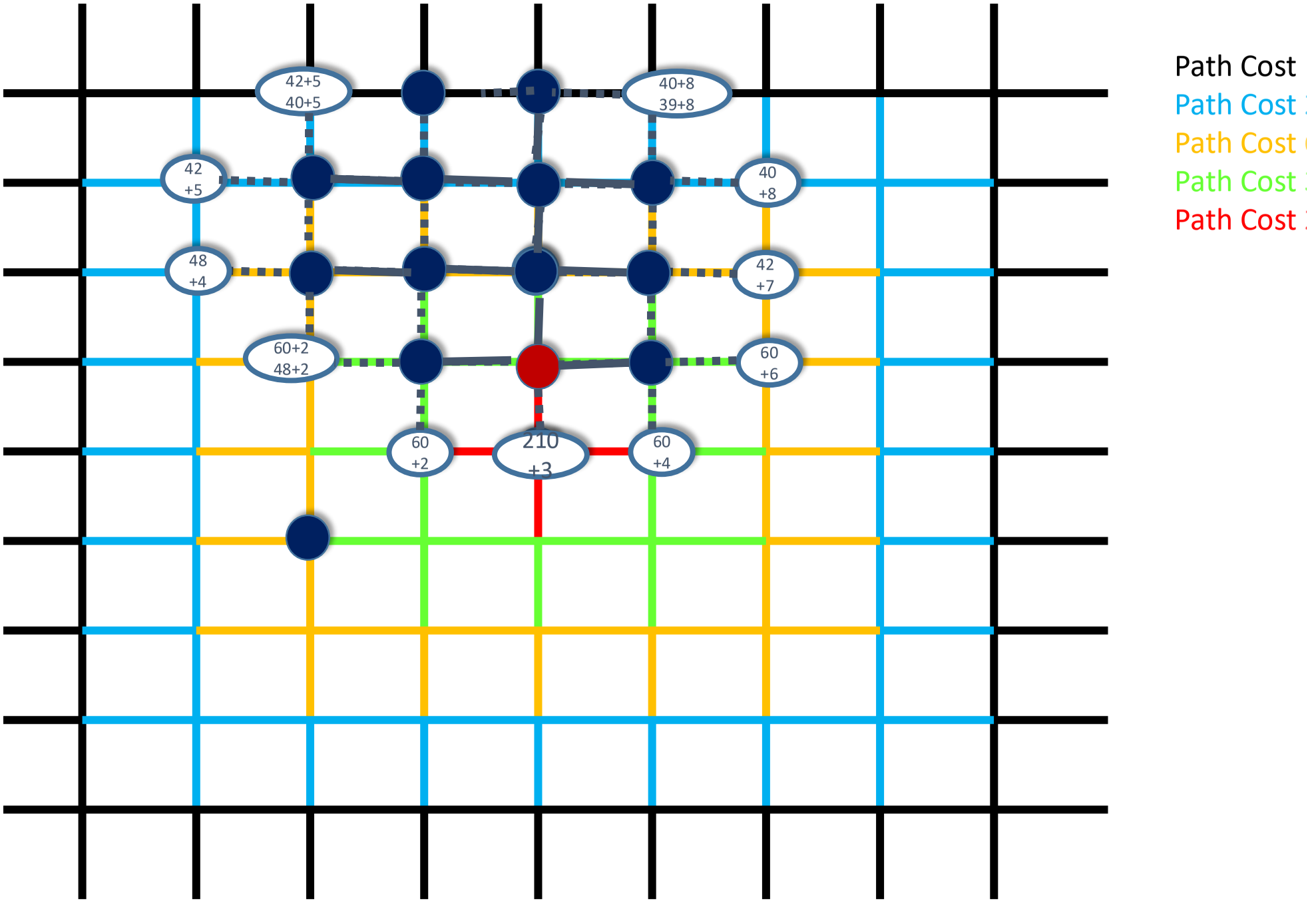
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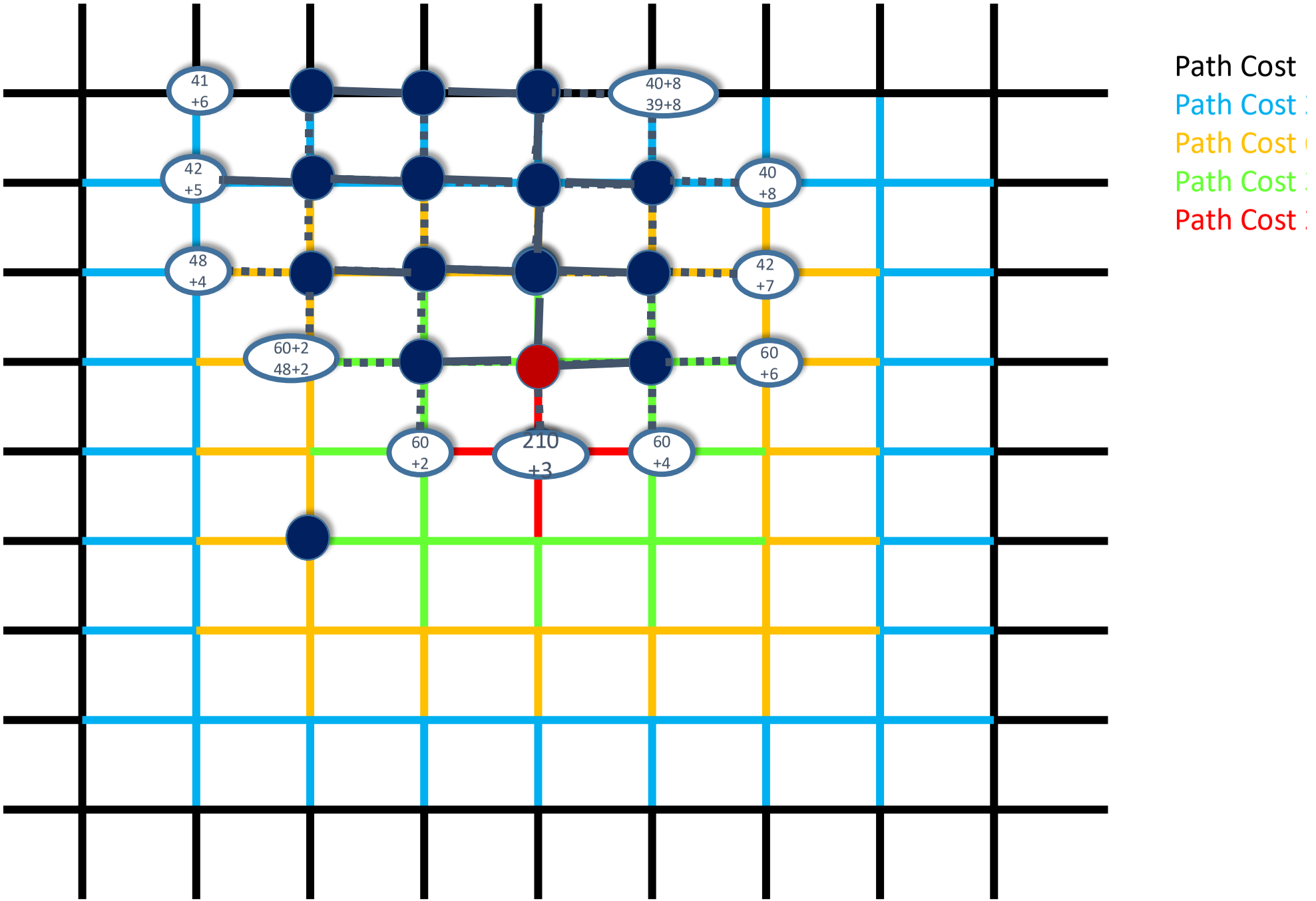
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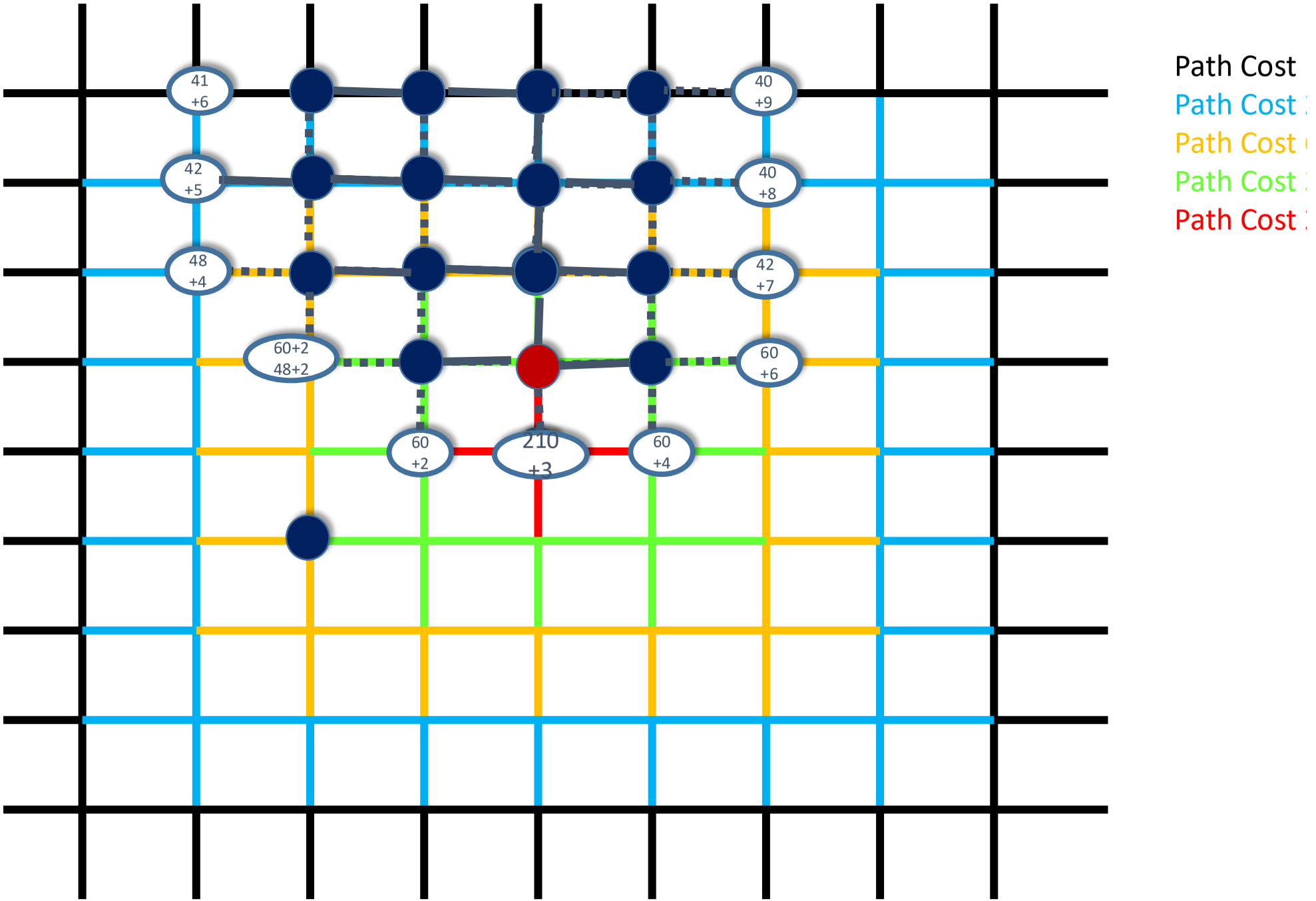
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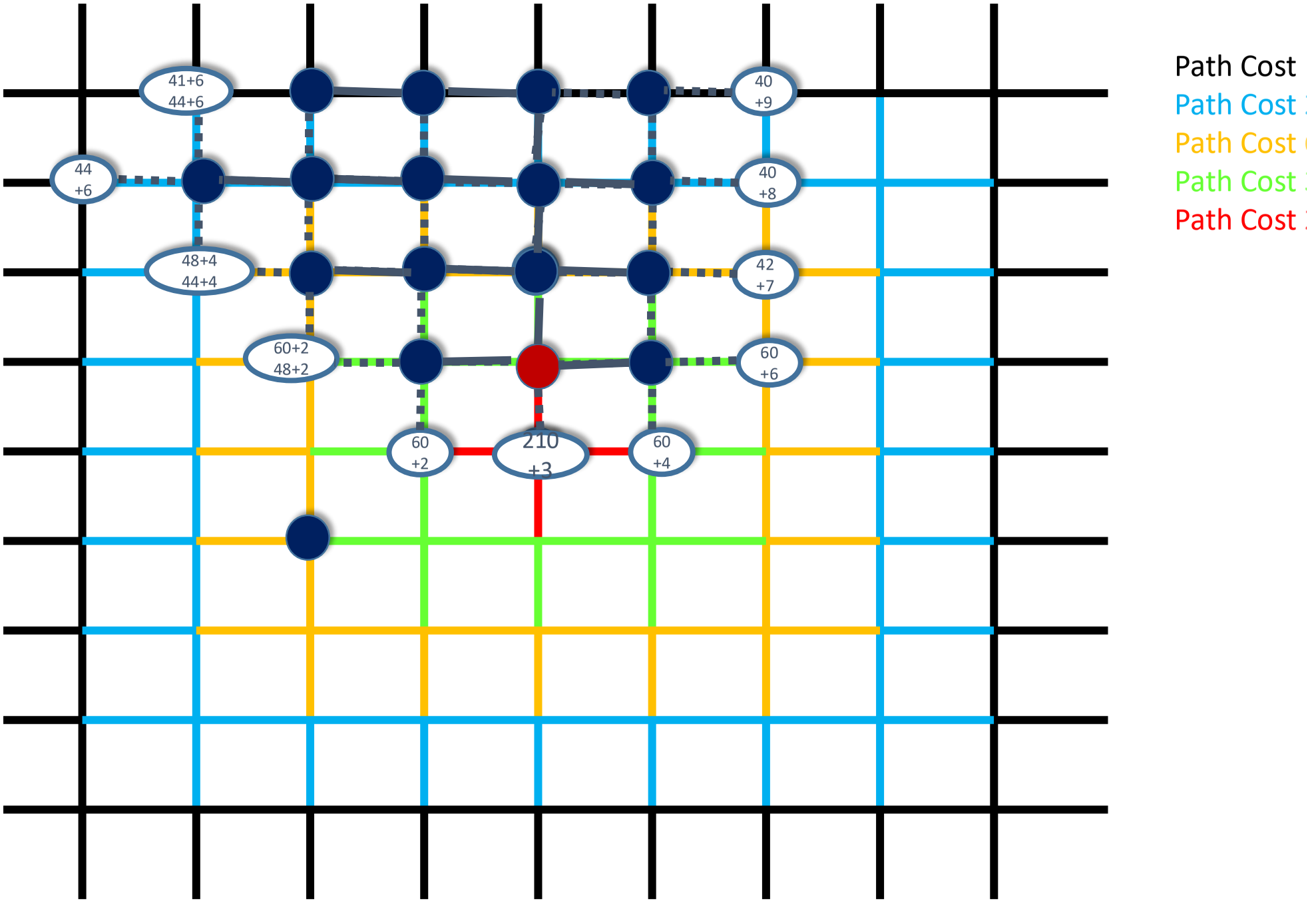
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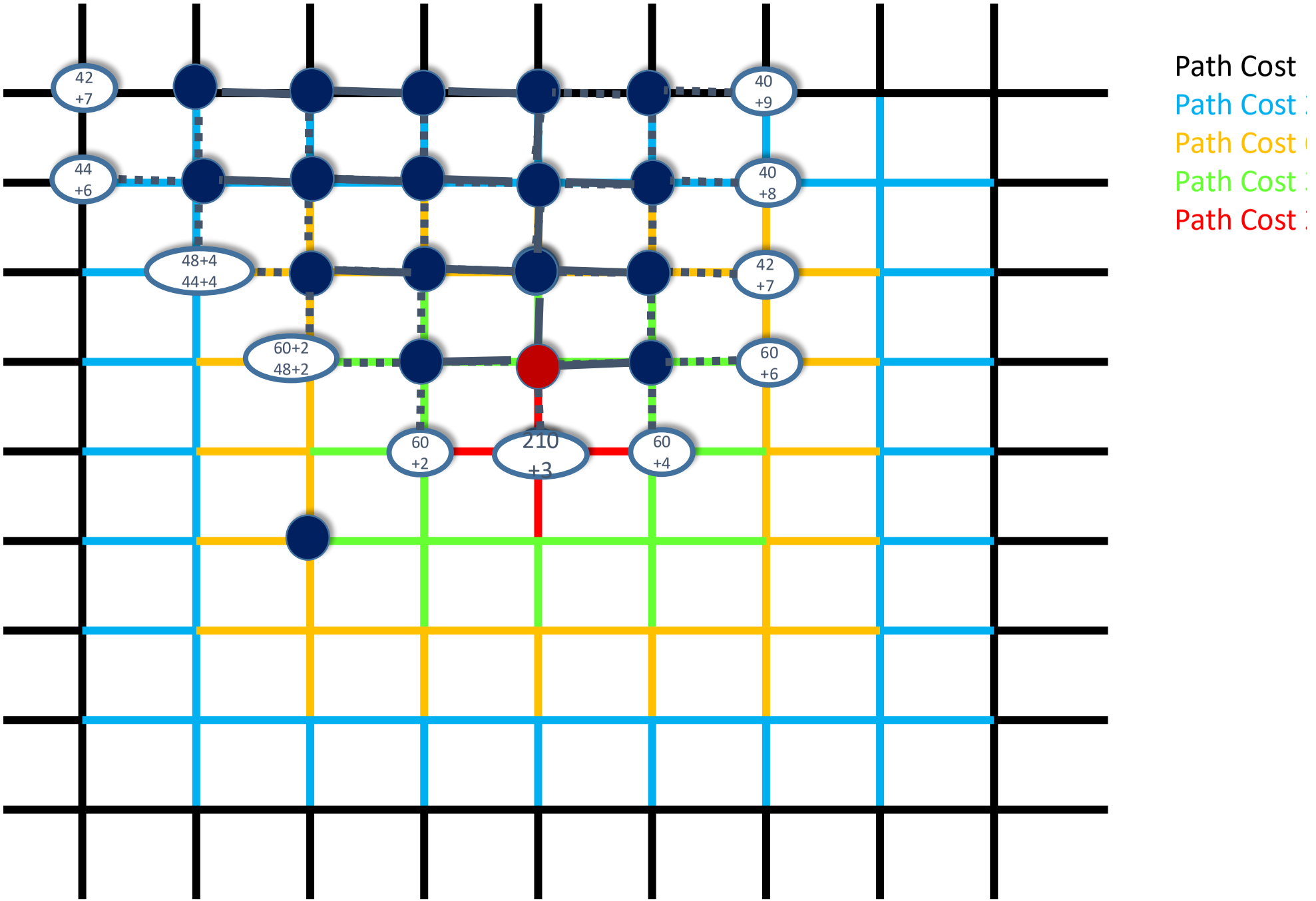
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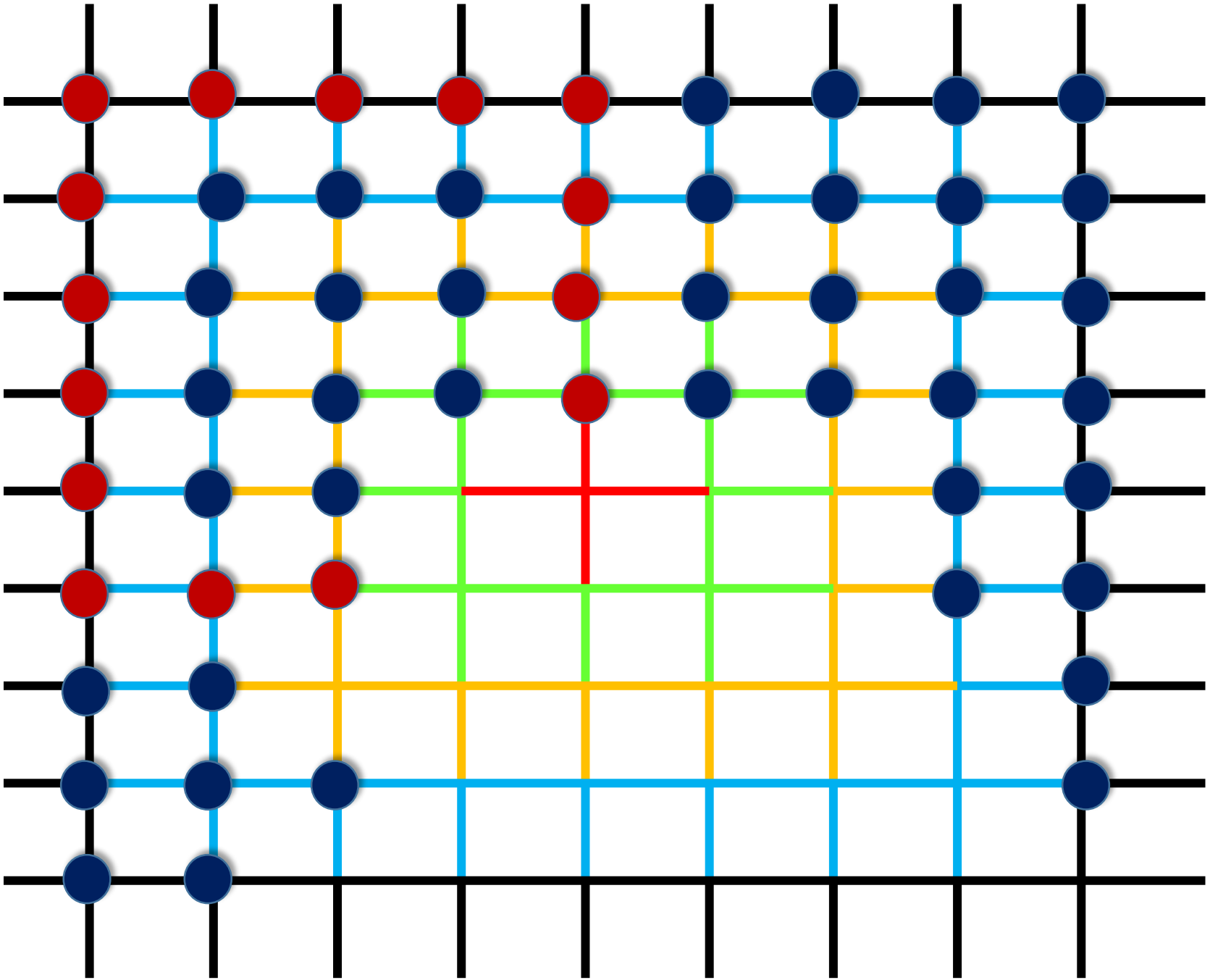
Path Cost
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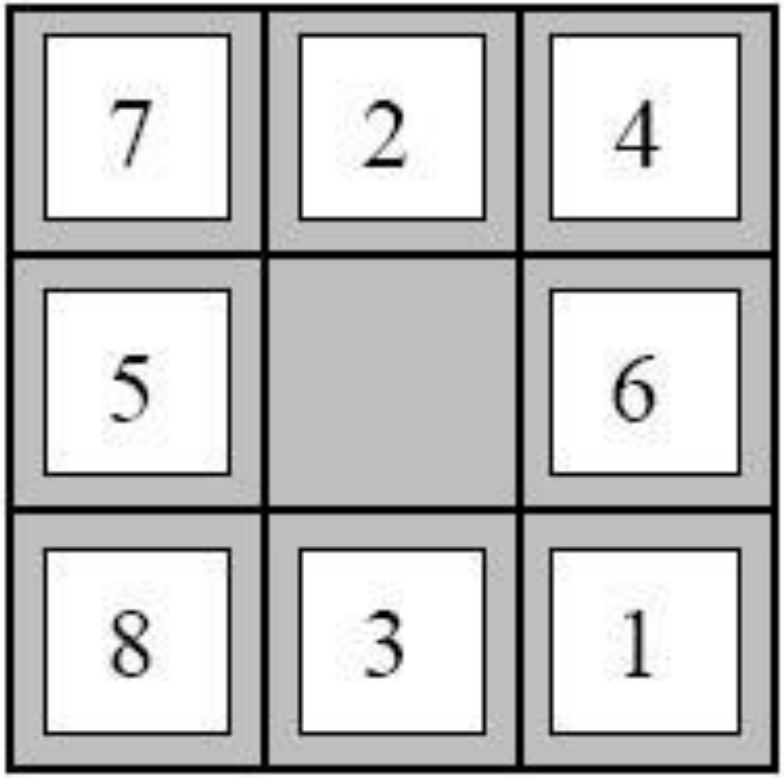
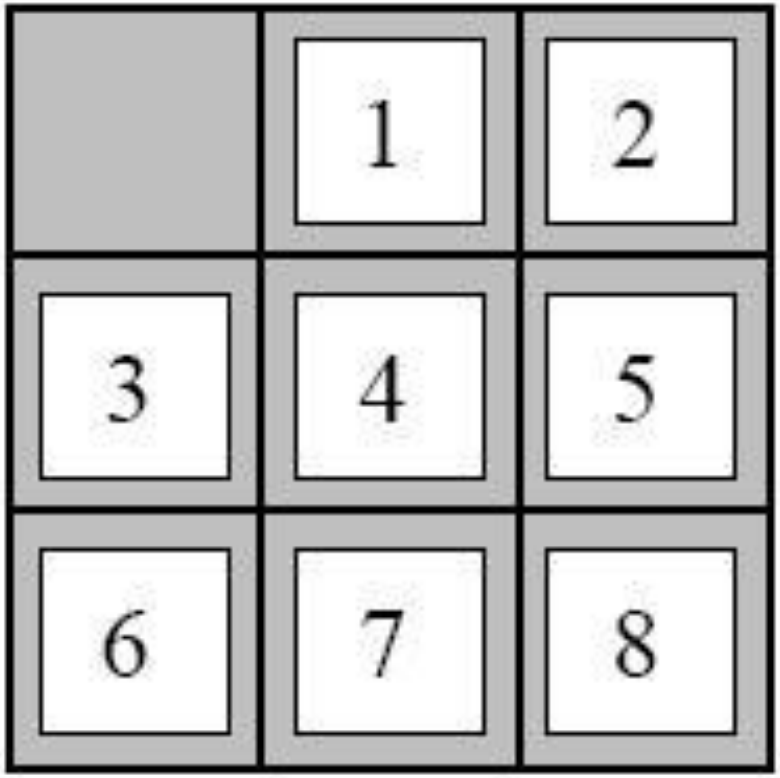
Number E
Shortest C

hoosing Good Heuristics

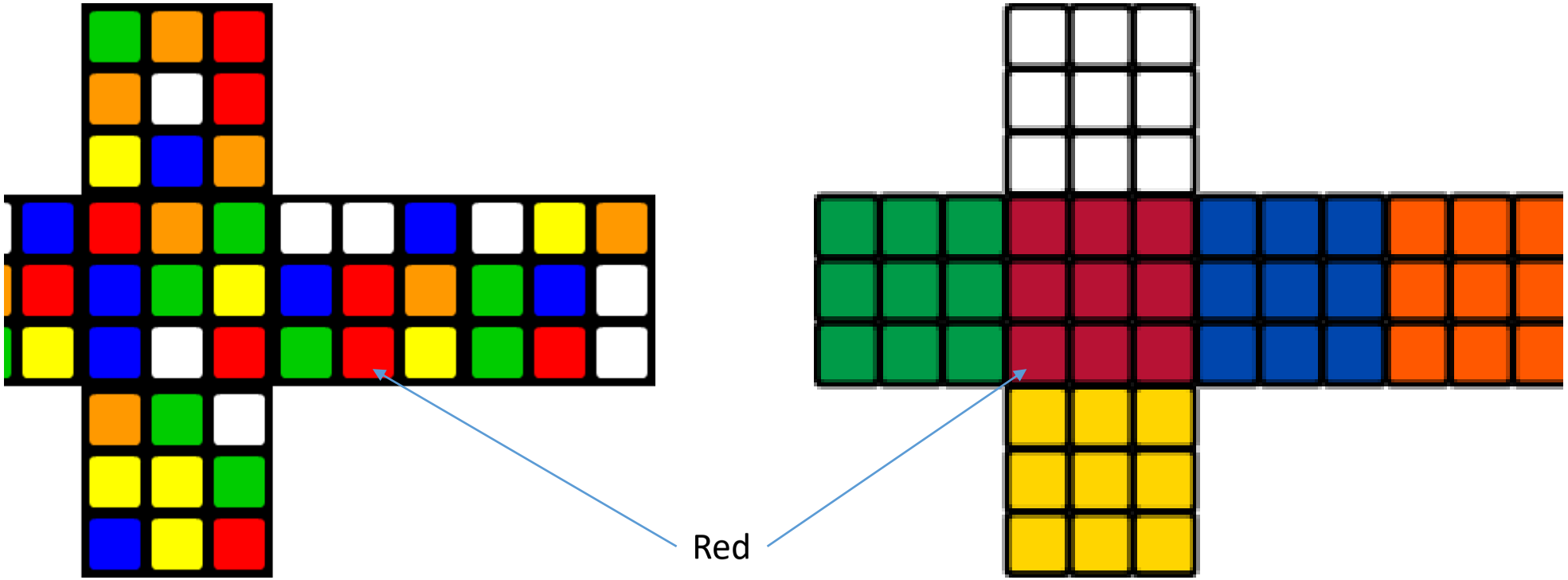


Start State



Goal State

Image from AI



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