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program 4 : Maze.

```
def astar-search(map, start, end) :  
    open = []  
    closed = []  
    start-node = Node (start, none)  
    goal-node = Node (end, none)  
    open.append (start-node)  
  
    while len (open) > 0 :  
        open.sort ()  
        current-node = open.pop (0)  
        closed.append (current-node)  
        if current-node != start-node :  
            path.append (current-node.position)  
            current-node = current-node.parent  
            return path [::-1]  
        (x, y) = current-node.position  
        neighbours = [(x-1, y), (x+1, y), (x, y-1),  
            (x, y+1)]  
        for next in neighbours :  
            map-value = map.get (next)  
            if (map-value == '#') :  
                continue  
            neighbour = Node (next, current-node)  
            if (neighbour in closed) :  
                continue  
            if (add-to-open (open, neighbour) == true) :  
                open.append (neighbour)  
    return None.
```