

Lab6 – main.py

Lab6 > main.py

main.py

```
15
16 def returned_path(current_node, maze):
17     path = []
18     no_rows, no_columns = np.shape(maze)
19     result = [[-1 for i in range(no_columns)] for j in range(no_rows)]
20     current = current_node
21     while current is not None:
22         path.append(current.position)
23         current = current.parent
24
25     path = path[::-1]
26     start_value = 0
27
28     for i in range(len(path)):
29         result[path[i][0]][path[i][1]] = start_value
30         start_value += 1
31     return result
32
```

Notifications

Run: main

```
[[0, -1, -1, -1, -1, -1], [1, 2, 3, 4, 5, -1], [-1, -1, -1, -1, 6, 7], [-1, -1, -1, -1, -1, 8], [-1, -1, -1, -1, -1, 9]]
0 -1 -1 -1 -1 -1
1 2 3 4 5 -1
-1 -1 -1 -1 6 7
-1 -1 -1 -1 -1 8
-1 -1 -1 -1 -1 9
```

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33

34 def search(maze, cost, start, end):

35 start_node = Node(None, tuple(start))

36 start_node.g = start_node.h = start_node.f = 0

37 end_node = Node(None, tuple(end))

38 end_node.g = end_node.h = end_node.f = 0

39

40 yet_to_visit_list = []

41 visited_list = []

42 yet_to_visit_list.append(start_node)

43

44 outer_iterations = 0

45 max_iterations = (len(maze) // 2) ** 10

46

47 move = [[-1, 0],

48 [0, -1],

49 [1, 0],

50 [0, 1]]

51

12 1

Notifications

Run: main

[[0, -1, -1, -1, -1, -1], [1, 2, 3, 4, 5, -1], [-1, -1, -1, -1, 6, 7], [-1, -1, -1, -1, -1, 8], [-1, -1, -1, -1, -1, 9]]

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```
52 no_rows, no_column = np.shape(maze)
53
54 while len(yet_to_visit_list) > 0:
55     outer_iterations += 1
56
57     current_node = yet_to_visit_list[0]
58     current_index = 0
59     for index, item in enumerate(yet_to_visit_list):
60         if item.f < current_node.f:
61             current_node = item
62             current_index = index
63
64     if outer_iterations > max_iterations:
65         print("giving up on pathfinding too many iterations")
66         return returned_path(current_node, maze)
67
68 yet_to_visit_list.pop(current_index)
69 visited_list.append(current_node)
```

Notifications

Run: main

```
[[0, -1, -1, -1, -1, -1], [1, 2, 3, 4, 5, -1], [-1, -1, -1, -1, 6, 7], [-1, -1, -1, -1, -1, 8], [-1, -1, -1, -1, -1, 9]]
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```
71 if current_node == end_node:
72     return returned_path(current_node, maze)
73
74 children = []
75
76 for new_position in move:
77     node_position = (current_node.position[0] + new_position[0],
78                     current_node.position[1] + new_position[1])
79     if (node_position[0] > (no_rows - 1) or
80         node_position[0] < 0 or
81         node_position[1] > (no_column - 1) or
82         node_position[1] < 0):
83         continue
84
85     if maze[node_position[0]][node_position[1]] != 0:
86         continue
87
88     new_node = Node(current_node, node_position)
```

Run: main

```
[[0, -1, -1, -1, -1, -1], [1, 2, 3, 4, 5, -1], [-1, -1, -1, -1, 6, 7], [-1, -1, -1, -1, -1, 8], [-1, -1, -1, -1, -1, 9]]
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```
90     children.append(new_node)
91
92     for child in children:
93
94         if len([visited_child for visited_child in visited_list if visited_child == child]) > 0:
95             continue
96
97         child.g = current_node.g + cost
98         child.h = (((child.position[0] - end_node.position[0]) ** 2) +
99                  ((child.position[1] - end_node.position[1]) ** 2))
100         child.f = child.g + child.h
101
102         if len([i for i in yet_to_visit_list if child == i and child.g > i.g]) > 0:
103             continue
104
105         yet_to_visit_list.append(child)
106
107
```

Notifications

Run: main

```
[[0, -1, -1, -1, -1, -1], [1, 2, 3, 4, 5, -1], [-1, -1, -1, -1, 6, 7], [-1, -1, -1, -1, -1, 8], [-1, -1, -1, -1, -1, 9]]
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main.py

```
103         continue
104
105     yet_to_visit_list.append(child)
106
107
108 if __name__ == '__main__':
109     maze = [[0, 1, 0, 0, 0, 0],
110             [0, 0, 0, 0, 0, 0],
111             [0, 1, 0, 1, 0, 0],
112             [0, 1, 0, 0, 1, 0],
113             [0, 0, 0, 0, 1, 0]]
114
115     start = [0, 0]
116     end = [4, 5]
117     cost = 1
118
119     path = search(maze, cost, start, end)
120     print(path)
```

Run: main

```
[[0, -1, -1, -1, -1, -1], [1, 2, 3, 4, 5, -1], [-1, -1, -1, -1, 6, 7], [-1, -1, -1, -1, -1, 8], [-1, -1, -1, -1, -1, 9]]
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Project

main.py

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120

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126

start = [0, 0]

end = [4, 5]

cost = 1

path = search(maze, cost, start, end)

print(path)

print('\n'.join([''.join("{}>3d".format(item) for item in row)

for row in path]))

#Student name: Khalid Nimri

#Student ID:

12

1

Notifications

Run: main

[[0, -1, -1, -1, -1, -1], [1, 2, 3, 4, 5, -1], [-1, -1, -1, -1, 6, 7], [-1, -1, -1, -1, -1, 8], [-1, -1, -1, -1, -1, 9]]

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main.py

114
115
116
117
118

start = [0, 0]
end = [4, 5]
cost = 1

12 1

Run: main

↑
↓
⌵
⌶
⌵
⌶
⌵

/Users/klnimri/PycharmProjects/Lab6/venv/bin/python /Users/klnimri/PycharmProjects/Lab6/main.py

[[0, -1, -1, -1, -1, -1], [1, 2, 3, 4, 5, -1], [-1, -1, -1, -1, 6, 7], [-1, -1, -1, -1, -1, 8], [-1, -1, -1, -1, -1, 9]]

0 -1 -1 -1 -1 -1
1 2 3 4 5 -1
-1 -1 -1 -1 6 7
-1 -1 -1 -1 -1 8
-1 -1 -1 -1 -1 9

Process finished with exit code 0

Version Control

Run

TODO

Problems

Terminal

Python Packages

Python Console

Services

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A small thumbnail image in the bottom right corner of the screen, showing a smaller version of the PyCharm IDE interface. It displays the same code editor with the 'main.py' file and the run console output, mirroring the main image.

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Project

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```
95         continue
96
97     child.g = current_node.g + cost
98     ##### The optimal requirement
99     child.h = (abs(child.position[0] - end_node.position[0]) + abs(child.position[1] - end_node.position[1]))
100     #####
101     child.f = child.g + child.h
102     if len([i for i in children if child.g > i.g]) > 0:
103         continue
104
105     yet_to_visit_list.
106
107
```

int
def __add__(self, x: int) -> int
Return self+value.
[`__add__\(self, x\)` on docs.python.org](#)

search() > while len(yet_to_visit_list) > 0 > for child in children

Run: main

/Users/klnimri/PycharmProjects/Lab6/venv/bin/python /Users/klnimri/PycharmProjects/Lab6/main.py

```
[[0, -1, -1, -1, -1, -1], [1, 2, 3, 4, 5, -1], [-1, -1, -1, -1, 6, 7], [-1, -1, -1, -1, -1, 8], [-1, -1, -1, -1, -1, 9]]
0 -1 -1 -1 -1 -1
1 2 3 4 5 -1
-1 -1 -1 -1 6 7
-1 -1 -1 -1 -1 8
-1 -1 -1 -1 -1 9
```

Process finished with exit code 0

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tabnine Starter 100:22 LF UTF-8 4 spaces Python 3.11 (Lab6)