

```
In [2]: import numpy as np
import math
from pylab import *
import matplotlib.pyplot as plt

# class for roomba simulation
class RoombaSimulation():
    """
        The parameters are: proportion of obstacles (q_o), prob of a random
        cell getting occupied (p_o),
        prob of a random cell getting unoccupied (p_u), prob of a random cel
        l getting dirty (p_d),
        prob of the roomba cleaning (p_c), size of the floor (size).
    """

    def __init__(self, q_o, p_u, p_o, p_d, p_c, size):
        self.q_o = q_o
        self.p_u = p_u
        self.p_o = p_o
        self.p_d = p_d
        self.p_c = p_c
        self.size = size
        # total time it takes
        self.T = 0
        # number of time steps
        self.step = 0
        # the floor
        self.config = np.zeros([size, size])
        # position of roomba
        self.pos = None
        # direction of roomba
        self.current_dir = None

    # initialize initial state
    def initialize(self):
        # put obstacles in random cells
        original_sum = 0
        while original_sum > (-int(self.size**2*self.q_o)):
            # get random coordinates
            x = np.random.choice(range(0, self.size-1), 1)[0]
            y = np.random.choice(range(0, self.size-1), 1)[0]
            # if it's empty, put obstacles
            if self.config[x, y] == 0:
                self.config[x, y] = -1
                original_sum -= 1

        # get all the empty cells
        empty = np.where(self.config == 0)
        # get a random position to start with
        point = np.random.choice(len(empty[0])-1, 1)[0]
        self.pos = np.array([empty[0][point], empty[1][point]])
        # get a random direction to start with
        self.current_dir = np.array([[1, 0], [-1, 0], [0, -1], [0, 1]])[
            np.random.choice(range(4), 1)[0]]

    # change the floor state without roomba's action
    def cell_change(self):
        # get a random cell
        x = np.random.choice(range(self.size), 1)[0]
        y = np.random.choice(range(self.size), 1)[0]
        # if roomba is not in this cell
        if not (np.array([x, y]).all() == self.pos.all()):
```

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# if there's obstacle
if self.config[x, y] == -1:
    # might remove obstacle
    if np.random.random() < self.p_u:
        self.config[x, y] == 0
# if there's no obstacle
else:
    # if cleaned, might become dirty
    if self.config[x, y] != 0 and np.random.random() < self.
p_d:
    self.config[x, y] = 0
# otherwise, put obstacle
elif np.random.random() < self.p_o:
    self.config[x, y] = -1

# update roomba's direction
def update_dir(self):
    # get current coordinates
    x_cor = list(self.pos)[0]
    y_cor = list(self.pos)[1]
#
    print(x_cor, y_cor)
    # get possible directions to go
    # top left corner
    if [x_cor, y_cor] == [0, 0]:
        dir_list = np.array([[1, 0], [0, 1]])
    # top wall
    if x_cor == 0 and 0 < y_cor < self.size-1:
        dir_list = np.array([[0, 1], [0, -1], [1, 0]])
    # top right corner
    if [x_cor, y_cor] == [0, self.size-1]:
        dir_list = np.array([[0, -1], [1, 0]])
    # right wall
    if y_cor == self.size-1 and 0 < x_cor < self.size-1:
        dir_list = np.array([[1, 0], [-1, 0], [0, -1]])
    # bottom right corner
    if [x_cor, y_cor] == [self.size-1, self.size-1]:
        dir_list = np.array([[-1, 0], [0, -1]])
    # bottom wall
    if x_cor == self.size-1 and 0 < y_cor < self.size-1:
        dir_list = np.array([[0, -1], [0, 1], [-1, 0]])
    # bottom left corner
    if [x_cor, y_cor] == [self.size-1, 0]:
        dir_list = np.array([[0, 1], [-1, 0]])
    # left wall
    if 0 < x_cor < self.size-1 and y_cor == 0:
        dir_list = np.array([[1, 0], [-1, 0], [0, 1]])
    # on the inside, not on boundaries or corners
    if 0 < x_cor < self.size-1 and 0 < y_cor < self.size-1:
        dir_list = np.array([[1, 0], [-1, 0], [0, -1], [0, 1]])
#
    print(dir_list)

    # get possible directions and new positions, considering obstacles and cleanliness
    possible_dir = []
    possible_pos_state = []
    # get directions with no obstacles
    for each in dir_list:
        new = list(self.pos + each)
        if self.config[new[0], new[1]] != -1:
            possible_dir.append(each)

#
    print(possible_dir)
    if len(possible_dir) == 0:

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        self.current_dir = np.array([0, 0])
    # if it's not stuck
    if len(possible_dir) > 0:
        # get potential new positions with no obstacles
        for i in range(len(possible_dir)):
            possible_pos = list(self.pos + possible_dir[i])
            possible_pos_state.append(self.config[possible_pos[0], p
ossible_pos[1]])
        # get the dirtiest one
        dirt = possible_pos_state.index(min(possible_pos_state))

        # if there's only one potential direction, take it
        if len(possible_dir) == 1:
            self.current_dir = possible_dir[0]
        # otherwise, prefer the dirtiest one
        else:
            if np.random.random() < 0.7:
                self.current_dir = possible_dir[dirt]
            # if the dirtiest one is not chosen, choose among others
            # equally
            else:
                del possible_dir[dirt]
                self.current_dir = possible_dir[(np.random.choice(ra
nge(len(possible_dir))), 1)[0]]

        # update position
    def update_pos(self):
        self.pos += self.current_dir

        # take action - clean or not
    def clean(self):
        if np.random.random() < self.p_c:
            self.config[(self.pos)[0], (self.pos)[1]] += 1
            # if clean, add 5 seconds
            self.T += 5

        # roomba 1's strategy
    def roomba_1(self):
        # clean or not
        # print(self.pos)
        self.clean()
        # update direction
        self.update_dir()
        # update position
        self.update_pos()
        # add 3 seconds
        self.T += 3

        # roomba 2's strategy
    def roomba_2(self):
        # print(self.pos)
        # clean or not
        self.clean()
        # maintain current direction and update position accordingly if
        # next position is dirty and empty
        next_pos = list(self.pos + self.current_dir)
        if -1 not in next_pos and self.size not in next_pos: # check if
        # it's still in the floor
            if self.config[next_pos[0], next_pos[1]] == 0: # check if i
            # t's dirty
                self.update_pos()
            # otherwise, update direction and position
            if -1 in next_pos or self.size in next_pos or self.config[next_p

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os[0], next_pos[1]] != 0:
    self.update_dir()
    self.update_pos()
    # add 3 seconds
    self.T += 3

# roomba 3's strategy
def roomba_3(self):
    # only clean if the cell has been cleaned less than 3 times
    #
    # print(self.pos)
    if self.config[self.pos[0], self.pos[1]] < 3:
        self.clean()
    # update direction
    self.update_dir()
    # update position
    self.update_pos()
    # add 3 seconds
    self.T += 3

```

```

In [143]: # simulation for roomba 1
# lists of number of steps, time, averaged cleanliness, cleanliness distribution and uncleaned amount
steps_list1 = []
time_list1 = []
ave_cleaned_list1 = []
cleanliness_1 = []
uncleaned_1 = []

np.random.seed(123)
# for 200 simulations
for i in range(200):
    # initialize
    roomba_1 = RoombaSimulation(0.05, 0.05, 0.05, 0.05, 0.8, 10)
    roomba_1.initialize()
    steps = 0
    # clean until the floor is 98% clean OR for 1000 time steps
    while len(np.where(roomba_1.config == 0)[0]) > 0.02*(roomba_1.size**2) and steps < 1000:
        roomba_1.cell_change()
        roomba_1.roomba_1()
        steps += 1

    # add quantities to the lists
    ave_cleaned = np.sum(roomba_1.config) / (roomba_1.size**2)
    steps_list1.append(steps)
    time_list1.append(roomba_1.T)
    ave_cleaned_list1.append(ave_cleaned)
    for k in roomba_1.config:
        for j in k:
            cleanliness_1.append(j)
    uncleaned_1.append(len(np.where(roomba_1.config == 0)[0]))

```

```
In [144]: # simulation for roomba 2, same as above
steps_list2 = []
time_list2 = []
ave_cleaned_list2 = []
cleanliness_2 = []
uncleaned_2 = []

np.random.seed(123)
for i in range(200):
    roomba_2 = RoombaSimulation(0.05, 0.05, 0.05, 0.05, 0.8, 10)
    roomba_2.initialize()
    steps = 0
    while len(np.where(roomba_2.config == 0)[0]) > 0.02*(roomba_2.size**2) and steps < 1000:
        roomba_2.cell_change()
        roomba_2.roomba_2()
        steps += 1
    ave_cleaned = np.sum(roomba_2.config) / (roomba_2.size**2)
    steps_list2.append(steps)
    time_list2.append(roomba_2.T)
    ave_cleaned_list2.append(ave_cleaned)

    for k in roomba_2.config:
        for j in k:
            cleanliness_2.append(j)

    uncleaned_2.append(len(np.where(roomba_2.config == 0)[0]))
```

```
In [145]: # simulation for roomba 3, same as above
steps_list3 = []
time_list3 = []
ave_cleaned_list3 = []
cleanliness_3 = []
uncleaned_3 = []

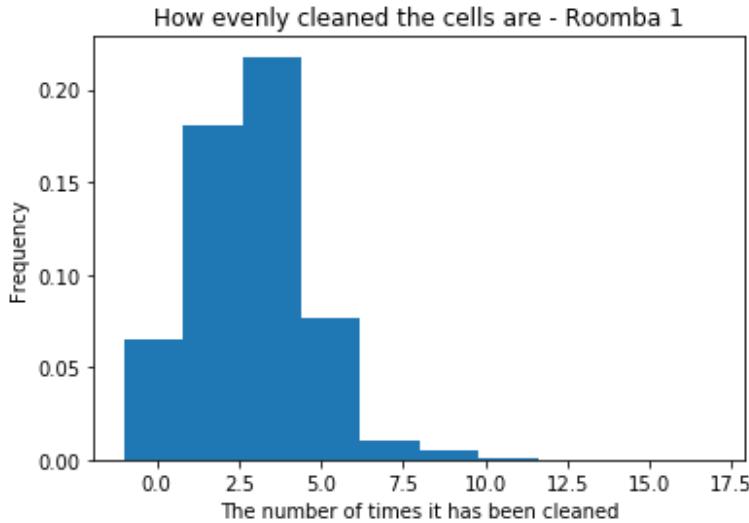
np.random.seed(123)
for i in range(200):
    roomba_3 = RoombaSimulation(0.05, 0.05, 0.05, 0.05, 0.8, 10)
    roomba_3.initialize()
    steps = 0
    while len(np.where(roomba_3.config == 0)[0]) > 0.02*(roomba_3.size**2) and steps < 1000:
        roomba_3.cell_change()
        roomba_3.roomba_3()
        steps += 1
    ave_cleaned = np.sum(roomba_3.config) / (roomba_3.size**2)
    steps_list3.append(steps)
    time_list3.append(roomba_3.T)
    ave_cleaned_list3.append(ave_cleaned)

    for k in roomba_3.config:
        for j in k:
            cleanliness_3.append(j)

    uncleaned_3.append(len(np.where(roomba_3.config == 0)[0])))
```

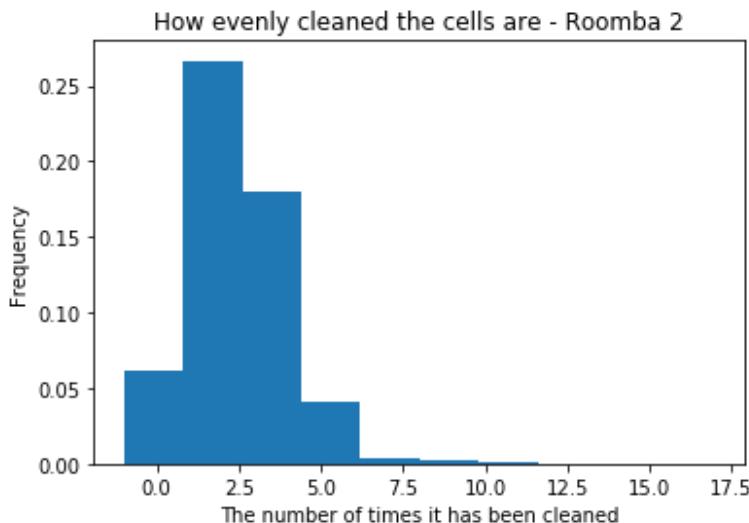
```
In [146]: # uncleaned amount
print("uncleaned on average: " + str(sum(uncleaned_1)/(roomba_1.size**2)/200))
# histogram of cleanliness distribution
plt.hist(cleanliness_1, density=True)
plt.title("How evenly cleaned the cells are - Roomba 1")
plt.xlabel("The number of times it has been cleaned")
plt.ylabel("Frequency")
plt.show()
```

uncleaned on average: 0.02



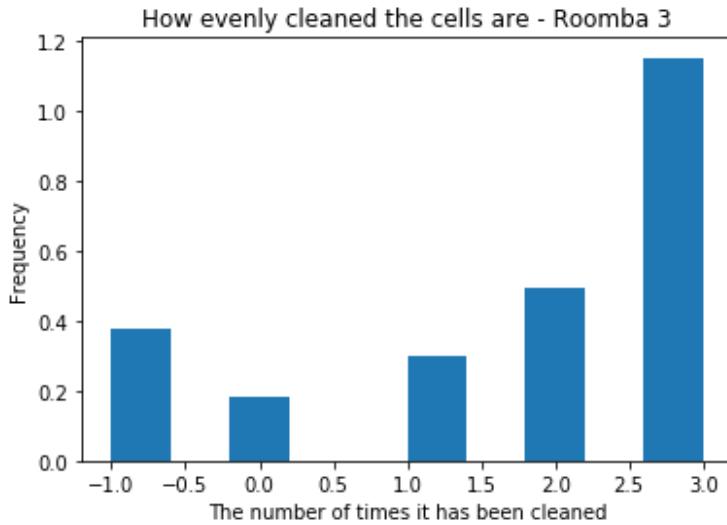
```
In [148]: print("uncleaned on average: " + str(sum(uncleaned_2)/(roomba_2.size**2)/200))
plt.hist(cleanliness_2, density=True)
plt.title("How evenly cleaned the cells are - Roomba 2")
plt.xlabel("The number of times it has been cleaned")
plt.ylabel("Frequency")
plt.show()
```

uncleaned on average: 0.02005



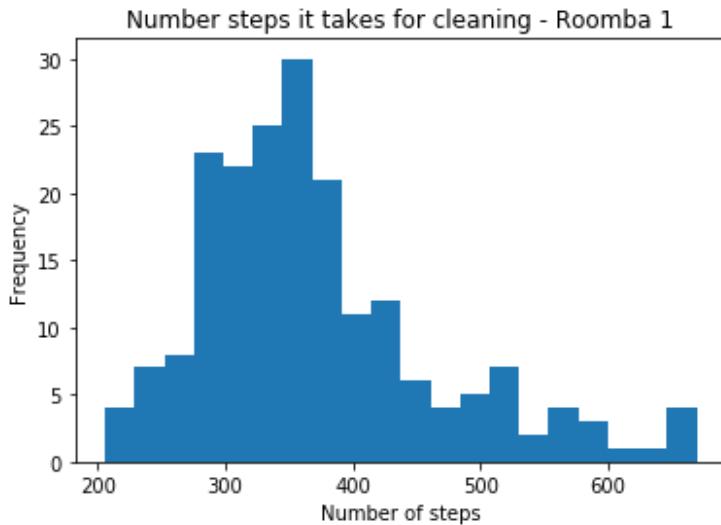
```
In [149]: print("uncleaned on average: " + str(sum(uncleaned_3)/(roomba_3.size**2)/200))
plt.hist(cleanliness_3, density=True)
plt.title("How evenly cleaned the cells are - Roomba 3")
plt.xlabel("The number of times it has been cleaned")
plt.ylabel("Frequency")
plt.show()
```

uncleaned on average: 0.07200000000000001



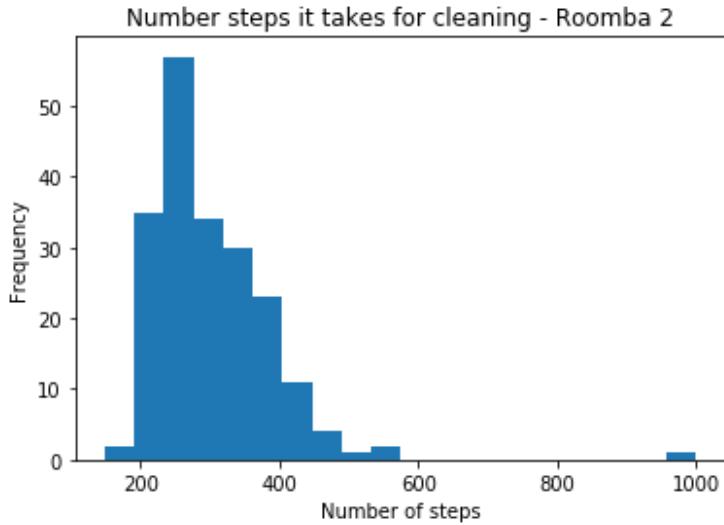
```
In [153]: # histogram of number of steps
plt.hist(steps_list1, bins=20)
plt.title("Number steps it takes for cleaning - Roomba 1")
plt.xlabel("Number of steps")
plt.ylabel("Frequency")
```

Out[153]: Text(0, 0.5, 'Frequency')



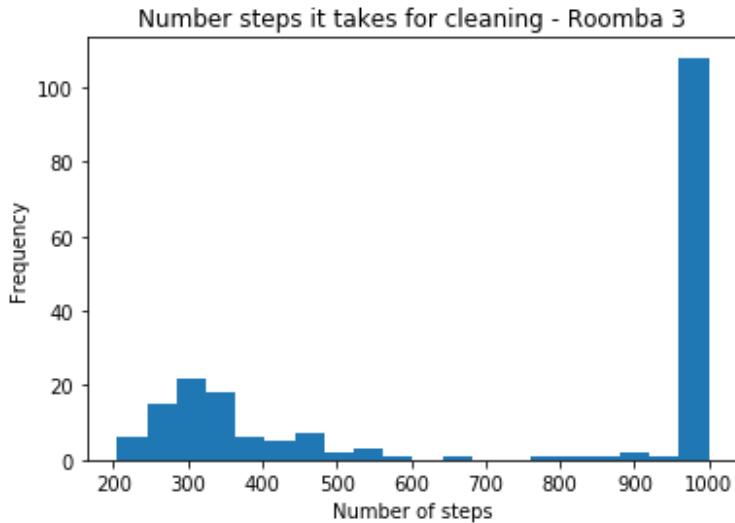
```
In [154]: plt.hist(steps_list2, bins=20)
plt.title("Number steps it takes for cleaning - Roomba 2")
plt.xlabel("Number of steps")
plt.ylabel("Frequency")
```

Out[154]: Text(0, 0.5, 'Frequency')



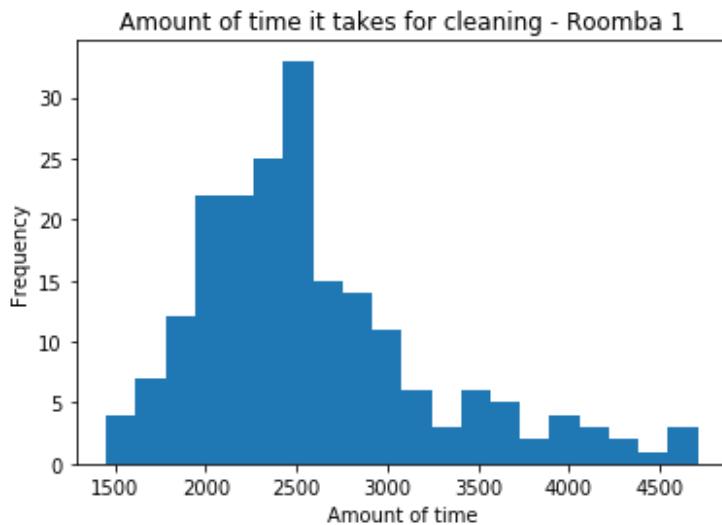
```
In [155]: plt.hist(steps_list3, bins=20)
plt.title("Number steps it takes for cleaning - Roomba 3")
plt.xlabel("Number of steps")
plt.ylabel("Frequency")
```

Out[155]: Text(0, 0.5, 'Frequency')



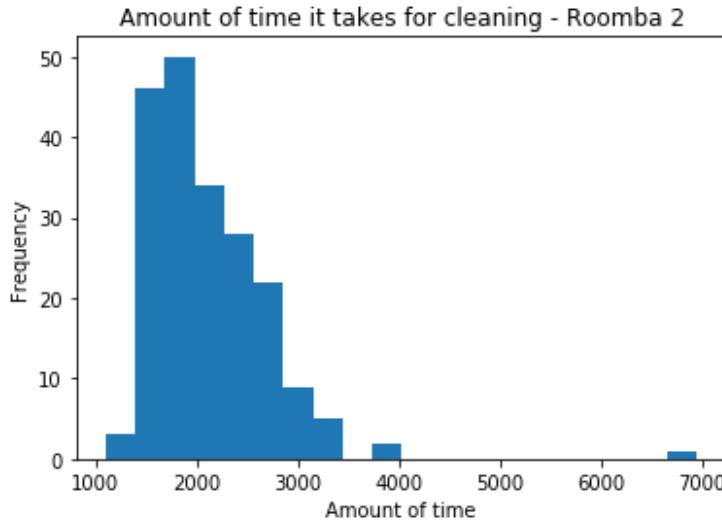
```
In [156]: # histogram of amount of time  
plt.hist(time_list1, bins = 20)  
plt.title("Amount of time it takes for cleaning - Roomba 1")  
plt.xlabel("Amount of time")  
plt.ylabel("Frequency")
```

Out[156]: Text(0, 0.5, 'Frequency')



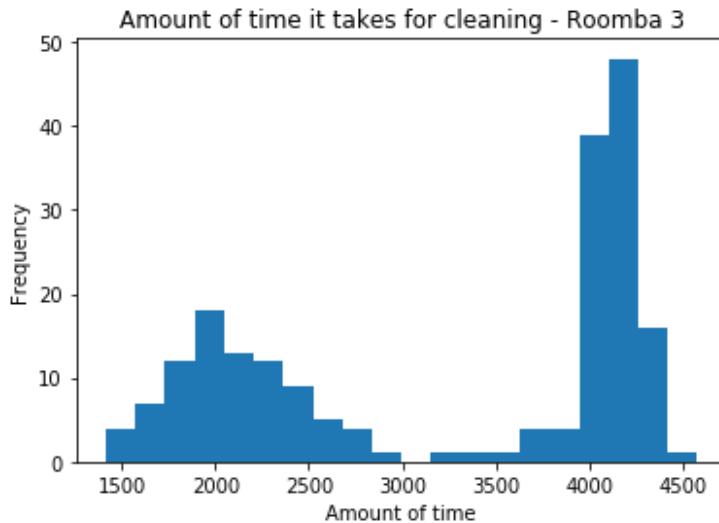
```
In [157]: plt.hist(time_list2, bins = 20)  
plt.title("Amount of time it takes for cleaning - Roomba 2")  
plt.xlabel("Amount of time")  
plt.ylabel("Frequency")
```

Out[157]: Text(0, 0.5, 'Frequency')



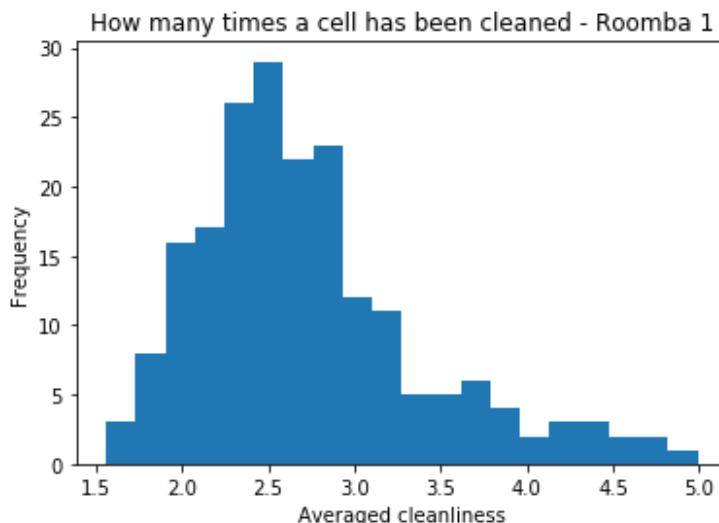
```
In [158]: plt.hist(time_list3, bins = 20)
plt.title("Amount of time it takes for cleaning - Roomba 3")
plt.xlabel("Amount of time")
plt.ylabel("Frequency")
```

Out[158]: Text(0, 0.5, 'Frequency')



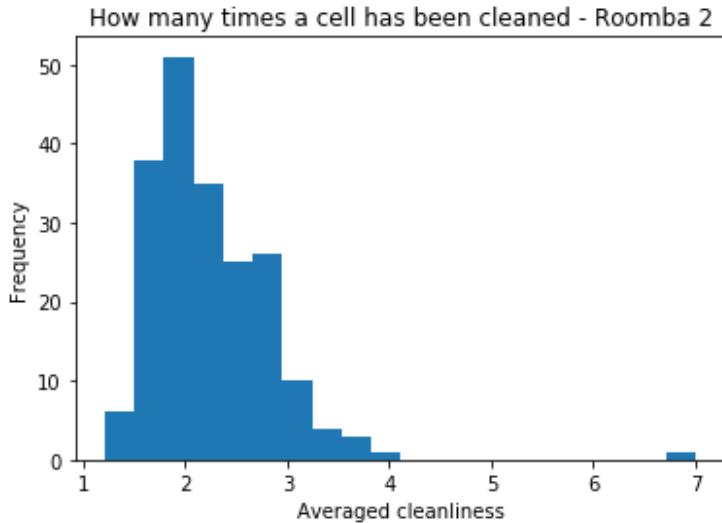
```
In [159]: # histogram of averaged cleanliness over the cells
plt.hist(ave_cleaned_list1, bins=20)
plt.title("How many times a cell has been cleaned - Roomba 1")
plt.xlabel("Averaged cleanliness")
plt.ylabel("Frequency")
```

Out[159]: Text(0, 0.5, 'Frequency')



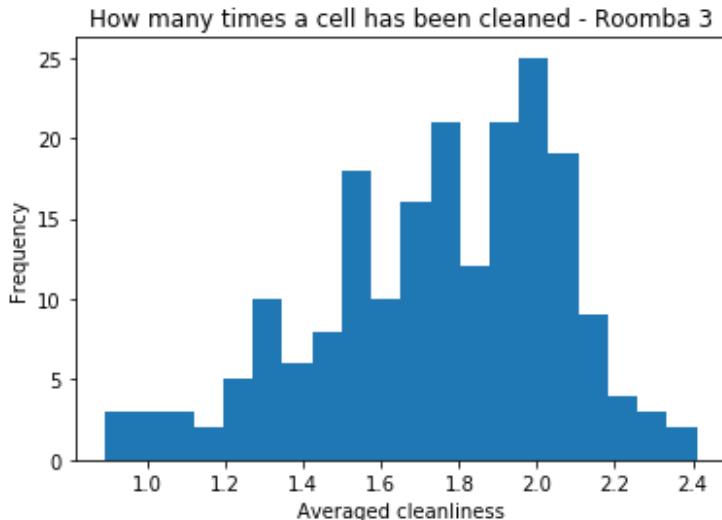
```
In [160]: plt.hist(ave_cleaned_list2, bins=20)
plt.title("How many times a cell has been cleaned - Roomba 2")
plt.xlabel("Averaged cleanliness")
plt.ylabel("Frequency")
```

Out[160]: Text(0, 0.5, 'Frequency')



```
In [161]: plt.hist(ave_cleaned_list3, bins=20)
plt.title("How many times a cell has been cleaned - Roomba 3")
plt.xlabel("Averaged cleanliness")
plt.ylabel("Frequency")
```

Out[161]: Text(0, 0.5, 'Frequency')



```
In [162]: # Visualization of how the roombas work
```

```
"""
Cell state scales:
0: has obstacles
1: empty and dirty
2: cleaned once
3: cleaned twice
...
"""

plt.cla()
plt.imshow(np.array([[i for i in range(17)]]), vmin = -1, vmax = 15, cmap = cm.summer)
plt.show()
```

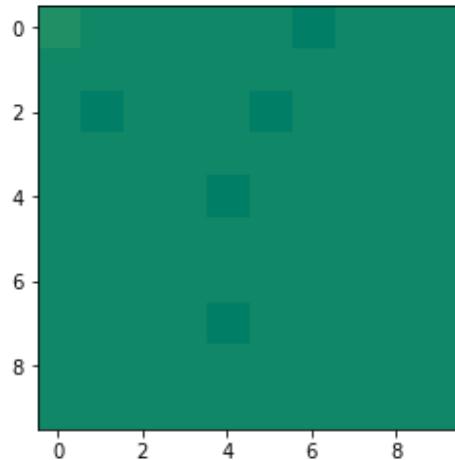


```
In [3]: # Visualization of the floor - Roomba 1
roomba_1 = RoombaSimulation(0.05, 0.05, 0.05, 0.05, 0.8, 10)
roomba_1.initialize()
steps_1 = 0
while len(np.where(roomba_1.config == 0)[0]) > 0.02*roomba_1.size**2 and
steps_1 < 1000:
    print("Step: " + str(steps_1))
    roomba_1.cell_change()
    print("Updated position: " + str(roomba_1.pos))
    roomba_1.roomba_1()
    print("Updated direction: " + str(roomba_1.current_dir))
    steps_1 += 1
    plt.cla()
    plt.imshow(roomba_1.config, vmin = -1, vmax = 15, cmap = cm.summer)
    plt.show()
print("Total amount of time: " + str(roomba_1.T))
```

Step: 0

Updated position: [ 0 0 ]

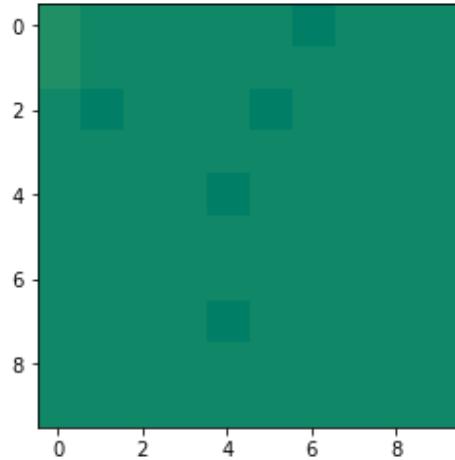
Updated direction: [ 1 0 ]



Step: 1

Updated position: [ 1 0 ]

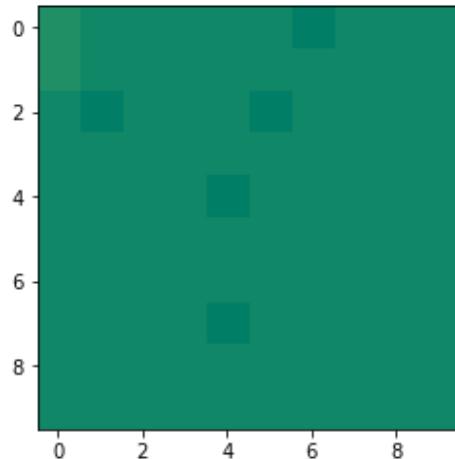
Updated direction: [ 1 0 ]



Step: 2

Updated position: [ 2 0 ]

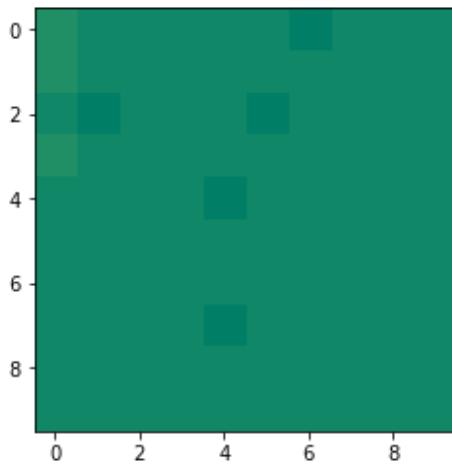
Updated direction: [ 1 0 ]



Step: 3

Updated position: [ 3 0 ]

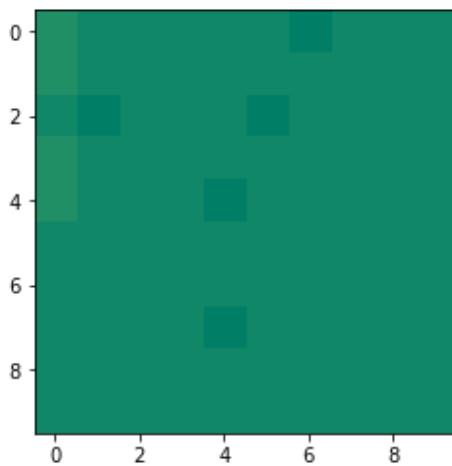
Updated direction: [ 1 0 ]



Step: 4

Updated position: [4 0]

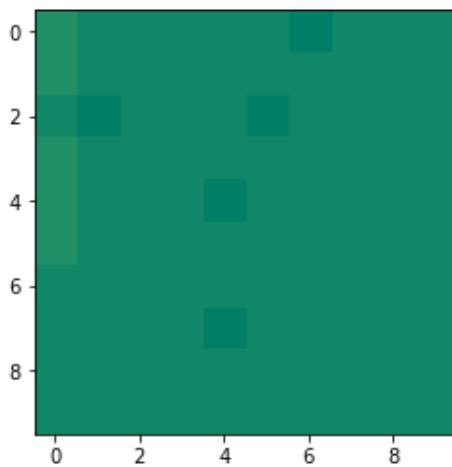
Updated direction: [1 0]



Step: 5

Updated position: [5 0]

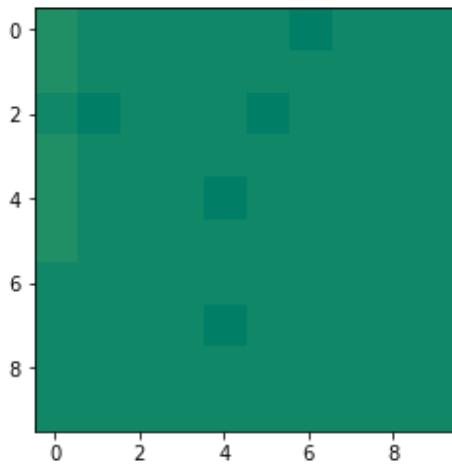
Updated direction: [-1 0]



Step: 6

Updated position: [4 0]

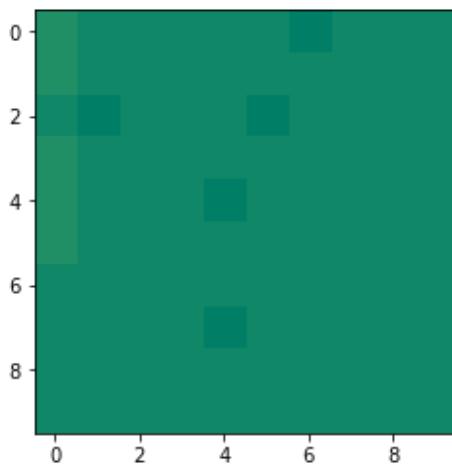
Updated direction: [-1 0]



Step: 7

Updated position: [ 3 0 ]

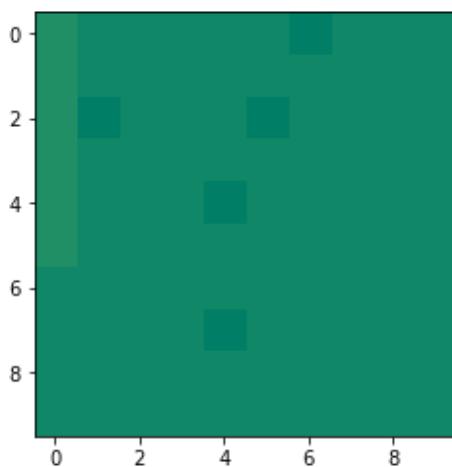
Updated direction: [ -1 0 ]



Step: 8

Updated position: [ 2 0 ]

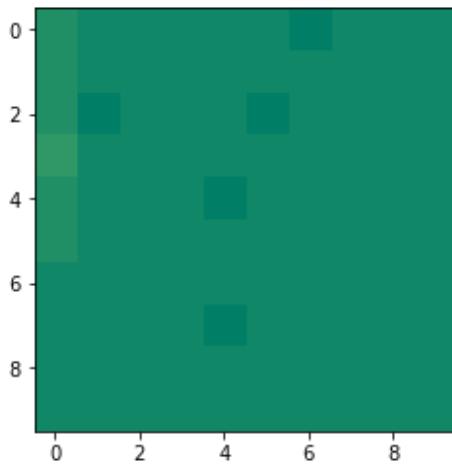
Updated direction: [ 1 0 ]



Step: 9

Updated position: [ 3 0 ]

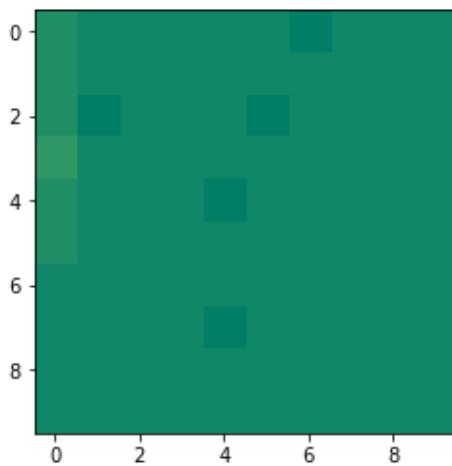
Updated direction: [ 0 1 ]



Step: 10

Updated position: [ 3 1 ]

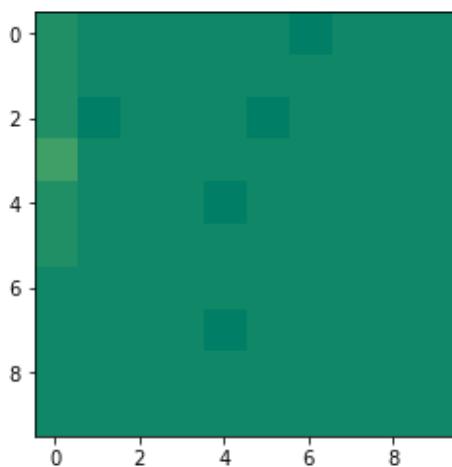
Updated direction: [ 0 -1 ]



Step: 11

Updated position: [ 3 0 ]

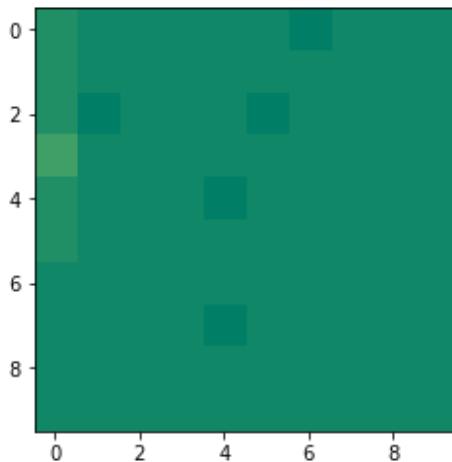
Updated direction: [ 1 0 ]



Step: 12

Updated position: [ 4 0 ]

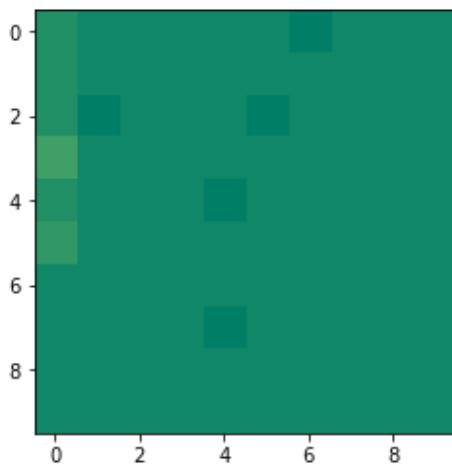
Updated direction: [ 1 0 ]



Step: 13

Updated position: [ 5 0 ]

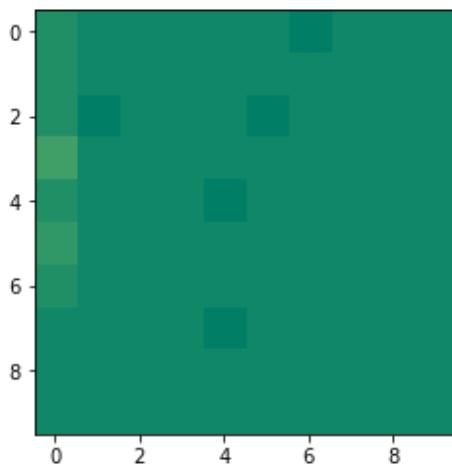
Updated direction: [ 1 0 ]



Step: 14

Updated position: [ 6 0 ]

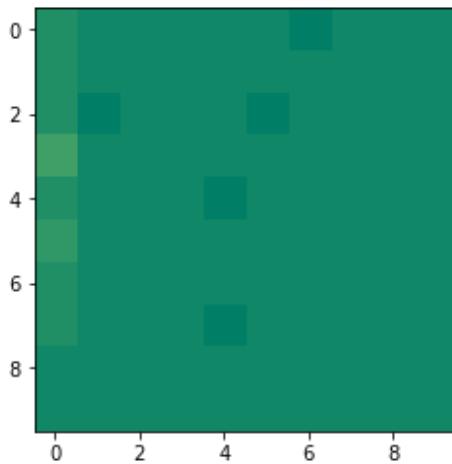
Updated direction: [ 1 0 ]



Step: 15

Updated position: [ 7 0 ]

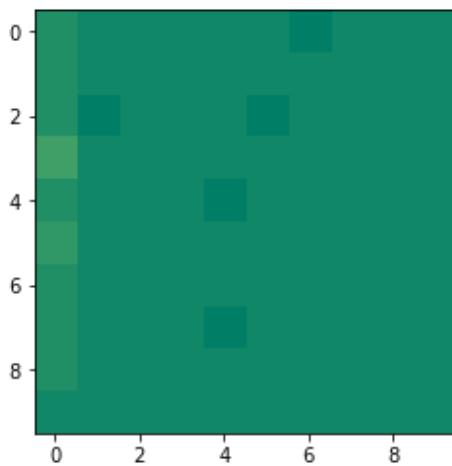
Updated direction: [ 1 0 ]



Step: 16

Updated position: [8 0]

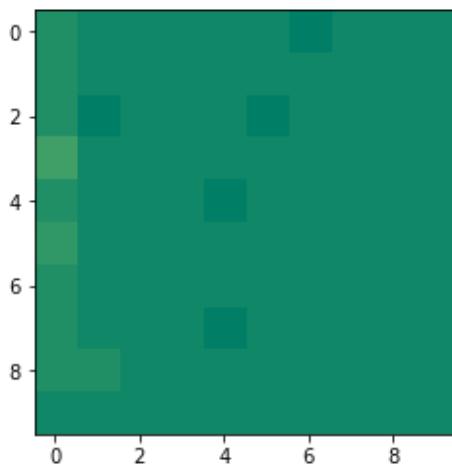
Updated direction: [0 1]



Step: 17

Updated position: [8 1]

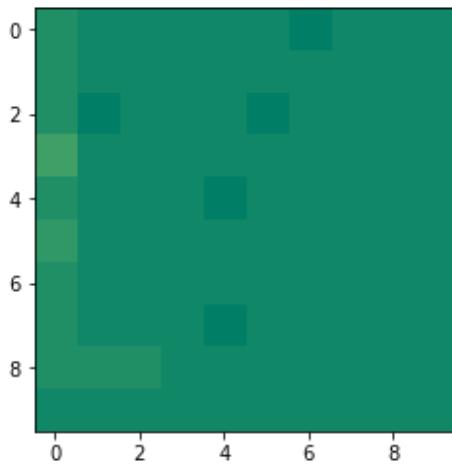
Updated direction: [0 1]



Step: 18

Updated position: [8 2]

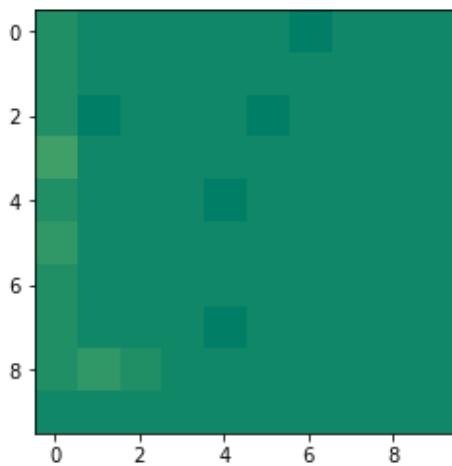
Updated direction: [0 -1]



Step: 19

Updated position: [ 8 1 ]

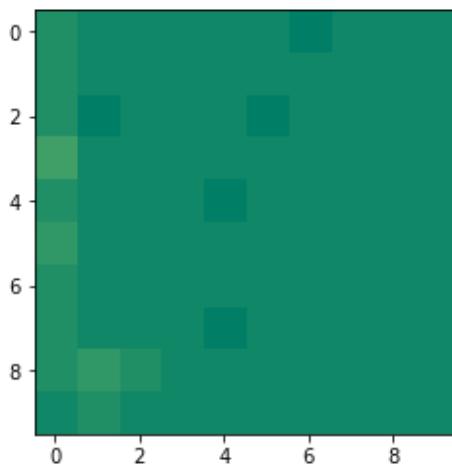
Updated direction: [ 1 0 ]



Step: 20

Updated position: [ 9 1 ]

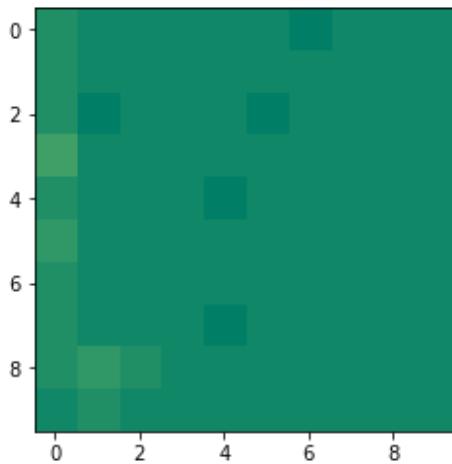
Updated direction: [ 0 1 ]



Step: 21

Updated position: [ 9 2 ]

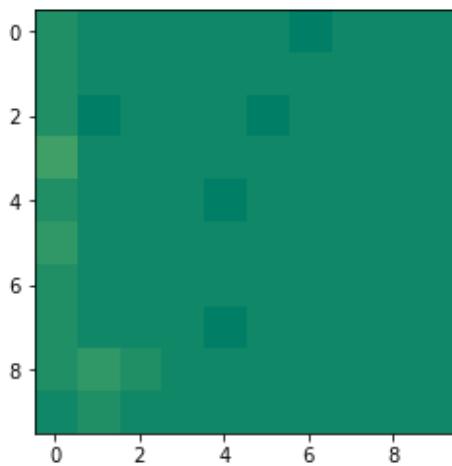
Updated direction: [ 0 1 ]



Step: 22

Updated position: [9 3]

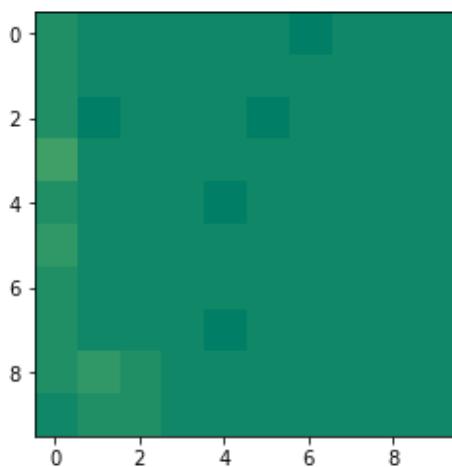
Updated direction: [ 0 -1 ]



Step: 23

Updated position: [9 2]

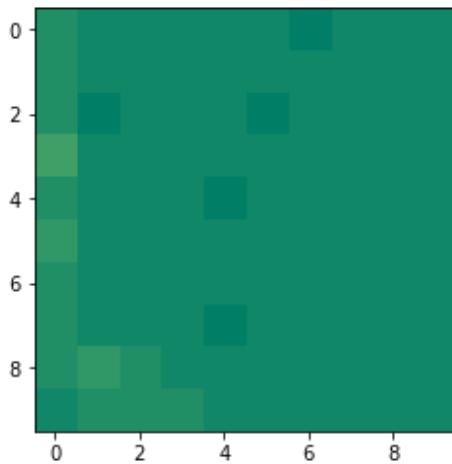
Updated direction: [ 0 1 ]



Step: 24

Updated position: [9 3]

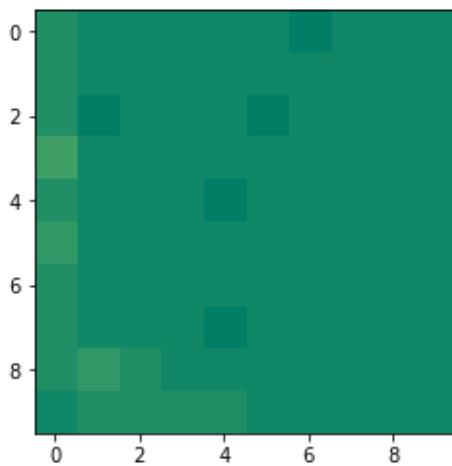
Updated direction: [ 0 1 ]



Step: 25

Updated position: [9 4]

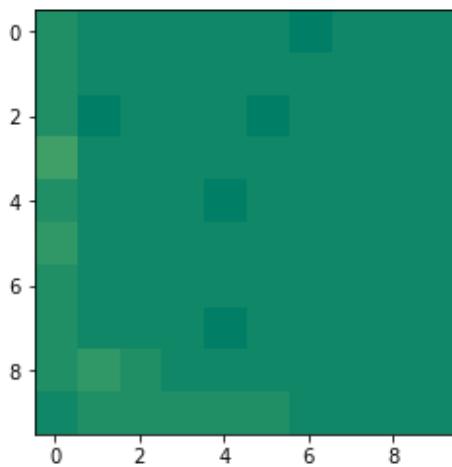
Updated direction: [0 1]



Step: 26

Updated position: [9 5]

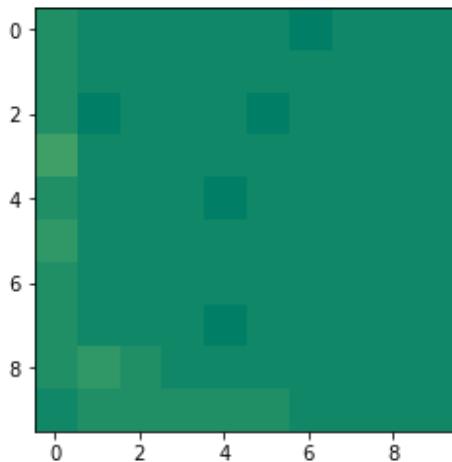
Updated direction: [0 1]



Step: 27

Updated position: [9 6]

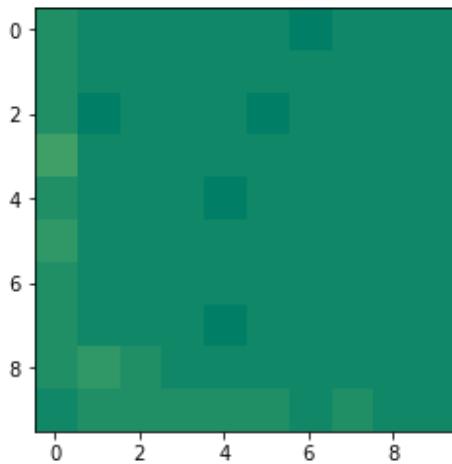
Updated direction: [0 1]



Step: 28

Updated position: [9 7]

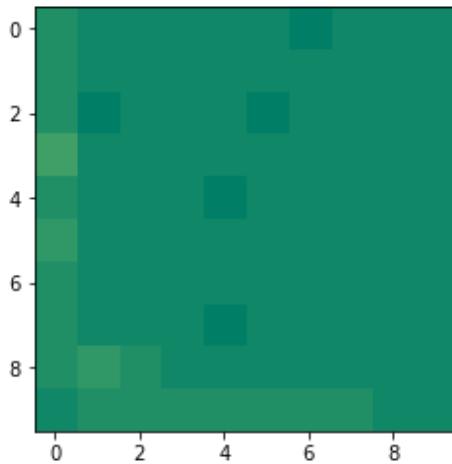
Updated direction: [ 0 -1 ]



Step: 29

Updated position: [9 6]

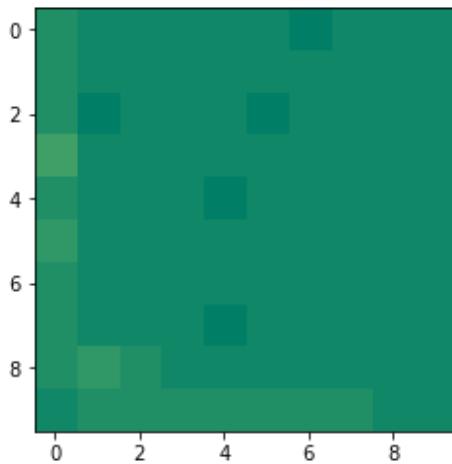
Updated direction: [ 0 -1 ]



Step: 30

Updated position: [9 5]

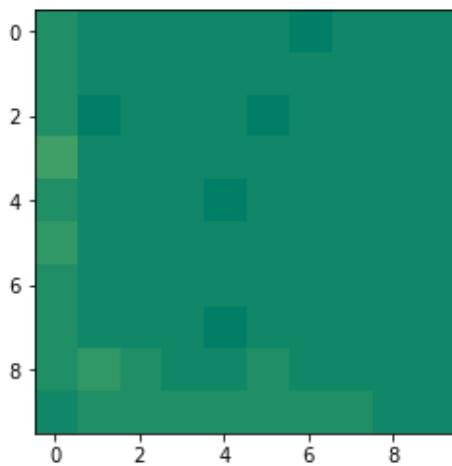
Updated direction: [-1 0 ]



Step: 31

Updated position: [ 8 5 ]

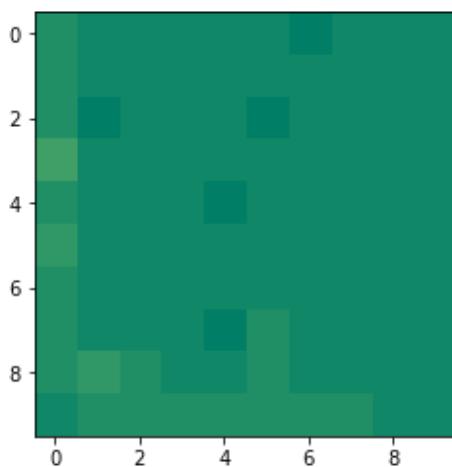
Updated direction: [ -1 0 ]



Step: 32

Updated position: [ 7 5 ]

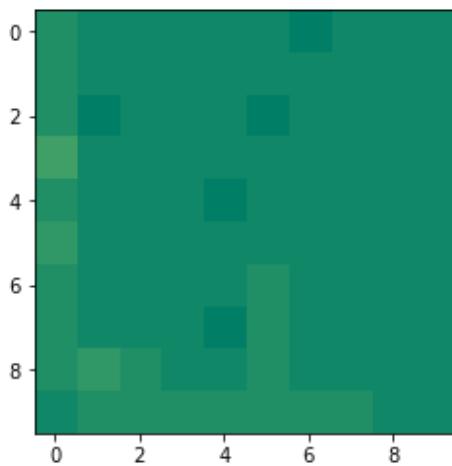
Updated direction: [ -1 0 ]



Step: 33

Updated position: [ 6 5 ]

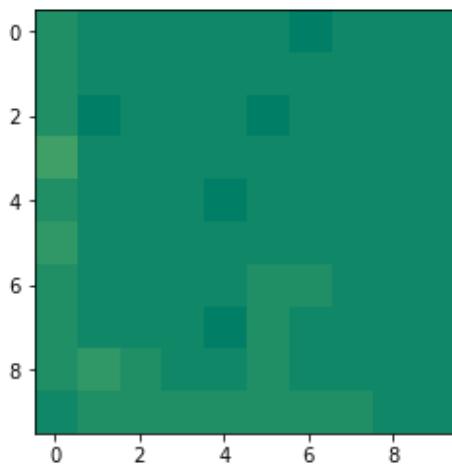
Updated direction: [ 0 1 ]



Step: 34

Updated position: [ 6 6 ]

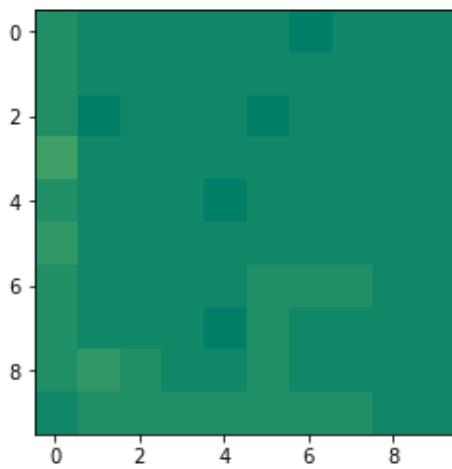
Updated direction: [ 0 1 ]



Step: 35

Updated position: [ 6 7 ]

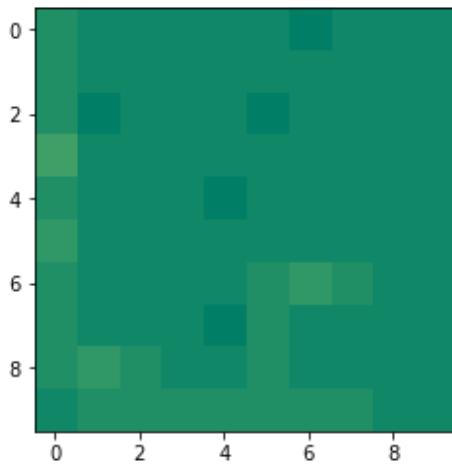
Updated direction: [ 0 -1 ]



Step: 36

Updated position: [ 6 6 ]

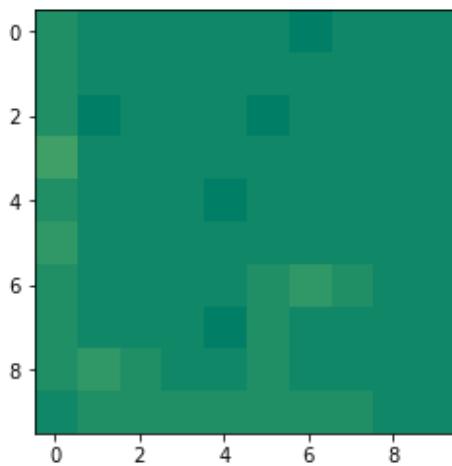
Updated direction: [ 0 1 ]



Step: 37

Updated position: [ 6 7 ]

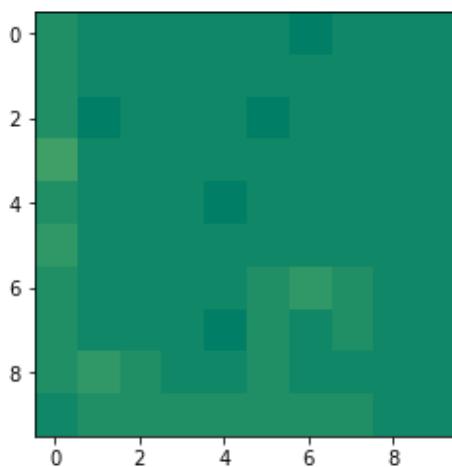
Updated direction: [ 1 0 ]



Step: 38

Updated position: [ 7 7 ]

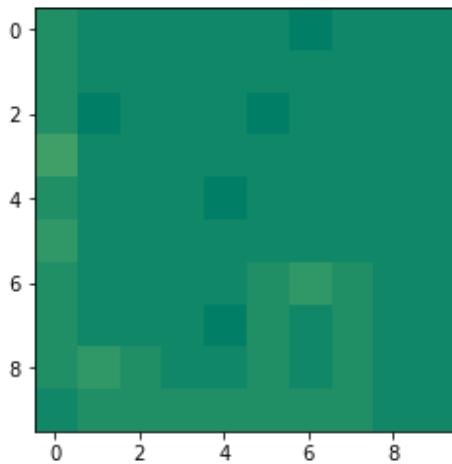
Updated direction: [ 1 0 ]



Step: 39

Updated position: [ 8 7 ]

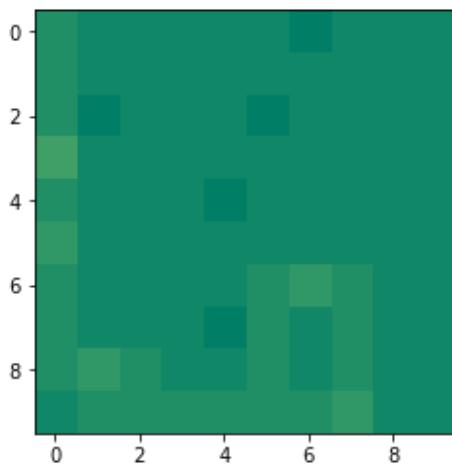
Updated direction: [ 1 0 ]



Step: 40

Updated position: [9 7]

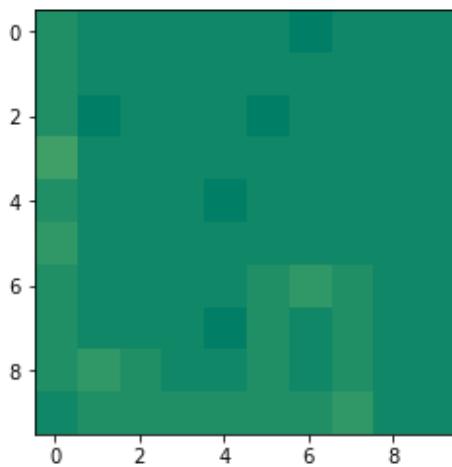
Updated direction: [-1 0]



Step: 41

Updated position: [8 7]

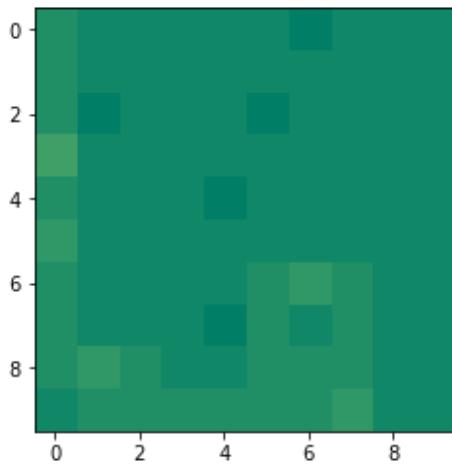
Updated direction: [ 0 -1]



Step: 42

Updated position: [8 6]

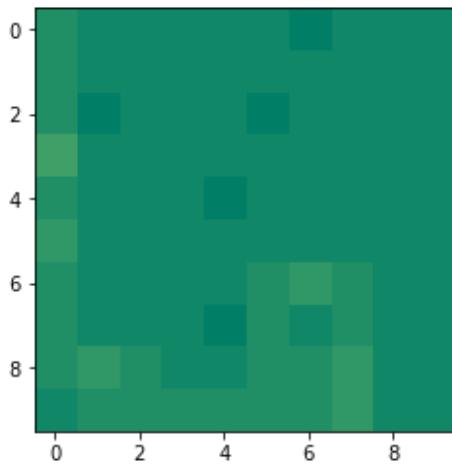
Updated direction: [ 0 1]



Step: 43

Updated position: [8 7]

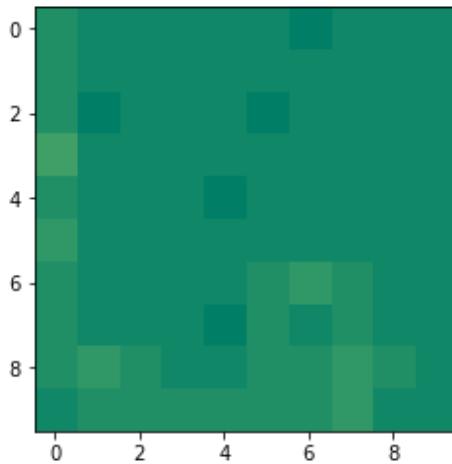
Updated direction: [0 1]



Step: 44

Updated position: [8 8]

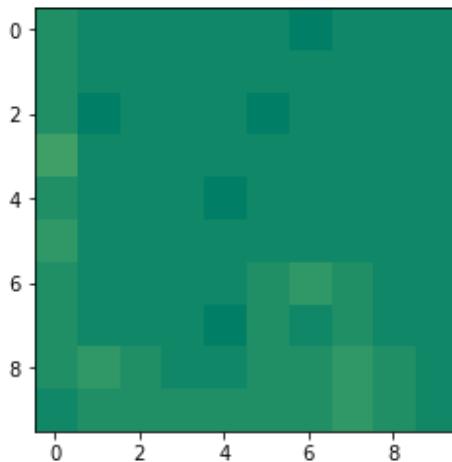
Updated direction: [1 0]



Step: 45

Updated position: [9 8]

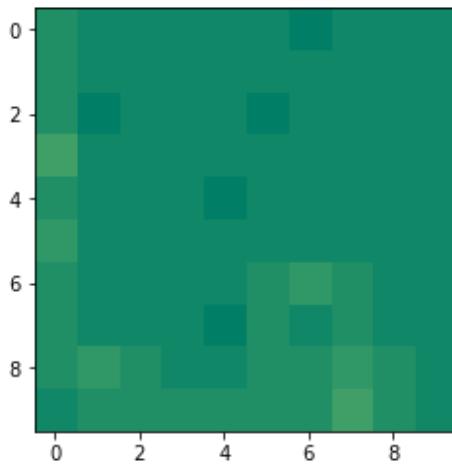
Updated direction: [0 -1]



Step: 46

Updated position: [9 7]

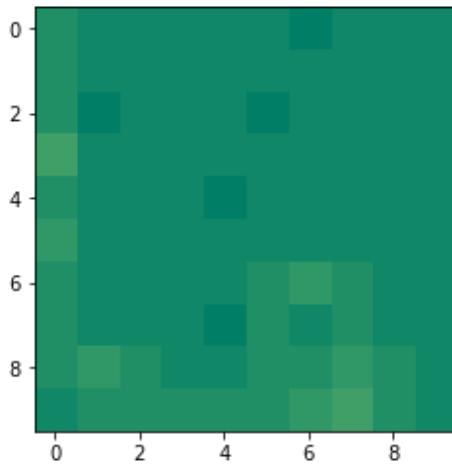
Updated direction: [ 0 -1 ]



Step: 47

Updated position: [9 6]

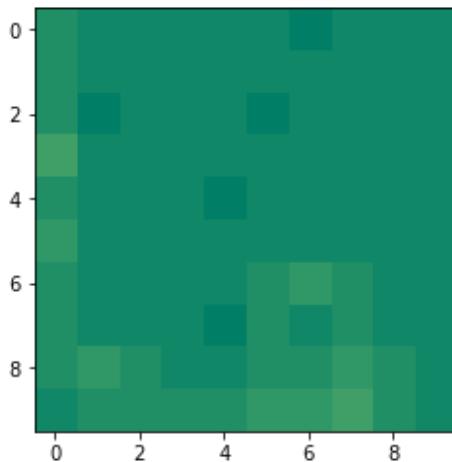
Updated direction: [ 0 -1 ]



Step: 48

Updated position: [9 5]

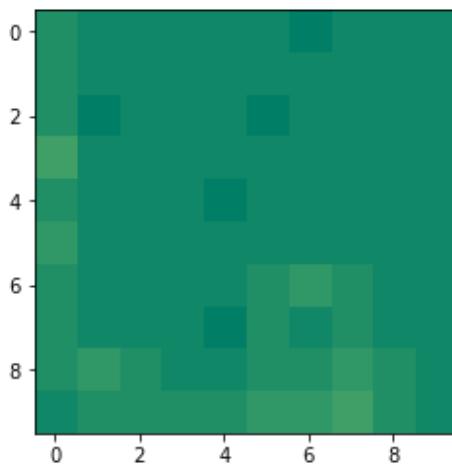
Updated direction: [-1 0 ]



Step: 49

Updated position: [8 5]

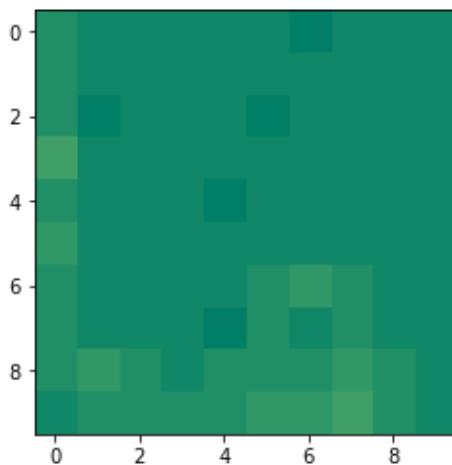
Updated direction: [ 0 -1 ]



Step: 50

Updated position: [8 4]

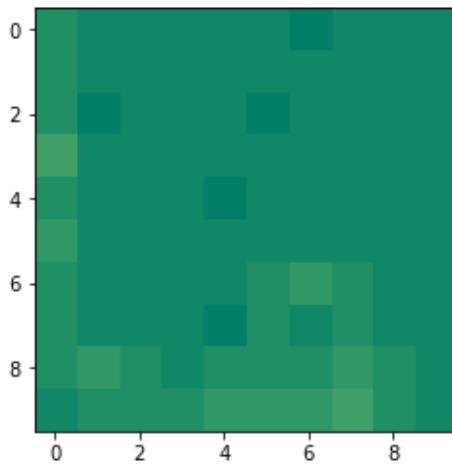
Updated direction: [ 1 0 ]



Step: 51

Updated position: [9 4]

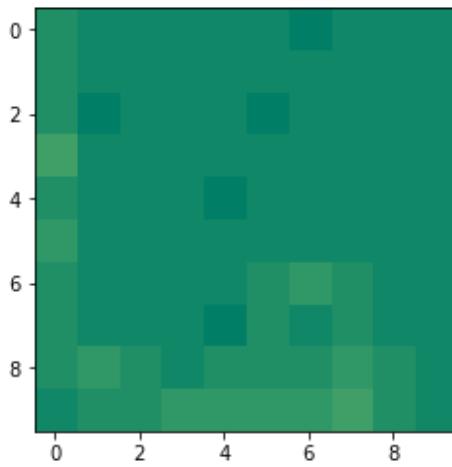
Updated direction: [ 0 -1 ]



Step: 52

Updated position: [ 9 3 ]

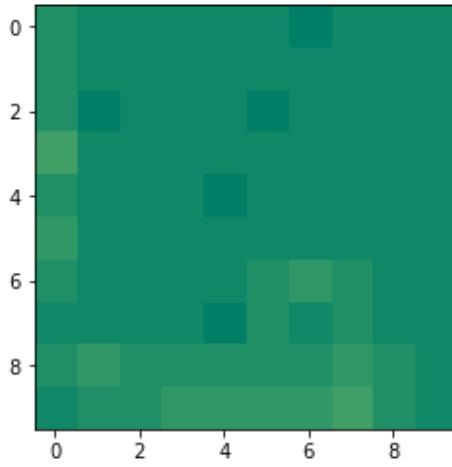
Updated direction: [-1 0 ]



Step: 53

Updated position: [ 8 3 ]

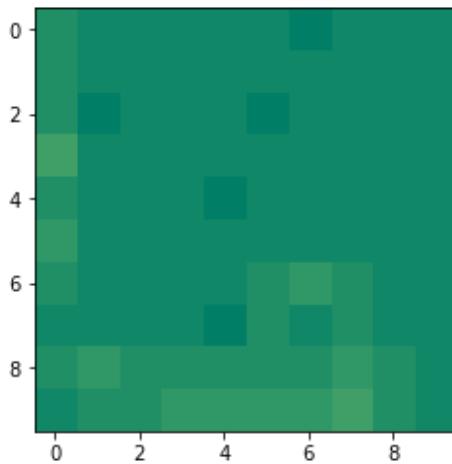
Updated direction: [-1 0 ]



Step: 54

Updated position: [ 7 3 ]

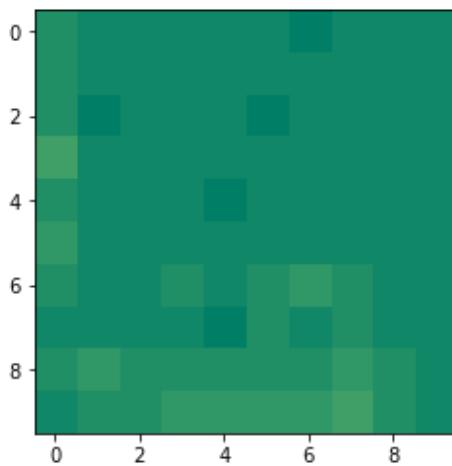
Updated direction: [-1 0 ]



Step: 55

Updated position: [ 6 3 ]

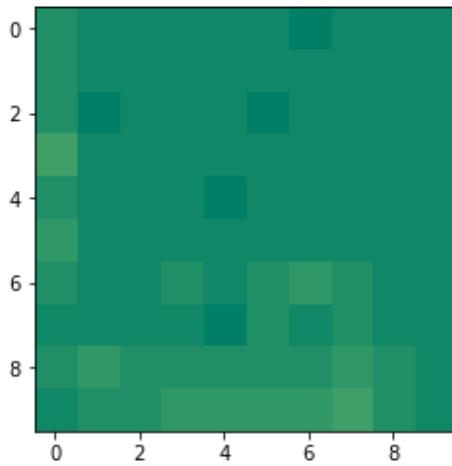
Updated direction: [ 1 0 ]



Step: 56

Updated position: [ 7 3 ]

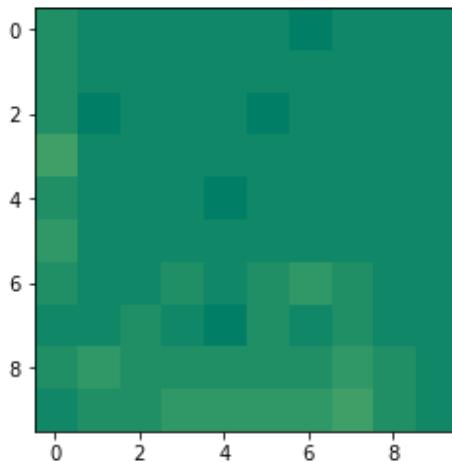
Updated direction: [ 0 -1 ]



Step: 57

Updated position: [ 7 2 ]

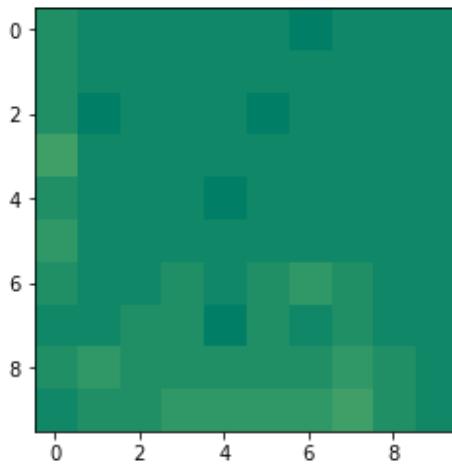
Updated direction: [ 0 1 ]



Step: 58

Updated position: [ 7 3 ]

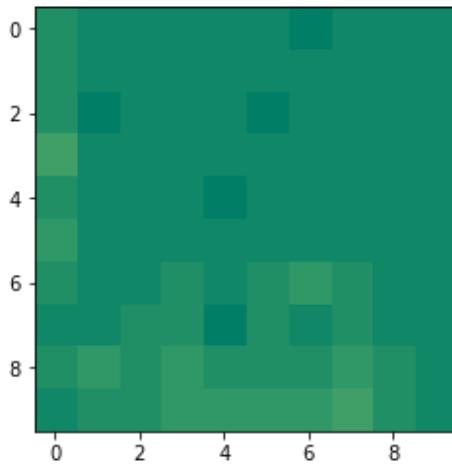
Updated direction: [ 1 0 ]



Step: 59

Updated position: [ 8 3 ]

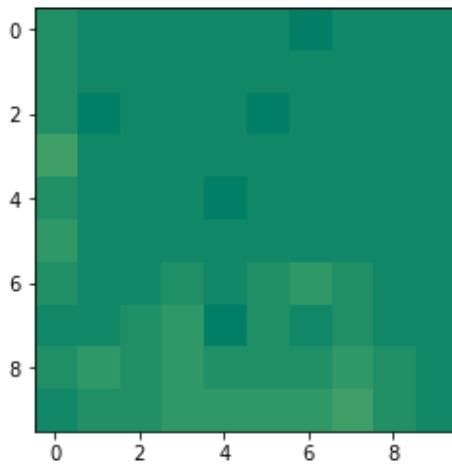
Updated direction: [ -1 0 ]



Step: 60

Updated position: [ 7 3 ]

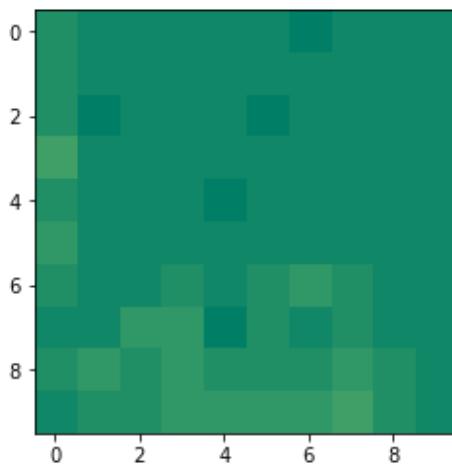
Updated direction: [ 0 -1 ]



Step: 61

Updated position: [ 7 2 ]

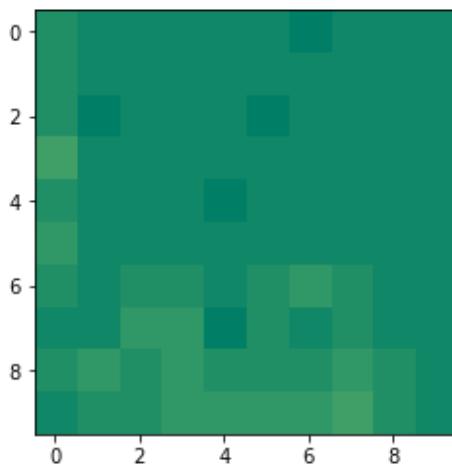
Updated direction: [ -1 0 ]



Step: 62

Updated position: [ 6 2 ]

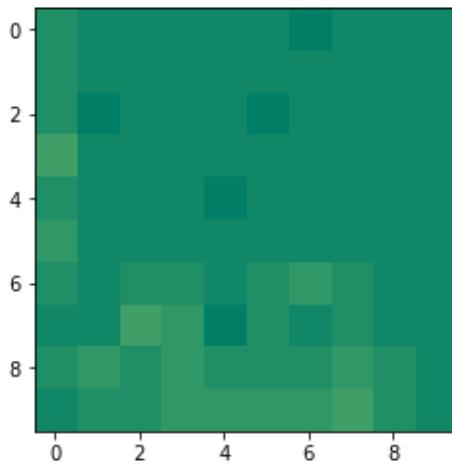
Updated direction: [ 1 0 ]



Step: 63

Updated position: [ 7 2 ]

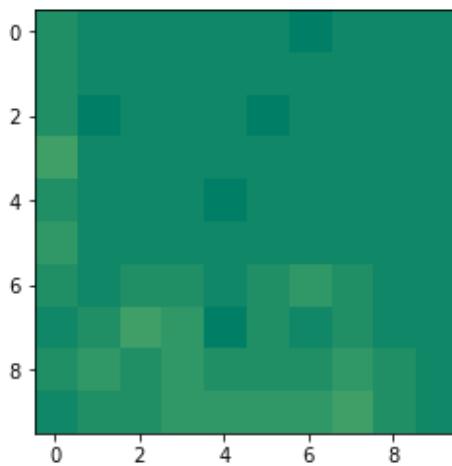
Updated direction: [ 0 -1 ]



Step: 64

Updated position: [ 7 1 ]

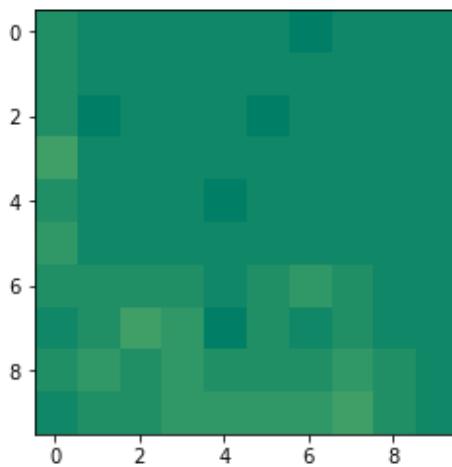
Updated direction: [-1 0 ]



Step: 65

Updated position: [ 6 1 ]

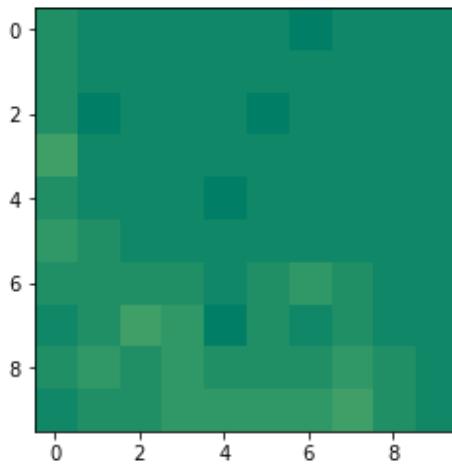
Updated direction: [-1 0 ]



Step: 66

Updated position: [ 5 1 ]

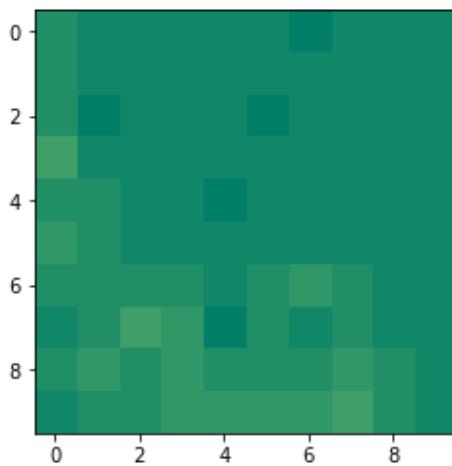
Updated direction: [-1 0 ]



Step: 67

Updated position: [ 4 1 ]

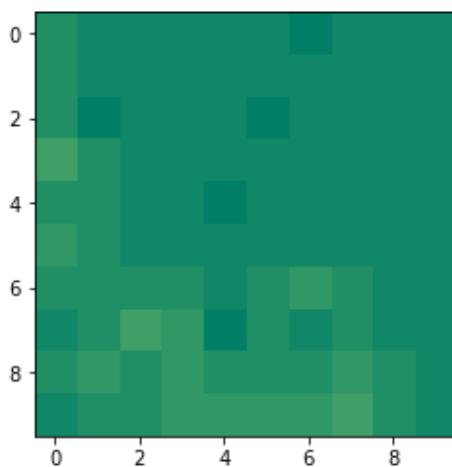
Updated direction: [ -1 0 ]



Step: 68

Updated position: [ 3 1 ]

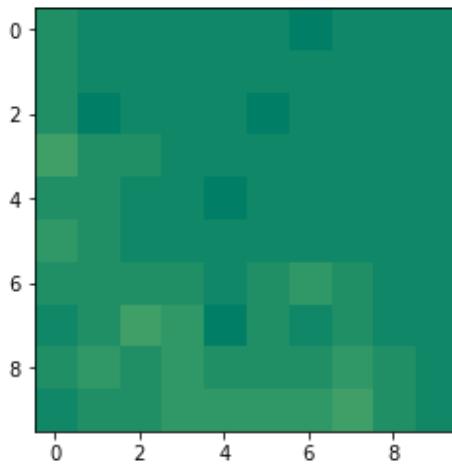
Updated direction: [ 0 1 ]



Step: 69

Updated position: [ 3 2 ]

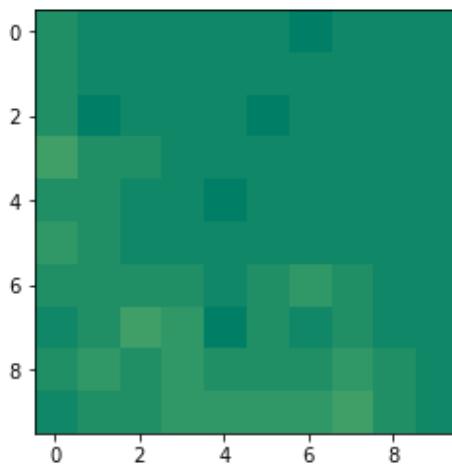
Updated direction: [ 1 0 ]



Step: 70

Updated position: [ 4 2 ]

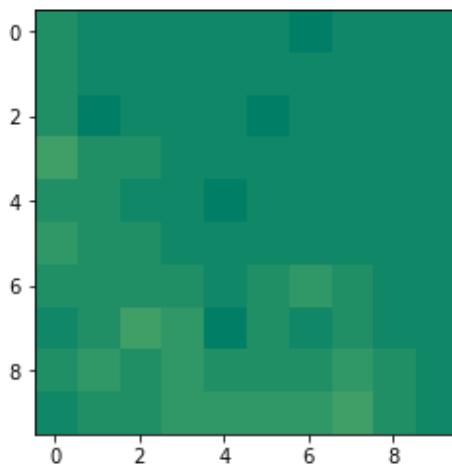
Updated direction: [ 1 0 ]



Step: 71

Updated position: [ 5 2 ]

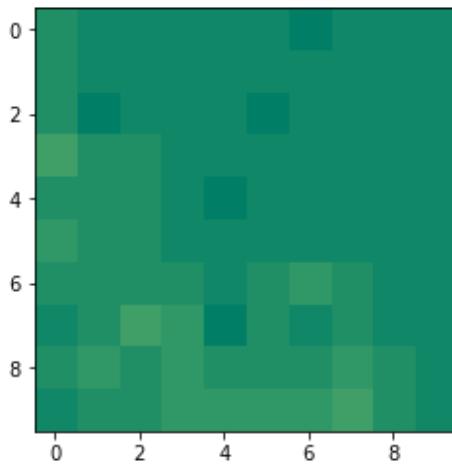
Updated direction: [ -1 0 ]



Step: 72

Updated position: [ 4 2 ]

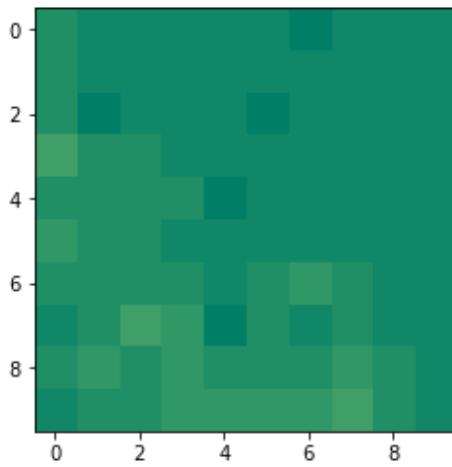
Updated direction: [ 0 1 ]



Step: 73

Updated position: [ 4 3 ]

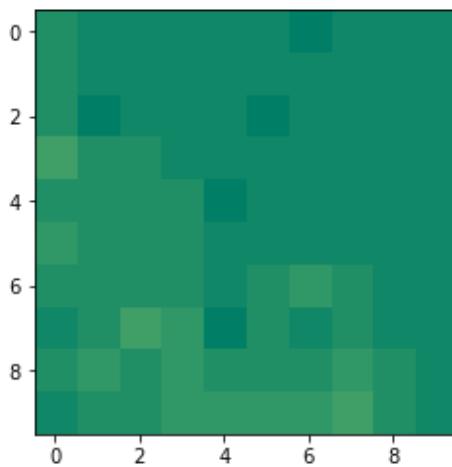
Updated direction: [ 1 0 ]



Step: 74

Updated position: [ 5 3 ]

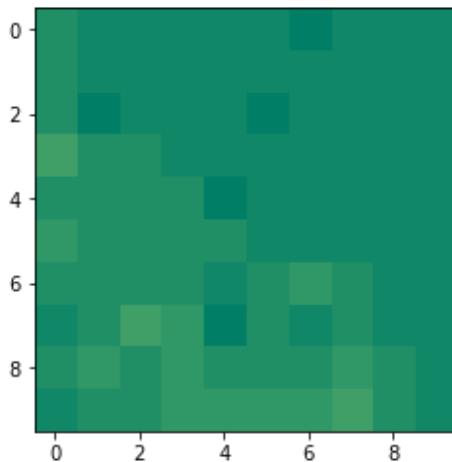
Updated direction: [ 0 1 ]



Step: 75

Updated position: [ 5 4 ]

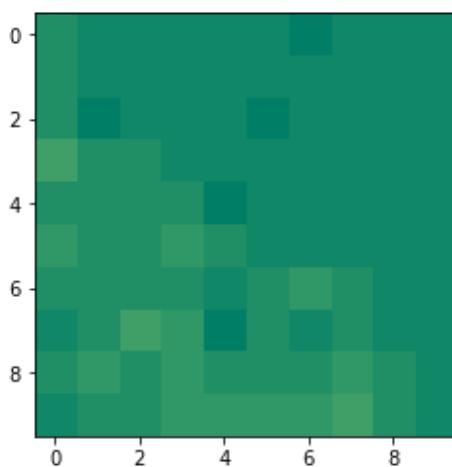
Updated direction: [ 0 -1 ]



Step: 76

Updated position: [ 5 3 ]

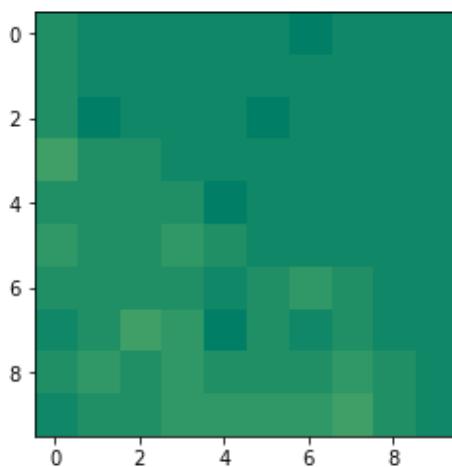
Updated direction: [ 0 1 ]



Step: 77

Updated position: [ 5 4 ]

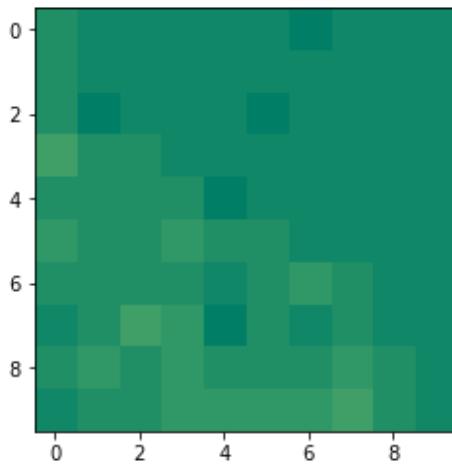
Updated direction: [ 0 1 ]



Step: 78

Updated position: [ 5 5 ]

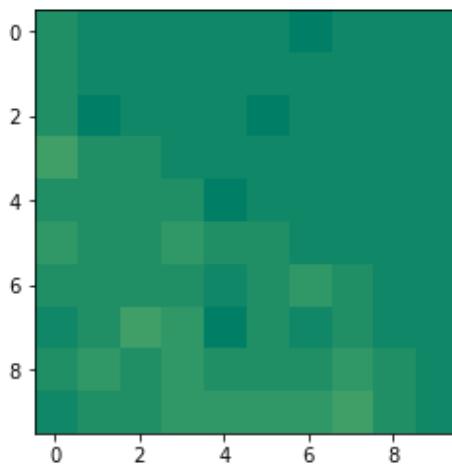
Updated direction: [ -1 0 ]



Step: 79

Updated position: [ 4 5 ]

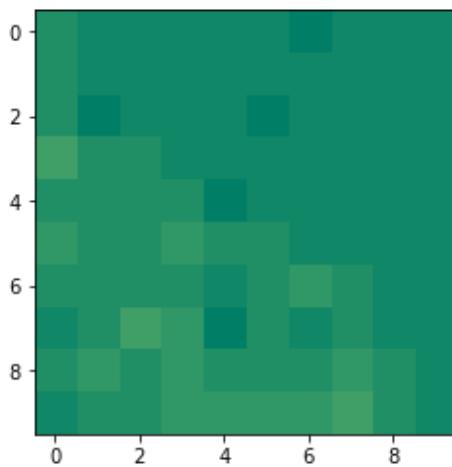
Updated direction: [ -1 0 ]



Step: 80

Updated position: [ 3 5 ]

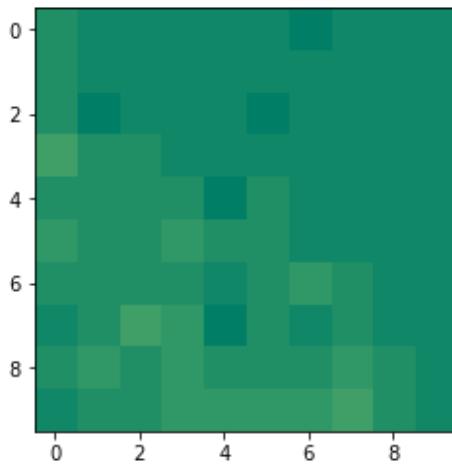
Updated direction: [ 1 0 ]



Step: 81

Updated position: [ 4 5 ]

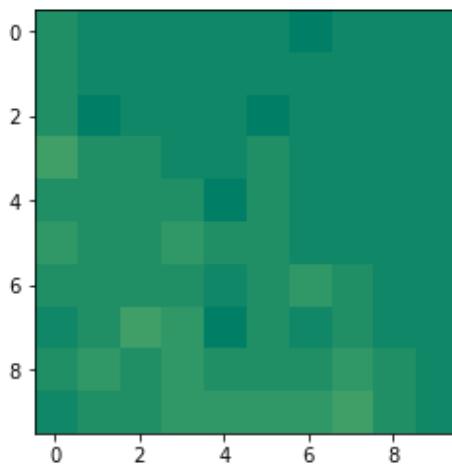
Updated direction: [ -1 0 ]



Step: 82

Updated position: [ 3 5 ]

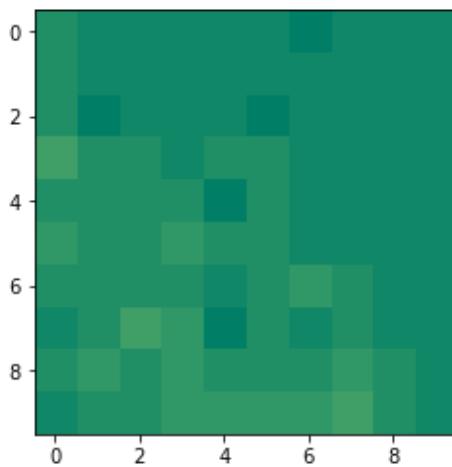
Updated direction: [ 0 -1 ]



Step: 83

Updated position: [ 3 4 ]

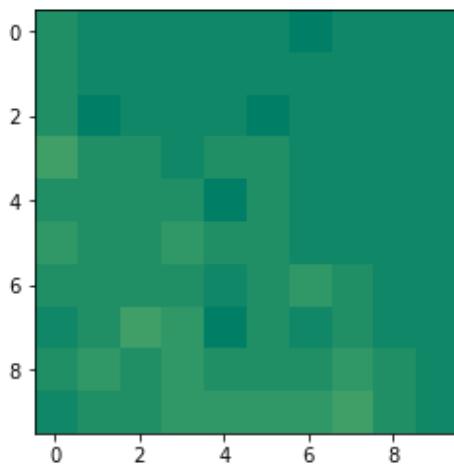
Updated direction: [-1 0]



Step: 84

Updated position: [ 2 4 ]

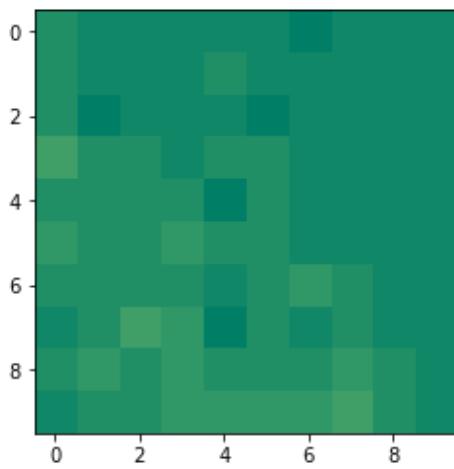
Updated direction: [-1 0]



Step: 85

Updated position: [ 1 4 ]

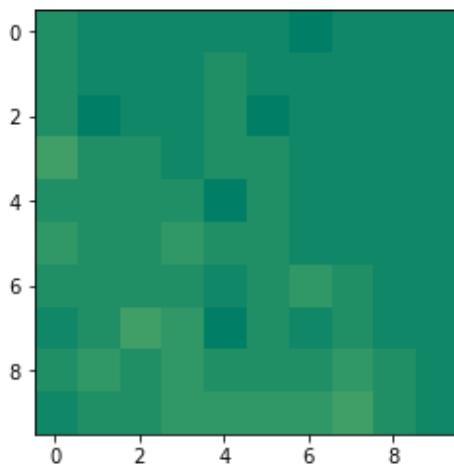
Updated direction: [ 1 0 ]



Step: 86

Updated position: [ 2 4 ]

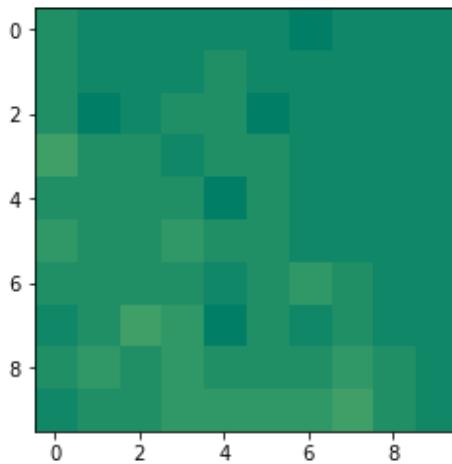
Updated direction: [ 0 -1 ]



Step: 87

Updated position: [ 2 3 ]

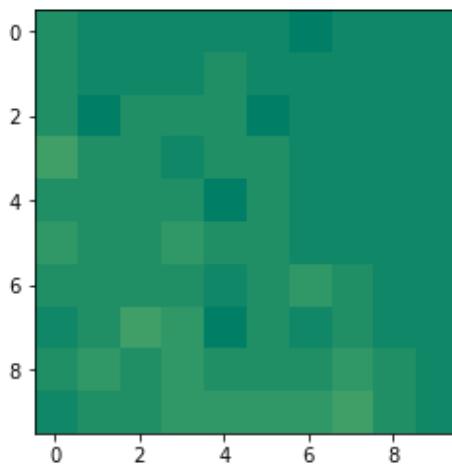
Updated direction: [ 0 -1 ]



Step: 88

Updated position: [ 2 2 ]

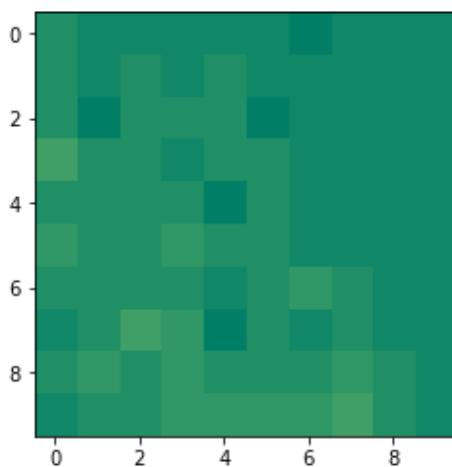
Updated direction: [ -1 0 ]



Step: 89

Updated position: [ 1 2 ]

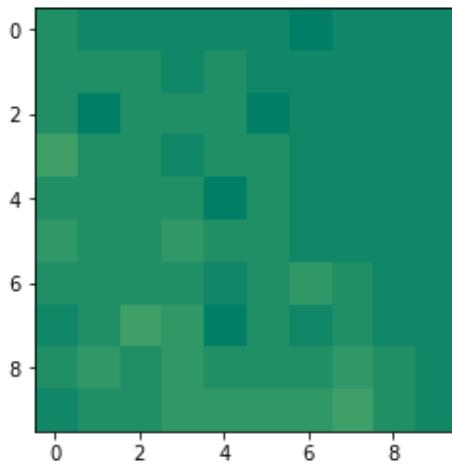
Updated direction: [ 0 -1 ]



Step: 90

Updated position: [ 1 1 ]

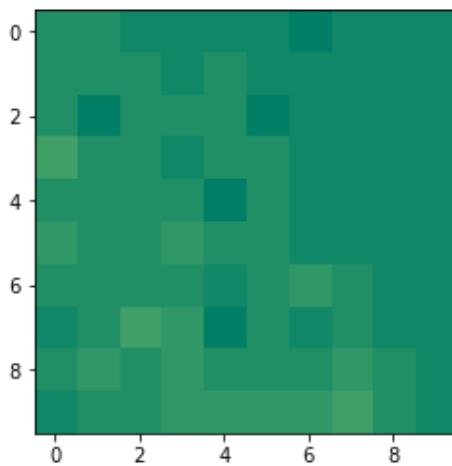
Updated direction: [ -1 0 ]



Step: 91

Updated position: [ 0 1 ]

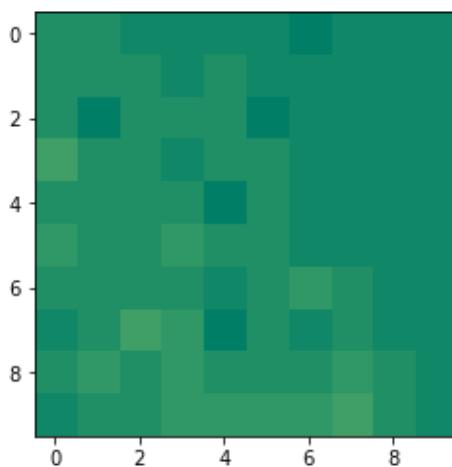
Updated direction: [ 0 1 ]



Step: 92

Updated position: [ 0 2 ]

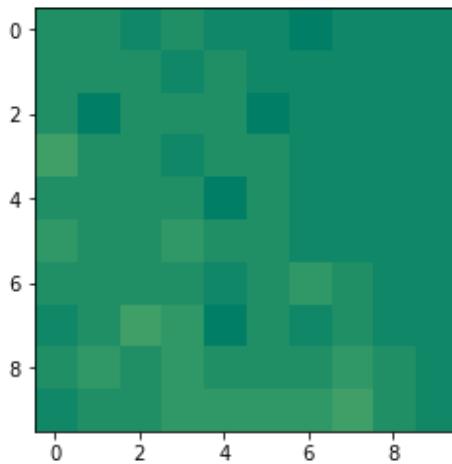
Updated direction: [ 0 1 ]



Step: 93

Updated position: [ 0 3 ]

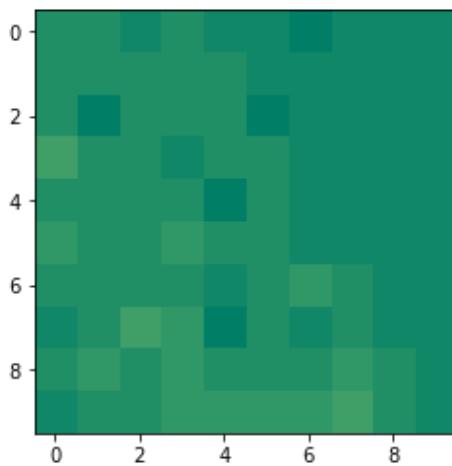
Updated direction: [ 1 0 ]



Step: 94

Updated position: [1 3]

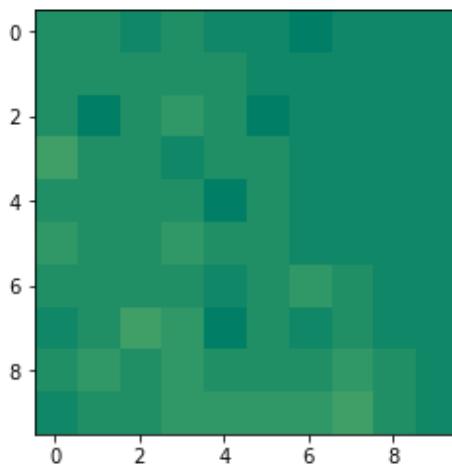
Updated direction: [1 0]



Step: 95

Updated position: [2 3]

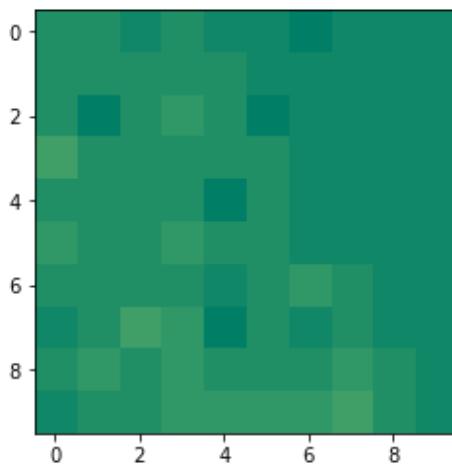
Updated direction: [1 0]



Step: 96

Updated position: [3 3]

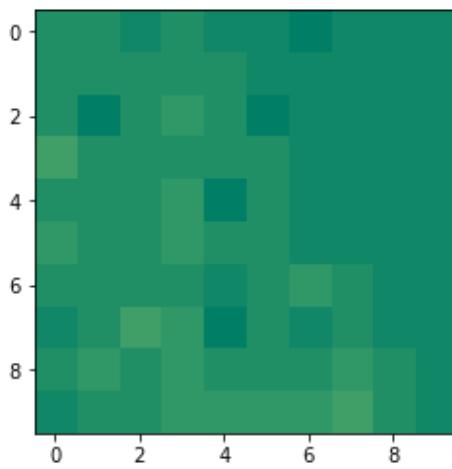
Updated direction: [1 0]



Step: 97

Updated position: [ 4 3 ]

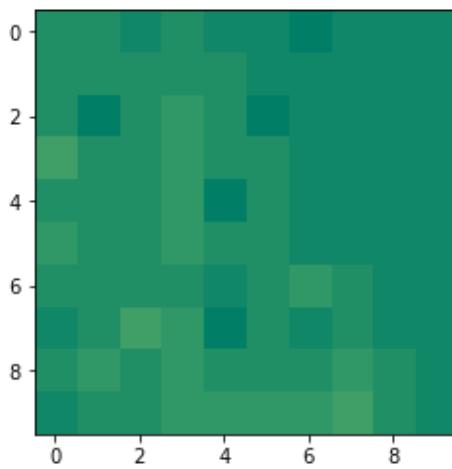
Updated direction: [ -1 0 ]



Step: 98

Updated position: [ 3 3 ]

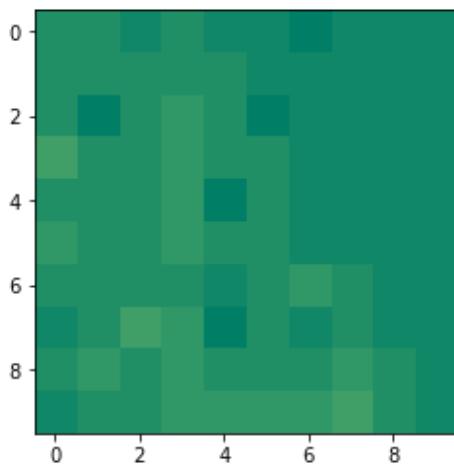
Updated direction: [ 0 -1 ]



Step: 99

Updated position: [ 3 2 ]

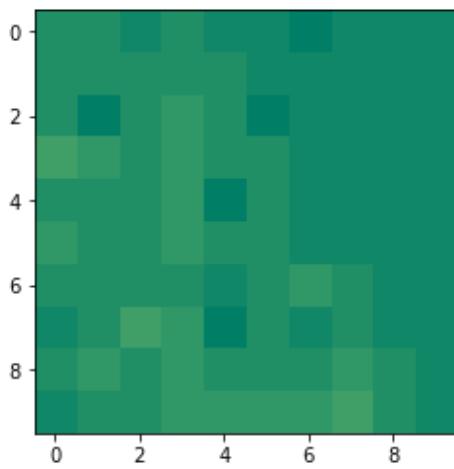
Updated direction: [ 0 -1 ]



Step: 100

Updated position: [ 3 1 ]

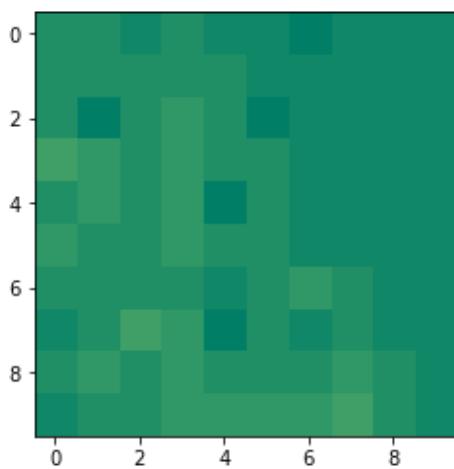
Updated direction: [ 1 0 ]



Step: 101

Updated position: [ 4 1 ]

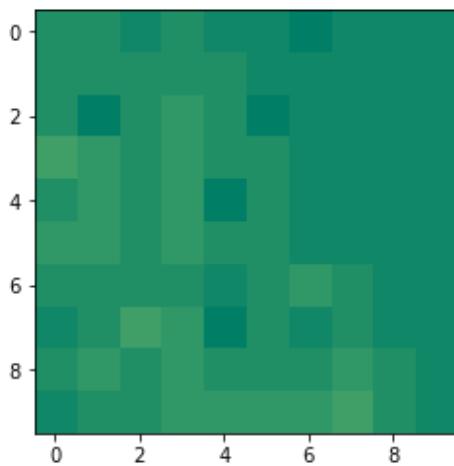
Updated direction: [ 1 0 ]



Step: 102

Updated position: [ 5 1 ]

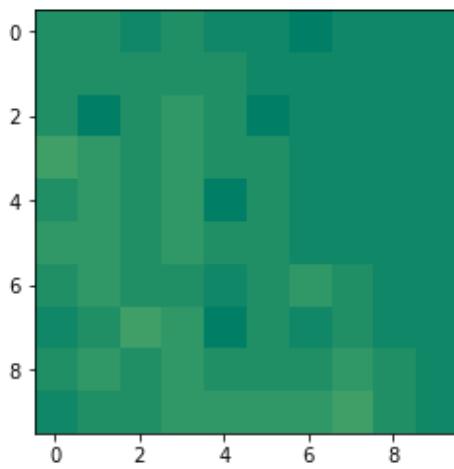
Updated direction: [ 1 0 ]



Step: 103

Updated position: [ 6 1 ]

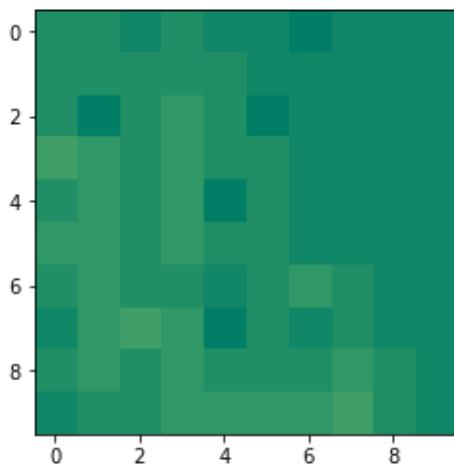
Updated direction: [ 1 0 ]



Step: 104

Updated position: [ 7 1 ]

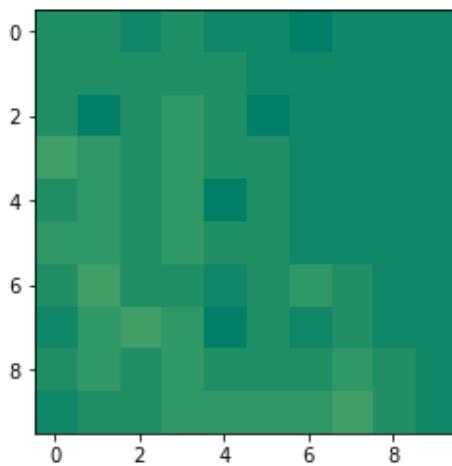
Updated direction: [ -1 0 ]



Step: 105

Updated position: [ 6 1 ]

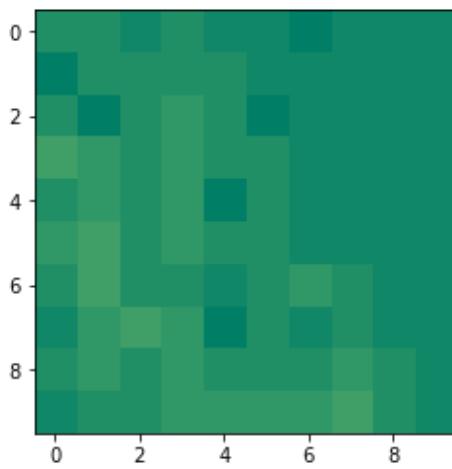
Updated direction: [ -1 0 ]



Step: 106

Updated position: [ 5 1 ]

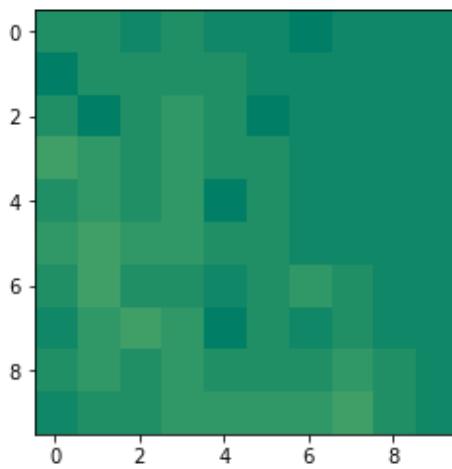
Updated direction: [ 0 1 ]



Step: 107

Updated position: [ 5 2 ]

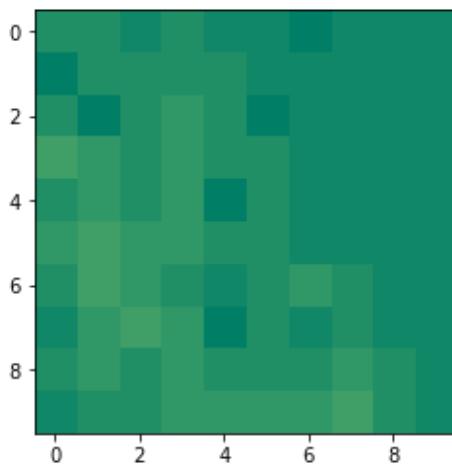
Updated direction: [ 1 0 ]



Step: 108

Updated position: [ 6 2 ]

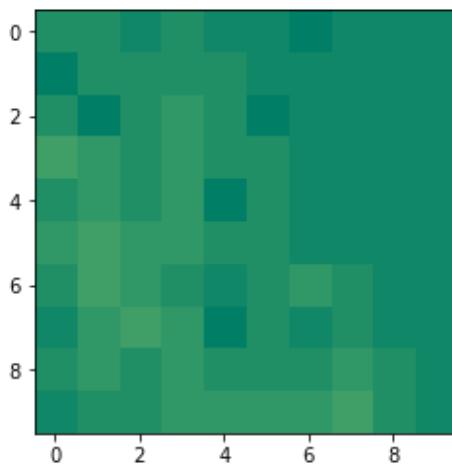
Updated direction: [ 0 1 ]



Step: 109

Updated position: [ 6 3 ]

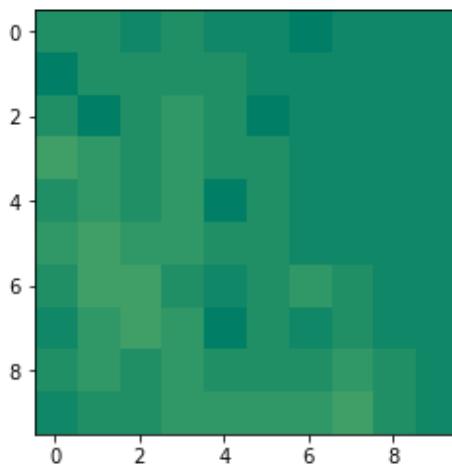
Updated direction: [ 0 -1 ]



Step: 110

Updated position: [ 6 2 ]

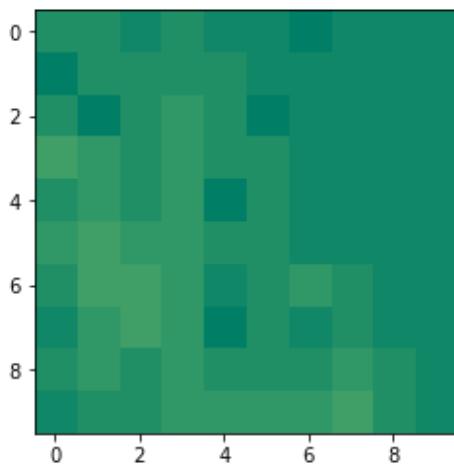
Updated direction: [ 0 1 ]



Step: 111

Updated position: [ 6 3 ]

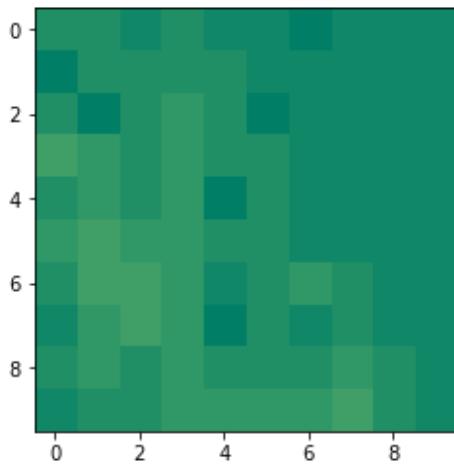
Updated direction: [-1 0 ]



Step: 112

Updated position: [ 5 3 ]

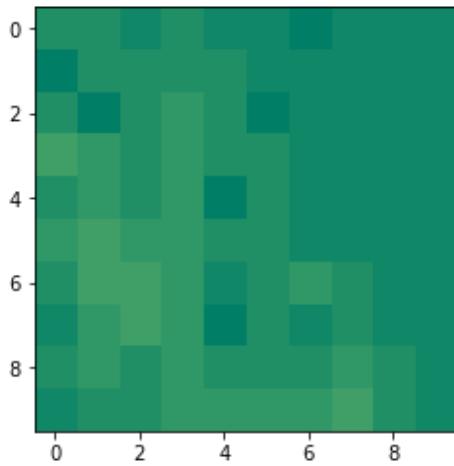
Updated direction: [ 0 1 ]



Step: 113

Updated position: [ 5 4 ]

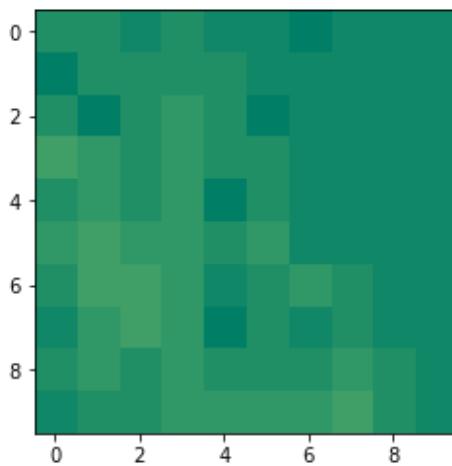
Updated direction: [ 0 1 ]



Step: 114

Updated position: [ 5 5 ]

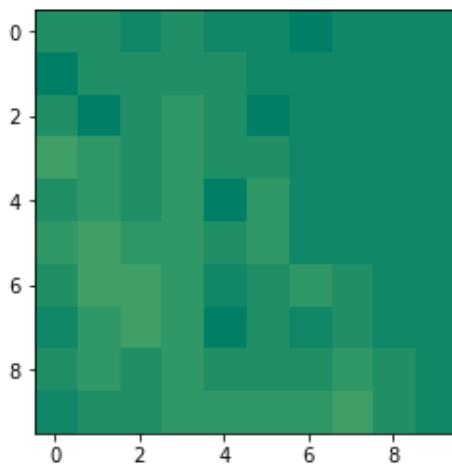
Updated direction: [ -1 0 ]



Step: 115

Updated position: [ 4 5 ]

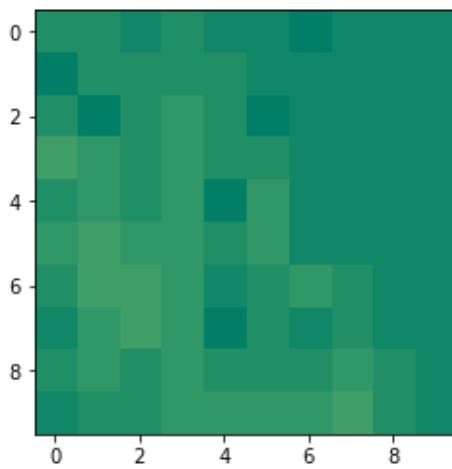
Updated direction: [ 0 1 ]



Step: 116

Updated position: [ 4 6 ]

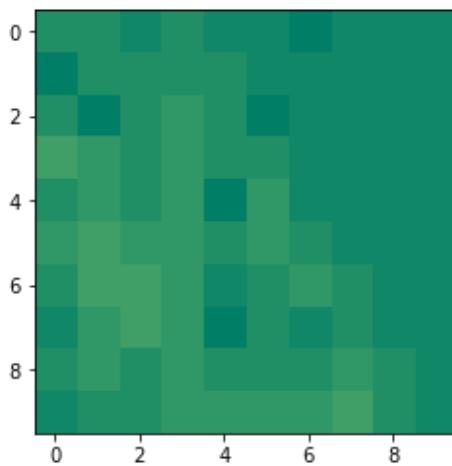
Updated direction: [ 1 0 ]



Step: 117

Updated position: [ 5 6 ]

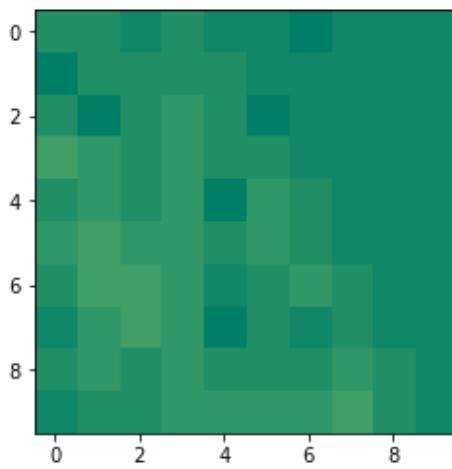
Updated direction: [ -1 0 ]



Step: 118

Updated position: [ 4 6 ]

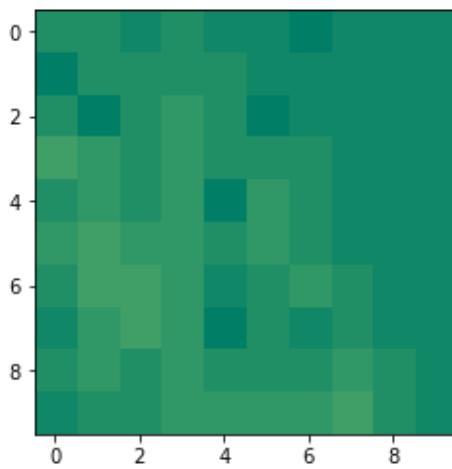
Updated direction: [ -1 0 ]



Step: 119

Updated position: [ 3 6 ]

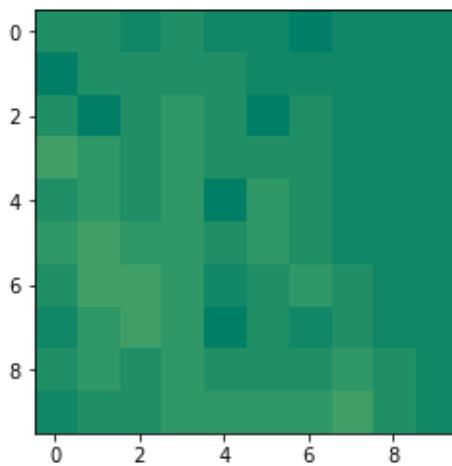
Updated direction: [ -1 0 ]



Step: 120

Updated position: [ 2 6 ]

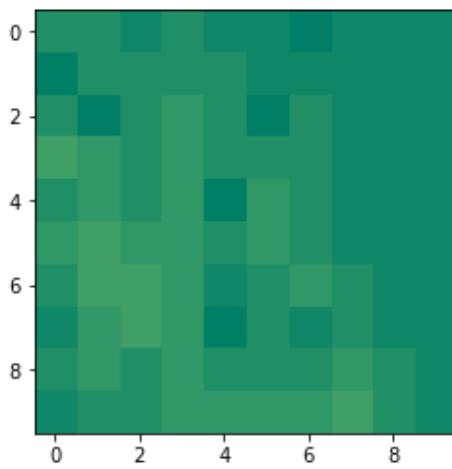
Updated direction: [ -1 0 ]



Step: 121

Updated position: [1 6]

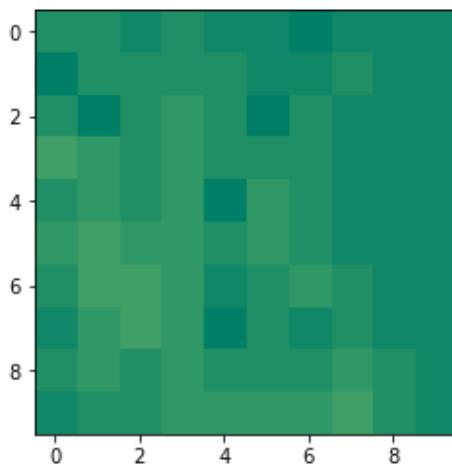
Updated direction: [0 1]



Step: 122

Updated position: [1 7]

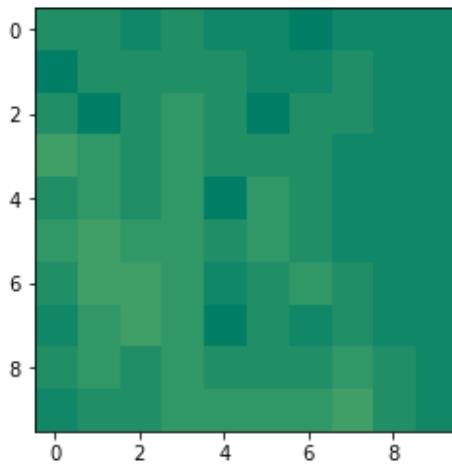
Updated direction: [1 0]



Step: 123

Updated position: [2 7]

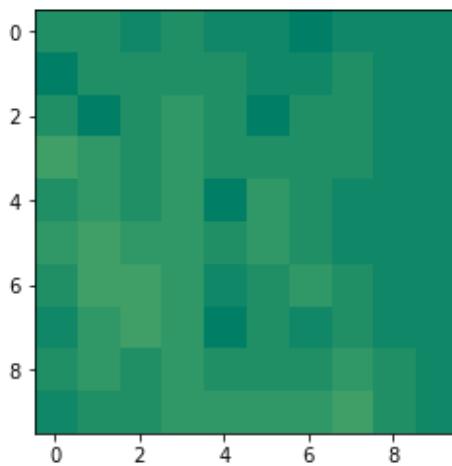
Updated direction: [1 0]



Step: 124

Updated position: [ 3 7 ]

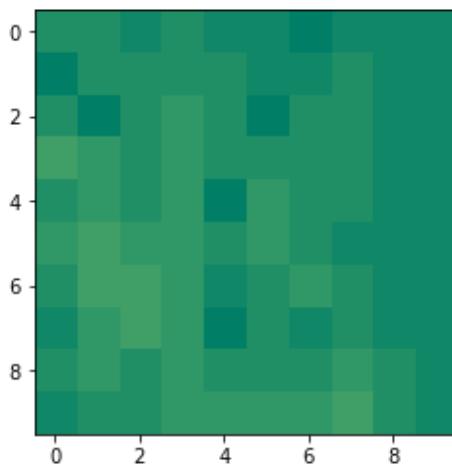
Updated direction: [ 1 0 ]



Step: 125

Updated position: [ 4 7 ]

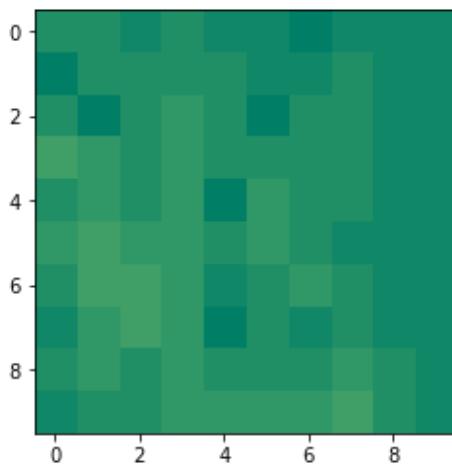
Updated direction: [ 1 0 ]



Step: 126

Updated position: [ 5 7 ]

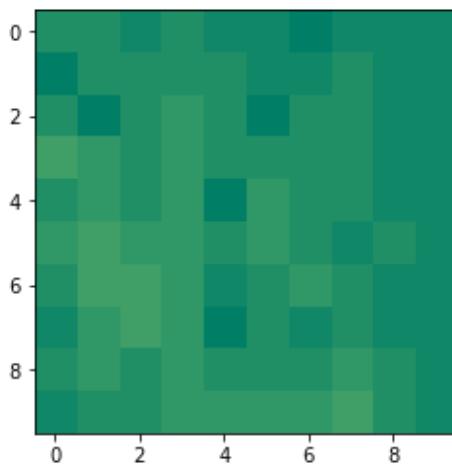
Updated direction: [ 0 1 ]



Step: 127

Updated position: [ 5 8 ]

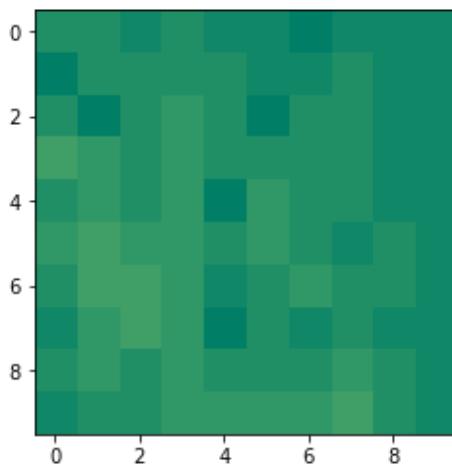
Updated direction: [ 1 0 ]



Step: 128

Updated position: [ 6 8 ]

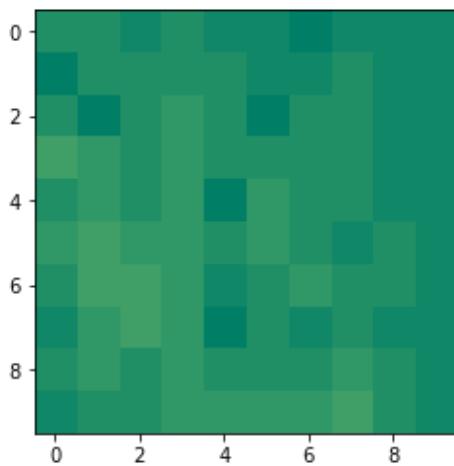
Updated direction: [ 0 -1 ]



Step: 129

Updated position: [ 6 7 ]

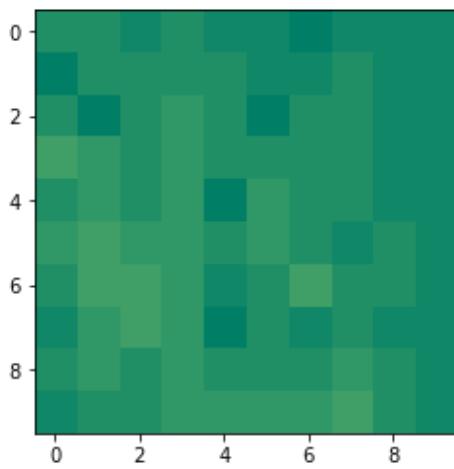
Updated direction: [ 0 -1 ]



Step: 130

Updated position: [ 6 6 ]

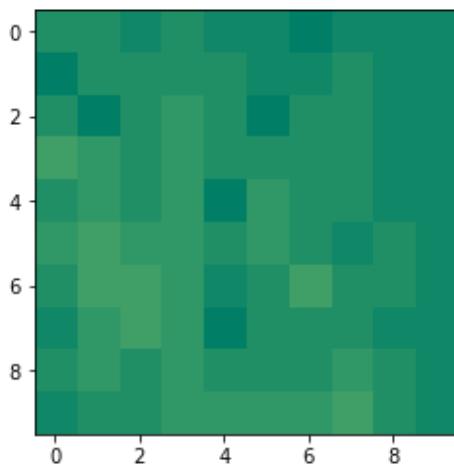
Updated direction: [ 1 0 ]



Step: 131

Updated position: [ 7 6 ]

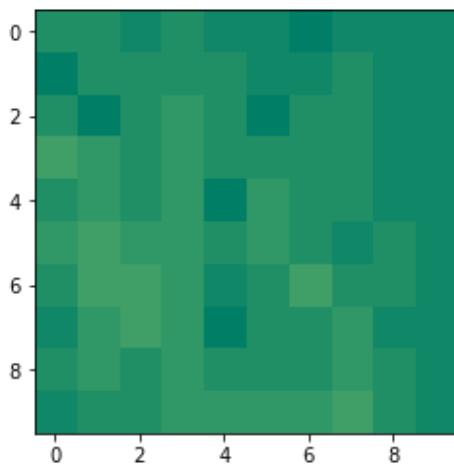
Updated direction: [ 0 1 ]



Step: 132

Updated position: [ 7 7 ]

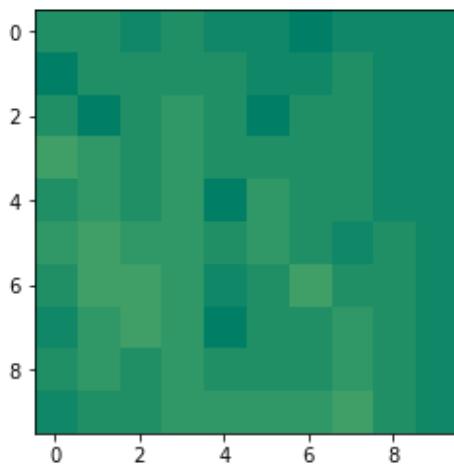
Updated direction: [ 0 1 ]



Step: 133

Updated position: [ 7 8 ]

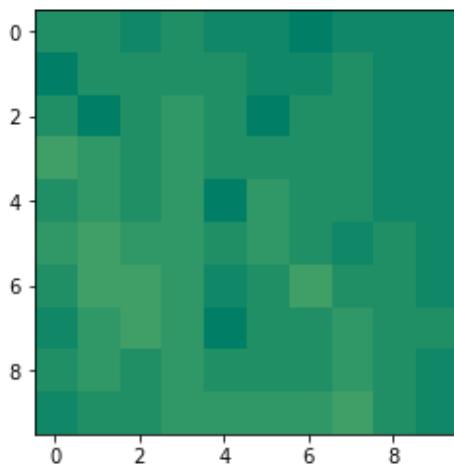
Updated direction: [ 0 1 ]



Step: 134

Updated position: [ 7 9 ]

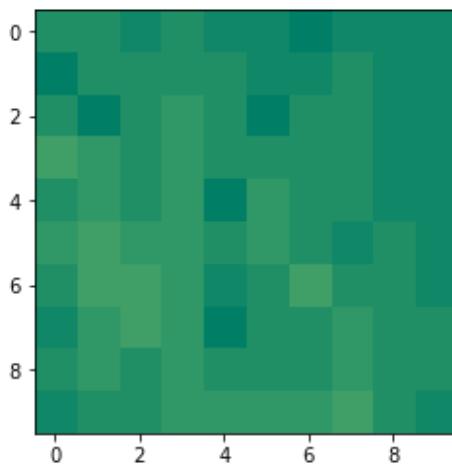
Updated direction: [ 1 0 ]



Step: 135

Updated position: [ 8 9 ]

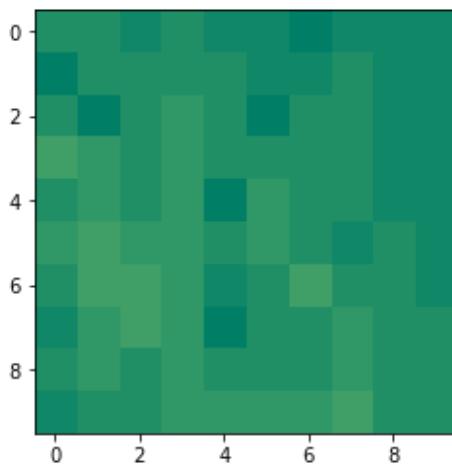
Updated direction: [ 1 0 ]



Step: 136

Updated position: [ 9 9 ]

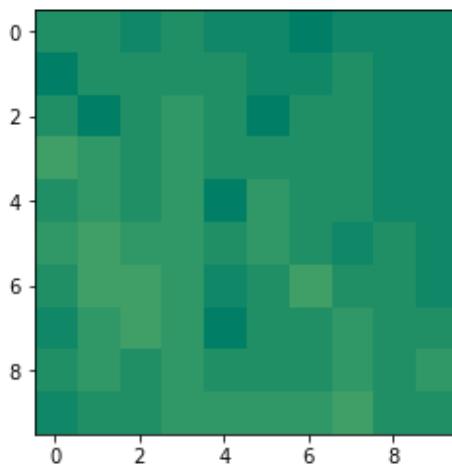
Updated direction: [ -1 0 ]



Step: 137

Updated position: [ 8 9 ]

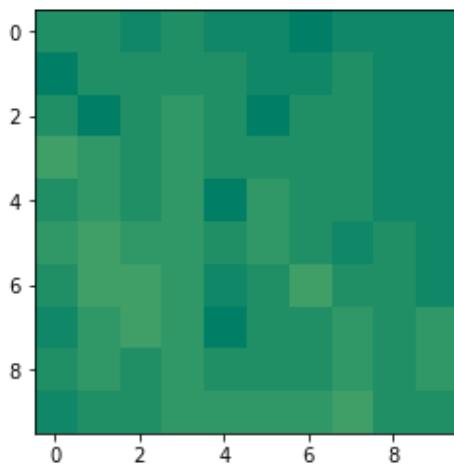
Updated direction: [ -1 0 ]



Step: 138

Updated position: [ 7 9 ]

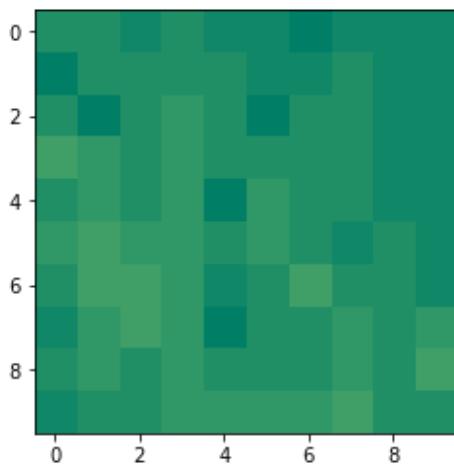
Updated direction: [ 1 0 ]



Step: 139

Updated position: [ 8 9 ]

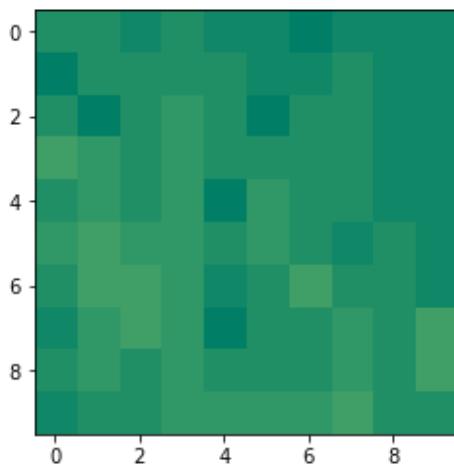
Updated direction: [-1 0 ]



Step: 140

Updated position: [ 7 9 ]

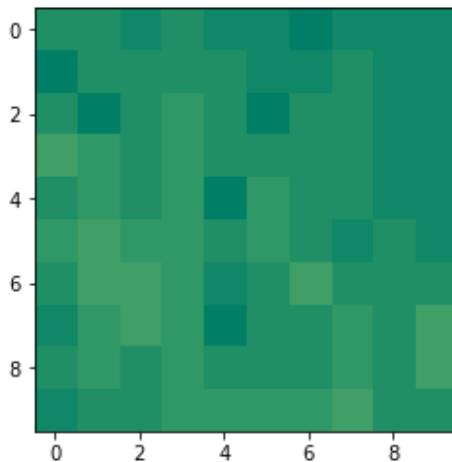
Updated direction: [-1 0 ]



Step: 141

Updated position: [ 6 9 ]

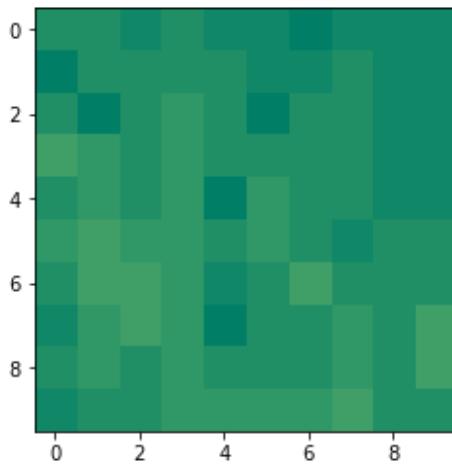
Updated direction: [-1 0 ]



Step: 142

Updated position: [ 5 9 ]

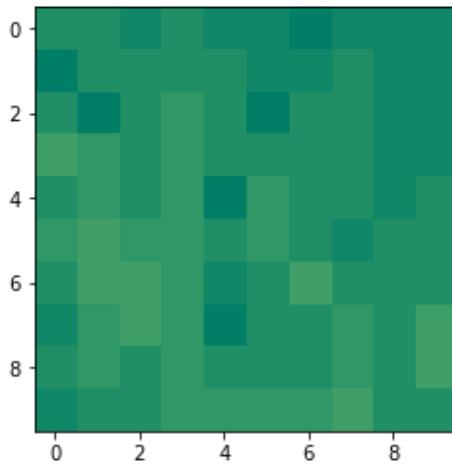
Updated direction: [-1 0 ]



Step: 143

Updated position: [ 4 9 ]

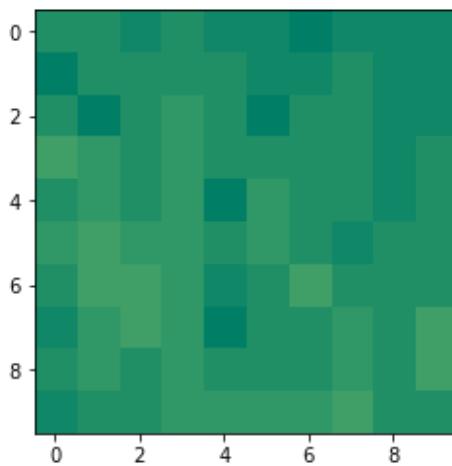
Updated direction: [-1 0 ]



Step: 144

Updated position: [ 3 9 ]

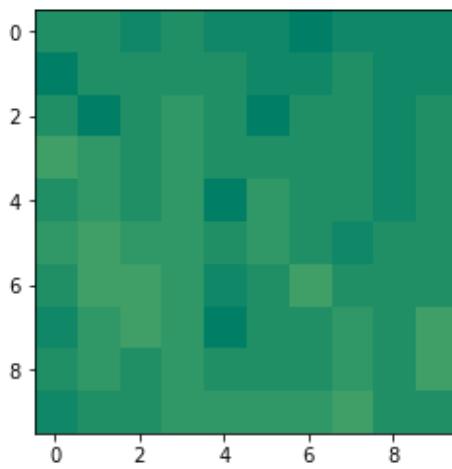
Updated direction: [-1 0 ]



Step: 145

Updated position: [ 2 9 ]

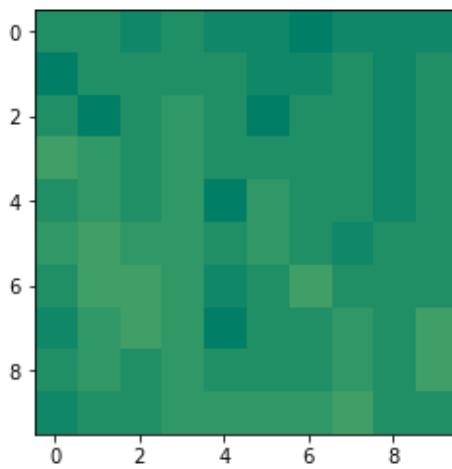
Updated direction: [ -1 0 ]



Step: 146

Updated position: [ 1 9 ]

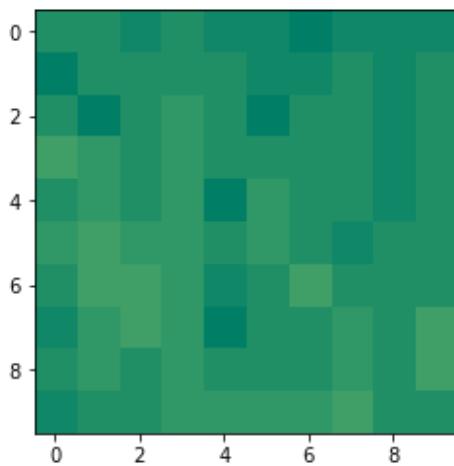
Updated direction: [ -1 0 ]



Step: 147

Updated position: [ 0 9 ]

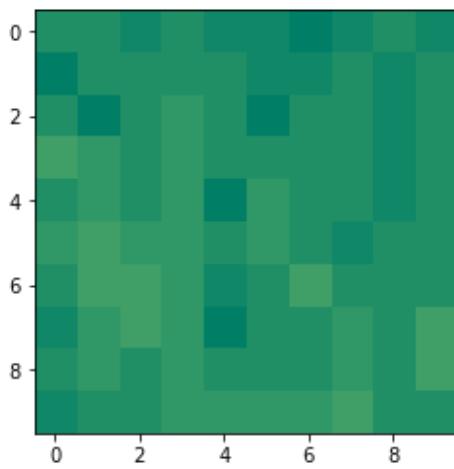
Updated direction: [ 0 -1 ]



Step: 148

Updated position: [ 0 8 ]

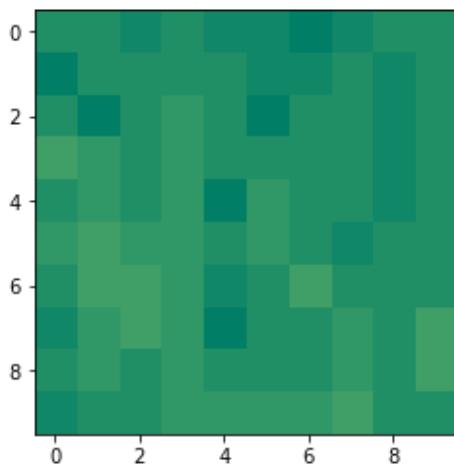
Updated direction: [ 0 1 ]



Step: 149

Updated position: [ 0 9 ]

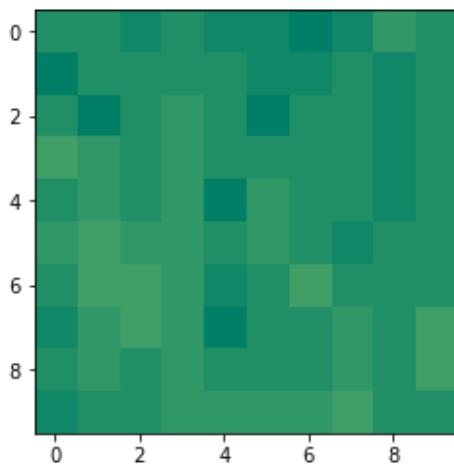
Updated direction: [ 0 -1 ]



Step: 150

Updated position: [ 0 8 ]

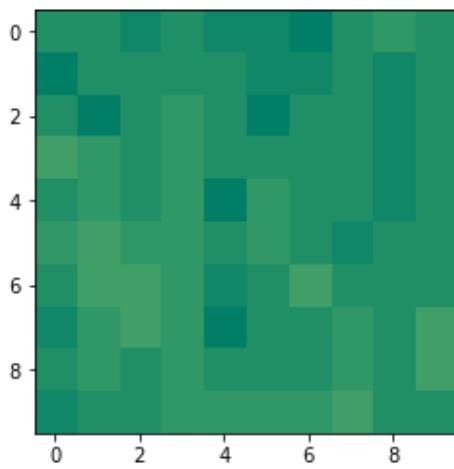
Updated direction: [ 0 -1 ]



Step: 151

Updated position: [0 7]

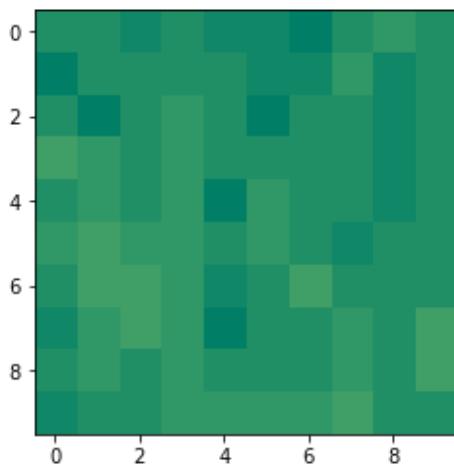
Updated direction: [1 0]



Step: 152

Updated position: [1 7]

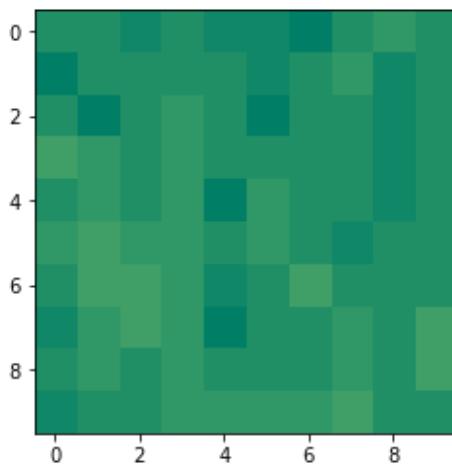
Updated direction: [0 -1]



Step: 153

Updated position: [1 6]

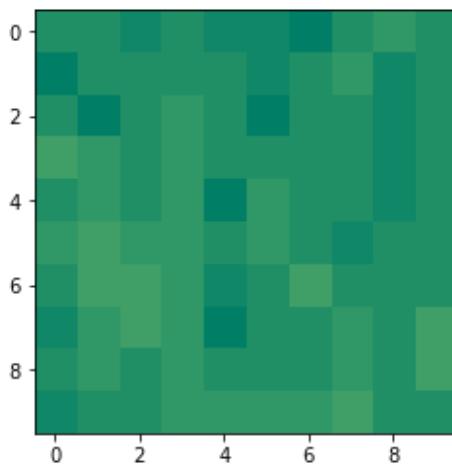
Updated direction: [0 -1]



Step: 154

Updated position: [ 1 5 ]

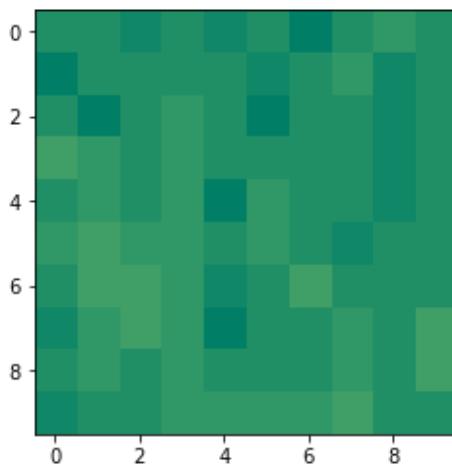
Updated direction: [ -1 0 ]



Step: 155

Updated position: [ 0 5 ]

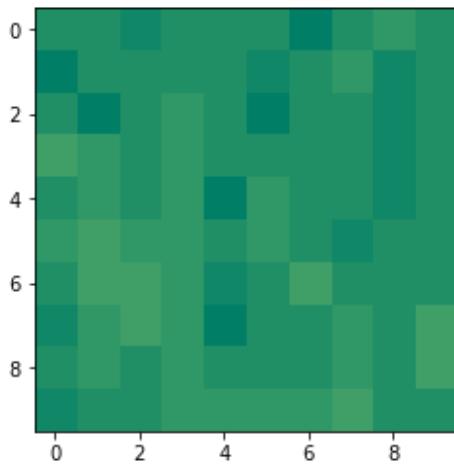
Updated direction: [ 0 -1 ]



Step: 156

Updated position: [ 0 4 ]

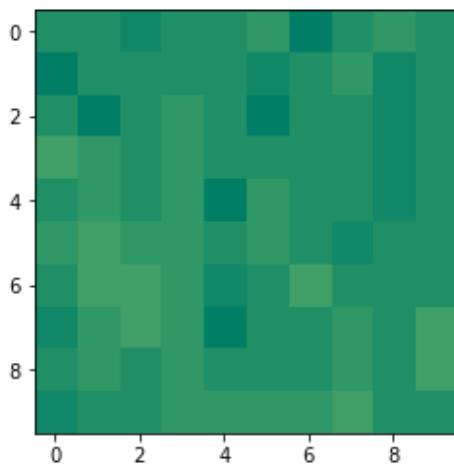
Updated direction: [ 0 1 ]



Step: 157

Updated position: [0 5]

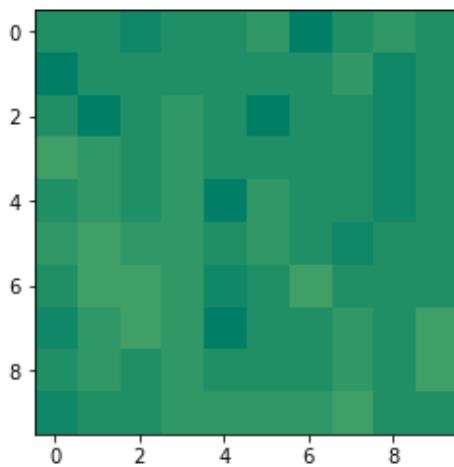
Updated direction: [1 0]



Step: 158

Updated position: [1 5]

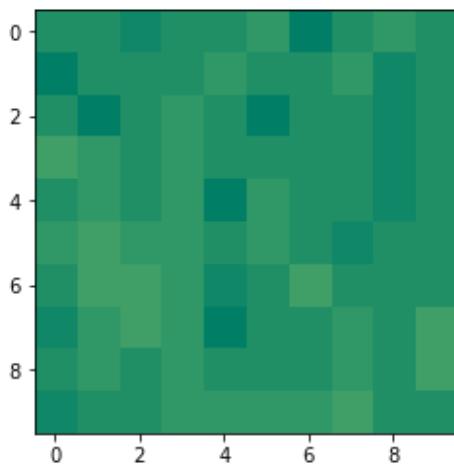
Updated direction: [0 -1]



Step: 159

Updated position: [1 4]

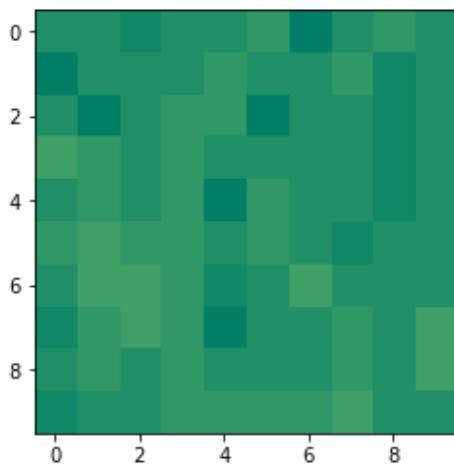
Updated direction: [1 0]



Step: 160

Updated position: [ 2 4 ]

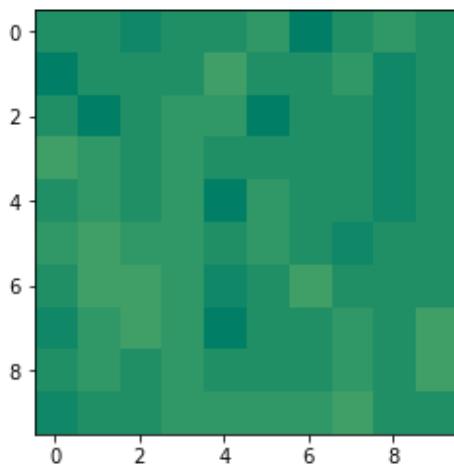
Updated direction: [-1 0 ]



Step: 161

Updated position: [ 1 4 ]

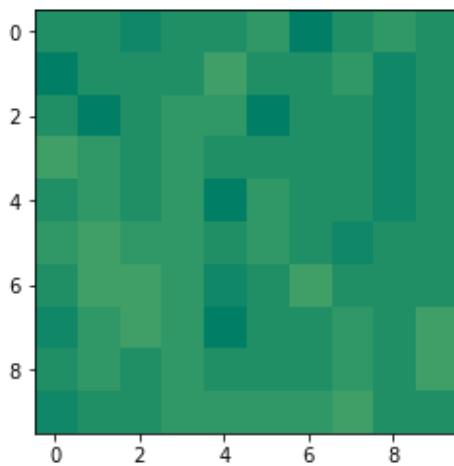
Updated direction: [-1 0 ]



Step: 162

Updated position: [ 0 4 ]

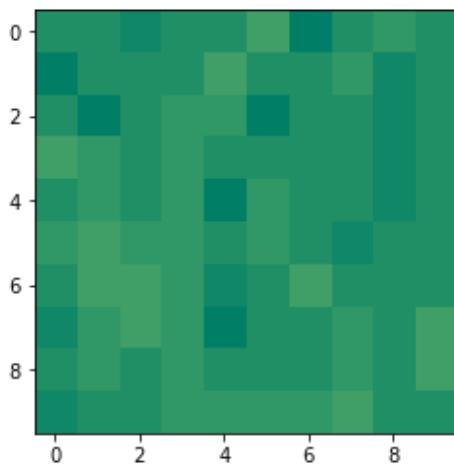
Updated direction: [ 0 1 ]



Step: 163

Updated position: [0 5]

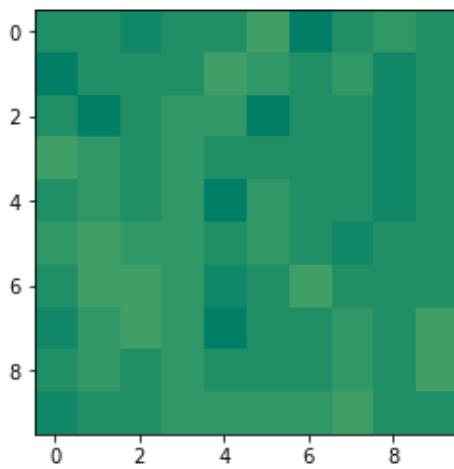
Updated direction: [1 0]



Step: 164

Updated position: [1 5]

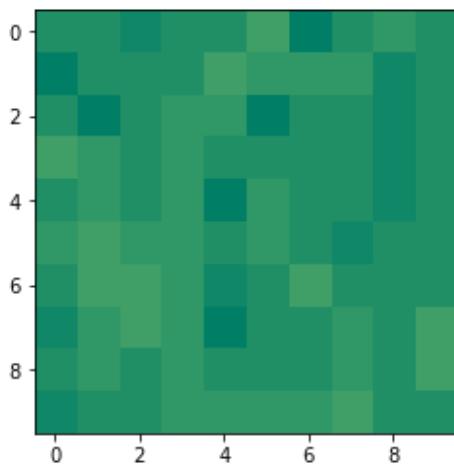
Updated direction: [0 1]



Step: 165

Updated position: [1 6]

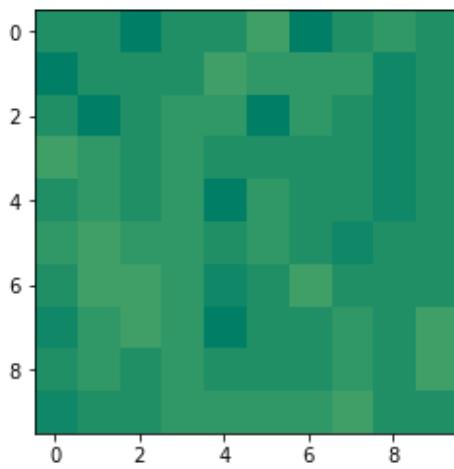
Updated direction: [1 0]



Step: 166

Updated position: [ 2 6 ]

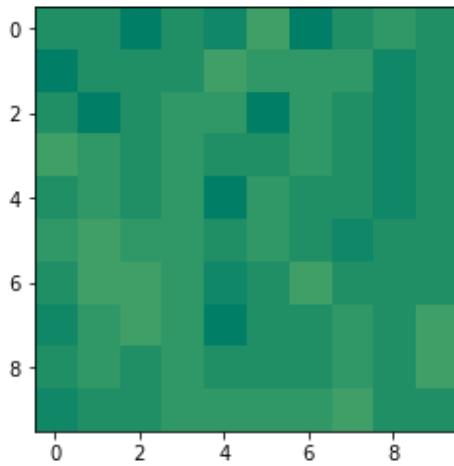
Updated direction: [ 1 0 ]



Step: 167

Updated position: [ 3 6 ]

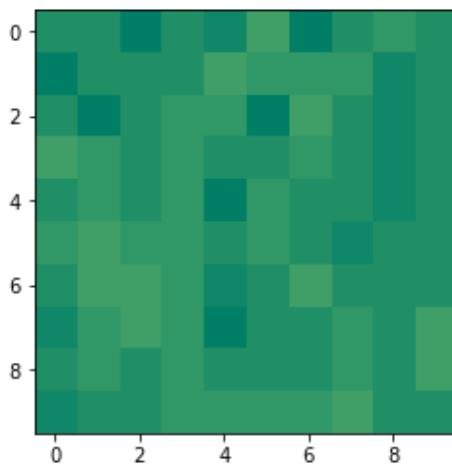
Updated direction: [ -1 0 ]



Step: 168

Updated position: [ 2 6 ]

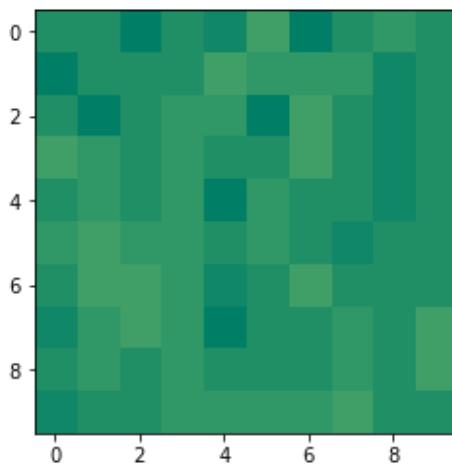
Updated direction: [ 1 0 ]



Step: 169

Updated position: [ 3 6 ]

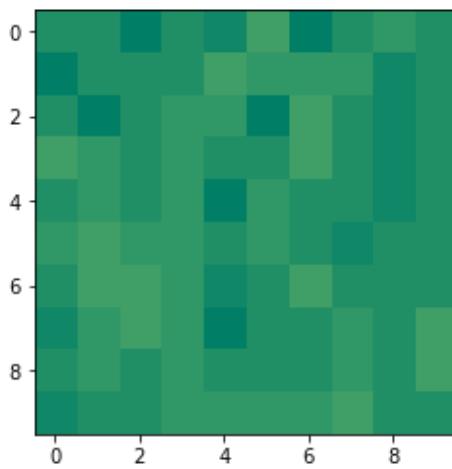
Updated direction: [ 1 0 ]



Step: 170

Updated position: [ 4 6 ]

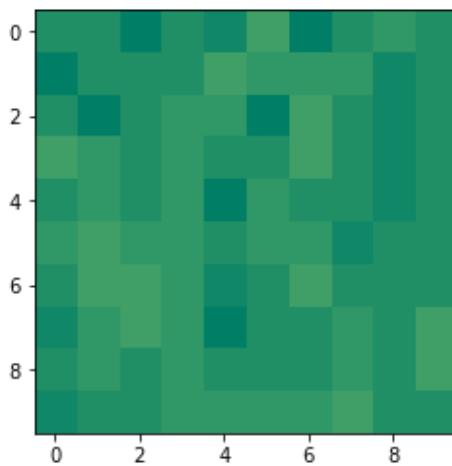
Updated direction: [ 1 0 ]



Step: 171

Updated position: [ 5 6 ]

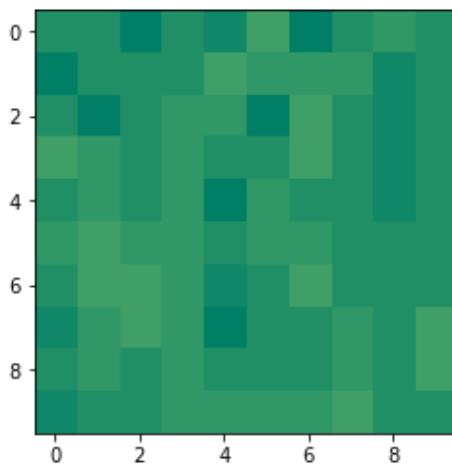
Updated direction: [ 0 1 ]



Step: 172

Updated position: [ 5 7 ]

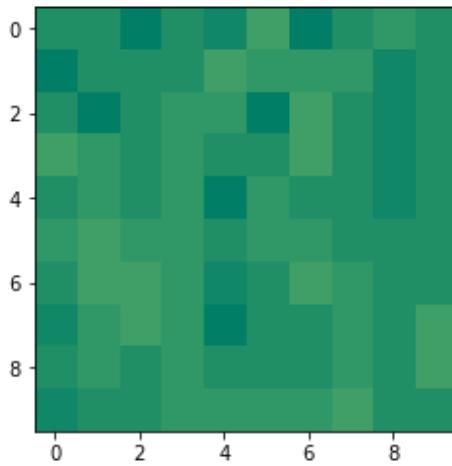
Updated direction: [ 1 0 ]



Step: 173

Updated position: [ 6 7 ]

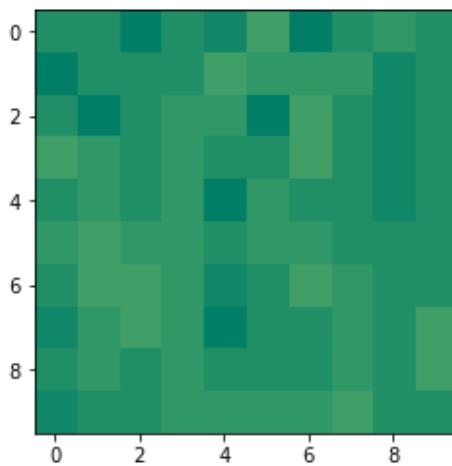
Updated direction: [ 0 -1 ]



Step: 174

Updated position: [ 6 6 ]

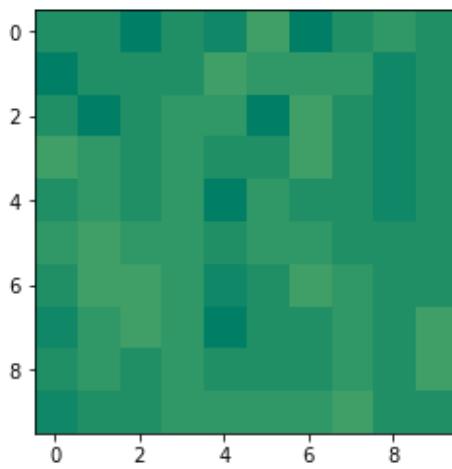
Updated direction: [ 1 0 ]



Step: 175

Updated position: [ 7 6 ]

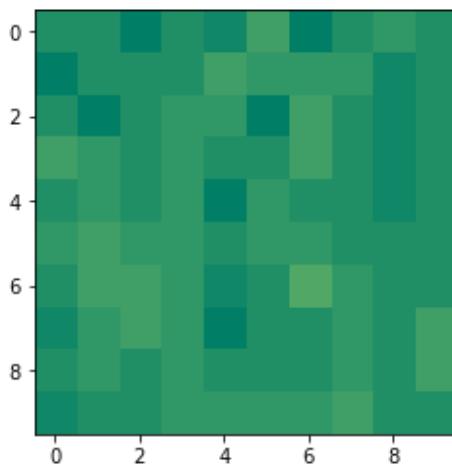
Updated direction: [ -1 0 ]



Step: 176

Updated position: [ 6 6 ]

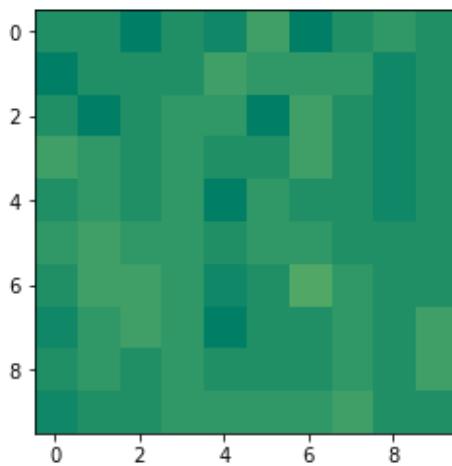
Updated direction: [ 1 0 ]



Step: 177

Updated position: [ 7 6 ]

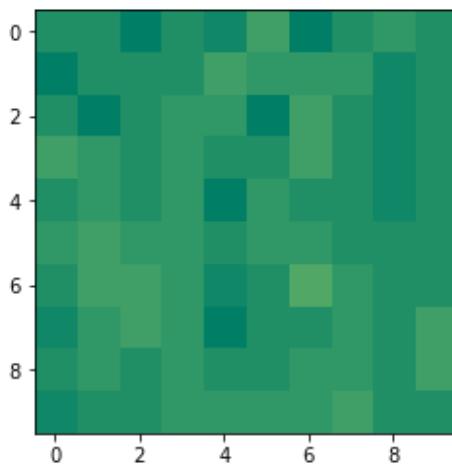
Updated direction: [ 1 0 ]



Step: 178

Updated position: [ 8 6 ]

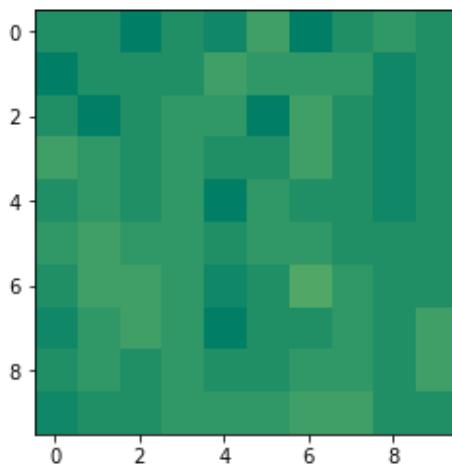
Updated direction: [ 1 0 ]



Step: 179

Updated position: [ 9 6 ]

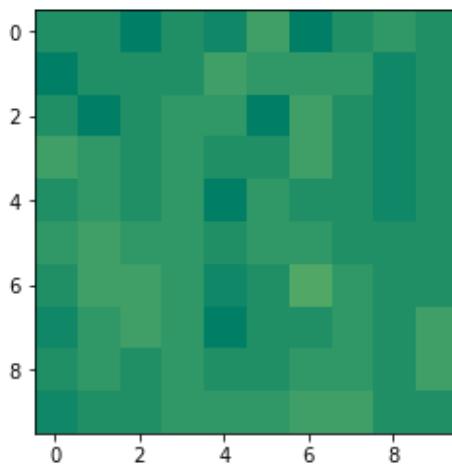
Updated direction: [ 0 -1 ]



Step: 180

Updated position: [ 9 5 ]

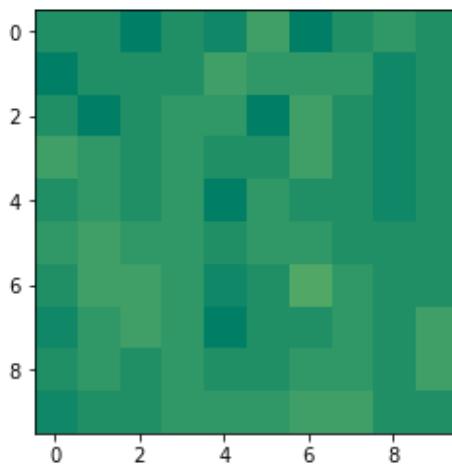
Updated direction: [-1 0]



Step: 181

Updated position: [ 8 5 ]

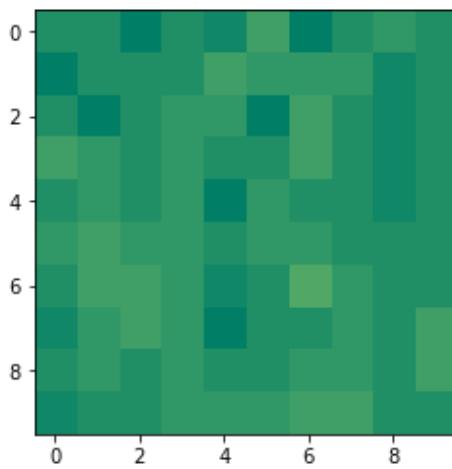
Updated direction: [ -1 0 ]



Step: 182

Updated position: [ 7 5 ]

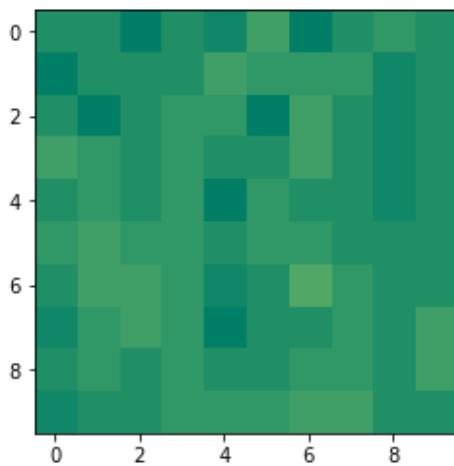
Updated direction: [ 1 0 ]



Step: 183

Updated position: [ 8 5 ]

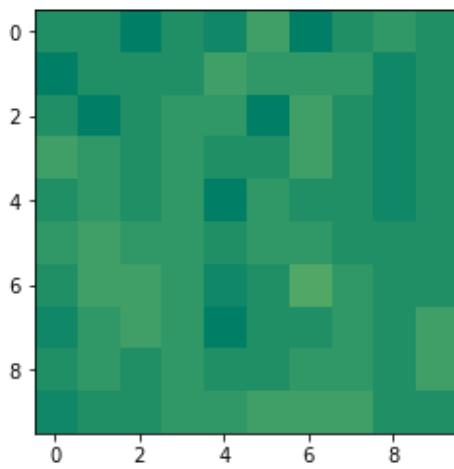
Updated direction: [ 1 0 ]



Step: 184

Updated position: [ 9 5 ]

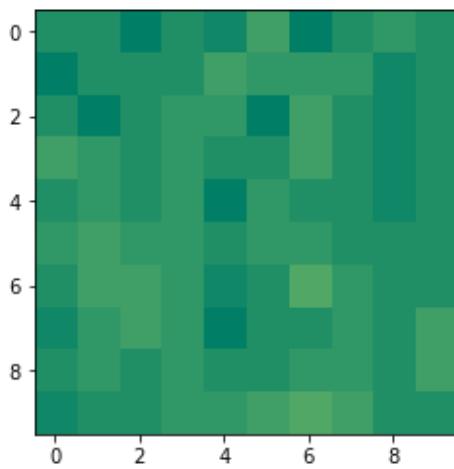
Updated direction: [ 0 1 ]



Step: 185

Updated position: [ 9 6 ]

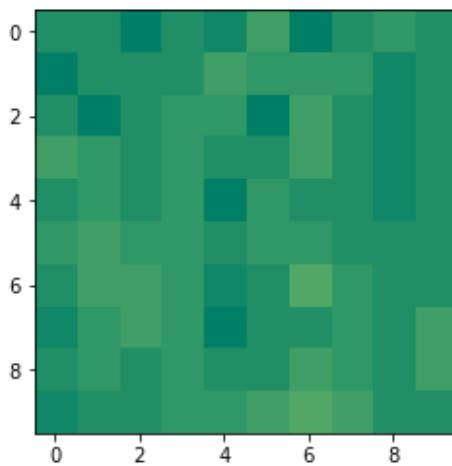
Updated direction: [ -1 0 ]



Step: 186

Updated position: [ 8 6 ]

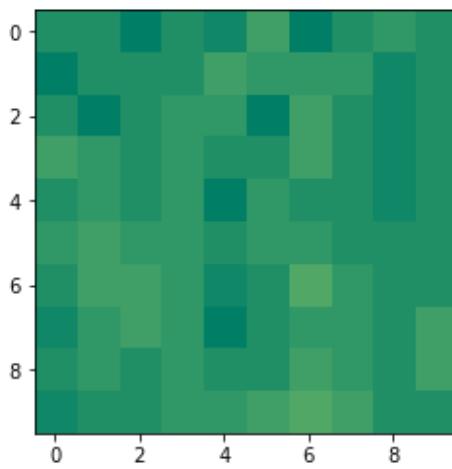
Updated direction: [ -1 0 ]



Step: 187

Updated position: [ 7 6 ]

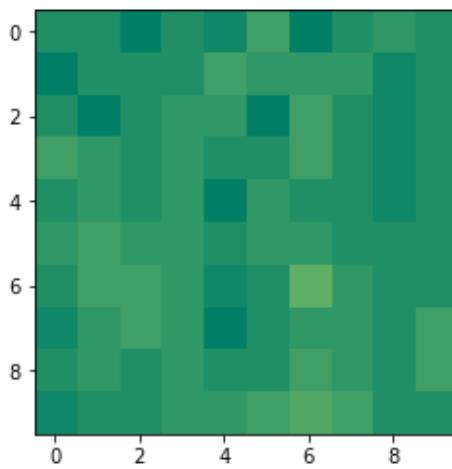
Updated direction: [ -1 0 ]



Step: 188

Updated position: [ 6 6 ]

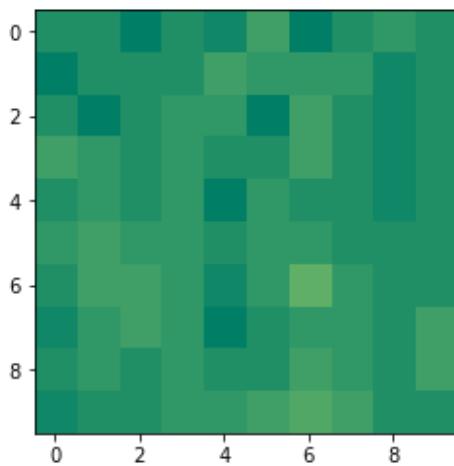
Updated direction: [ 0 -1 ]



Step: 189

Updated position: [ 6 5 ]

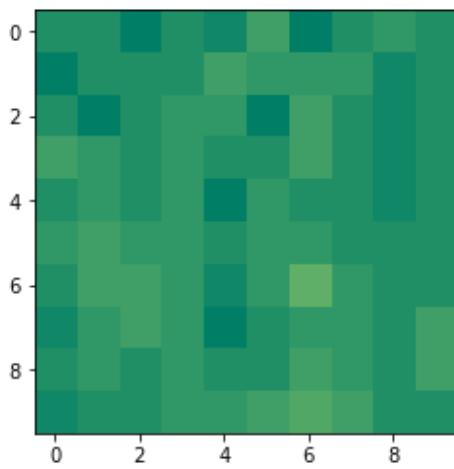
Updated direction: [ 0 -1 ]



Step: 190

Updated position: [ 6 4 ]

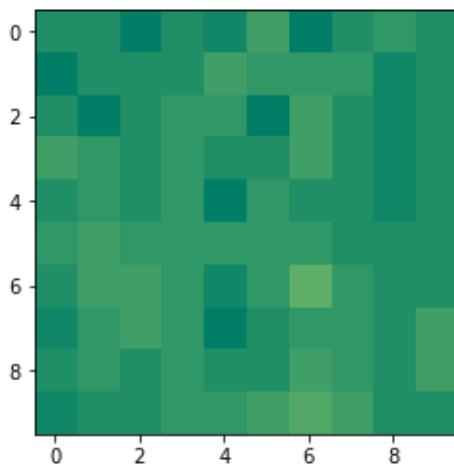
Updated direction: [ -1 0 ]



Step: 191

Updated position: [ 5 4 ]

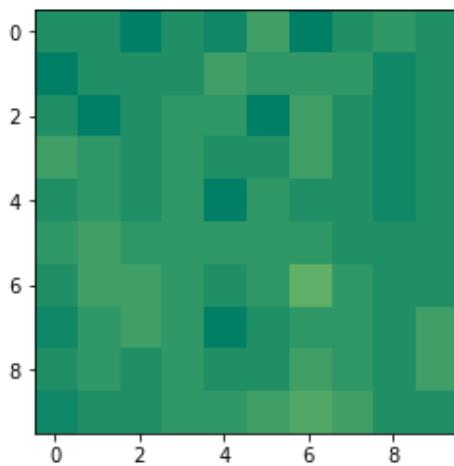
Updated direction: [ 1 0 ]



Step: 192

Updated position: [ 6 4 ]

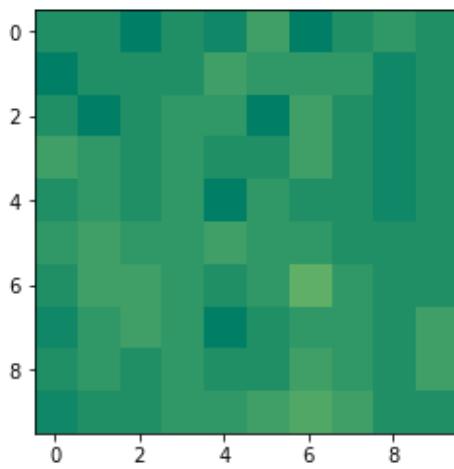
Updated direction: [ -1 0 ]



Step: 193

Updated position: [ 5 4 ]

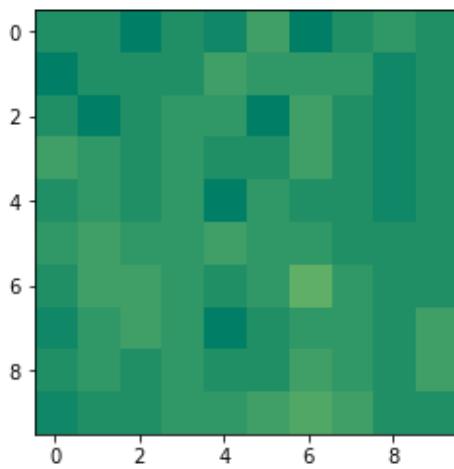
Updated direction: [ 1 0 ]



Step: 194

Updated position: [ 6 4 ]

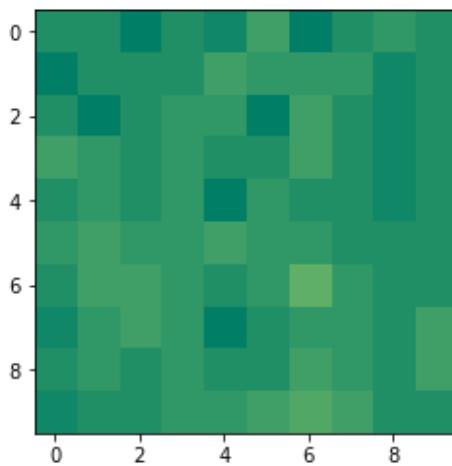
Updated direction: [ -1 0 ]



Step: 195

Updated position: [ 5 4 ]

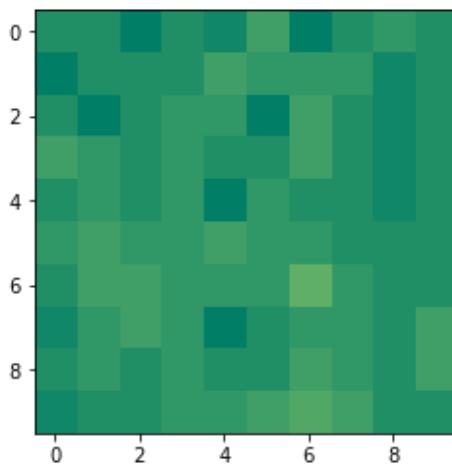
Updated direction: [ 1 0 ]



Step: 196

Updated position: [ 6 4 ]

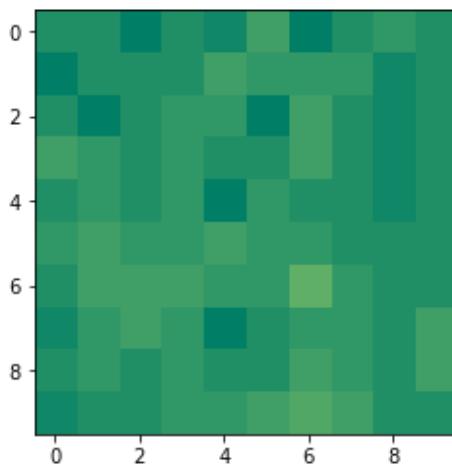
Updated direction: [ 0 -1 ]



Step: 197

Updated position: [ 6 3 ]

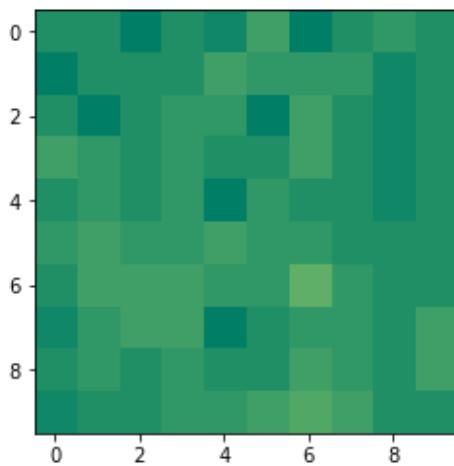
Updated direction: [ 1 0 ]



Step: 198

Updated position: [ 7 3 ]

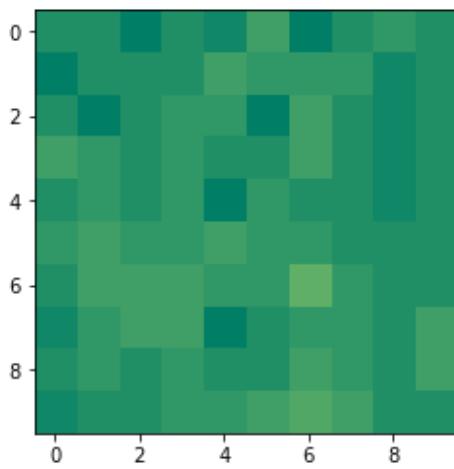
Updated direction: [ 1 0 ]



Step: 199

Updated position: [8 3]

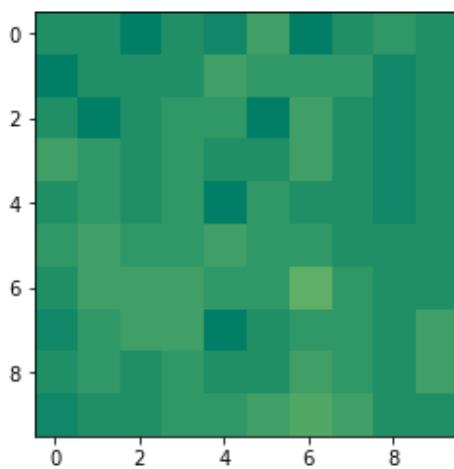
Updated direction: [ 0 -1 ]



Step: 200

Updated position: [8 2]

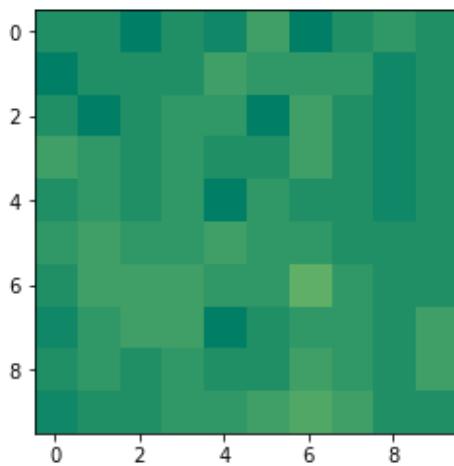
Updated direction: [ 1 0 ]



Step: 201

Updated position: [9 2]

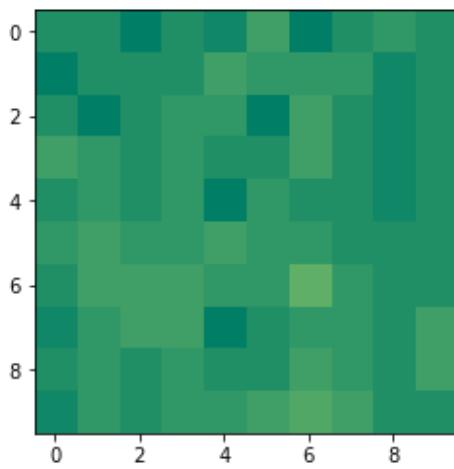
Updated direction: [ 0 -1 ]



Step: 202

Updated position: [9 1]

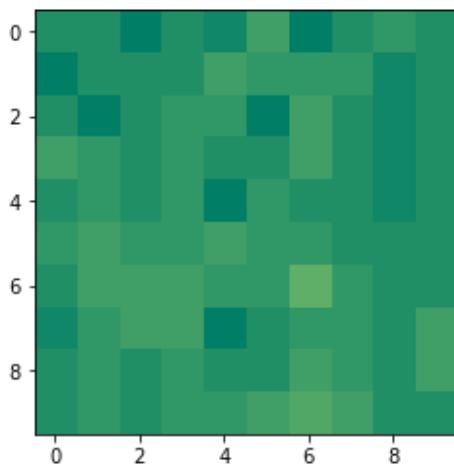
Updated direction: [ 0 -1 ]



Step: 203

Updated position: [9 0]

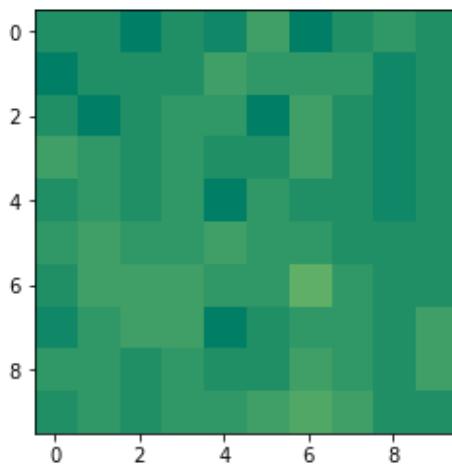
Updated direction: [-1 0 ]



Step: 204

Updated position: [8 0]

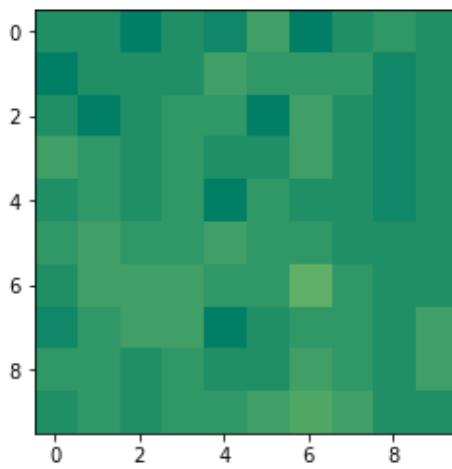
Updated direction: [1 0 ]



Step: 205

Updated position: [9 0]

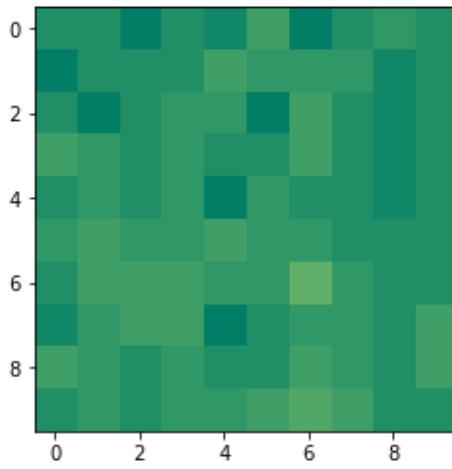
Updated direction: [-1 0]



Step: 206

Updated position: [8 0]

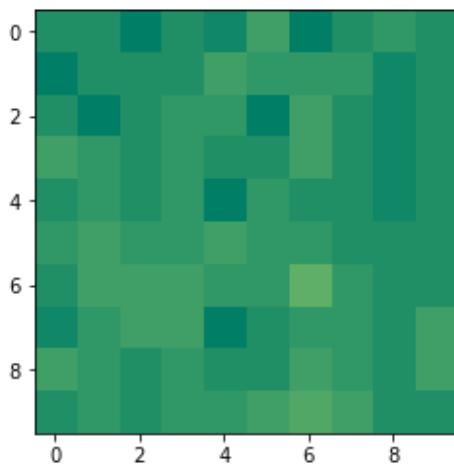
Updated direction: [-1 0]



Step: 207

Updated position: [7 0]

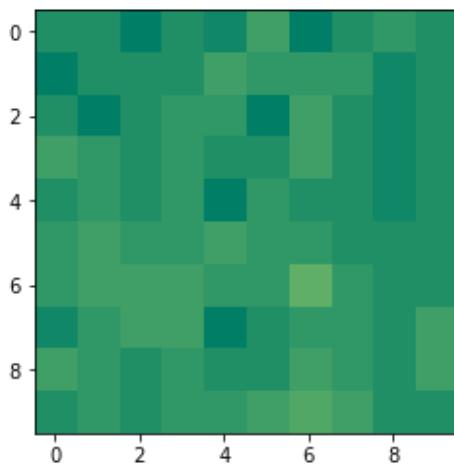
Updated direction: [-1 0]



Step: 208

Updated position: [ 6 0 ]

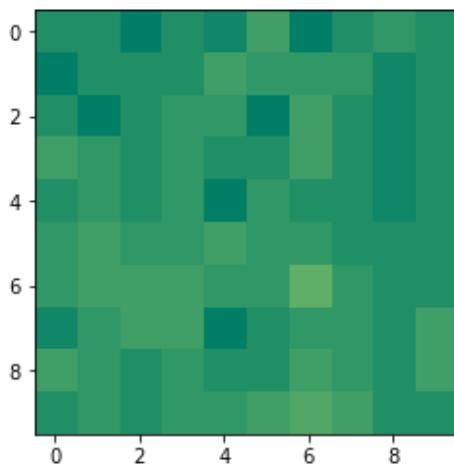
Updated direction: [ 0 1 ]



Step: 209

Updated position: [ 6 1 ]

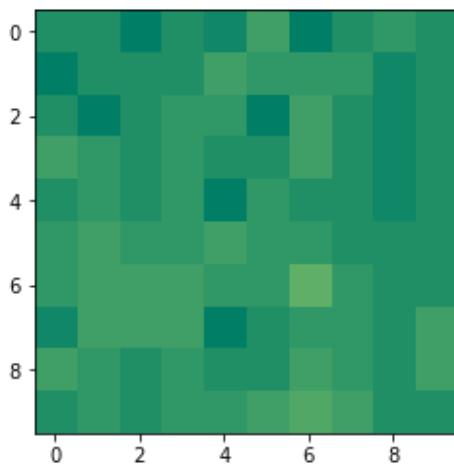
Updated direction: [ 1 0 ]



Step: 210

Updated position: [ 7 1 ]

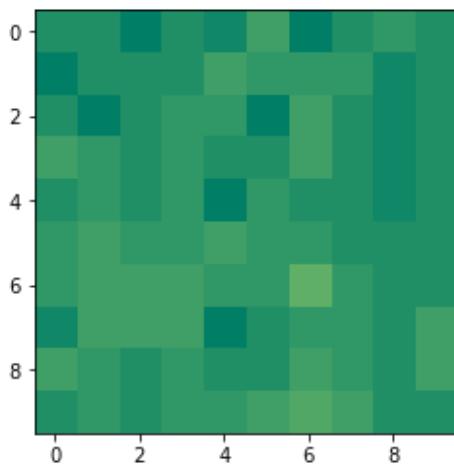
Updated direction: [ 0 -1 ]



Step: 211

Updated position: [ 7 0 ]

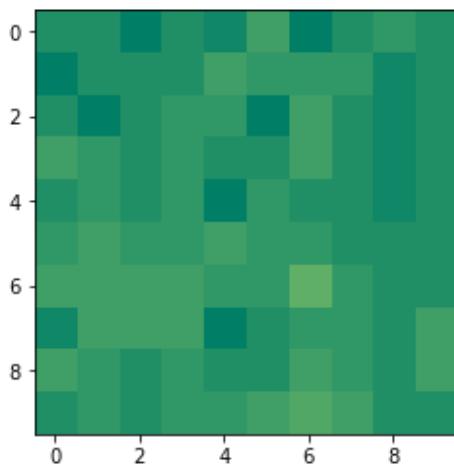
Updated direction: [ -1 0 ]



Step: 212

Updated position: [ 6 0 ]

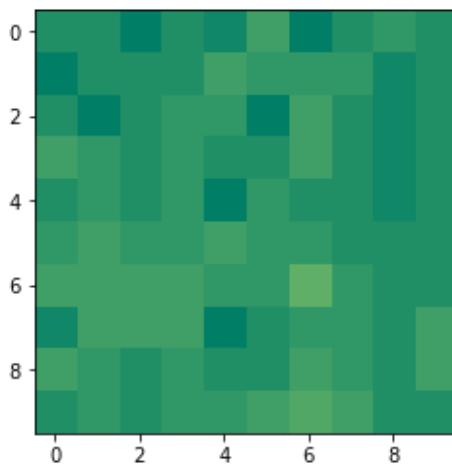
Updated direction: [ 1 0 ]



Step: 213

Updated position: [ 7 0 ]

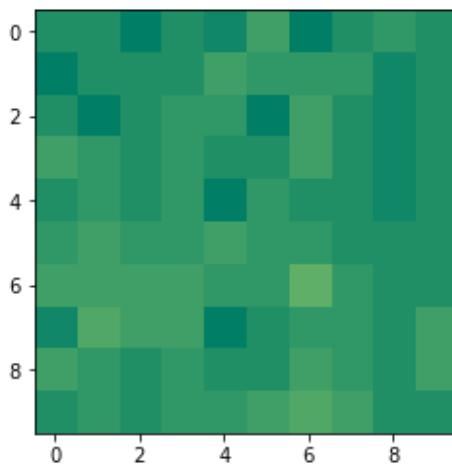
Updated direction: [ 0 1 ]



Step: 214

Updated position: [ 7 1 ]

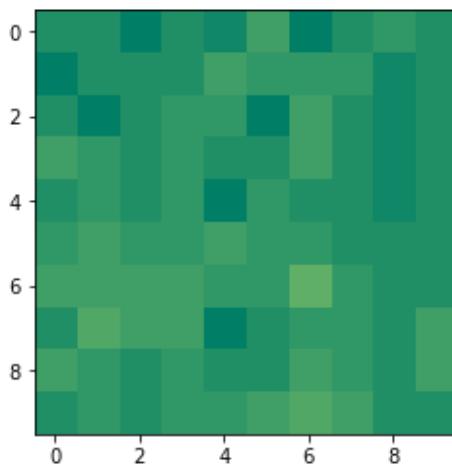
Updated direction: [ 0 -1 ]



Step: 215

Updated position: [ 7 0 ]

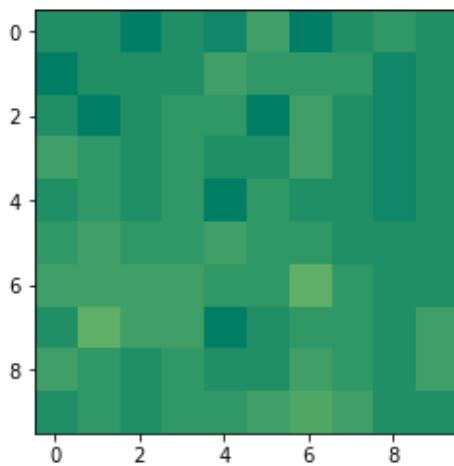
Updated direction: [ 0 1 ]



Step: 216

Updated position: [ 7 1 ]

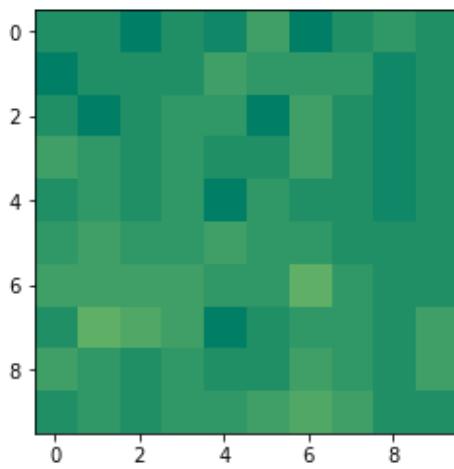
Updated direction: [ 0 1 ]



Step: 217

Updated position: [ 7 2 ]

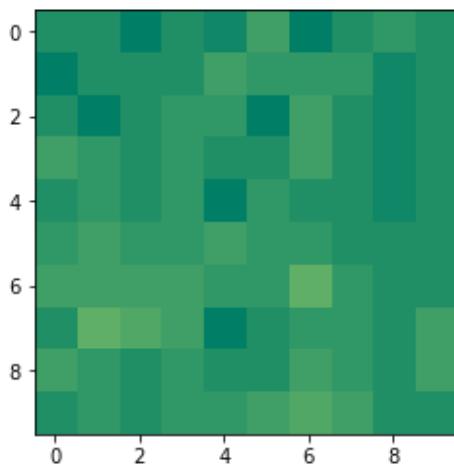
Updated direction: [ 1 0 ]



Step: 218

Updated position: [ 8 2 ]

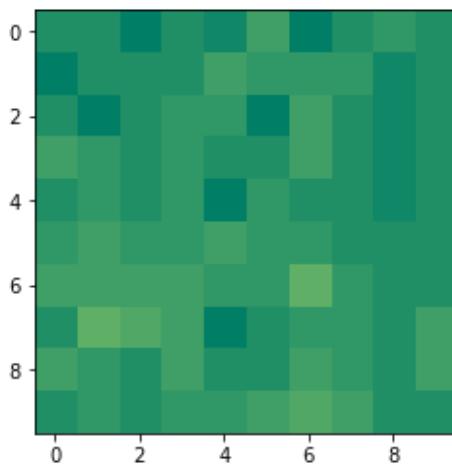
Updated direction: [ 0 1 ]



Step: 219

Updated position: [ 8 3 ]

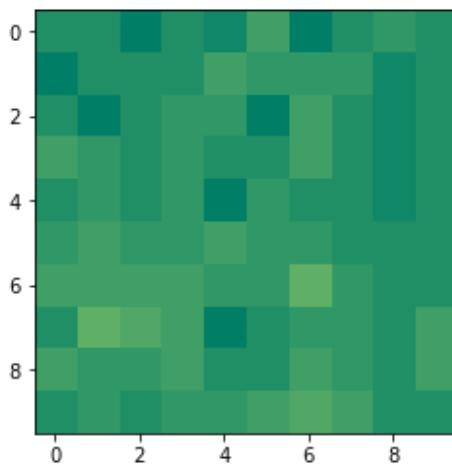
Updated direction: [ 0 -1 ]



Step: 220

Updated position: [ 8 2 ]

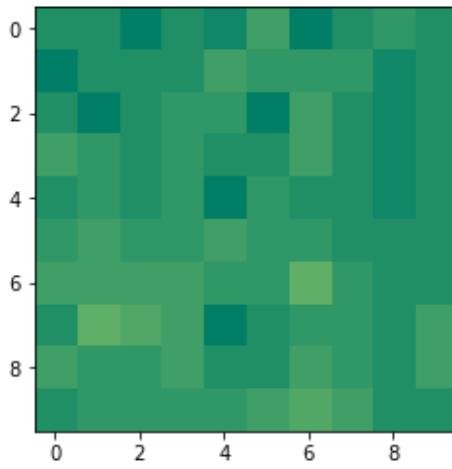
Updated direction: [ 1 0 ]



Step: 221

Updated position: [ 9 2 ]

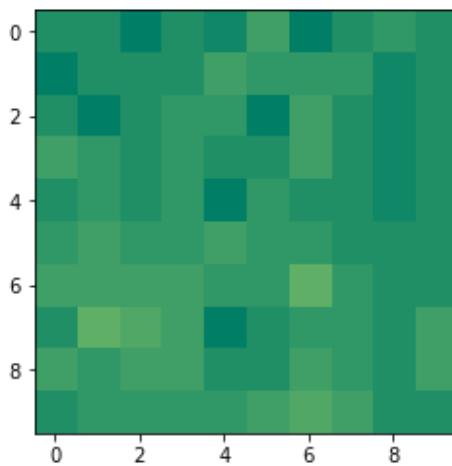
Updated direction: [ -1 0 ]



Step: 222

Updated position: [ 8 2 ]

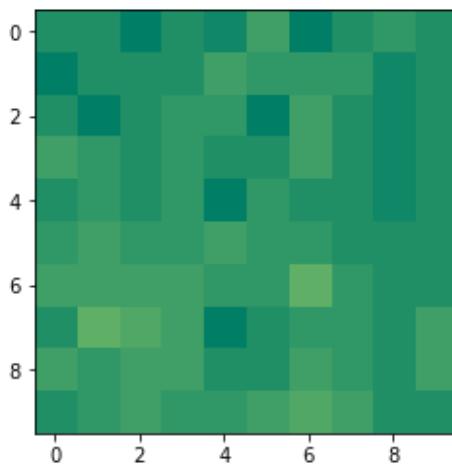
Updated direction: [ 1 0 ]



Step: 223

Updated position: [9 2]

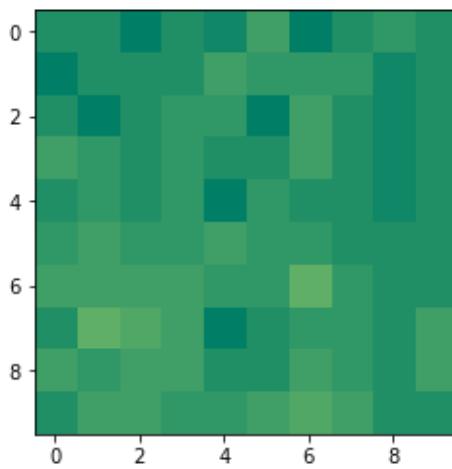
Updated direction: [ 0 -1 ]



Step: 224

Updated position: [9 1]

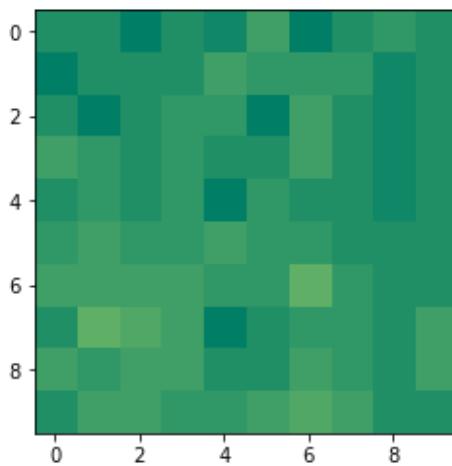
Updated direction: [ 0 -1 ]



Step: 225

Updated position: [9 0]

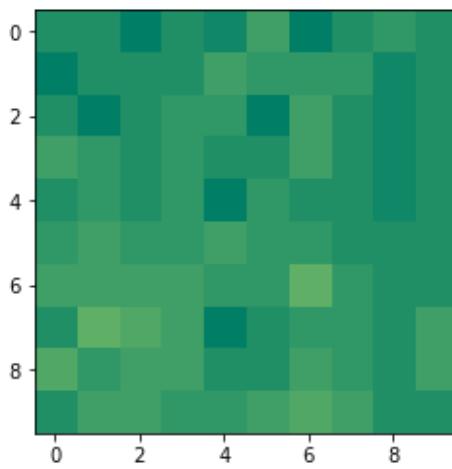
Updated direction: [-1 0 ]



Step: 226

Updated position: [ 8 0 ]

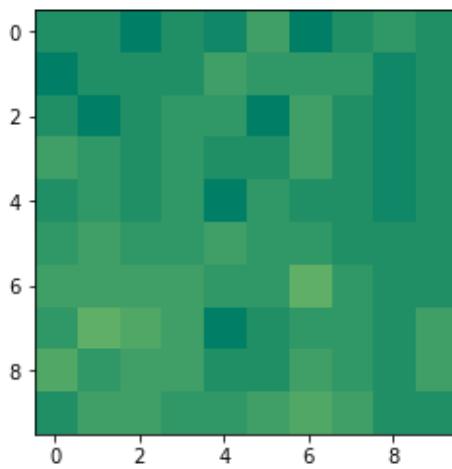
Updated direction: [ -1 0 ]



Step: 227

Updated position: [ 7 0 ]

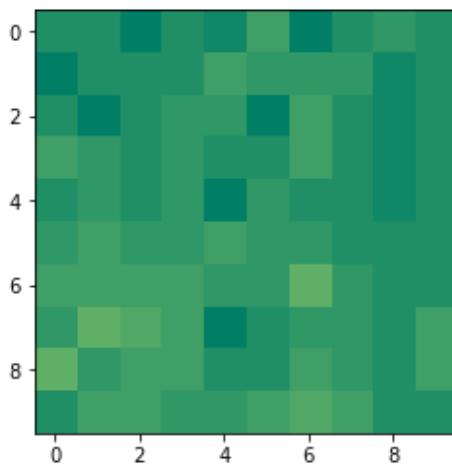
Updated direction: [ 1 0 ]



Step: 228

Updated position: [ 8 0 ]

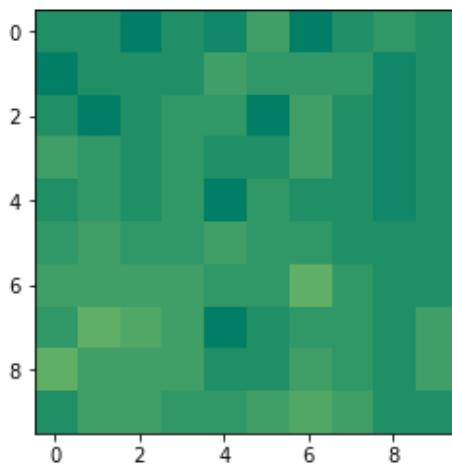
Updated direction: [ 0 1 ]



Step: 229

Updated position: [ 8 1 ]

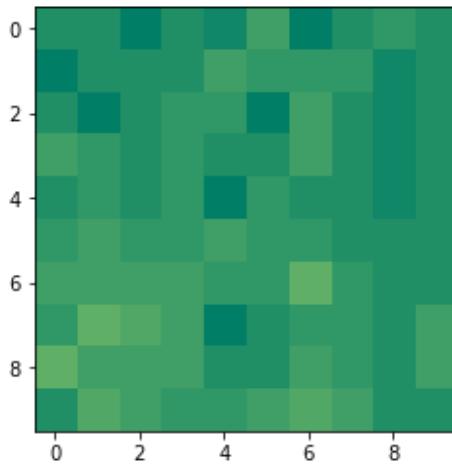
Updated direction: [ 1 0 ]



Step: 230

Updated position: [ 9 1 ]

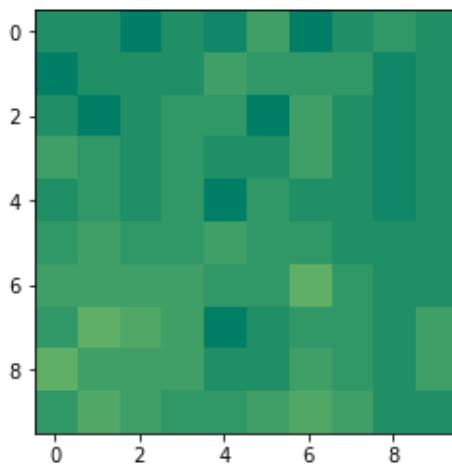
Updated direction: [ 0 -1 ]



Step: 231

Updated position: [ 9 0 ]

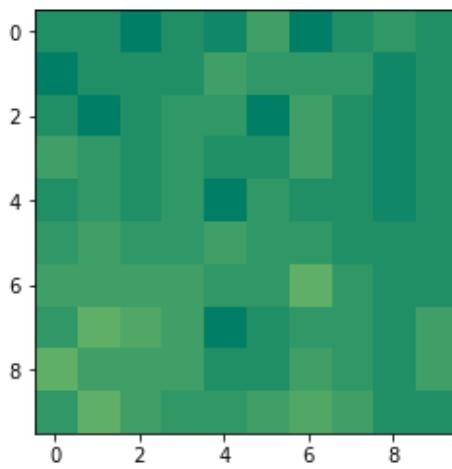
Updated direction: [ 0 1 ]



Step: 232

Updated position: [ 9 1 ]

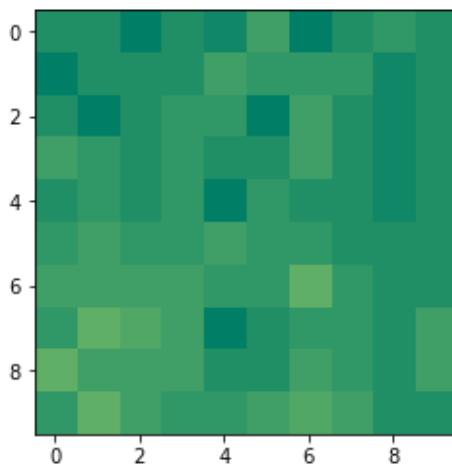
Updated direction: [ 0 1 ]



Step: 233

Updated position: [ 9 2 ]

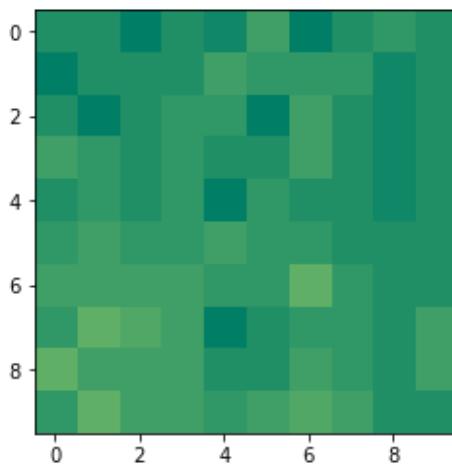
Updated direction: [ 0 1 ]



Step: 234

Updated position: [ 9 3 ]

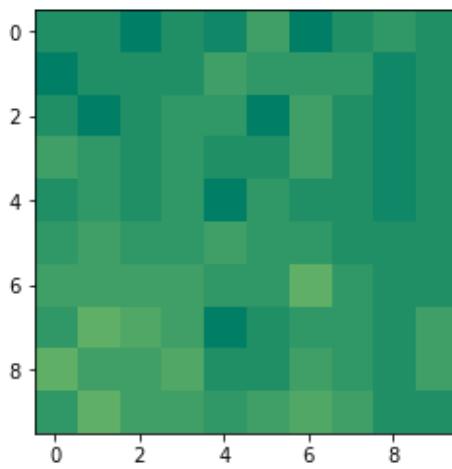
Updated direction: [ -1 0 ]



Step: 235

Updated position: [ 8 3 ]

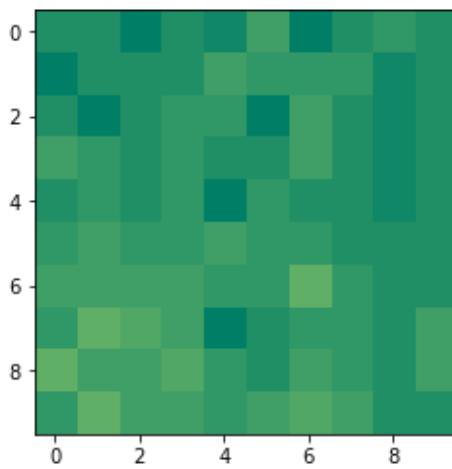
Updated direction: [ 0 1 ]



Step: 236

Updated position: [ 8 4 ]

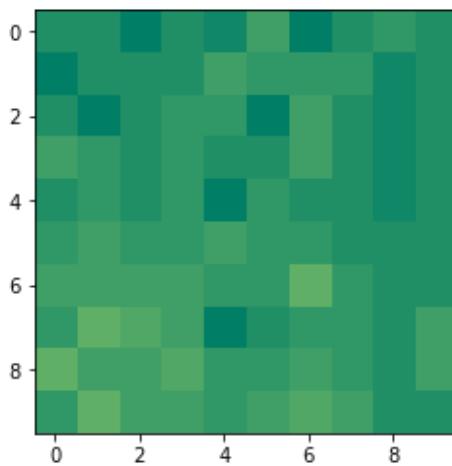
Updated direction: [ 0 1 ]



Step: 237

Updated position: [ 8 5 ]

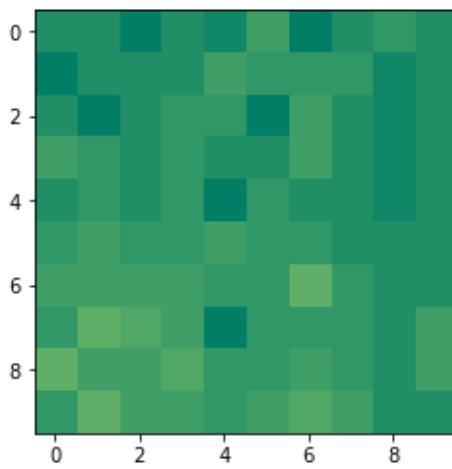
Updated direction: [ -1 0 ]



Step: 238

Updated position: [ 7 5 ]

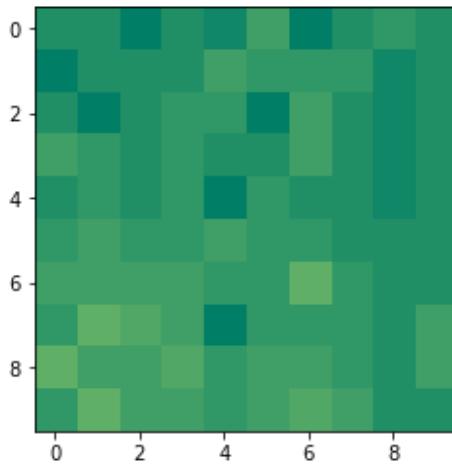
Updated direction: [ 1 0 ]



Step: 239

Updated position: [ 8 5 ]

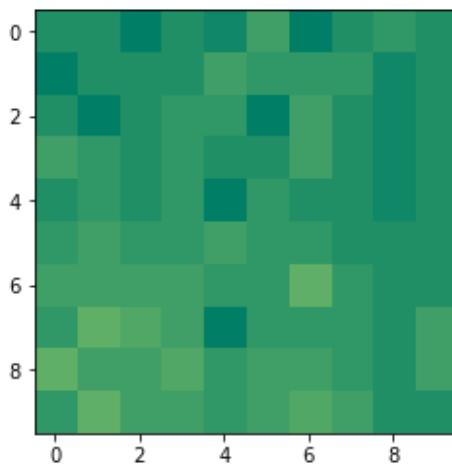
Updated direction: [ 0 1 ]



Step: 240

Updated position: [ 8 6 ]

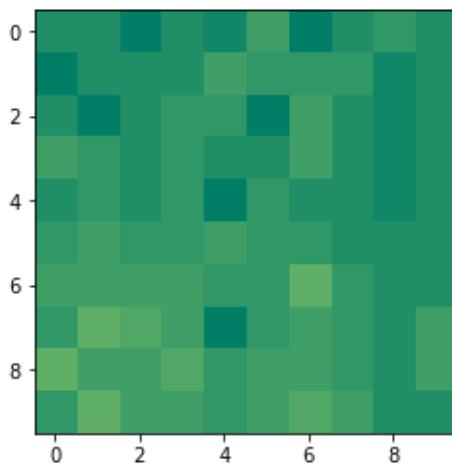
Updated direction: [ -1 0 ]



Step: 241

Updated position: [ 7 6 ]

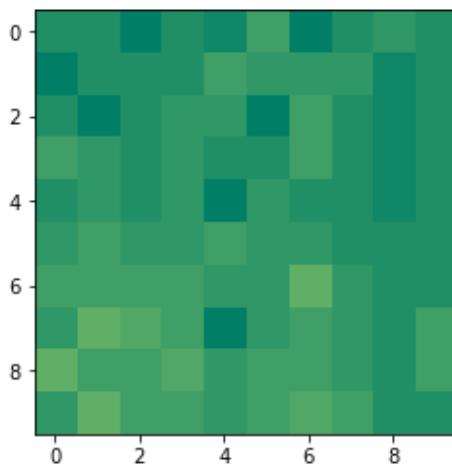
Updated direction: [ 0 1 ]



Step: 242

Updated position: [ 7 7 ]

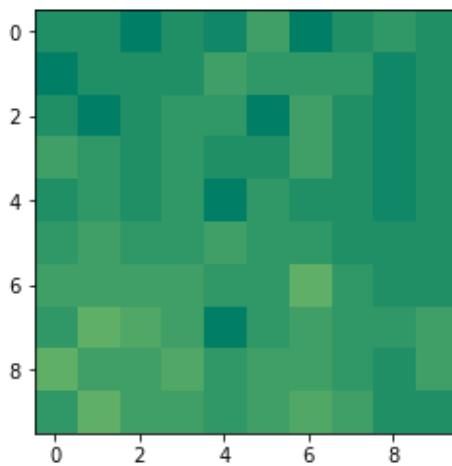
Updated direction: [ 0 1 ]



Step: 243

Updated position: [ 7 8 ]

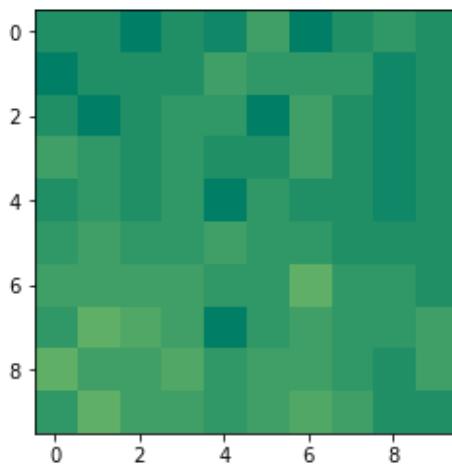
Updated direction: [ -1 0 ]



Step: 244

Updated position: [ 6 8 ]

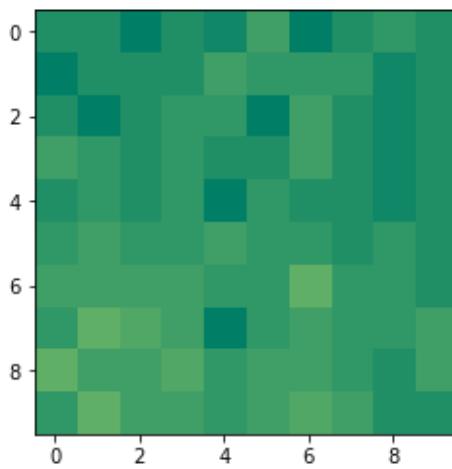
Updated direction: [ -1 0 ]



Step: 245

Updated position: [ 5 8 ]

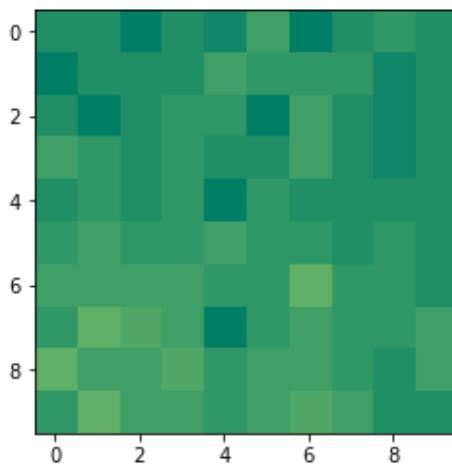
Updated direction: [ -1 0 ]



Step: 246

Updated position: [ 4 8 ]

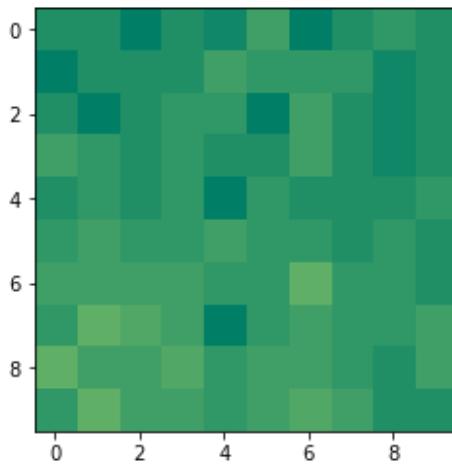
Updated direction: [ 0 1 ]



Step: 247

Updated position: [ 4 9 ]

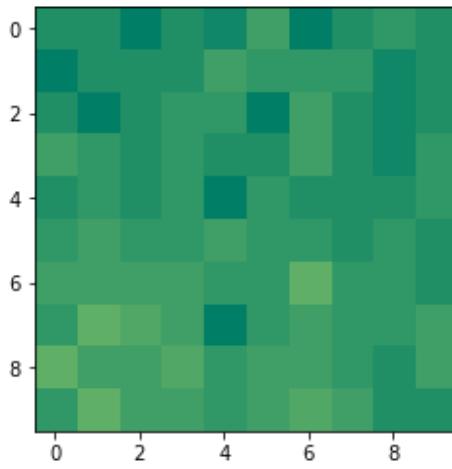
Updated direction: [ -1 0 ]



Step: 248

Updated position: [ 3 9 ]

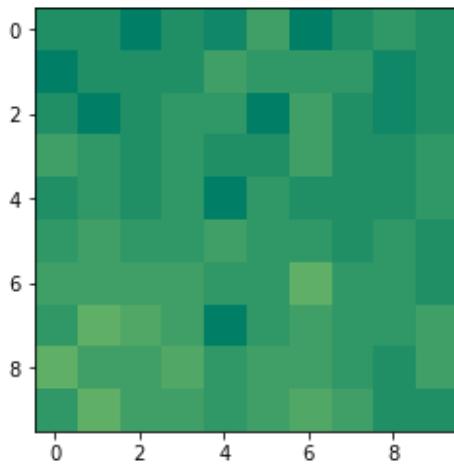
Updated direction: [ 0 -1 ]



Step: 249

Updated position: [ 3 8 ]

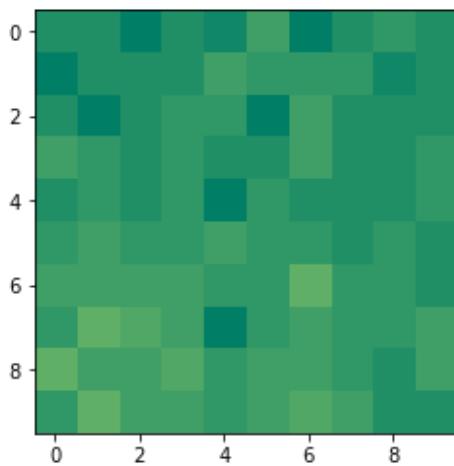
Updated direction: [ -1 0 ]



Step: 250

Updated position: [ 2 8 ]

Updated direction: [ 1 0 ]



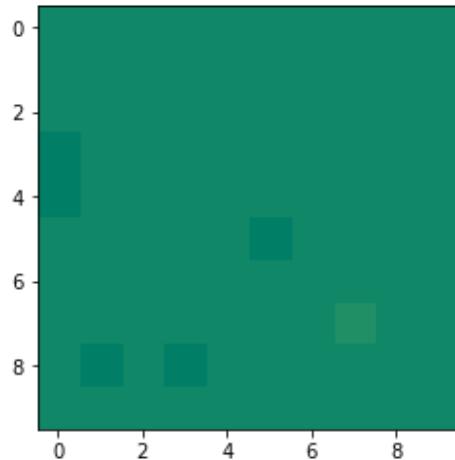
Total amount of time: 1733

```
In [164]: # Visualization of the floor - Roomba 2
roomba_2 = RoombaSimulation(0.05, 0.05, 0.05, 0.05, 0.8, 10)
roomba_2.initialize()
steps_2 = 0
while len(np.where(roomba_2.config == 0)[0]) > 0.02*roomba_1.size**2 and
steps_2 < 1000:
    print("Step: " + str(steps_2))
    roomba_2.cell_change()
    print("Updated position: " + str(roomba_2.pos))
    roomba_2.roomba_2()
    print("Updated direction: " + str(roomba_2.current_dir))
    steps_2 += 1
    plt.cla()
    plt.imshow(roomba_2.config, vmin = -1, vmax = 15, cmap = cm.summer)
    plt.show()
print("Total amount of time: " + str(roomba_2.T))
```

Step: 0

Updated position: [ 7 7 ]

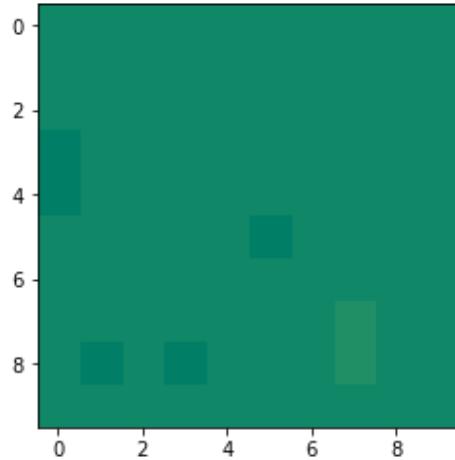
Updated direction: [ 1 0 ]



Step: 1

Updated position: [ 8 7 ]

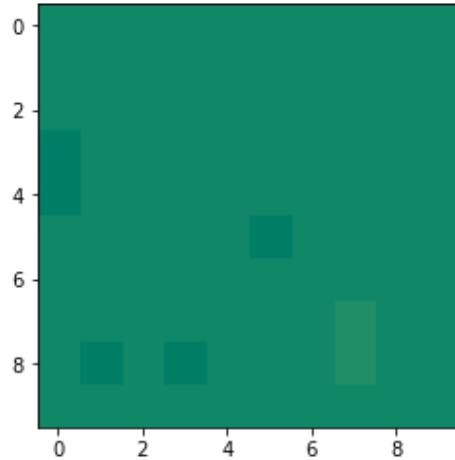
Updated direction: [ 1 0 ]



Step: 2

Updated position: [ 9 7 ]

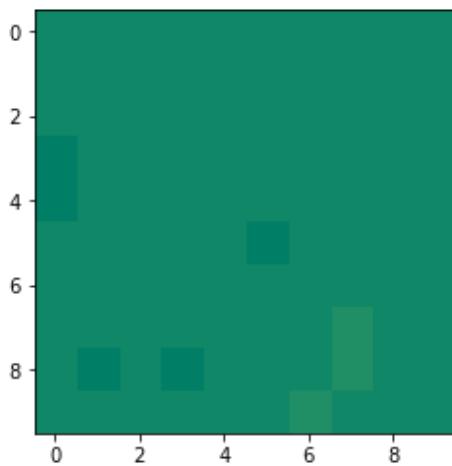
Updated direction: [ 0 -1 ]



Step: 3

Updated position: [ 9 6 ]

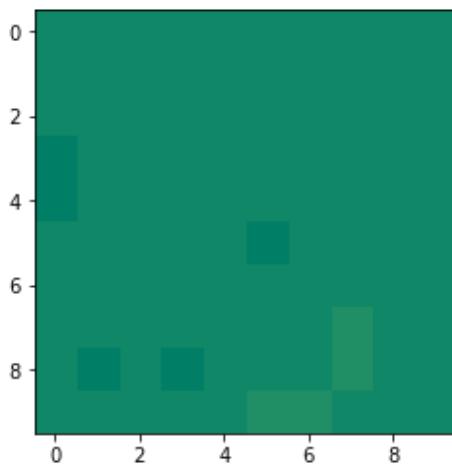
Updated direction: [ 0 -1 ]



Step: 4

Updated position: [9 5]

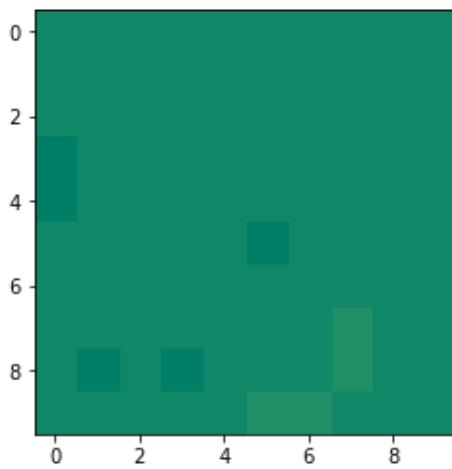
Updated direction: [ 0 -1]



Step: 5

Updated position: [9 4]

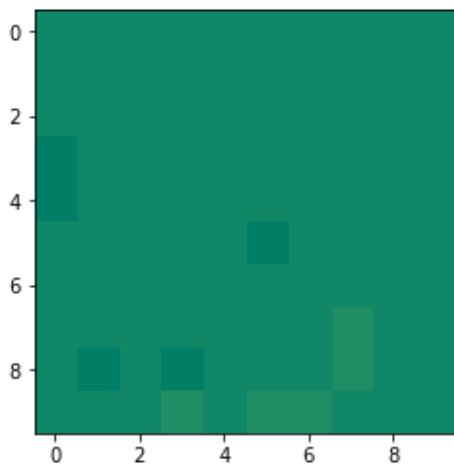
Updated direction: [ 0 -1]



Step: 6

Updated position: [9 3]

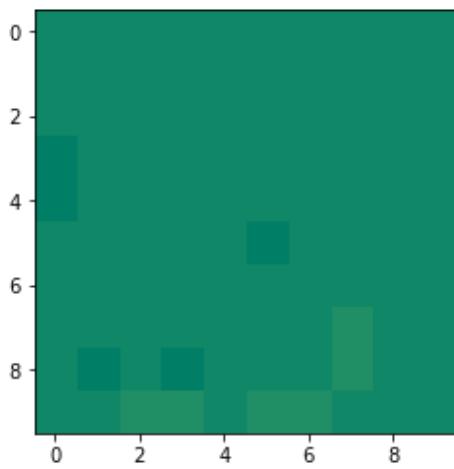
Updated direction: [ 0 -1]



Step: 7

Updated position: [9 2]

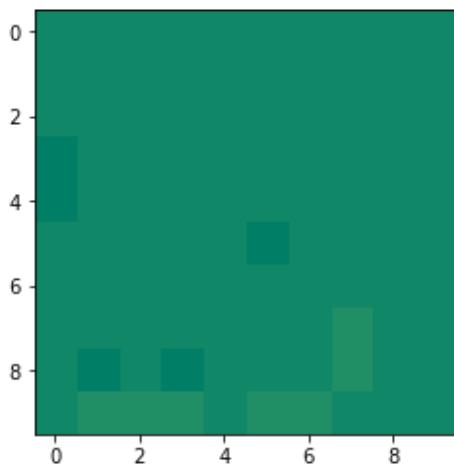
Updated direction: [ 0 -1 ]



Step: 8

Updated position: [9 1]

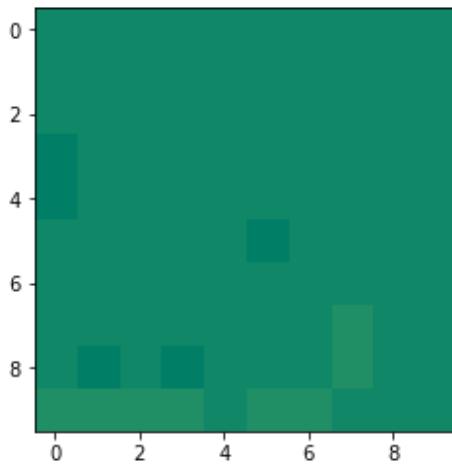
Updated direction: [ 0 -1 ]



Step: 9

Updated position: [9 0]

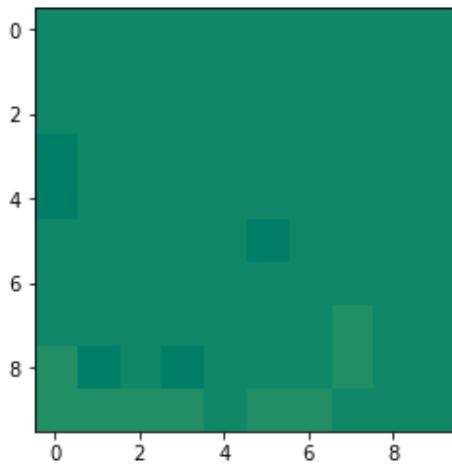
Updated direction: [-1 0 ]



Step: 10

Updated position: [ 8 0 ]

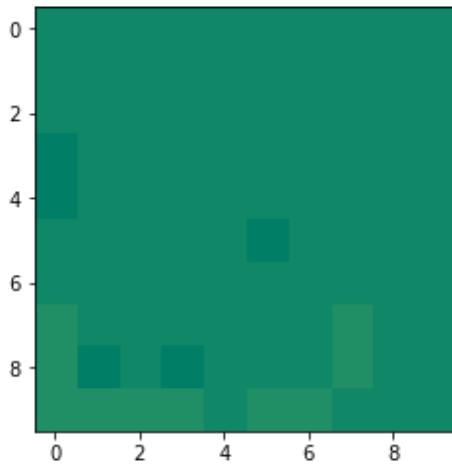
Updated direction: [ -1 0 ]



Step: 11

Updated position: [ 7 0 ]

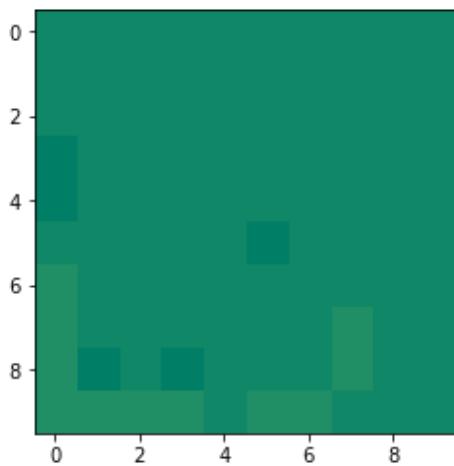
Updated direction: [ -1 0 ]



Step: 12

Updated position: [ 6 0 ]

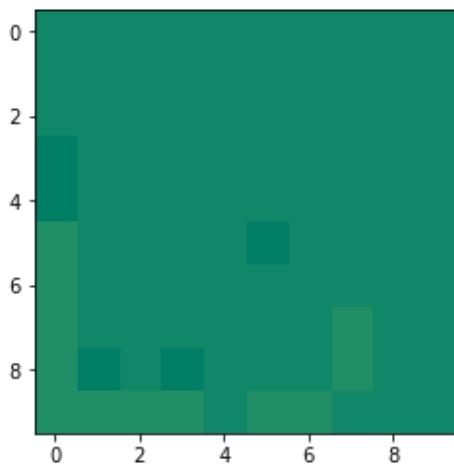
Updated direction: [ -1 0 ]



Step: 13

Updated position: [5 0]

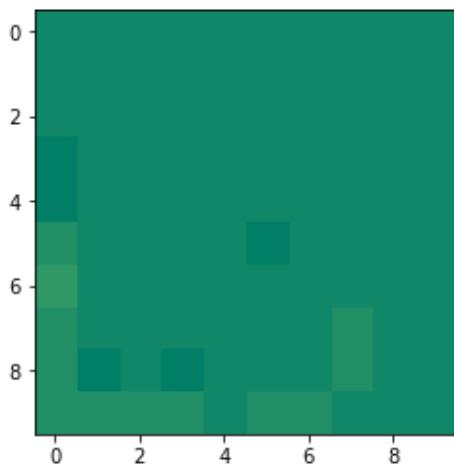
Updated direction: [1 0]



Step: 14

Updated position: [6 0]

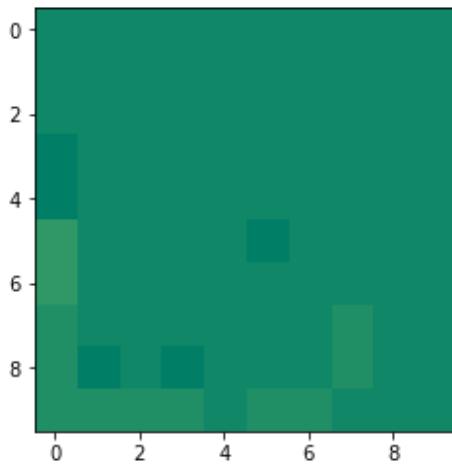
Updated direction: [-1 0]



Step: 15

Updated position: [5 0]

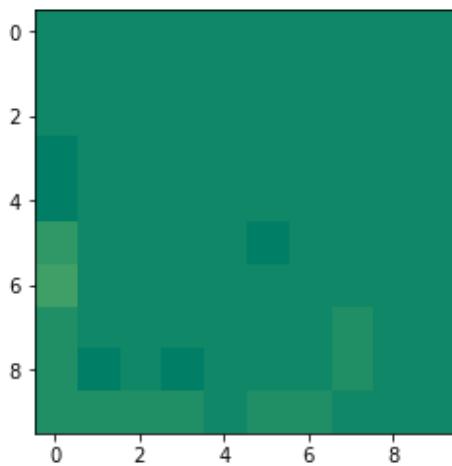
Updated direction: [1 0]



Step: 16

Updated position: [ 6 0 ]

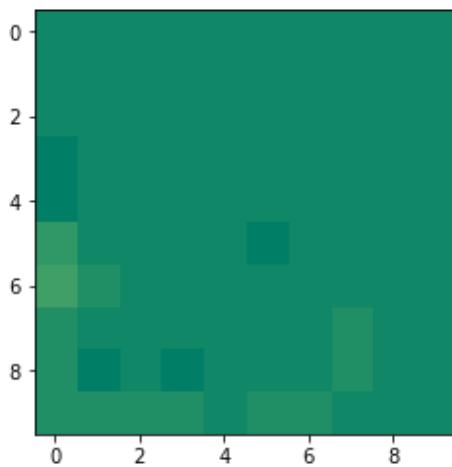
Updated direction: [ 0 1 ]



Step: 17

Updated position: [ 6 1 ]

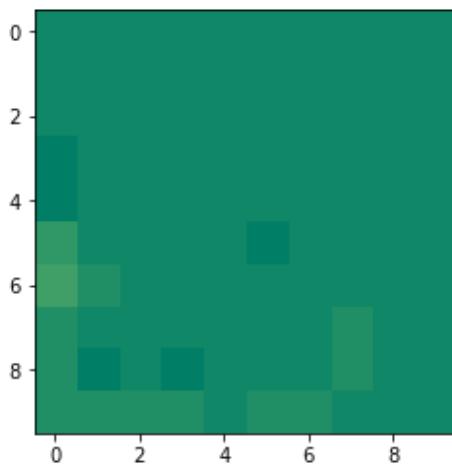
Updated direction: [ 0 1 ]



Step: 18

Updated position: [ 6 2 ]

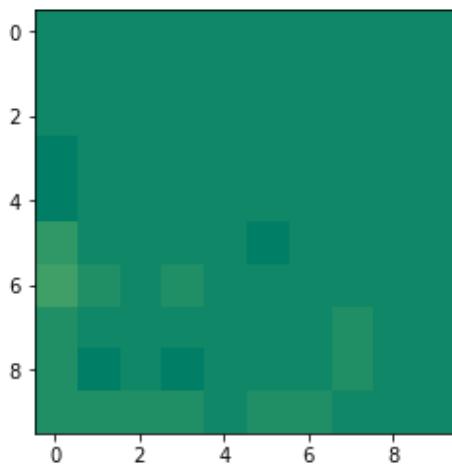
Updated direction: [ 0 1 ]



Step: 19

Updated position: [ 6 3 ]

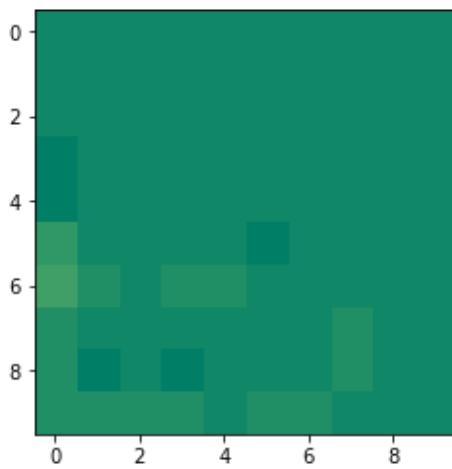
Updated direction: [ 0 1 ]



Step: 20

Updated position: [ 6 4 ]

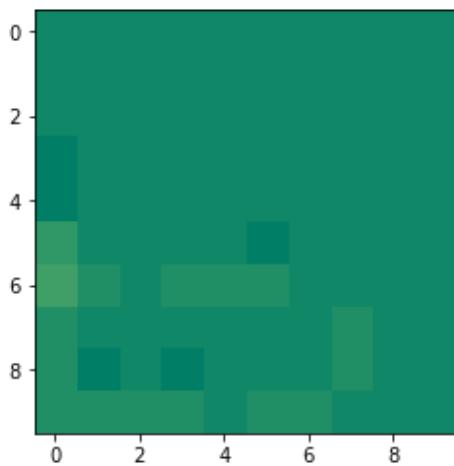
Updated direction: [ 0 1 ]



Step: 21

Updated position: [ 6 5 ]

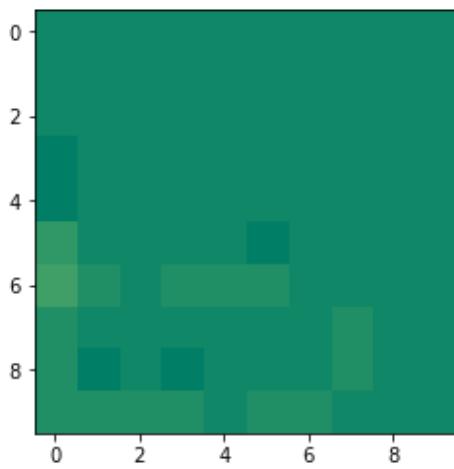
Updated direction: [ 0 1 ]



Step: 22

Updated position: [ 6 6 ]

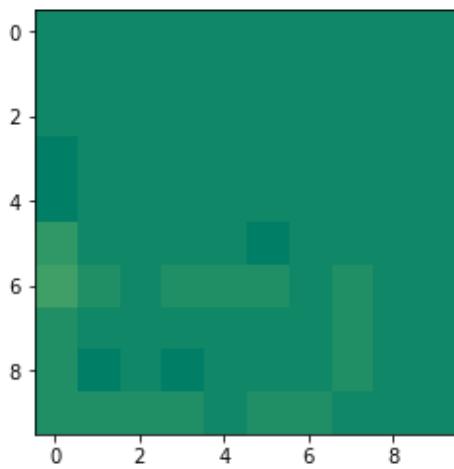
Updated direction: [ 0 1 ]



Step: 23

Updated position: [ 6 7 ]

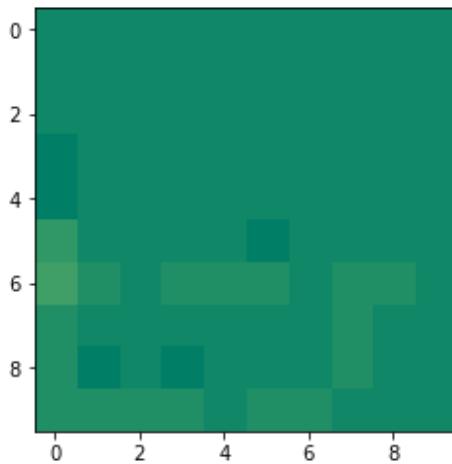
Updated direction: [ 0 1 ]



Step: 24

Updated position: [ 6 8 ]

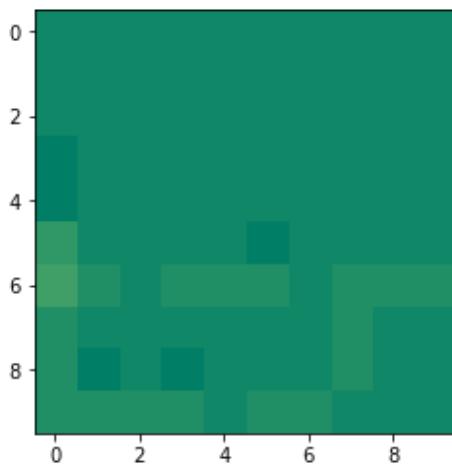
Updated direction: [ 0 1 ]



Step: 25

Updated position: [ 6 9 ]

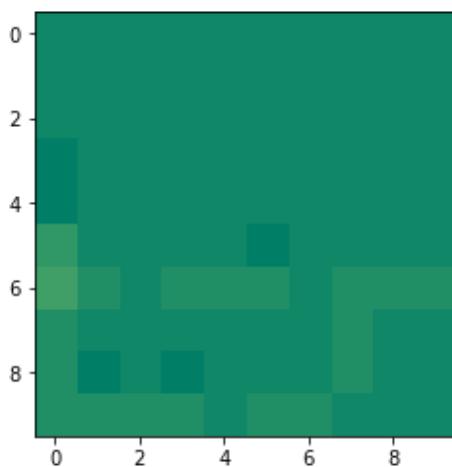
Updated direction: [ 1 0 ]



Step: 26

Updated position: [ 7 9 ]

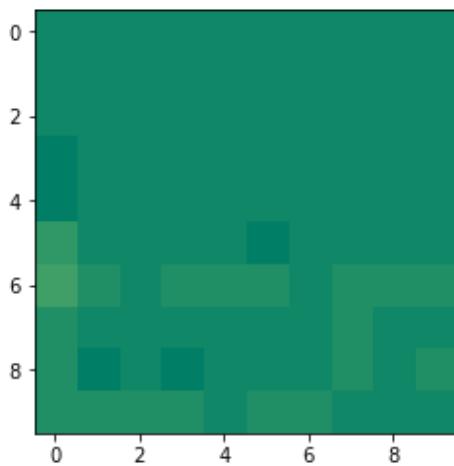
Updated direction: [ 1 0 ]



Step: 27

Updated position: [ 8 9 ]

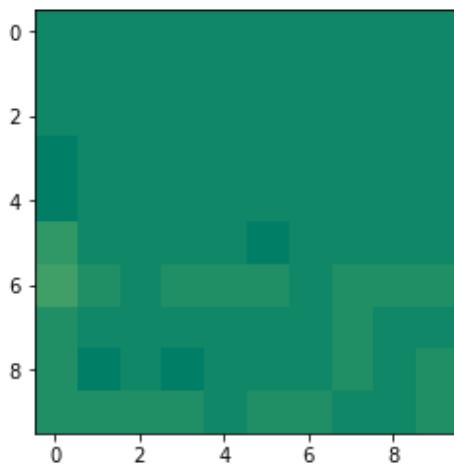
Updated direction: [ 1 0 ]



Step: 28

Updated position: [9 9]

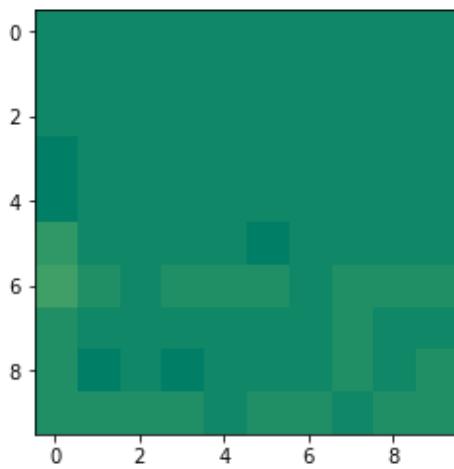
Updated direction: [ 0 -1]



Step: 29

Updated position: [9 8]

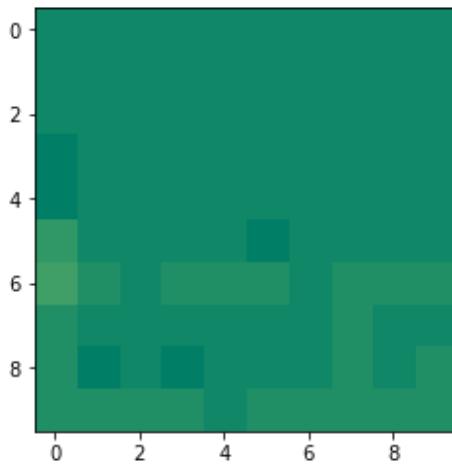
Updated direction: [ 0 -1]



Step: 30

Updated position: [9 7]

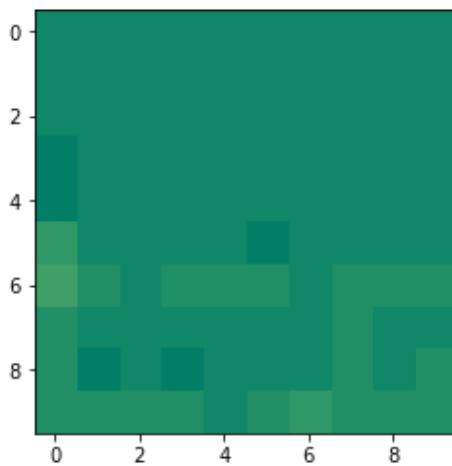
Updated direction: [ 0 -1]



Step: 31

Updated position: [9 6]

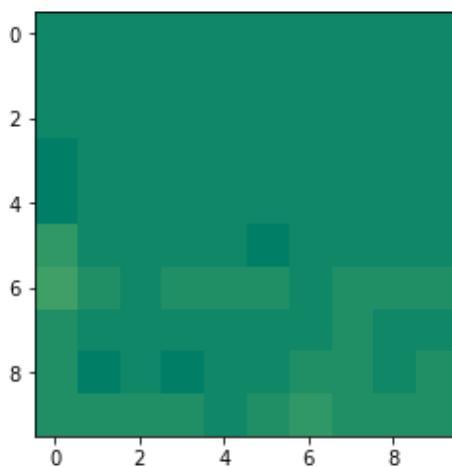
Updated direction: [-1 0]



Step: 32

Updated position: [8 6]

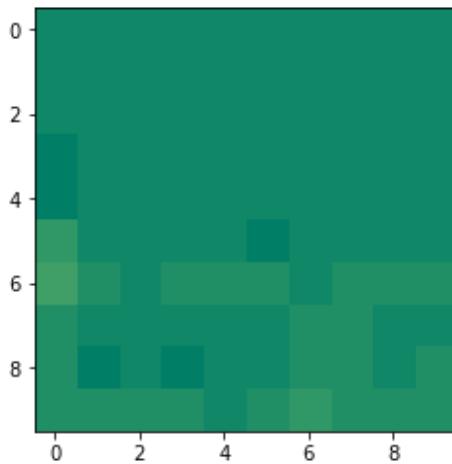
Updated direction: [-1 0]



Step: 33

Updated position: [7 6]

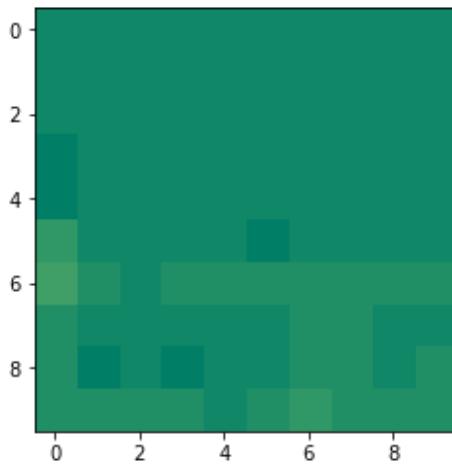
Updated direction: [-1 0]



Step: 34

Updated position: [ 6 6 ]

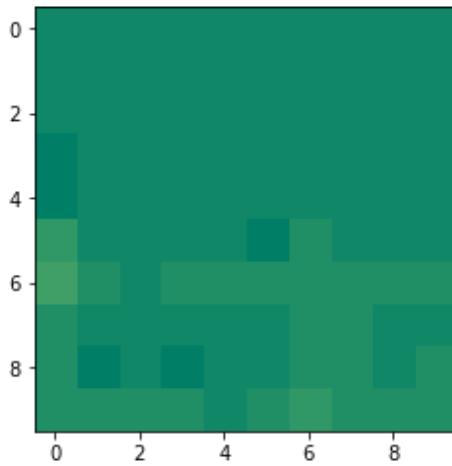
Updated direction: [ -1 0 ]



Step: 35

Updated position: [ 5 6 ]

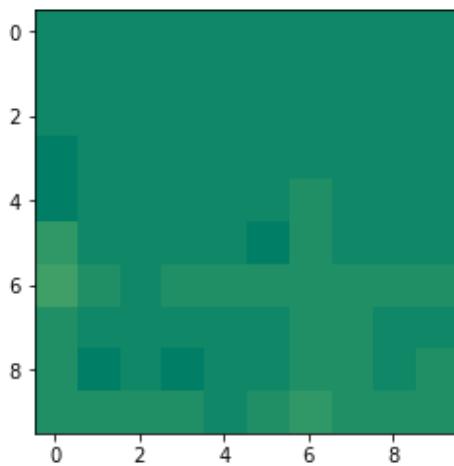
Updated direction: [ -1 0 ]



Step: 36

Updated position: [ 4 6 ]

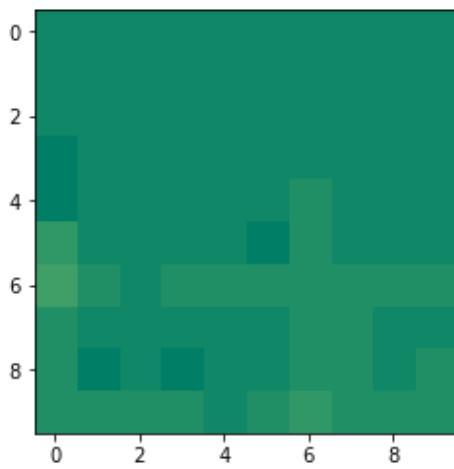
Updated direction: [ -1 0 ]



Step: 37

Updated position: [ 3 6 ]

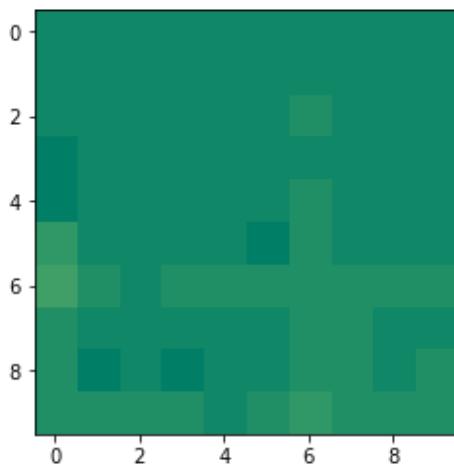
Updated direction: [ -1 0 ]



Step: 38

Updated position: [ 2 6 ]

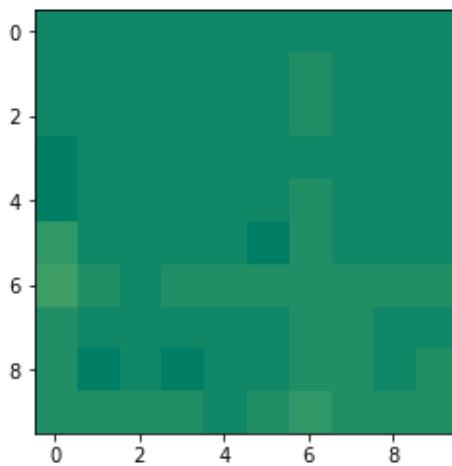
Updated direction: [ -1 0 ]



Step: 39

Updated position: [ 1 6 ]

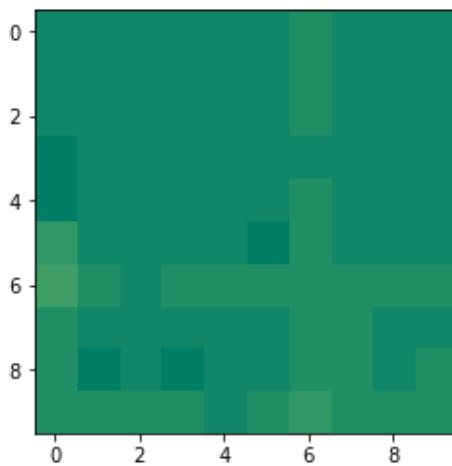
Updated direction: [ -1 0 ]



Step: 40

Updated position: [ 0 6 ]

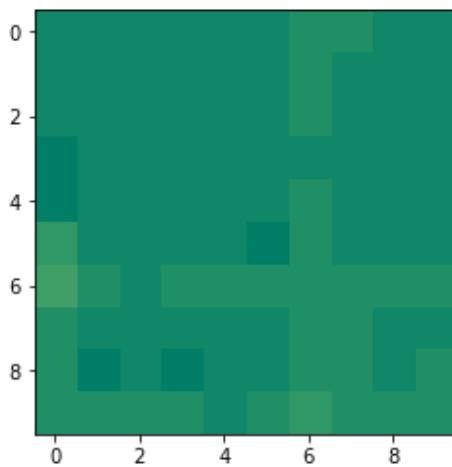
Updated direction: [ 0 1 ]



Step: 41

Updated position: [ 0 7 ]

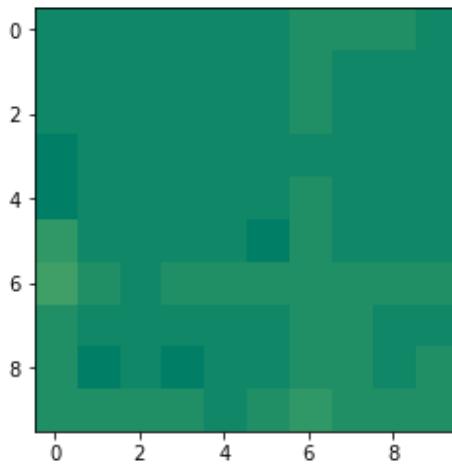
Updated direction: [ 0 1 ]



Step: 42

Updated position: [ 0 8 ]

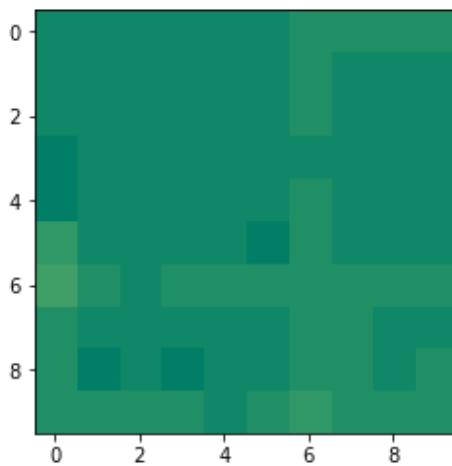
Updated direction: [ 0 1 ]



Step: 43

Updated position: [0 9]

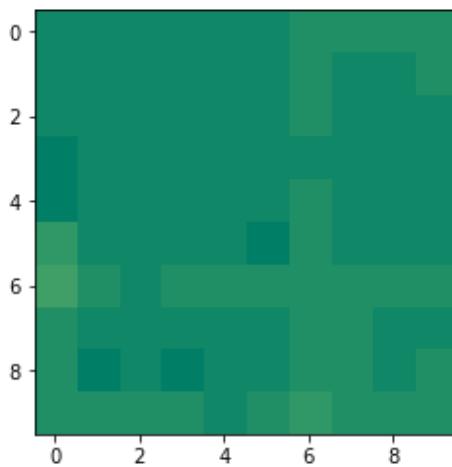
Updated direction: [1 0]



Step: 44

Updated position: [1 9]

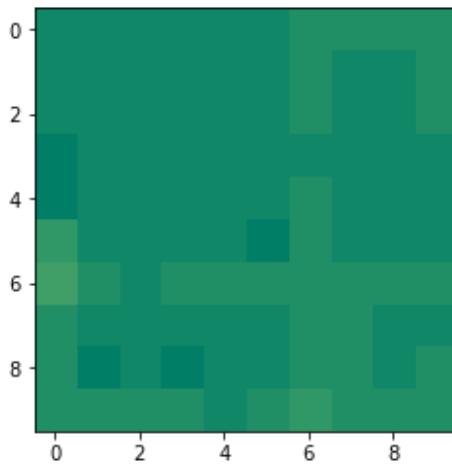
Updated direction: [1 0]



Step: 45

Updated position: [2 9]

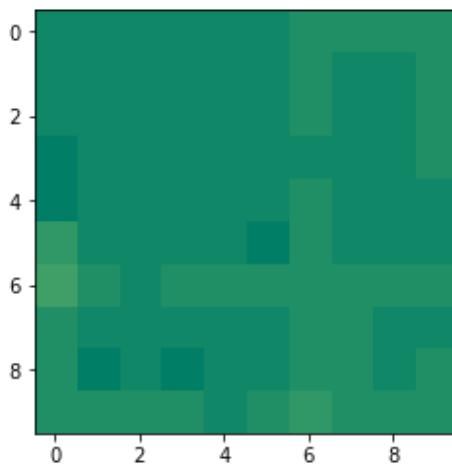
Updated direction: [1 0]



Step: 46

Updated position: [ 3 9 ]

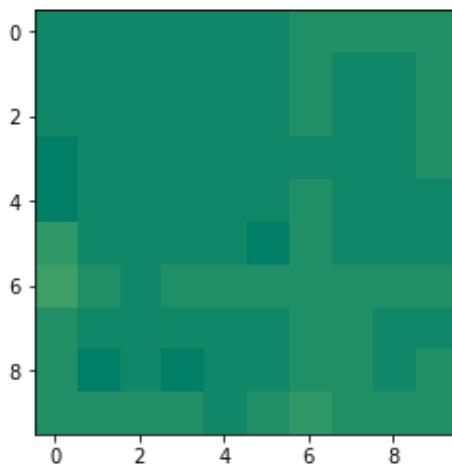
Updated direction: [ 1 0 ]



Step: 47

Updated position: [ 4 9 ]

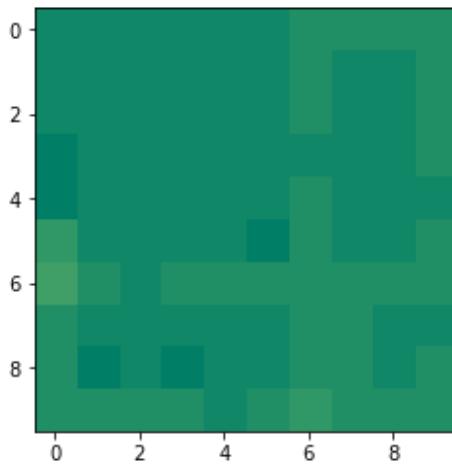
Updated direction: [ 1 0 ]



Step: 48

Updated position: [ 5 9 ]

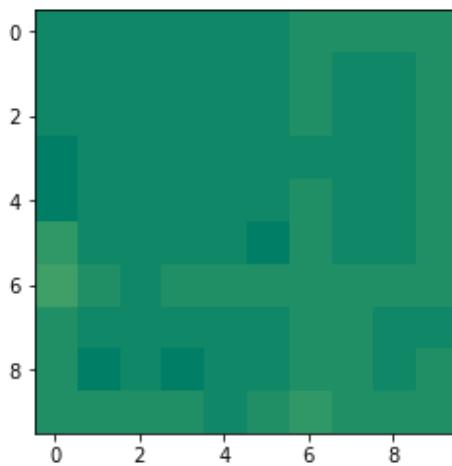
Updated direction: [ -1 0 ]



Step: 49

Updated position: [ 4 9 ]

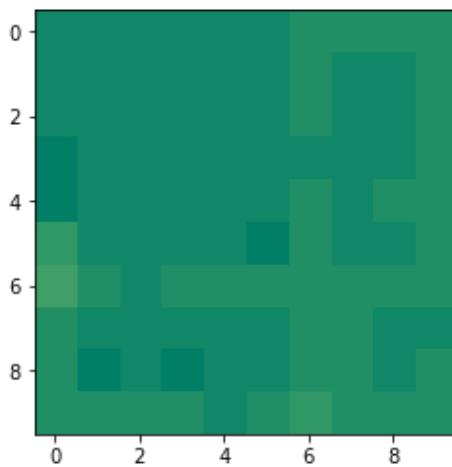
Updated direction: [ 0 -1 ]



Step: 50

Updated position: [ 4 8 ]

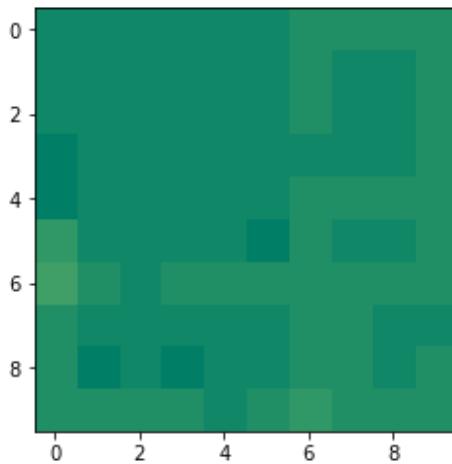
Updated direction: [ 0 -1 ]



Step: 51

Updated position: [ 4 7 ]

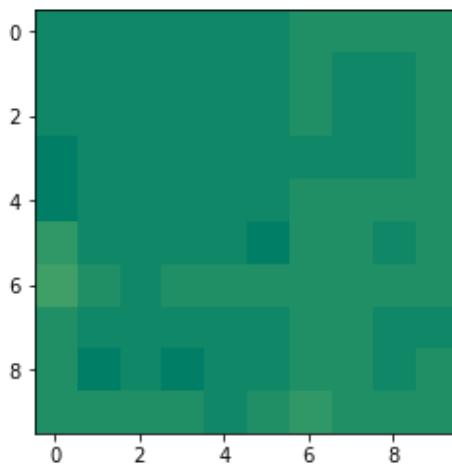
Updated direction: [ 1 0 ]



Step: 52

Updated position: [ 5 7 ]

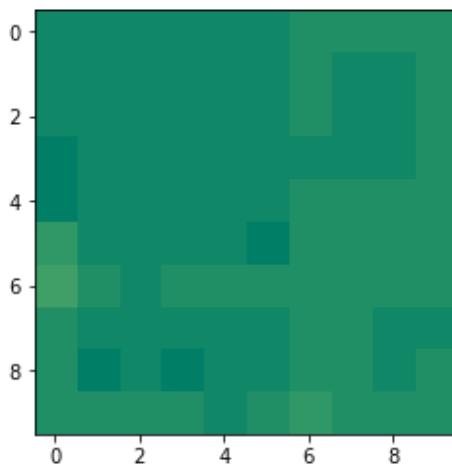
Updated direction: [ 0 1 ]



Step: 53

Updated position: [ 5 8 ]

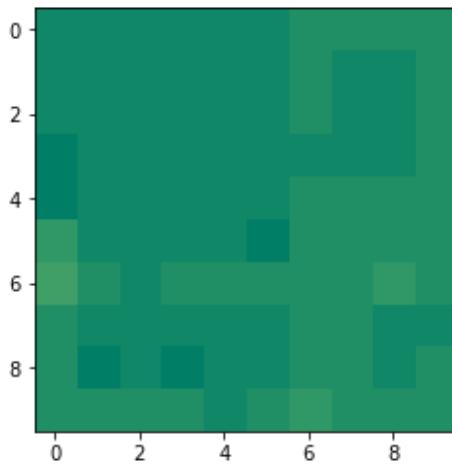
Updated direction: [ 1 0 ]



Step: 54

Updated position: [ 6 8 ]

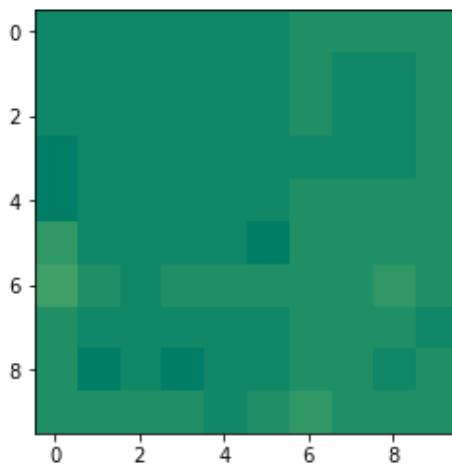
Updated direction: [ 1 0 ]



Step: 55

Updated position: [ 7 8 ]

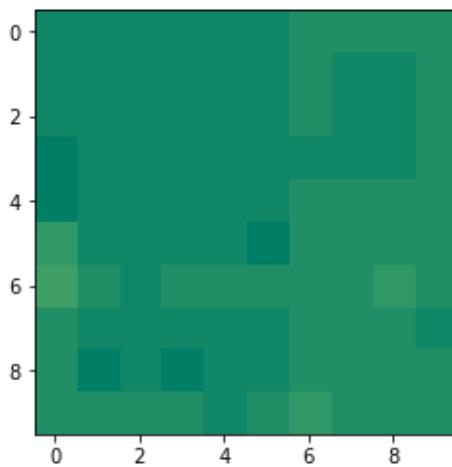
Updated direction: [ 1 0 ]



Step: 56

Updated position: [ 8 8 ]

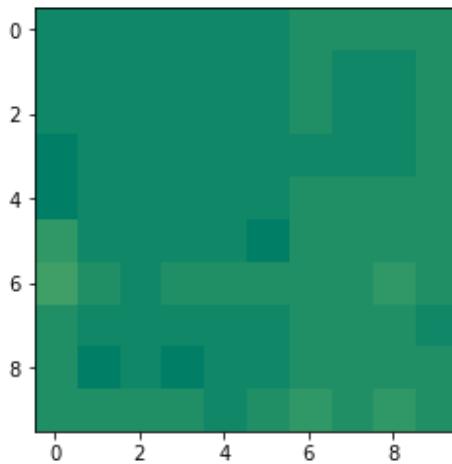
Updated direction: [ 1 0 ]



Step: 57

Updated position: [ 9 8 ]

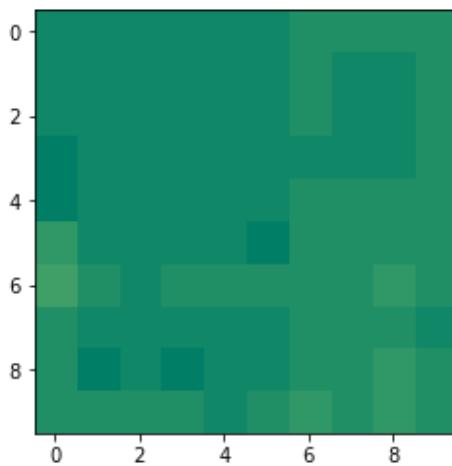
Updated direction: [ -1 0 ]



Step: 58

Updated position: [ 8 8 ]

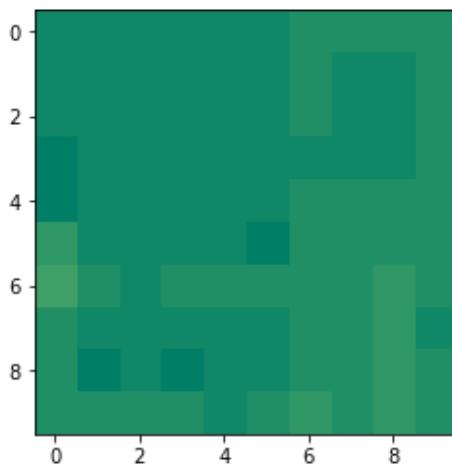
Updated direction: [ -1 0 ]



Step: 59

Updated position: [ 7 8 ]

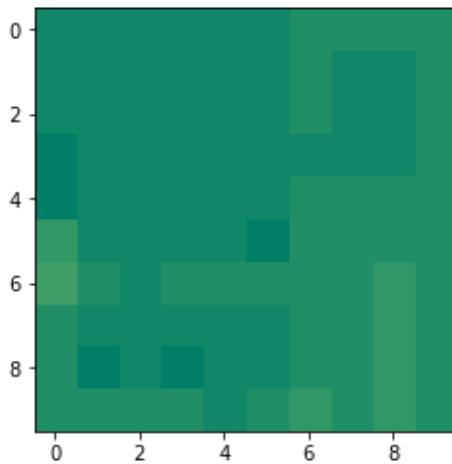
Updated direction: [ 0 1 ]



Step: 60

Updated position: [ 7 9 ]

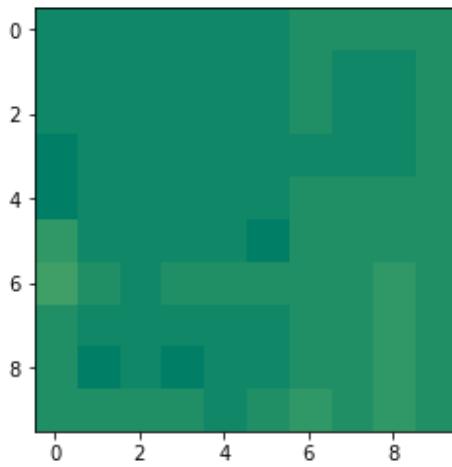
Updated direction: [ 1 0 ]



Step: 61

Updated position: [8 9]

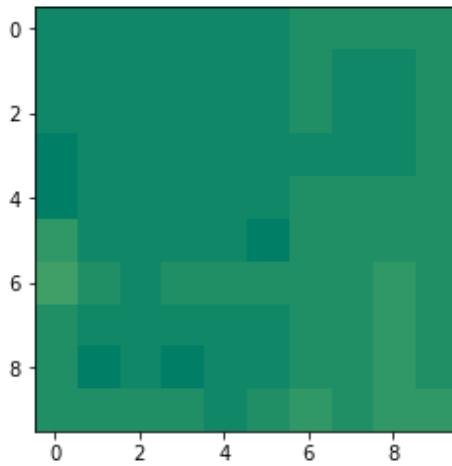
Updated direction: [1 0]



Step: 62

Updated position: [9 9]

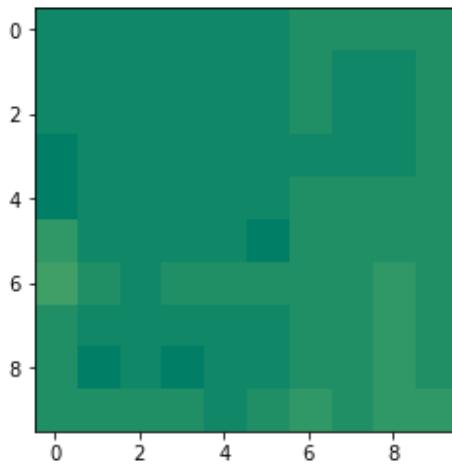
Updated direction: [-1 0]



Step: 63

Updated position: [8 9]

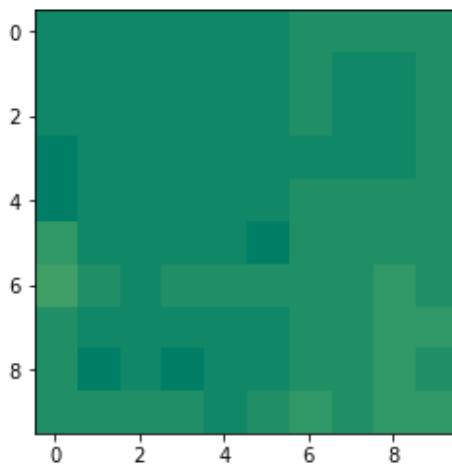
Updated direction: [-1 0]



Step: 64

Updated position: [ 7 9 ]

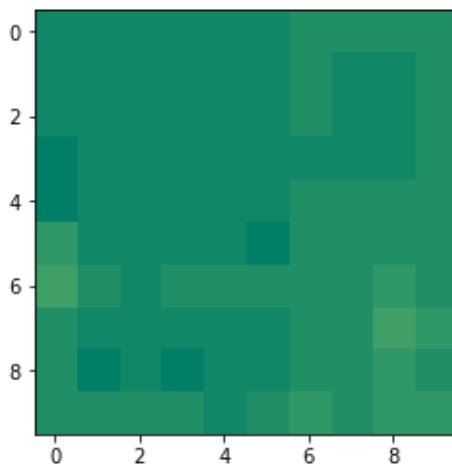
Updated direction: [ 0 -1 ]



Step: 65

Updated position: [ 7 8 ]

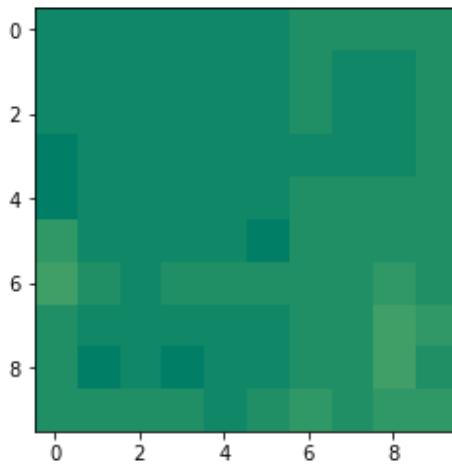
Updated direction: [ 1 0 ]



Step: 66

Updated position: [ 8 8 ]

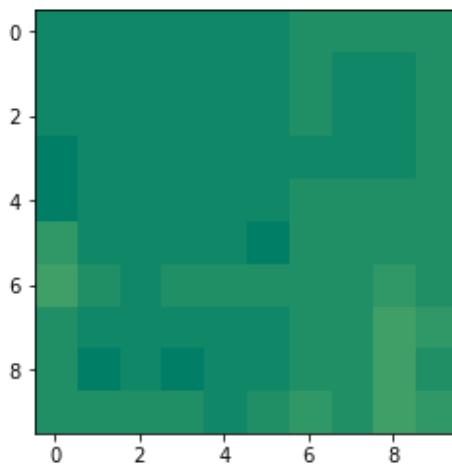
Updated direction: [ 1 0 ]



Step: 67

Updated position: [9 8]

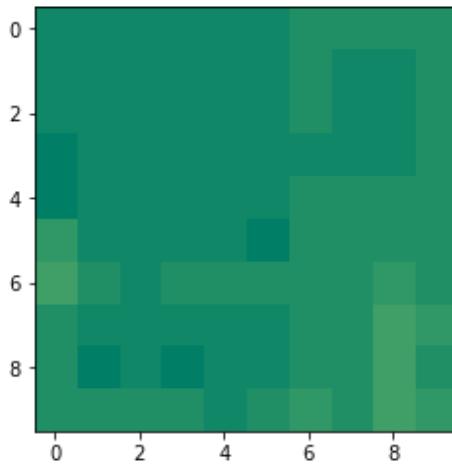
Updated direction: [ 0 -1 ]



Step: 68

Updated position: [9 7]

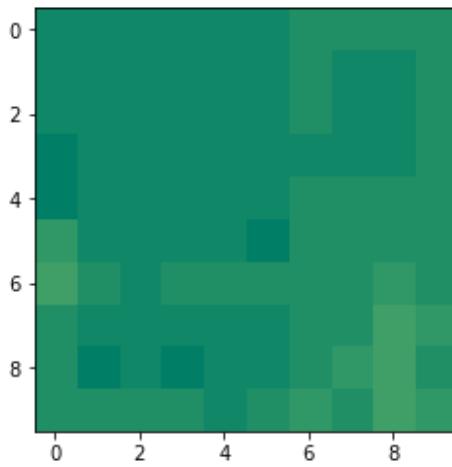
Updated direction: [-1 0 ]



Step: 69

Updated position: [8 7]

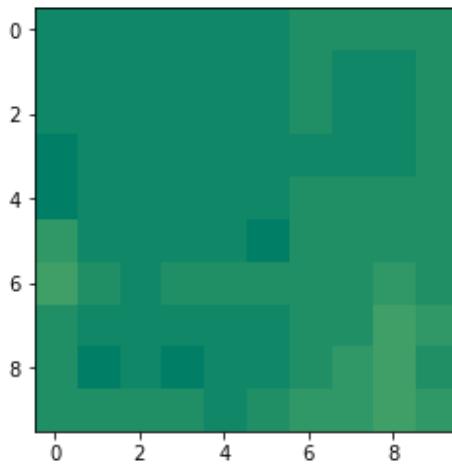
Updated direction: [1 0 ]



Step: 70

Updated position: [9 7]

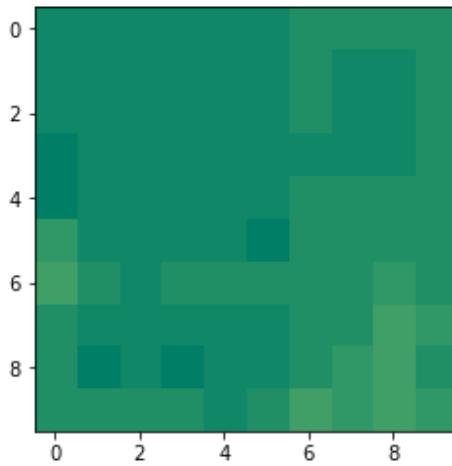
Updated direction: [ 0 -1]



Step: 71

Updated position: [9 6]

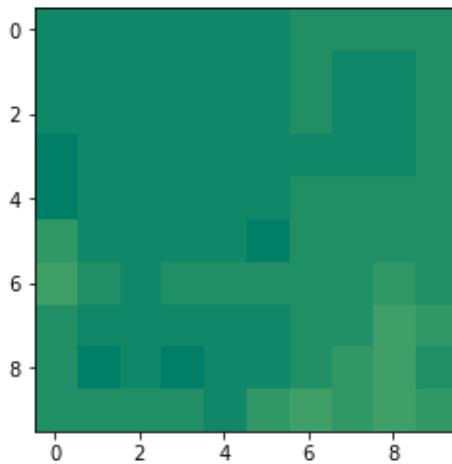
Updated direction: [ 0 -1]



Step: 72

Updated position: [9 5]

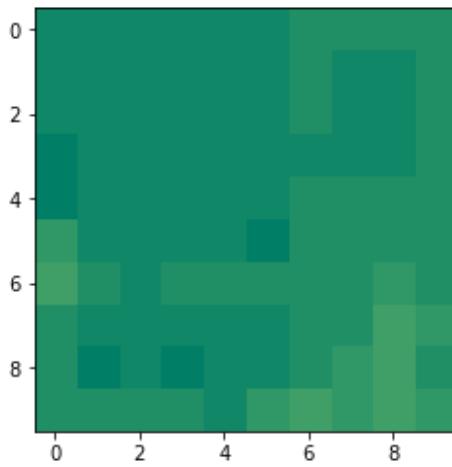
Updated direction: [ 0 -1]



Step: 73

Updated position: [ 9 4 ]

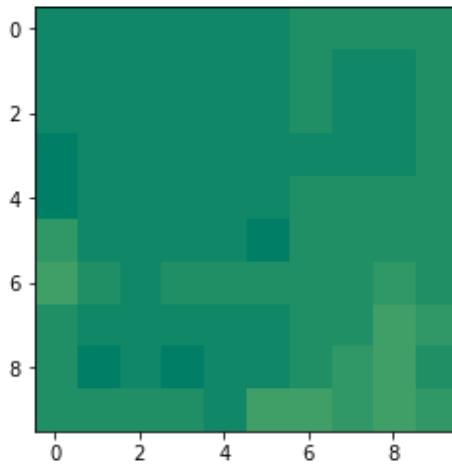
Updated direction: [ 0 1 ]



Step: 74

Updated position: [ 9 5 ]

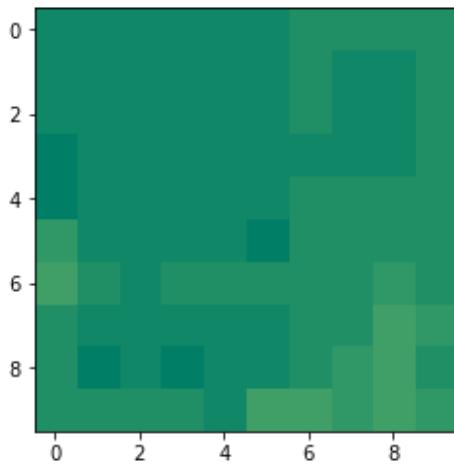
Updated direction: [ 0 -1 ]



Step: 75

Updated position: [ 9 4 ]

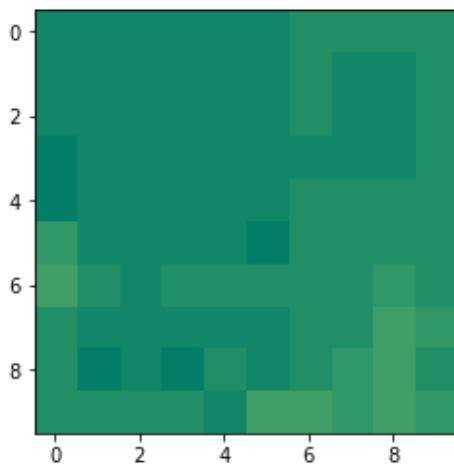
Updated direction: [-1 0 ]



Step: 76

Updated position: [ 8 4 ]

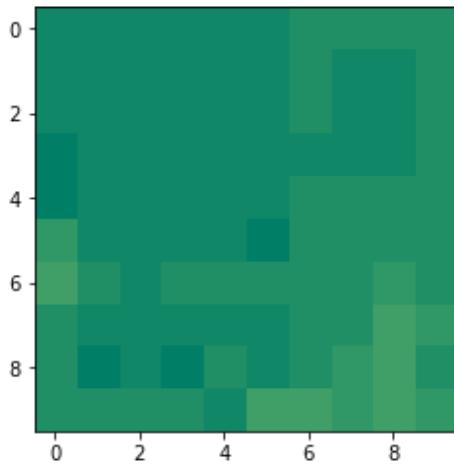
Updated direction: [ -1 0 ]



Step: 77

Updated position: [ 7 4 ]

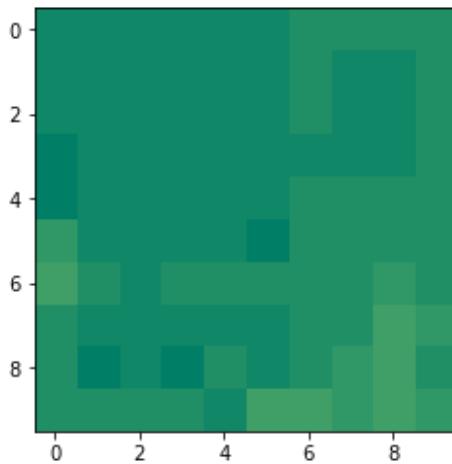
Updated direction: [ 0 -1 ]



Step: 78

Updated position: [ 7 3 ]

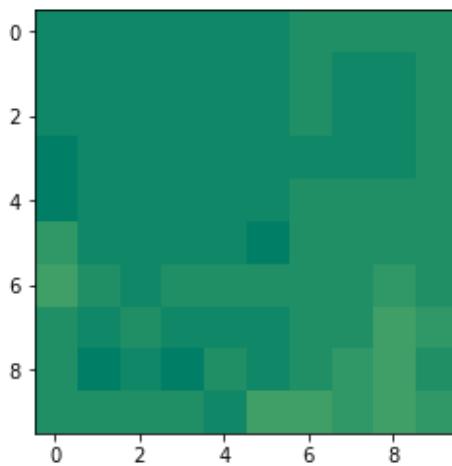
Updated direction: [ 0 -1 ]



Step: 79

Updated position: [ 7 2 ]

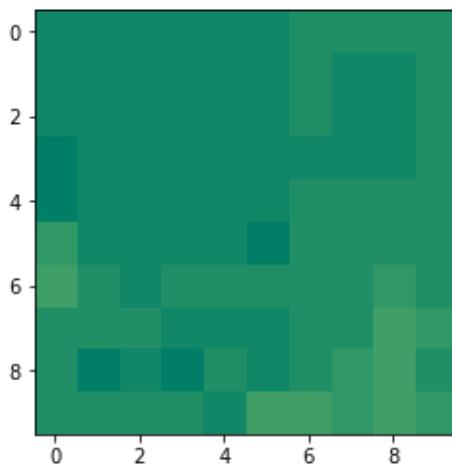
Updated direction: [ 0 -1 ]



Step: 80

Updated position: [ 7 1 ]

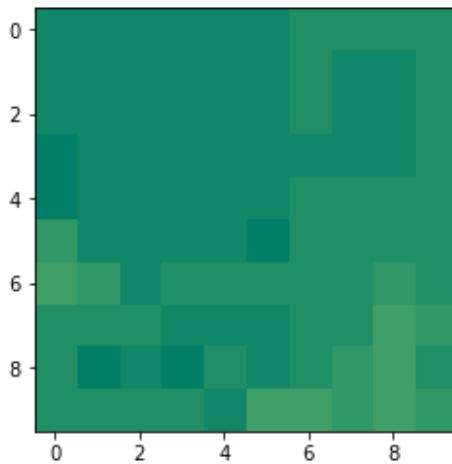
Updated direction: [-1 0 ]



Step: 81

Updated position: [ 6 1 ]

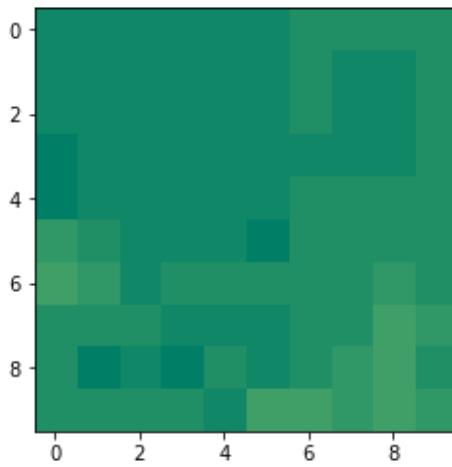
Updated direction: [-1 0 ]



Step: 82

Updated position: [ 5 1 ]

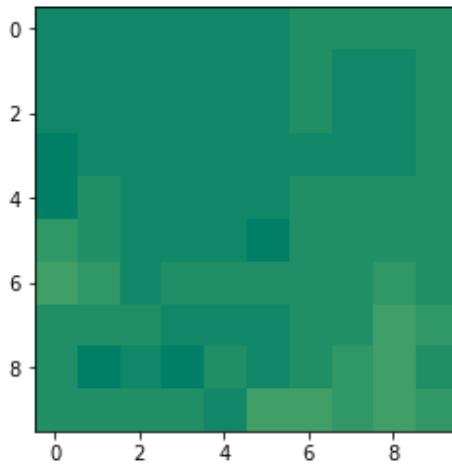
Updated direction: [-1 0 ]



Step: 83

Updated position: [ 4 1 ]

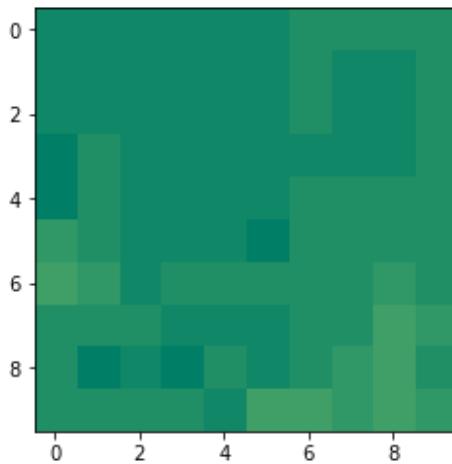
Updated direction: [-1 0 ]



Step: 84

Updated position: [ 3 1 ]

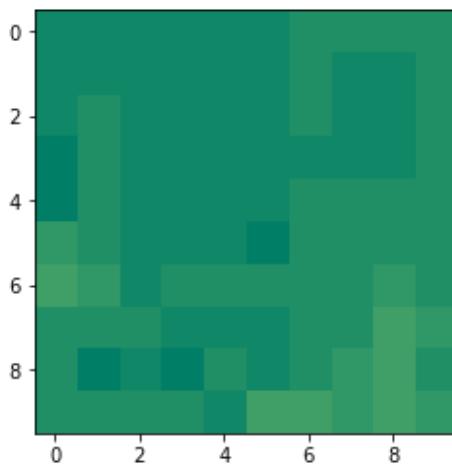
Updated direction: [-1 0 ]



Step: 85

Updated position: [ 2 1 ]

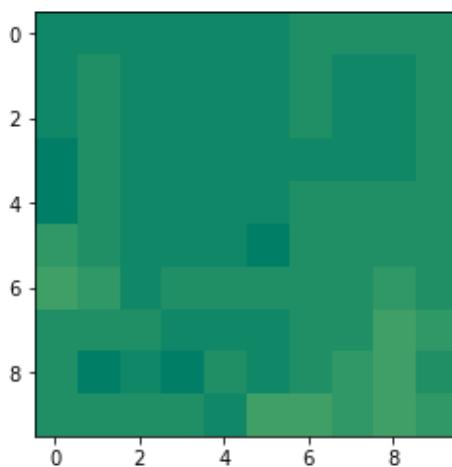
Updated direction: [-1 0 ]



Step: 86

Updated position: [ 1 1 ]

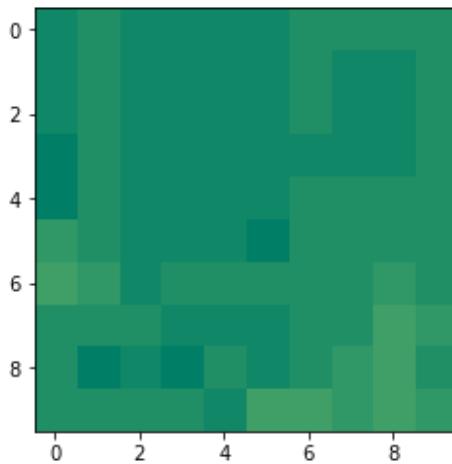
Updated direction: [-1 0 ]



Step: 87

Updated position: [ 0 1 ]

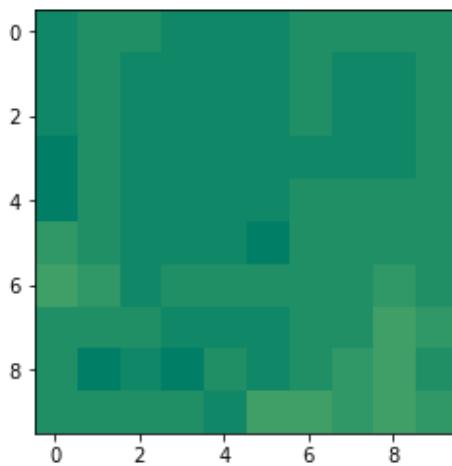
Updated direction: [ 0 1 ]



Step: 88

Updated position: [0 2]

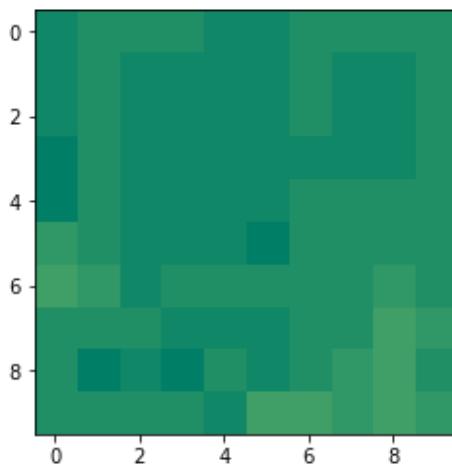
Updated direction: [0 1]



Step: 89

Updated position: [0 3]

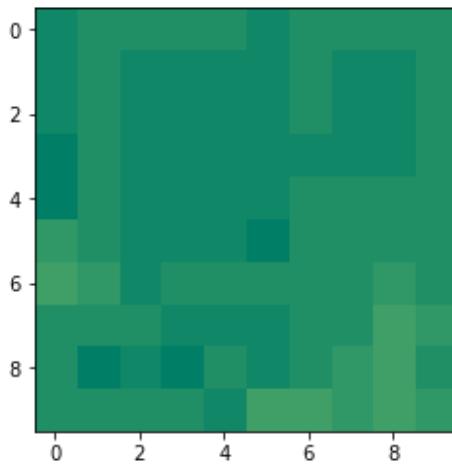
Updated direction: [0 1]



Step: 90

Updated position: [0 4]

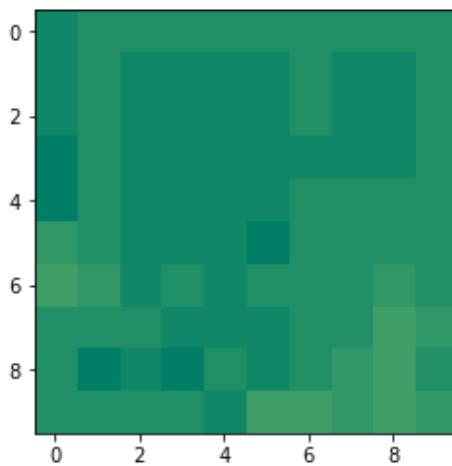
Updated direction: [0 1]



Step: 91

Updated position: [0 5]

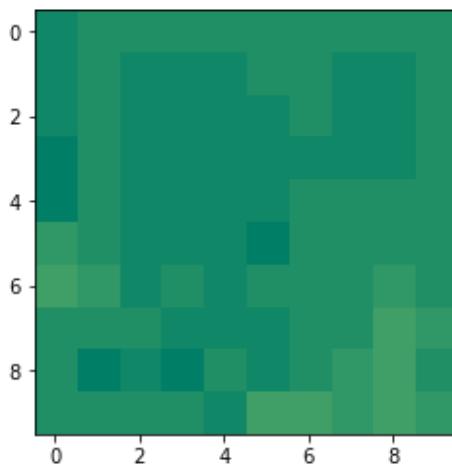
Updated direction: [1 0]



Step: 92

Updated position: [1 5]

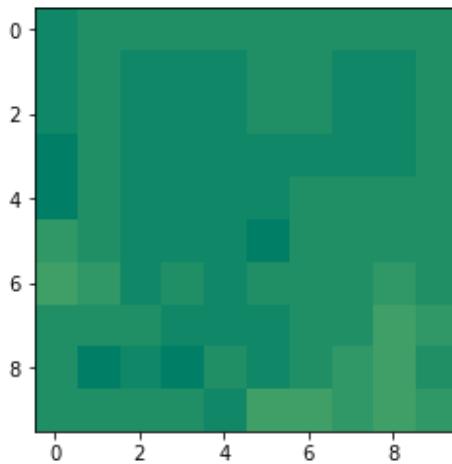
Updated direction: [1 0]



Step: 93

Updated position: [2 5]

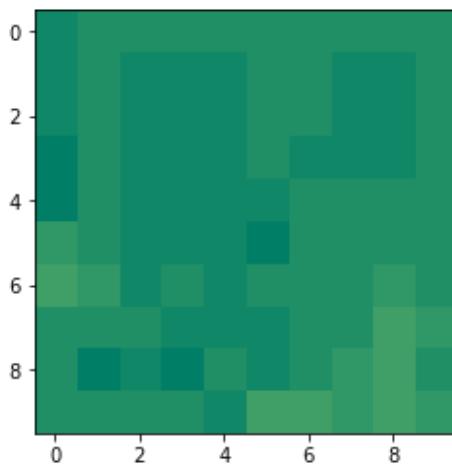
Updated direction: [1 0]



Step: 94

Updated position: [ 3 5 ]

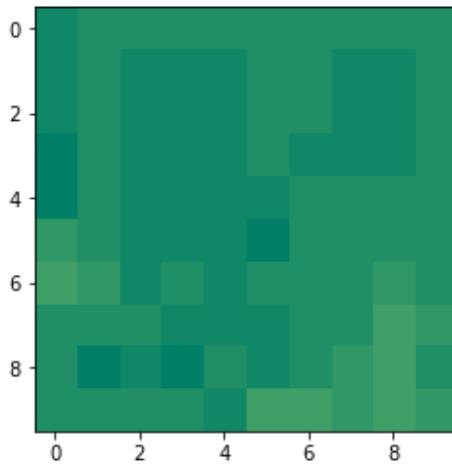
Updated direction: [ 1 0 ]



Step: 95

Updated position: [ 4 5 ]

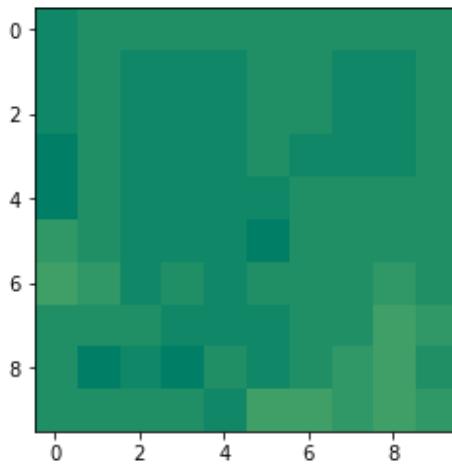
Updated direction: [ 0 -1 ]



Step: 96

Updated position: [ 4 4 ]

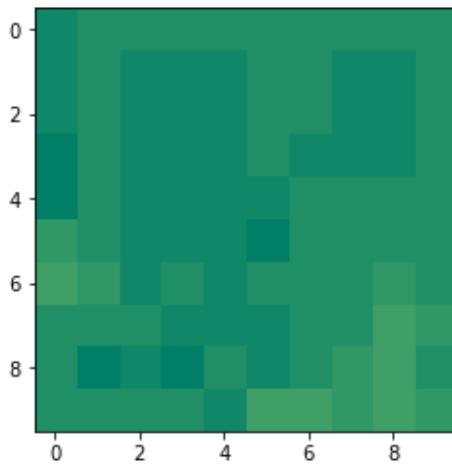
Updated direction: [ 0 -1 ]



Step: 97

Updated position: [ 4 3 ]

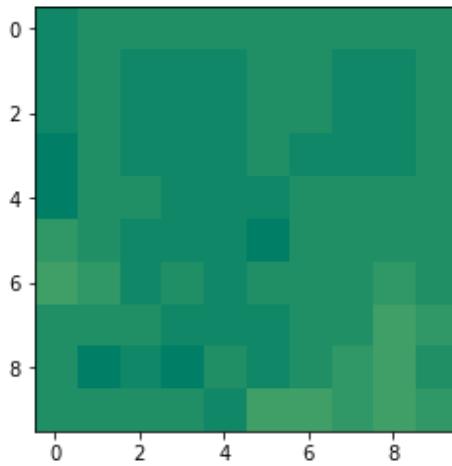
Updated direction: [ 0 -1 ]



Step: 98

Updated position: [ 4 2 ]

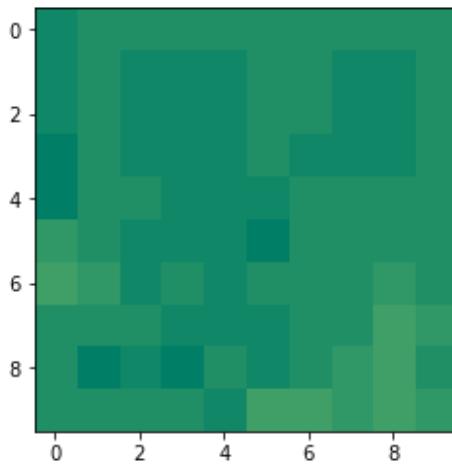
Updated direction: [ 1 0 ]



Step: 99

Updated position: [ 5 2 ]

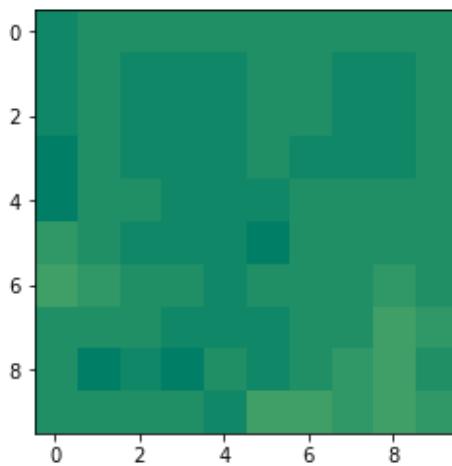
Updated direction: [ 1 0 ]



Step: 100

Updated position: [ 6 2 ]

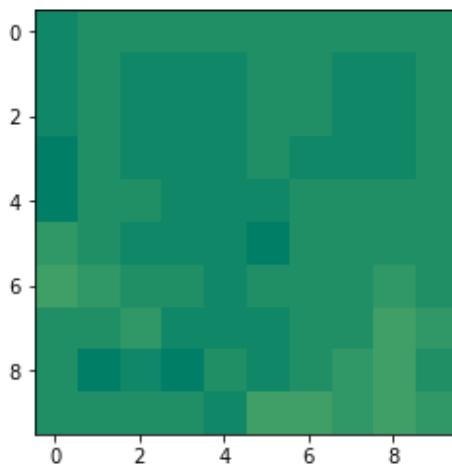
Updated direction: [ 1 0 ]



Step: 101

Updated position: [ 7 2 ]

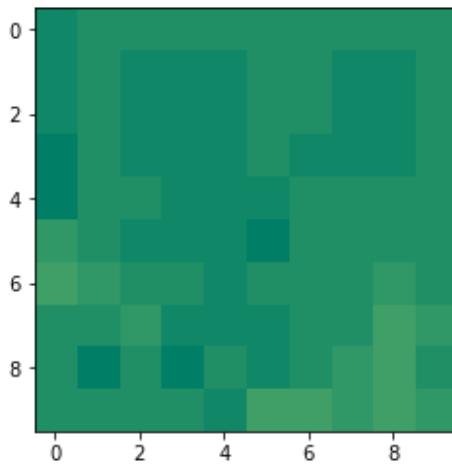
Updated direction: [ 1 0 ]



Step: 102

Updated position: [ 8 2 ]

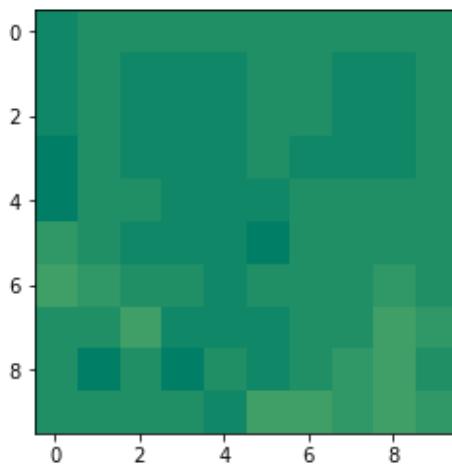
Updated direction: [ -1 0 ]



Step: 103

Updated position: [ 7 2 ]

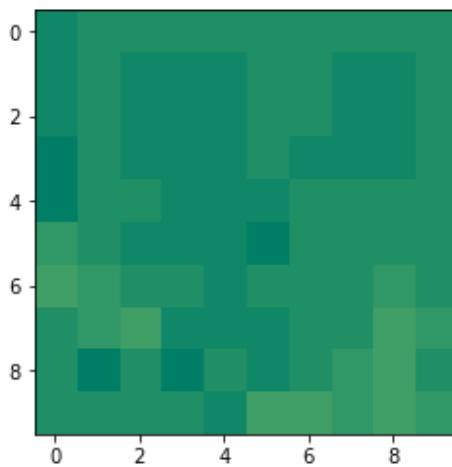
Updated direction: [ 0 -1 ]



Step: 104

Updated position: [ 7 1 ]

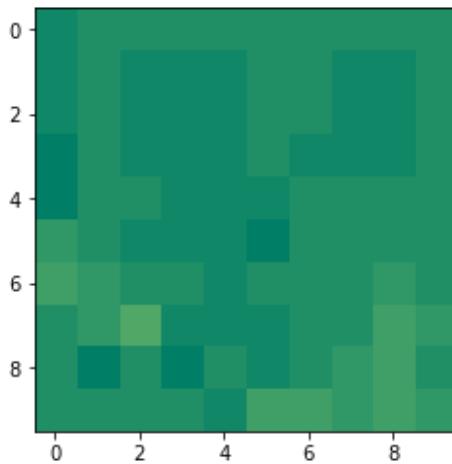
Updated direction: [ 0 1 ]



Step: 105

Updated position: [ 7 2 ]

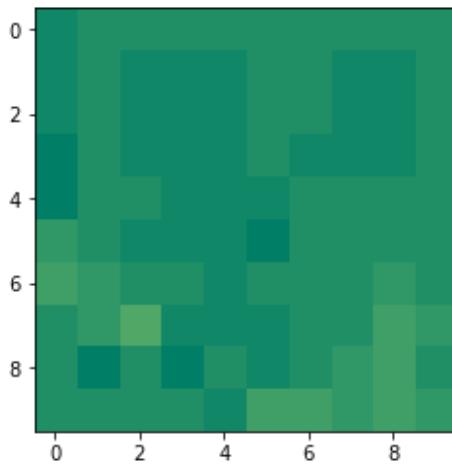
Updated direction: [ 0 1 ]



Step: 106

Updated position: [ 7 3 ]

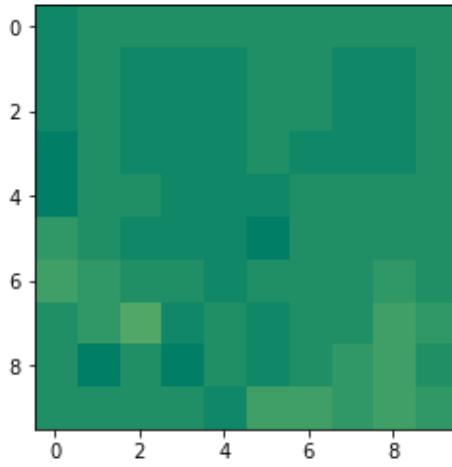
Updated direction: [ 0 1 ]



Step: 107

Updated position: [ 7 4 ]

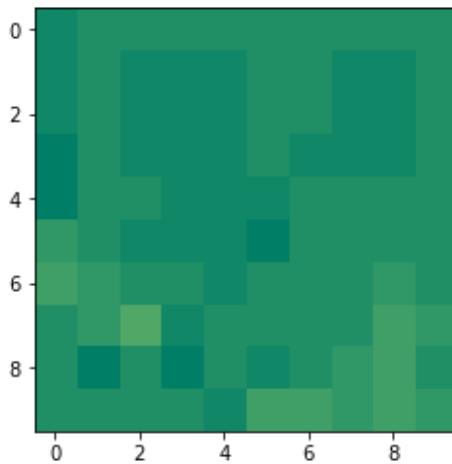
Updated direction: [ 0 1 ]



Step: 108

Updated position: [ 7 5 ]

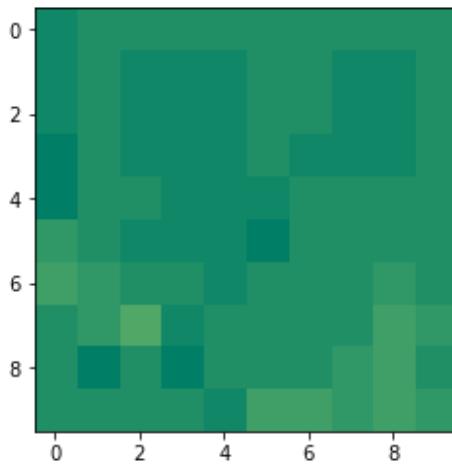
Updated direction: [ 1 0 ]



Step: 109

Updated position: [ 8 5 ]

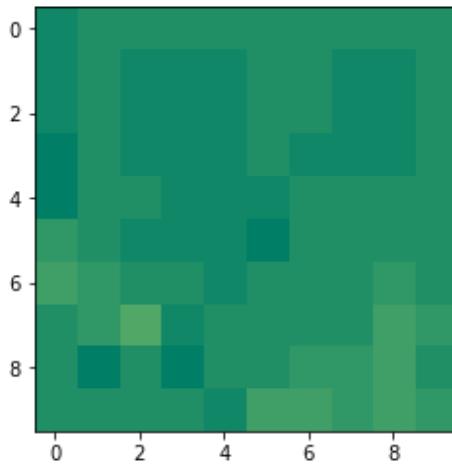
Updated direction: [ 0 1 ]



Step: 110

Updated position: [ 8 6 ]

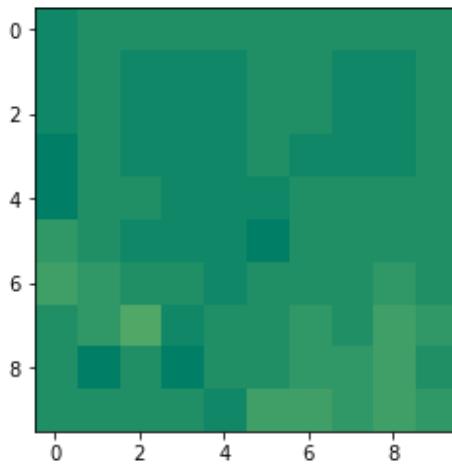
Updated direction: [ -1 0 ]



Step: 111

Updated position: [ 7 6 ]

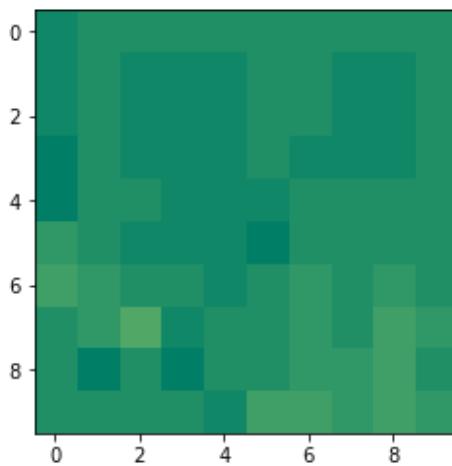
Updated direction: [ -1 0 ]



Step: 112

Updated position: [ 6 6 ]

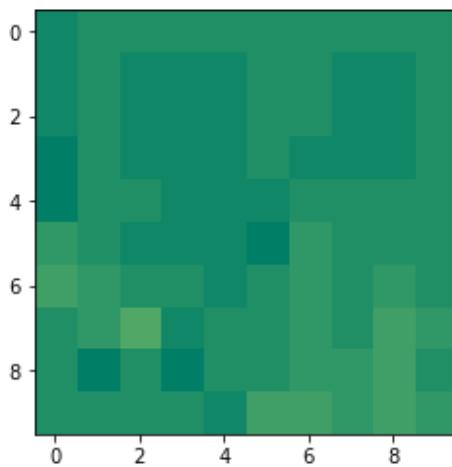
Updated direction: [-1 0 ]



Step: 113

Updated position: [ 5 6 ]

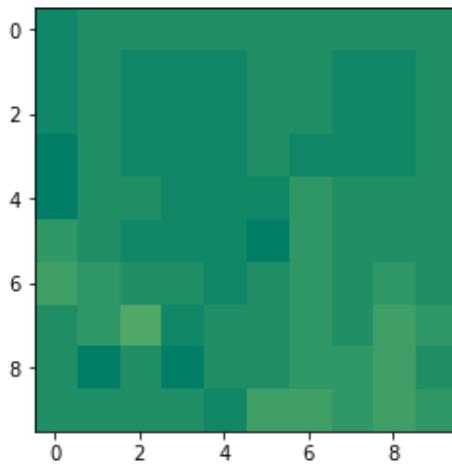
Updated direction: [-1 0 ]



Step: 114

Updated position: [ 4 6 ]

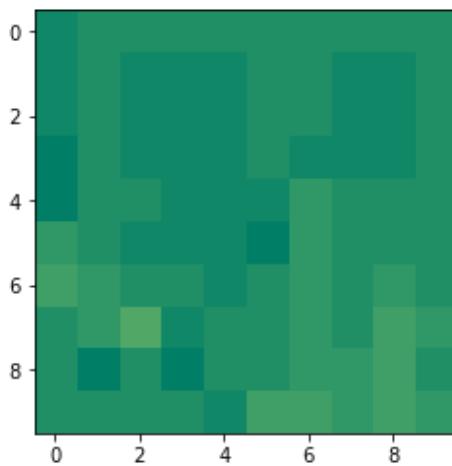
Updated direction: [-1 0 ]



Step: 115

Updated position: [ 3 6 ]

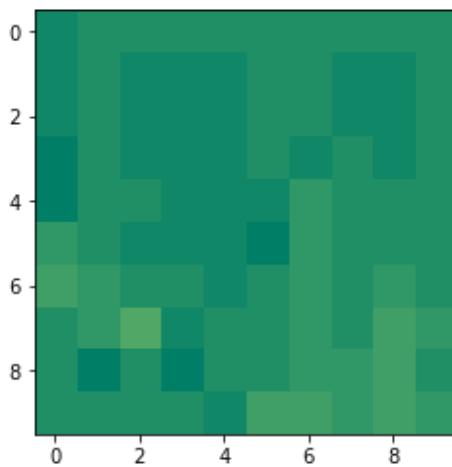
Updated direction: [ 0 1 ]



Step: 116

Updated position: [ 3 7 ]

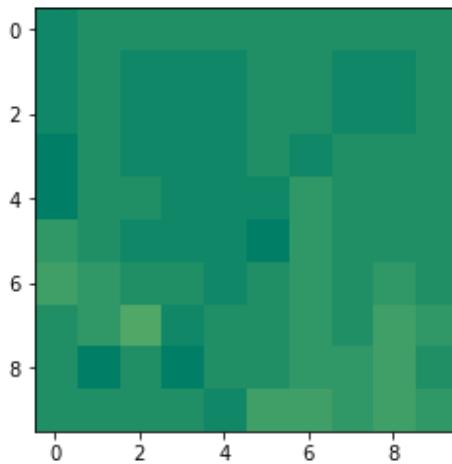
Updated direction: [ 0 1 ]



Step: 117

Updated position: [ 3 8 ]

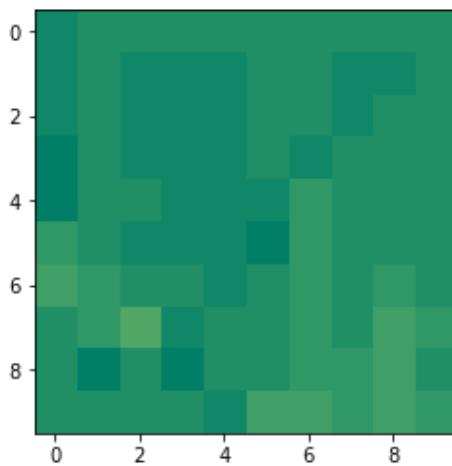
Updated direction: [-1 0]



Step: 118

Updated position: [ 2 8 ]

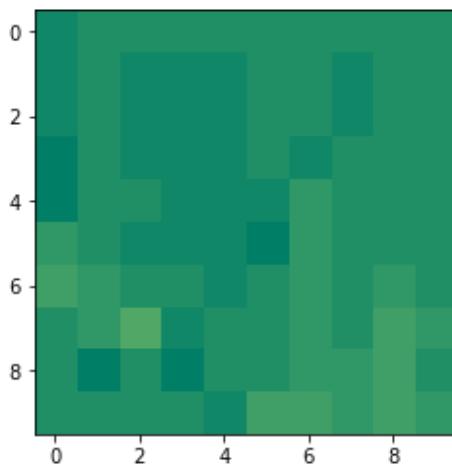
Updated direction: [ -1 0 ]



Step: 119

Updated position: [ 1 8 ]

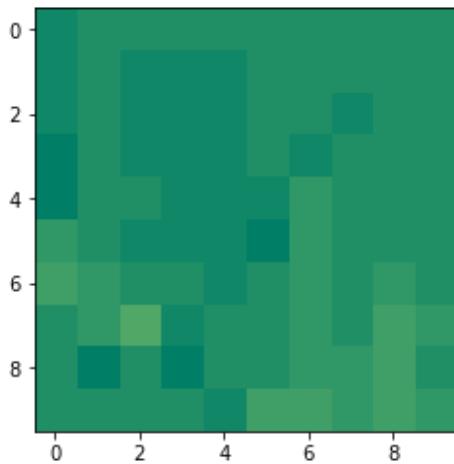
Updated direction: [ 0 -1 ]



Step: 120

Updated position: [ 1 7 ]

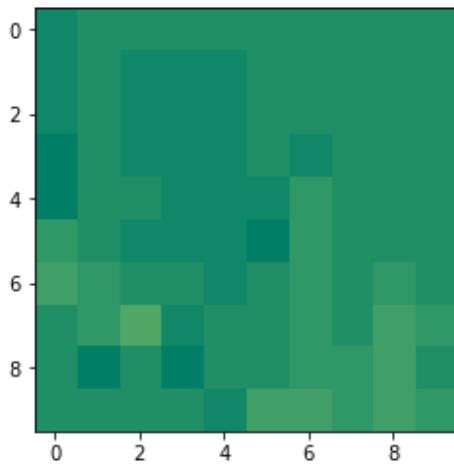
Updated direction: [ 1 0 ]



Step: 121

Updated position: [ 2 7 ]

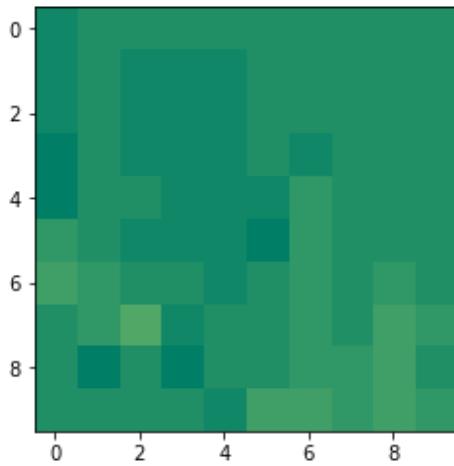
Updated direction: [ 1 0 ]



Step: 122

Updated position: [ 3 7 ]

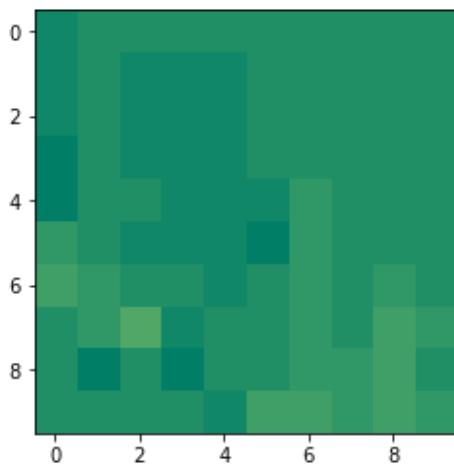
Updated direction: [ 0 -1 ]



Step: 123

Updated position: [ 3 6 ]

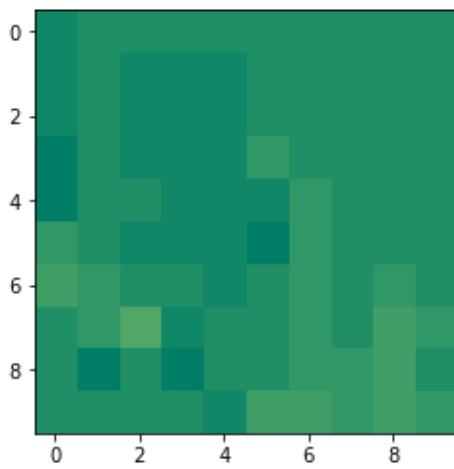
Updated direction: [ 0 -1 ]



Step: 124

Updated position: [ 3 5 ]

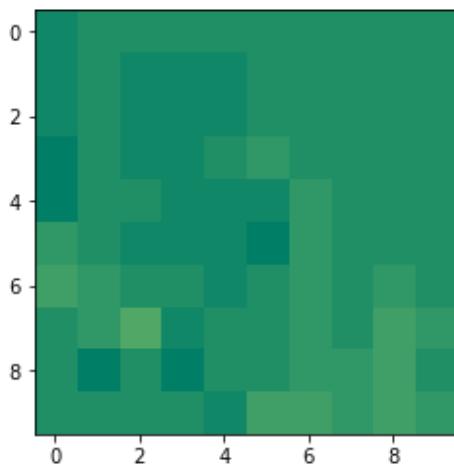
Updated direction: [ 0 -1 ]



Step: 125

Updated position: [ 3 4 ]

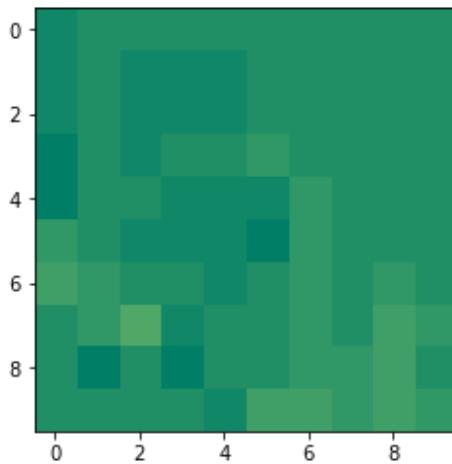
Updated direction: [ 0 -1 ]



Step: 126

Updated position: [ 3 3 ]

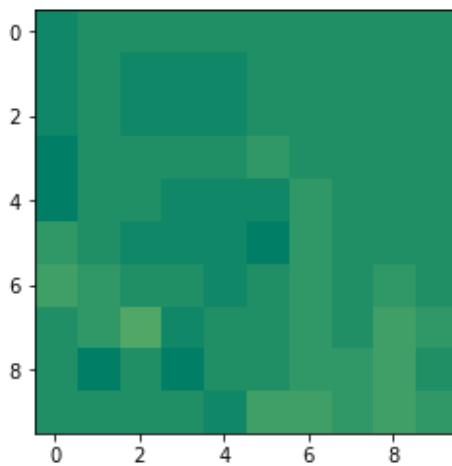
Updated direction: [ 0 -1 ]



Step: 127

Updated position: [ 3 2 ]

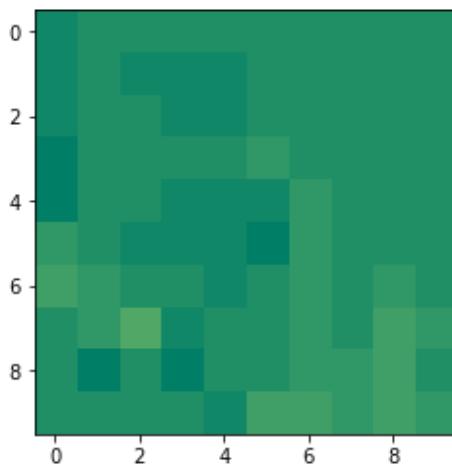
Updated direction: [-1 0 ]



Step: 128

Updated position: [ 2 2 ]

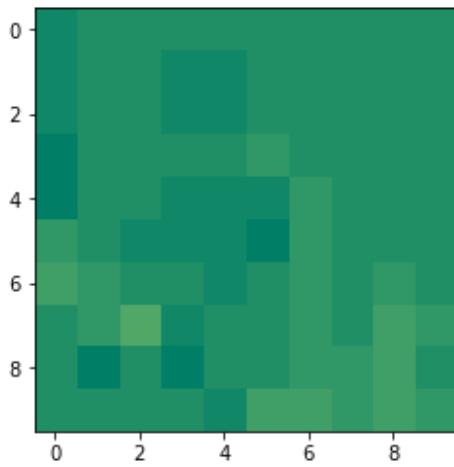
Updated direction: [-1 0 ]



Step: 129

Updated position: [ 1 2 ]

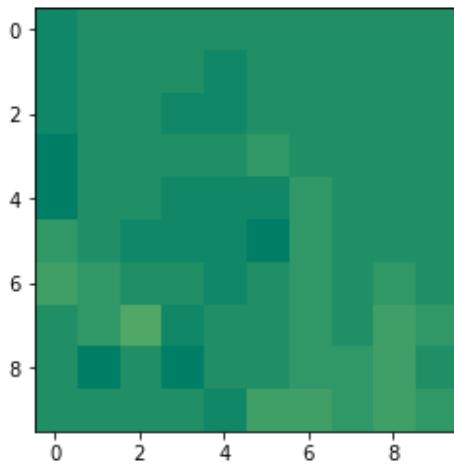
Updated direction: [ 0 1 ]



Step: 130

Updated position: [1 3]

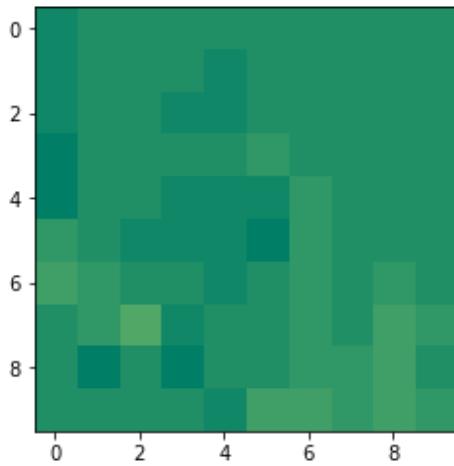
Updated direction: [0 1]



Step: 131

Updated position: [1 4]

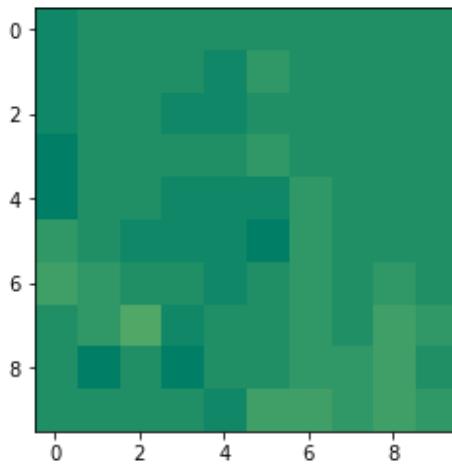
Updated direction: [0 1]



Step: 132

Updated position: [1 5]

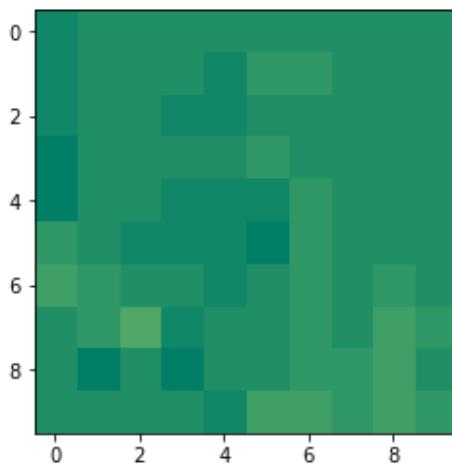
Updated direction: [0 1]



Step: 133

Updated position: [1 6]

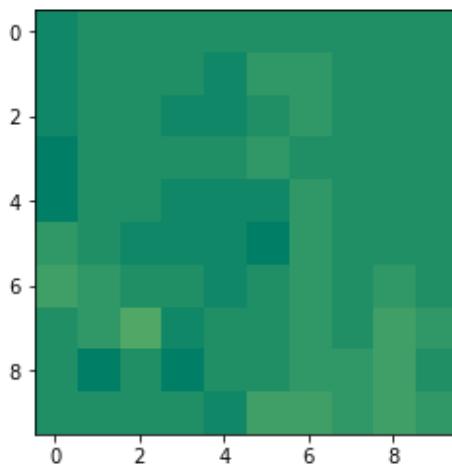
Updated direction: [1 0]



Step: 134

Updated position: [2 6]

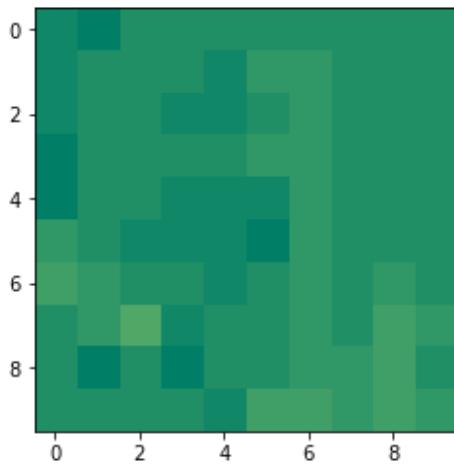
Updated direction: [1 0]



Step: 135

Updated position: [3 6]

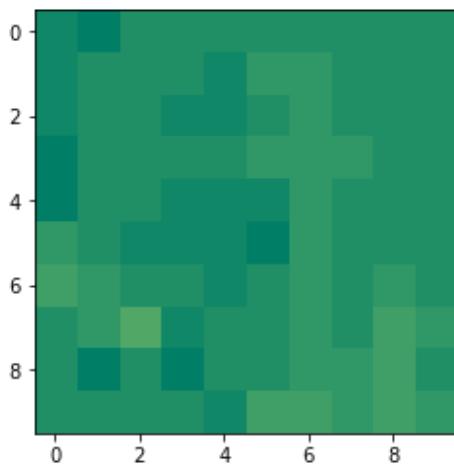
Updated direction: [0 1]



Step: 136

Updated position: [ 3 7 ]

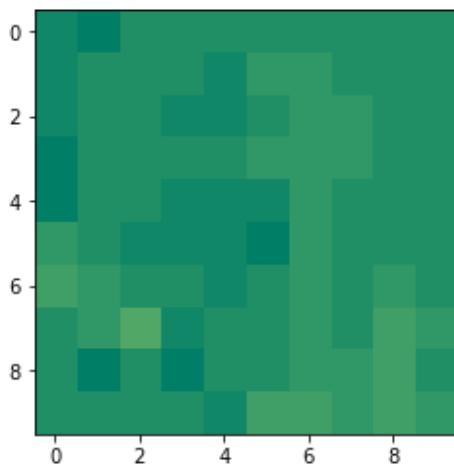
Updated direction: [-1 0 ]



Step: 137

Updated position: [ 2 7 ]

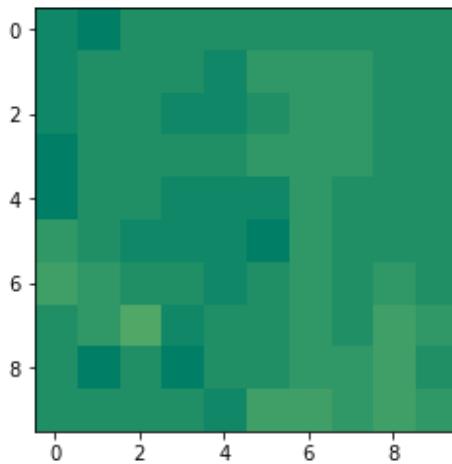
Updated direction: [-1 0 ]



Step: 138

Updated position: [ 1 7 ]

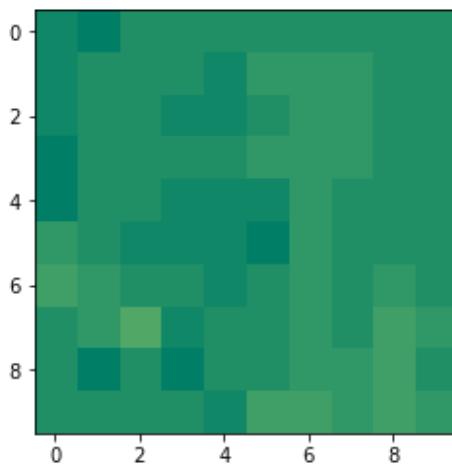
Updated direction: [-1 0 ]



Step: 139

Updated position: [0 7]

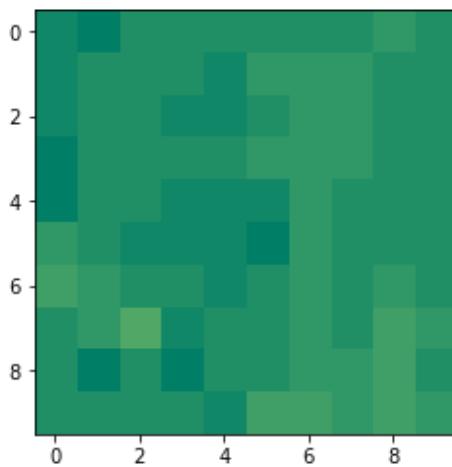
Updated direction: [0 1]



Step: 140

Updated position: [0 8]

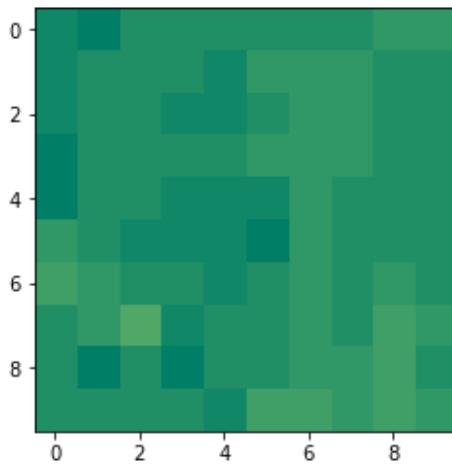
Updated direction: [0 1]



Step: 141

Updated position: [0 9]

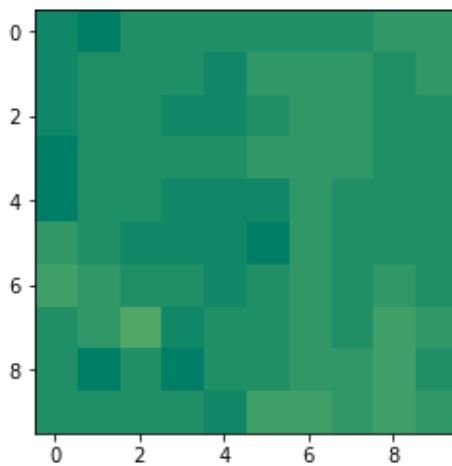
Updated direction: [1 0]



Step: 142

Updated position: [1 9]

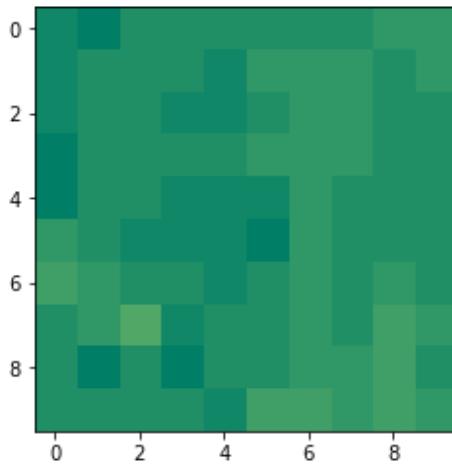
Updated direction: [1 0]



Step: 143

Updated position: [2 9]

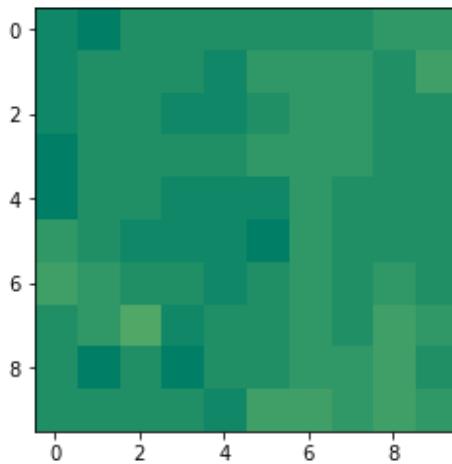
Updated direction: [-1 0]



Step: 144

Updated position: [1 9]

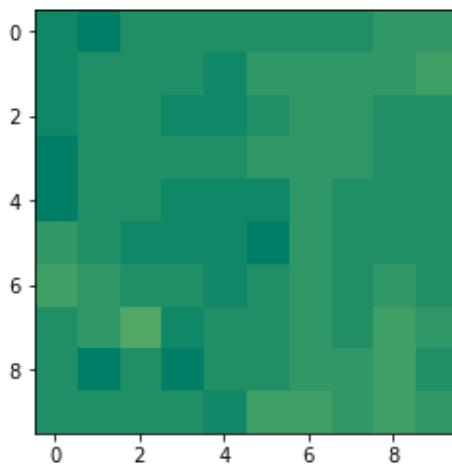
Updated direction: [0 -1]



Step: 145

Updated position: [1 8]

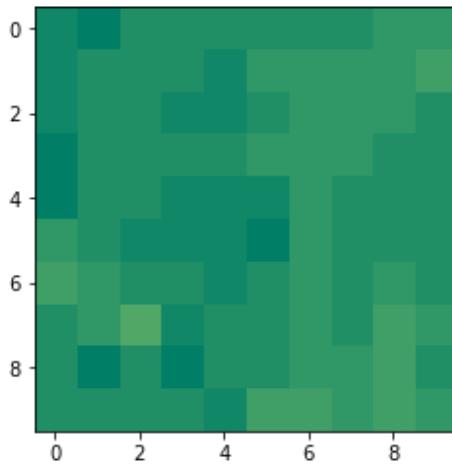
Updated direction: [1 0]



Step: 146

Updated position: [2 8]

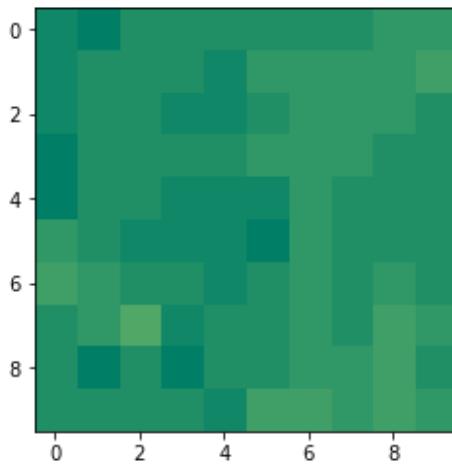
Updated direction: [0 -1]



Step: 147

Updated position: [2 7]

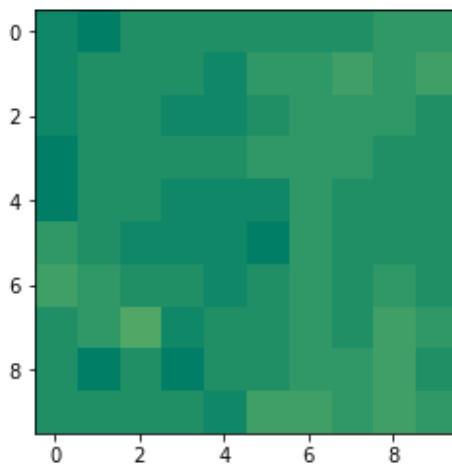
Updated direction: [-1 0]



Step: 148

Updated position: [1 7]

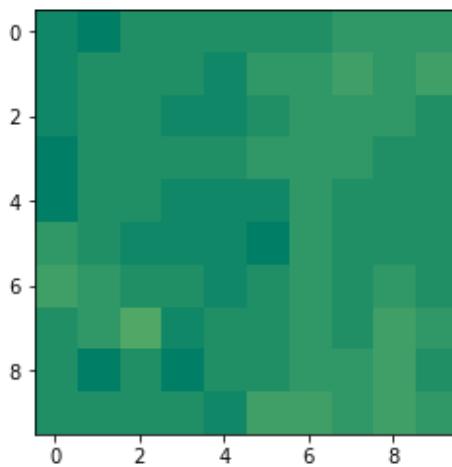
Updated direction: [-1 0]



Step: 149

Updated position: [0 7]

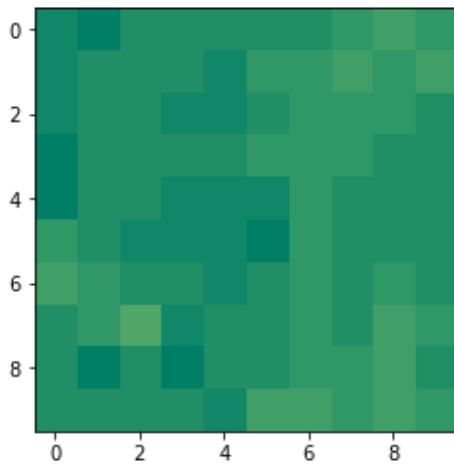
Updated direction: [0 1]



Step: 150

Updated position: [0 8]

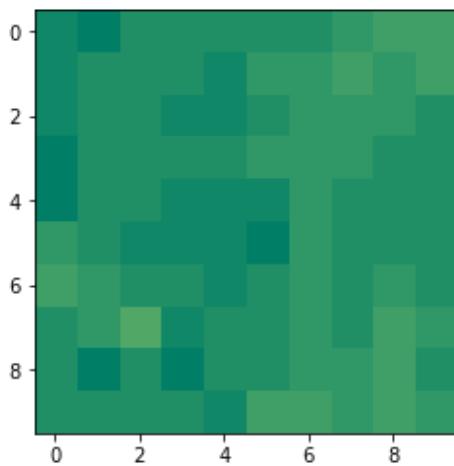
Updated direction: [0 1]



Step: 151

Updated position: [ 0 9 ]

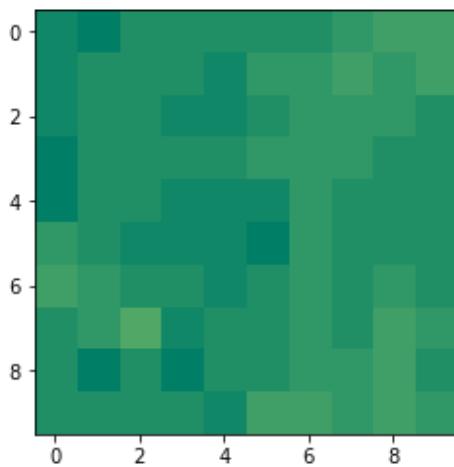
Updated direction: [ 0 -1 ]



Step: 152

Updated position: [ 0 8 ]

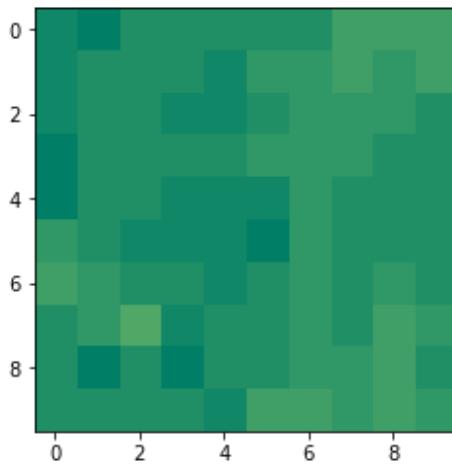
Updated direction: [ 0 -1 ]



Step: 153

Updated position: [ 0 7 ]

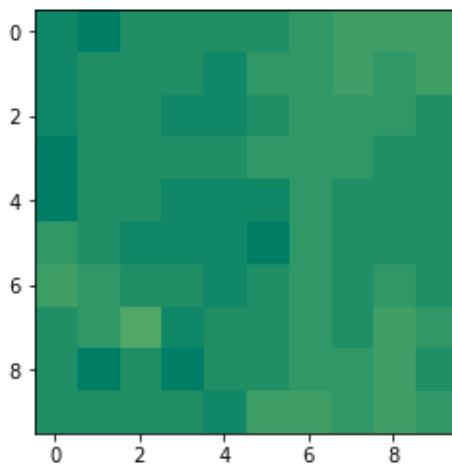
Updated direction: [ 0 -1 ]



Step: 154

Updated position: [0 6]

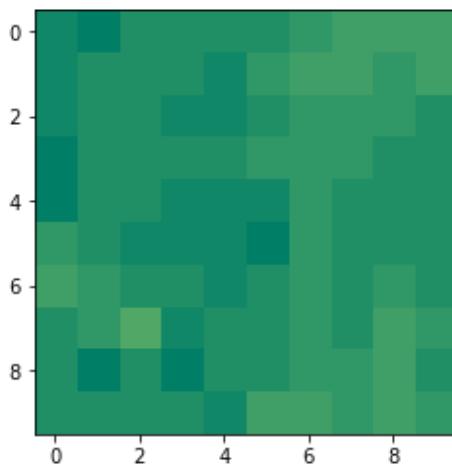
Updated direction: [1 0]



Step: 155

Updated position: [1 6]

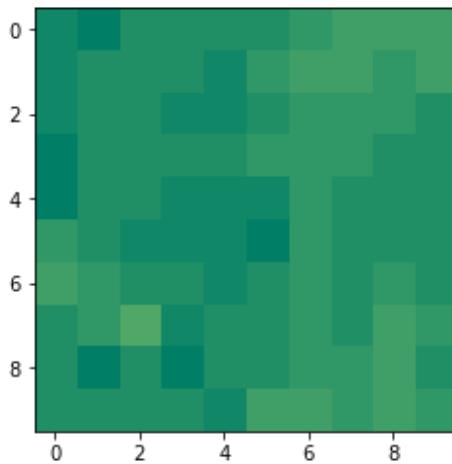
Updated direction: [1 0]



Step: 156

Updated position: [2 6]

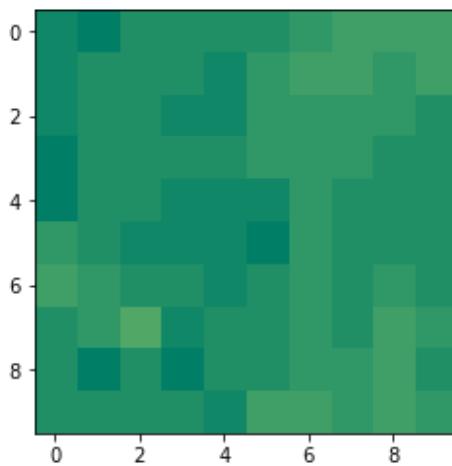
Updated direction: [0 -1]



Step: 157

Updated position: [ 2 5 ]

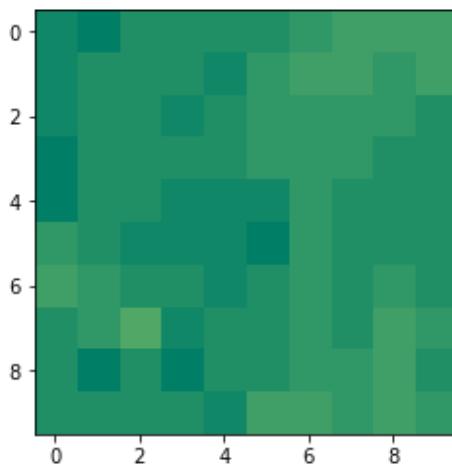
Updated direction: [ 0 -1 ]



Step: 158

Updated position: [ 2 4 ]

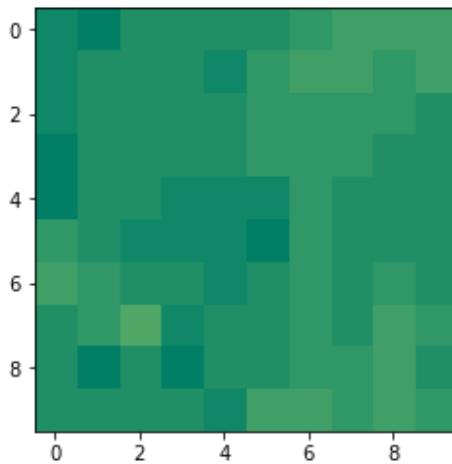
Updated direction: [ 0 -1 ]



Step: 159

Updated position: [ 2 3 ]

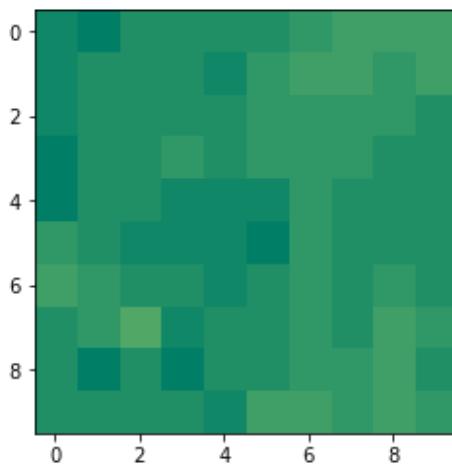
Updated direction: [ 1 0 ]



Step: 160

Updated position: [ 3 3 ]

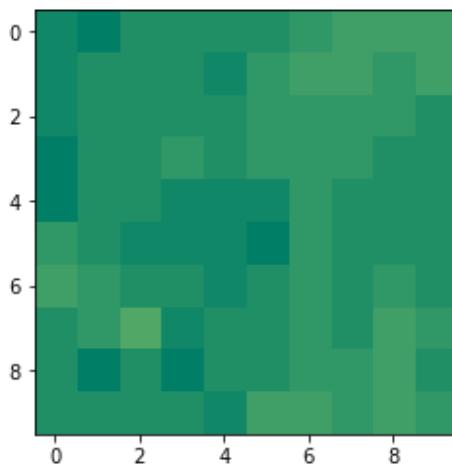
Updated direction: [ 1 0 ]



Step: 161

Updated position: [ 4 3 ]

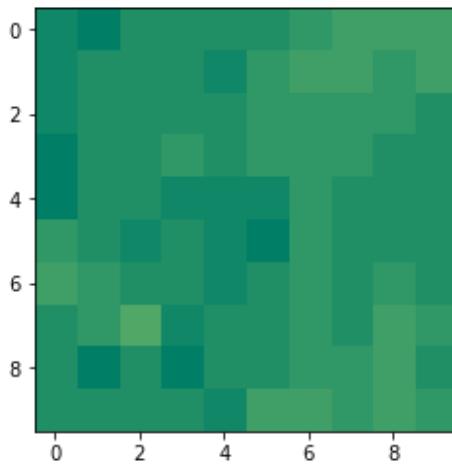
Updated direction: [ 1 0 ]



Step: 162

Updated position: [ 5 3 ]

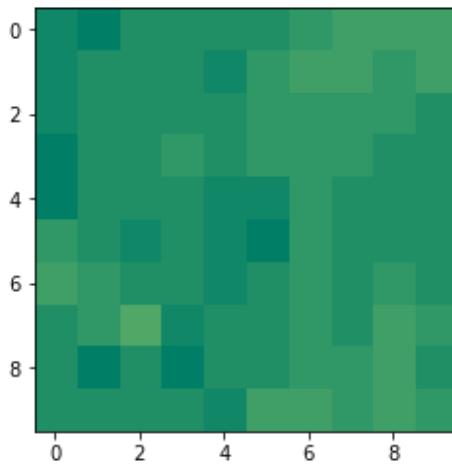
Updated direction: [ -1 0 ]



Step: 163

Updated position: [ 4 3 ]

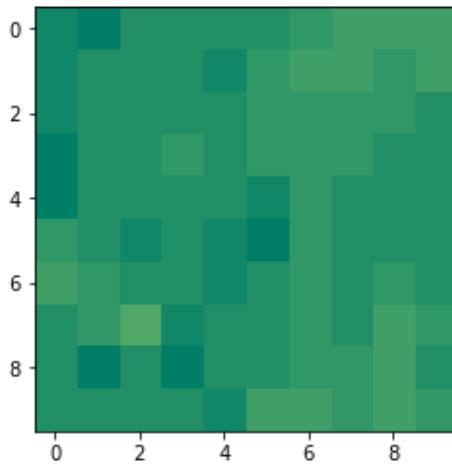
Updated direction: [ 0 1 ]



Step: 164

Updated position: [ 4 4 ]

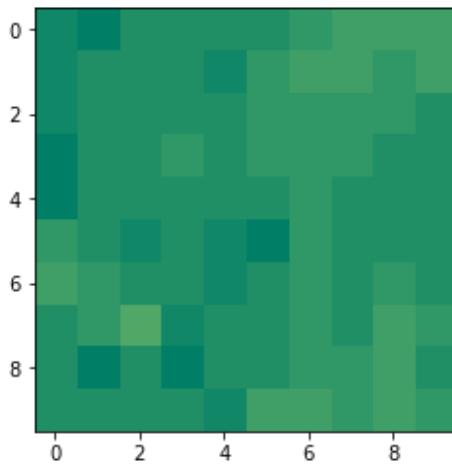
Updated direction: [ 0 1 ]



Step: 165

Updated position: [ 4 5 ]

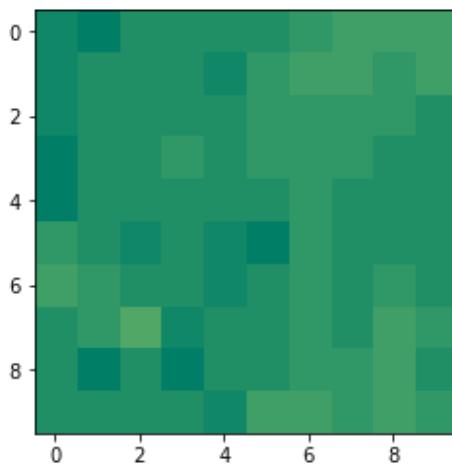
Updated direction: [ 0 -1 ]



Step: 166

Updated position: [ 4 4 ]

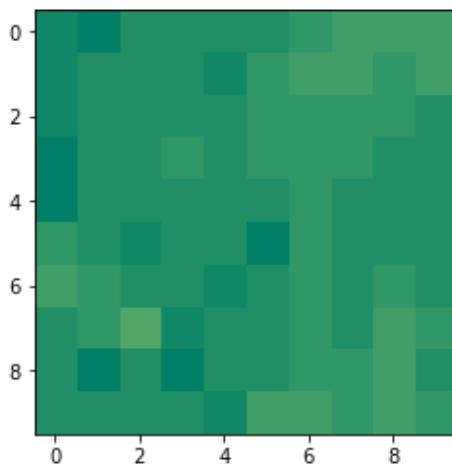
Updated direction: [ 1 0 ]



Step: 167

Updated position: [ 5 4 ]

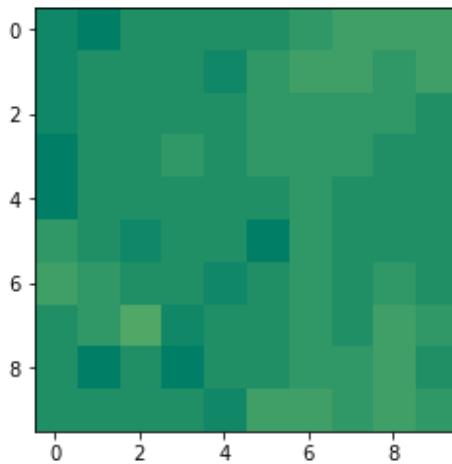
Updated direction: [ 1 0 ]



Step: 168

Updated position: [ 6 4 ]

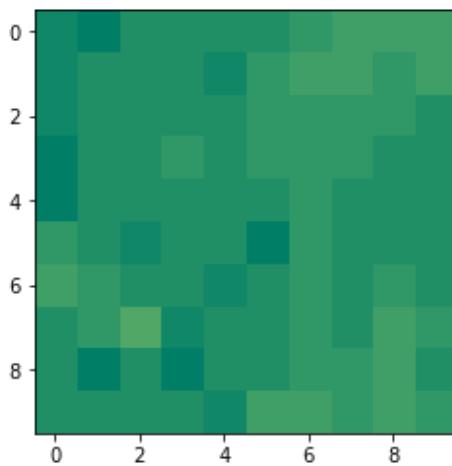
Updated direction: [ 1 0 ]



Step: 169

Updated position: [ 7 4 ]

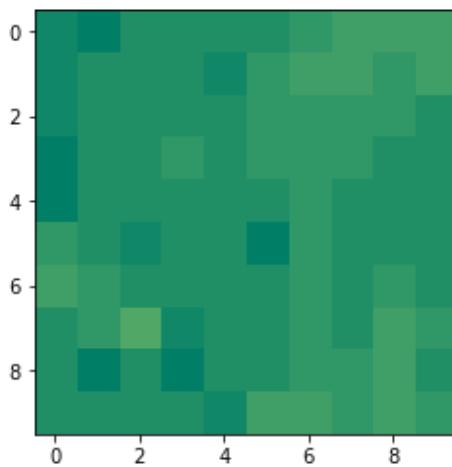
Updated direction: [ -1 0 ]



Step: 170

Updated position: [ 6 4 ]

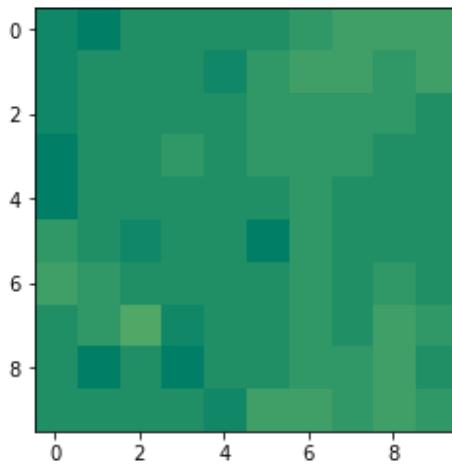
Updated direction: [ 1 0 ]



Step: 171

Updated position: [ 7 4 ]

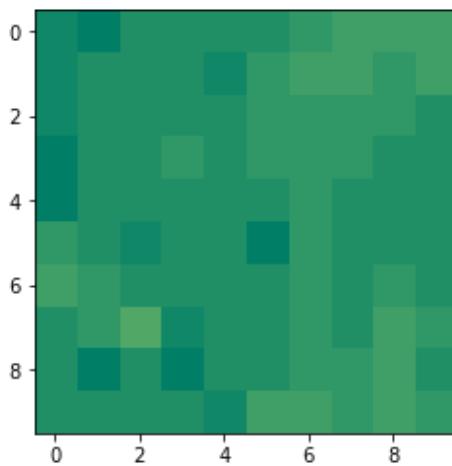
Updated direction: [ 0 -1 ]



Step: 172

Updated position: [ 7 3 ]

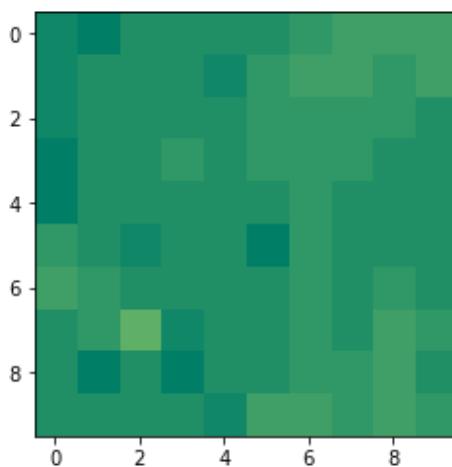
Updated direction: [ 0 -1 ]



Step: 173

Updated position: [ 7 2 ]

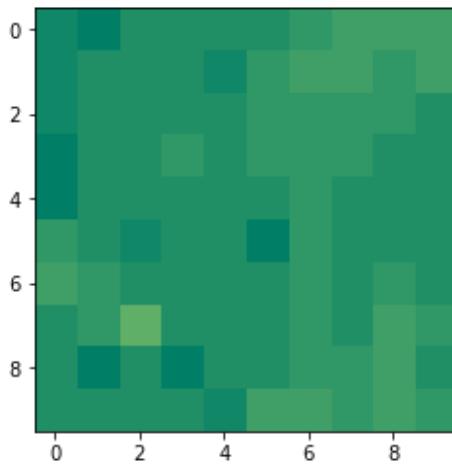
Updated direction: [ 0 1 ]



Step: 174

Updated position: [ 7 3 ]

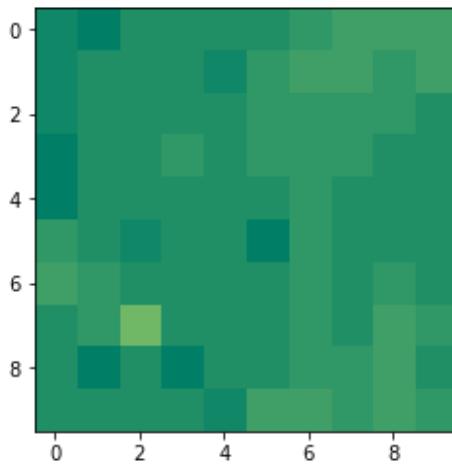
Updated direction: [ 0 -1 ]



Step: 175

Updated position: [ 7 2 ]

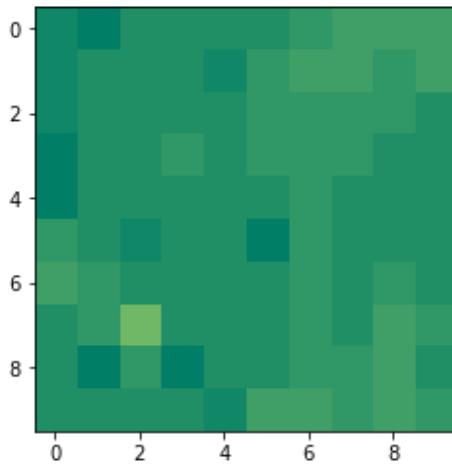
Updated direction: [ 1 0 ]



Step: 176

Updated position: [ 8 2 ]

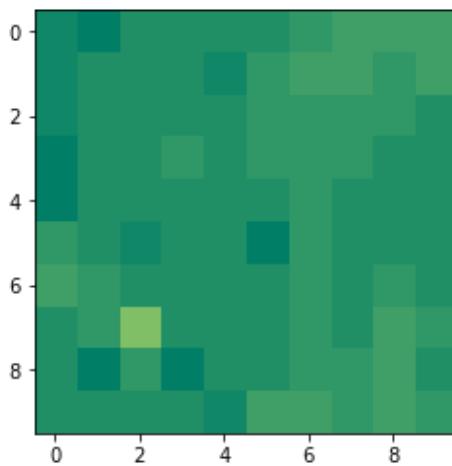
Updated direction: [ -1 0 ]



Step: 177

Updated position: [ 7 2 ]

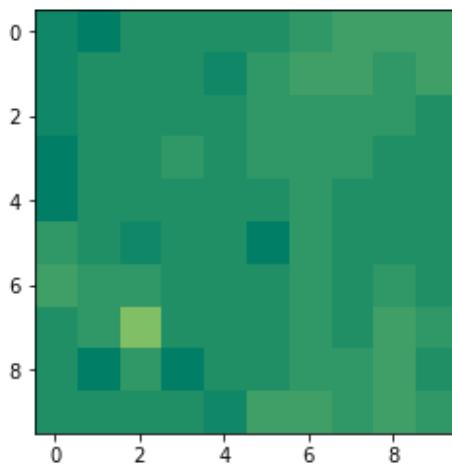
Updated direction: [ -1 0 ]



Step: 178

Updated position: [ 6 2 ]

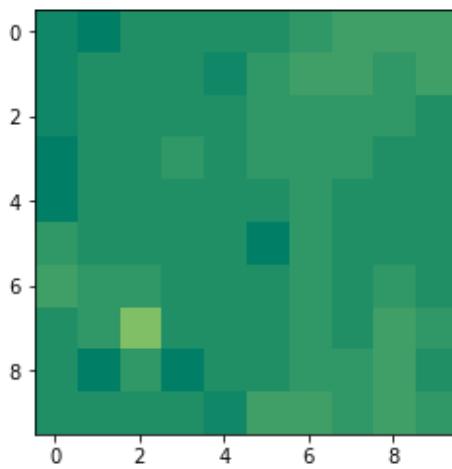
Updated direction: [-1 0 ]



Step: 179

Updated position: [ 5 2 ]

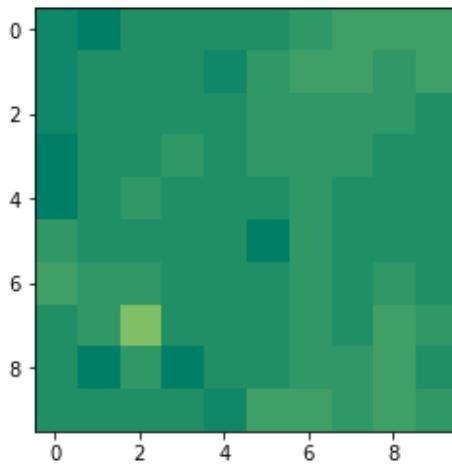
Updated direction: [-1 0 ]



Step: 180

Updated position: [ 4 2 ]

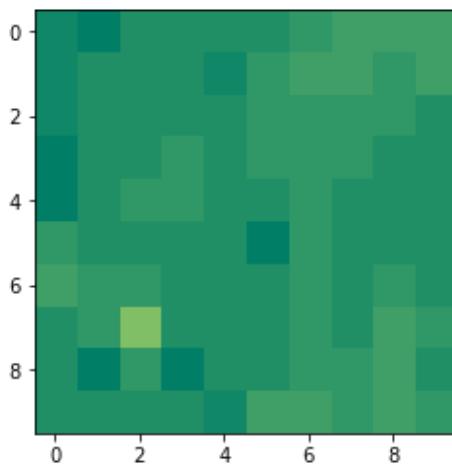
Updated direction: [ 0 1 ]



Step: 181

Updated position: [ 4 3 ]

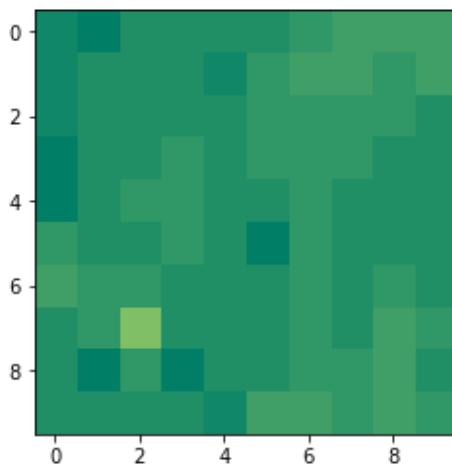
Updated direction: [ 1 0 ]



Step: 182

Updated position: [ 5 3 ]

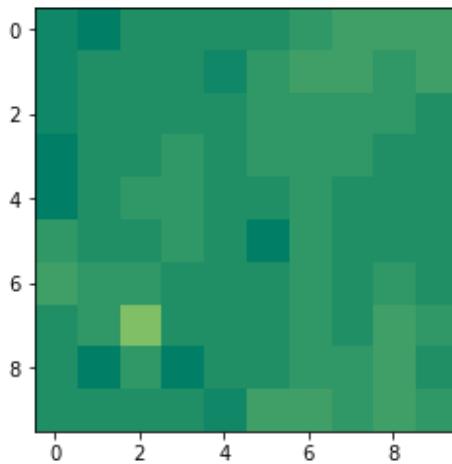
Updated direction: [ 1 0 ]



Step: 183

Updated position: [ 6 3 ]

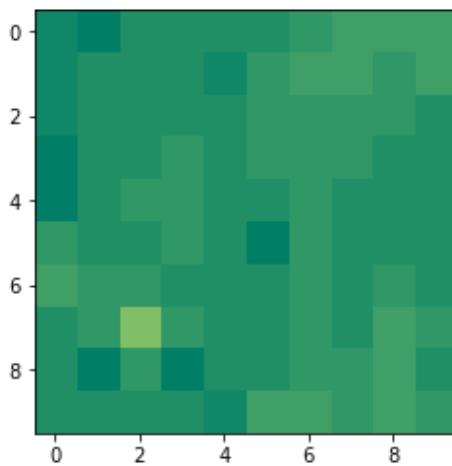
Updated direction: [ 1 0 ]



Step: 184

Updated position: [ 7 3 ]

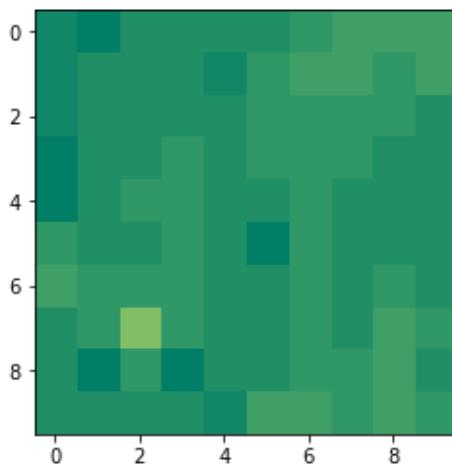
Updated direction: [ -1 0 ]



Step: 185

Updated position: [ 6 3 ]

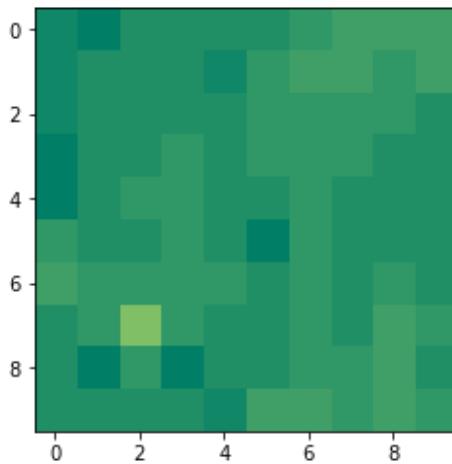
Updated direction: [ 0 1 ]



Step: 186

Updated position: [ 6 4 ]

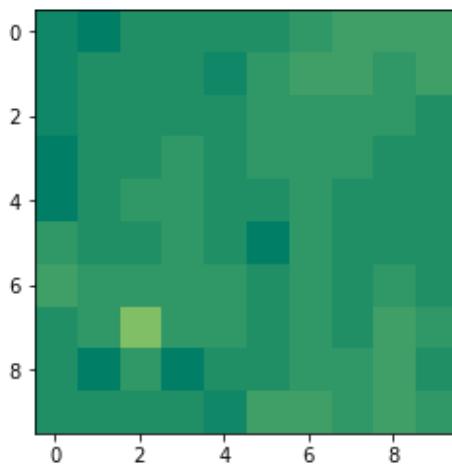
Updated direction: [ 1 0 ]



Step: 187

Updated position: [ 7 4 ]

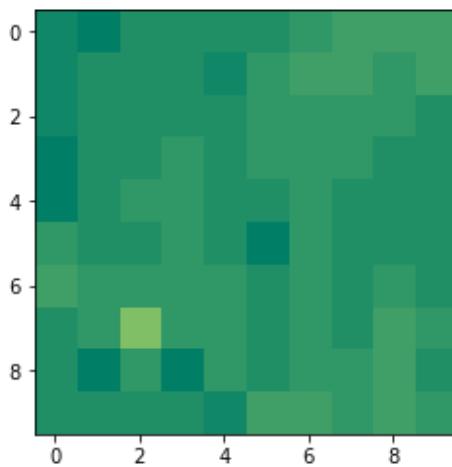
Updated direction: [ 1 0 ]



Step: 188

Updated position: [ 8 4 ]

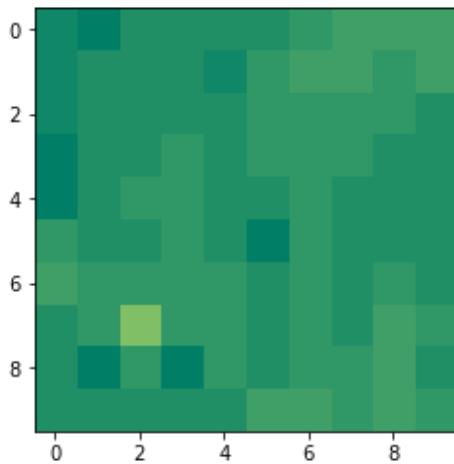
Updated direction: [ 1 0 ]



Step: 189

Updated position: [ 9 4 ]

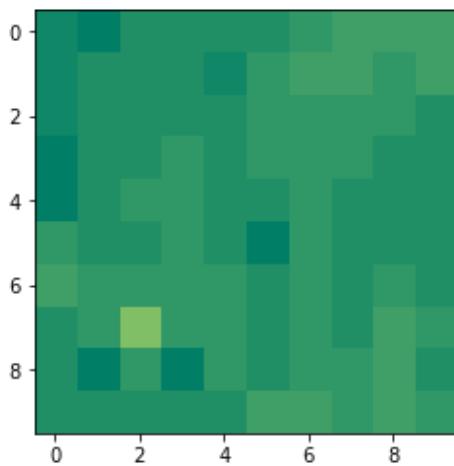
Updated direction: [ -1 0 ]



Step: 190

Updated position: [ 8 4 ]

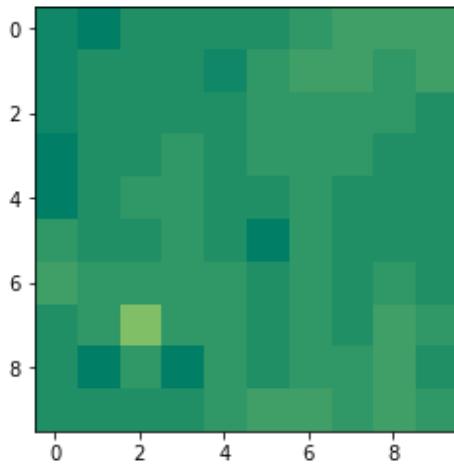
Updated direction: [ 1 0 ]



Step: 191

Updated position: [ 9 4 ]

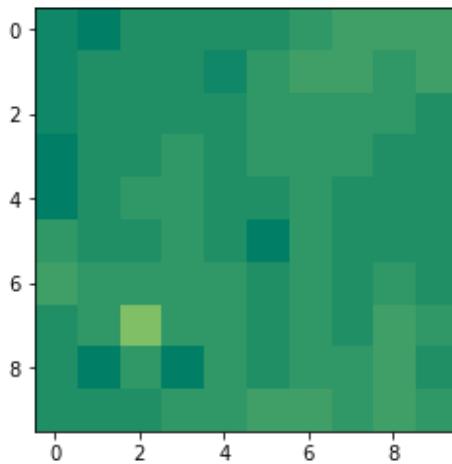
Updated direction: [ 0 -1 ]



Step: 192

Updated position: [ 9 3 ]

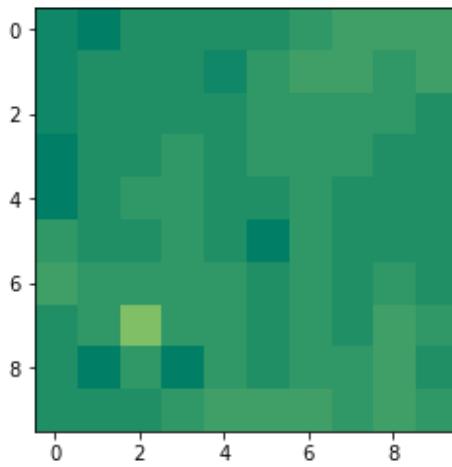
Updated direction: [ 0 1 ]



Step: 193

Updated position: [ 9 4 ]

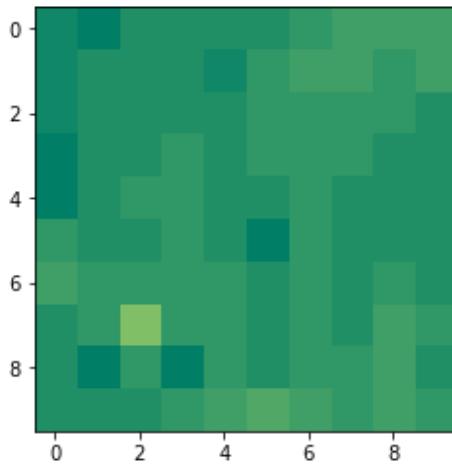
Updated direction: [ 0 1 ]



Step: 194

Updated position: [ 9 5 ]

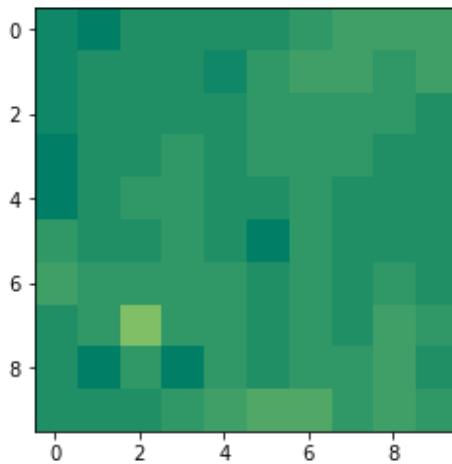
Updated direction: [ 0 1 ]



Step: 195

Updated position: [ 9 6 ]

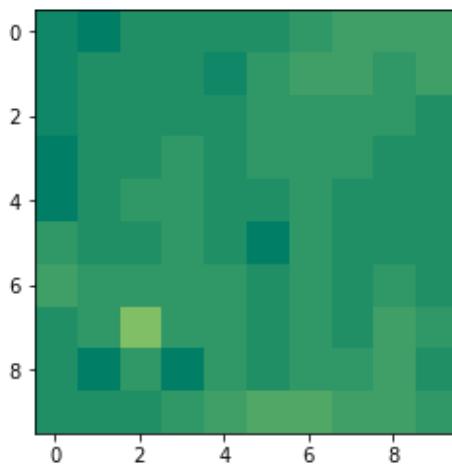
Updated direction: [ 0 1 ]



Step: 196

Updated position: [ 9 7 ]

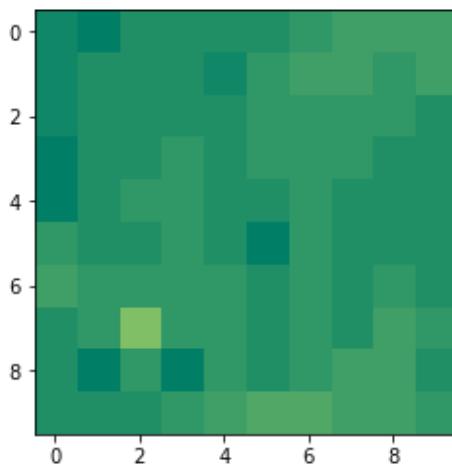
Updated direction: [ -1 0 ]



Step: 197

Updated position: [ 8 7 ]

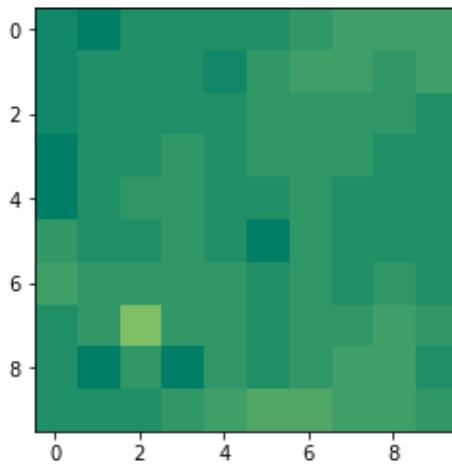
Updated direction: [ -1 0 ]



Step: 198

Updated position: [ 7 7 ]

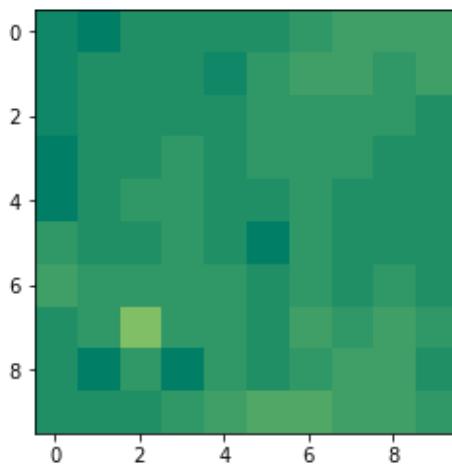
Updated direction: [ 0 -1 ]



Step: 199

Updated position: [ 7 6 ]

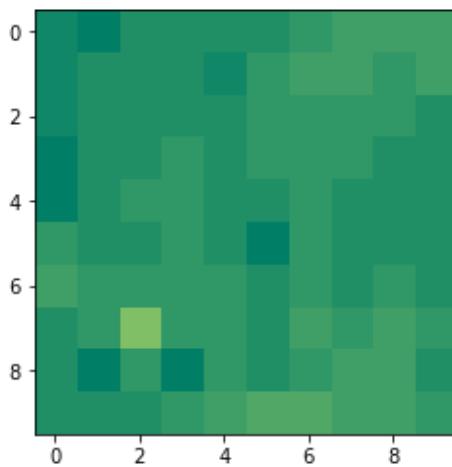
Updated direction: [ -1 0 ]



Step: 200

Updated position: [ 6 6 ]

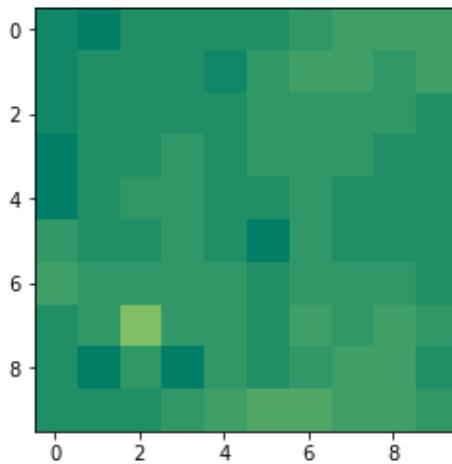
Updated direction: [ 0 1 ]



Step: 201

Updated position: [ 6 7 ]

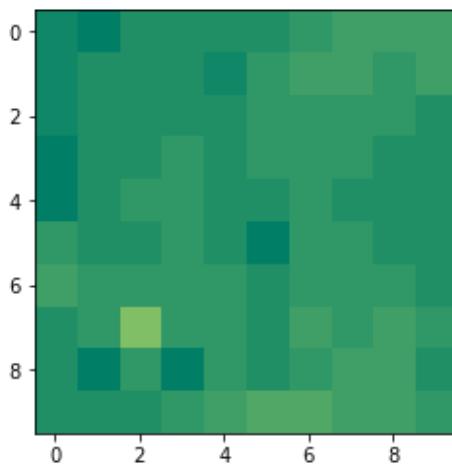
Updated direction: [ -1 0 ]



Step: 202

Updated position: [ 5 7 ]

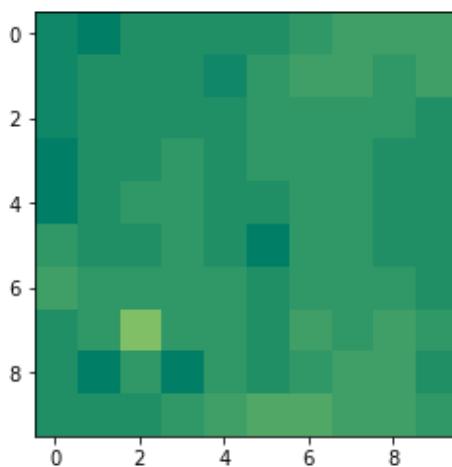
Updated direction: [ -1 0 ]



Step: 203

Updated position: [ 4 7 ]

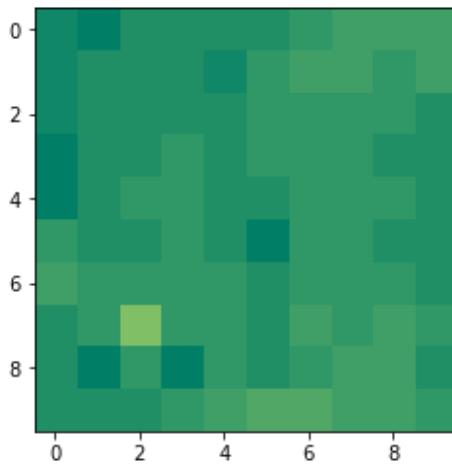
Updated direction: [ 0 1 ]



Step: 204

Updated position: [ 4 8 ]

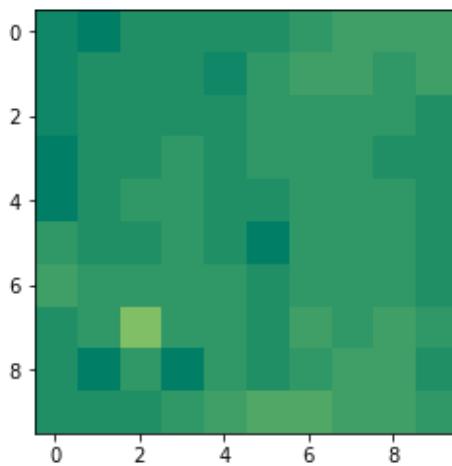
Updated direction: [ 1 0 ]



Step: 205

Updated position: [5 8]

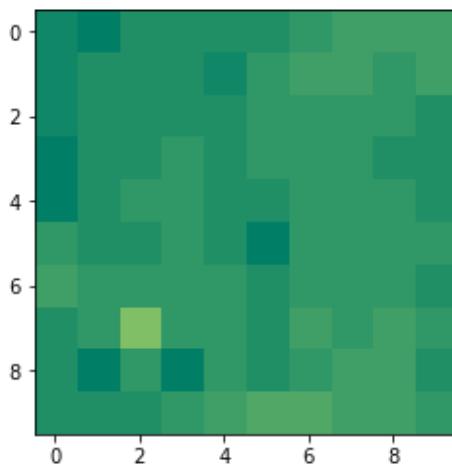
Updated direction: [0 1]



Step: 206

Updated position: [5 9]

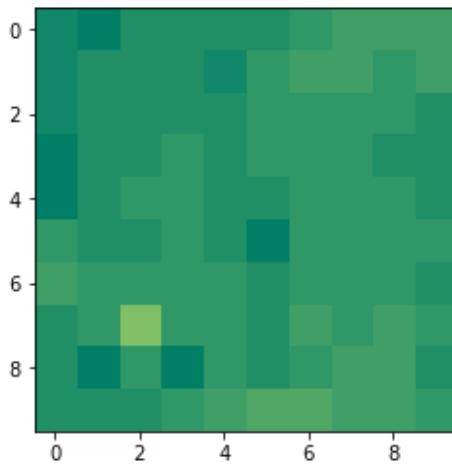
Updated direction: [1 0]



Step: 207

Updated position: [6 9]

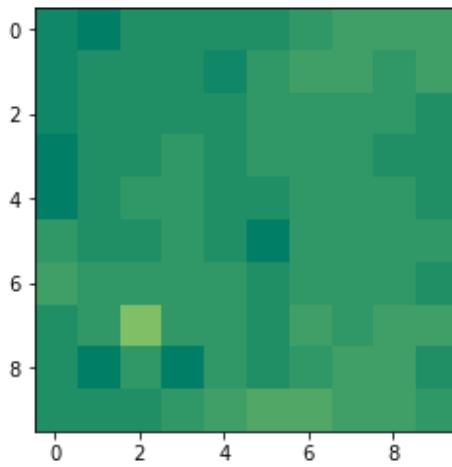
Updated direction: [1 0]



Step: 208

Updated position: [ 7 9 ]

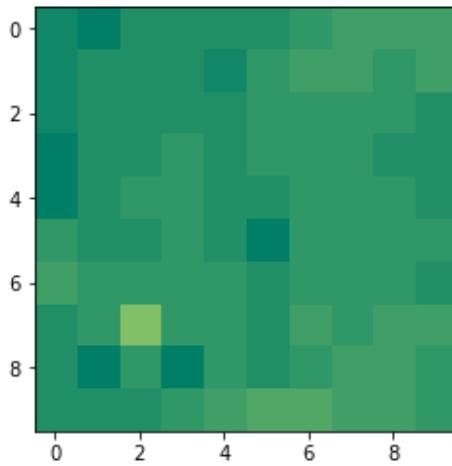
Updated direction: [ 1 0 ]



Step: 209

Updated position: [ 8 9 ]

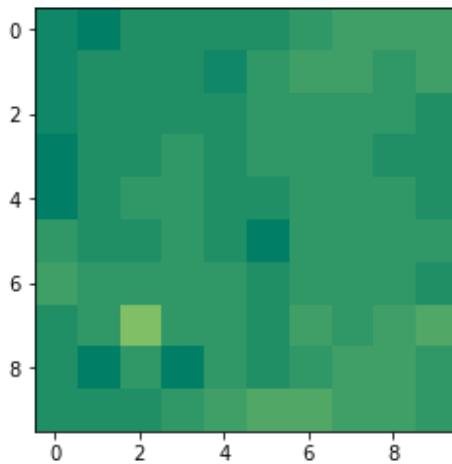
Updated direction: [ -1 0 ]



Step: 210

Updated position: [ 7 9 ]

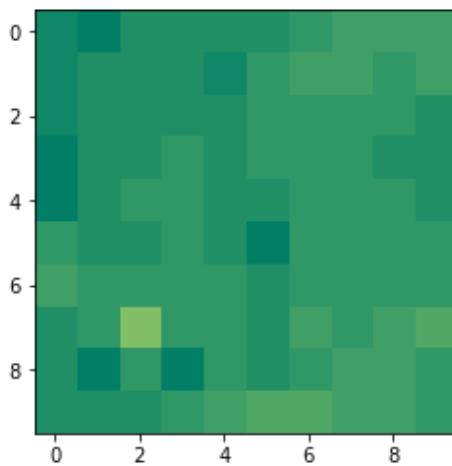
Updated direction: [ -1 0 ]



Step: 211

Updated position: [ 6 9 ]

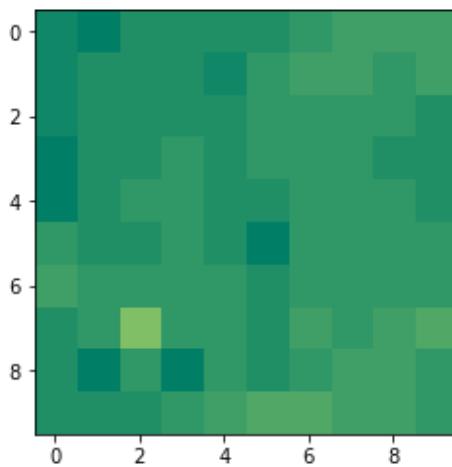
Updated direction: [-1 0 ]



Step: 212

Updated position: [ 5 9 ]

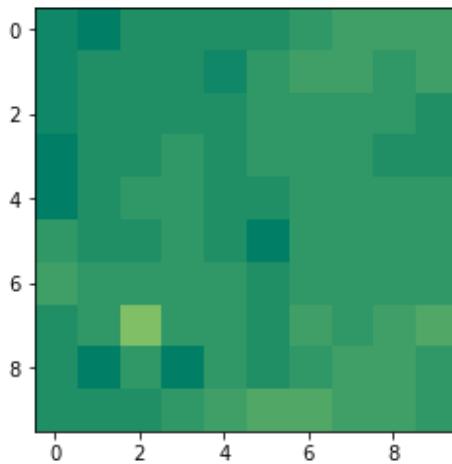
Updated direction: [-1 0 ]



Step: 213

Updated position: [ 4 9 ]

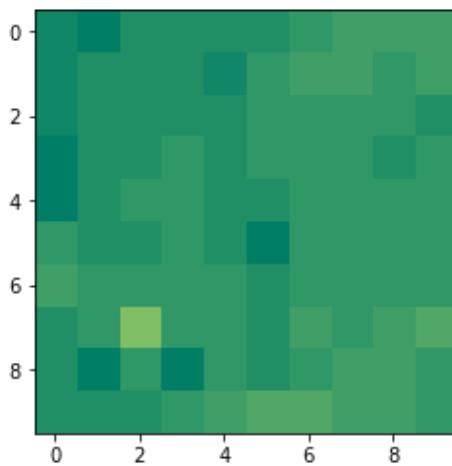
Updated direction: [-1 0 ]



Step: 214

Updated position: [ 3 9 ]

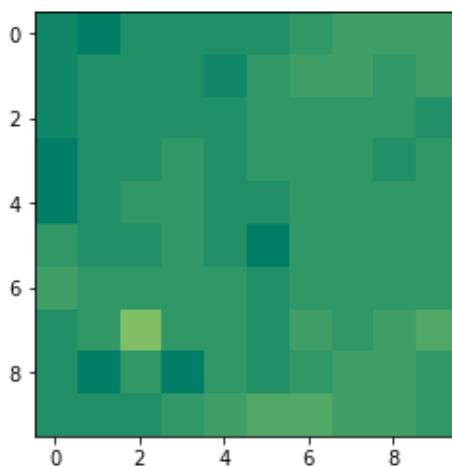
Updated direction: [ 0 -1 ]



Step: 215

Updated position: [ 3 8 ]

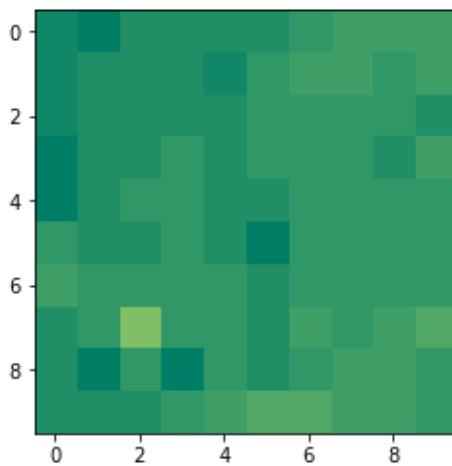
Updated direction: [ 0 1 ]



Step: 216

Updated position: [ 3 9 ]

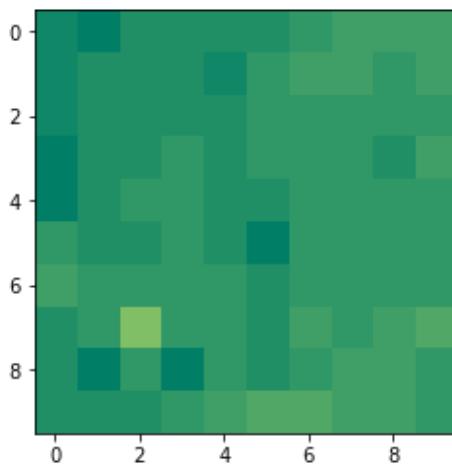
Updated direction: [-1 0 ]



Step: 217

Updated position: [ 2 9 ]

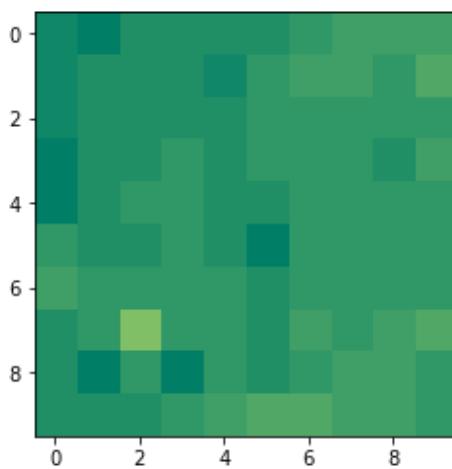
Updated direction: [-1 0 ]



Step: 218

Updated position: [ 1 9 ]

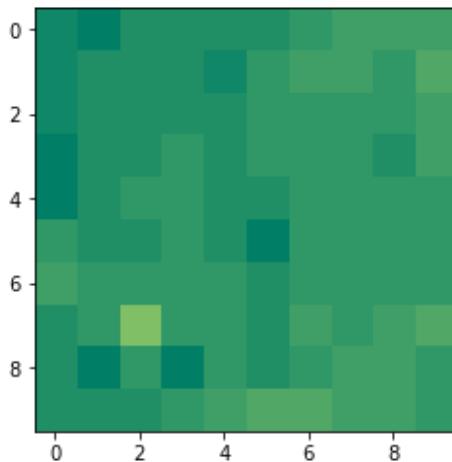
Updated direction: [ 1 0 ]



Step: 219

Updated position: [ 2 9 ]

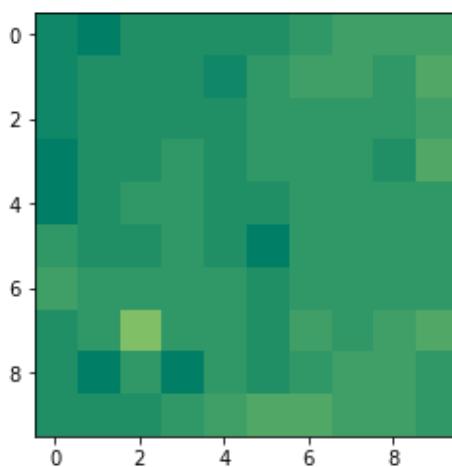
Updated direction: [ 1 0 ]



Step: 220

Updated position: [ 3 9 ]

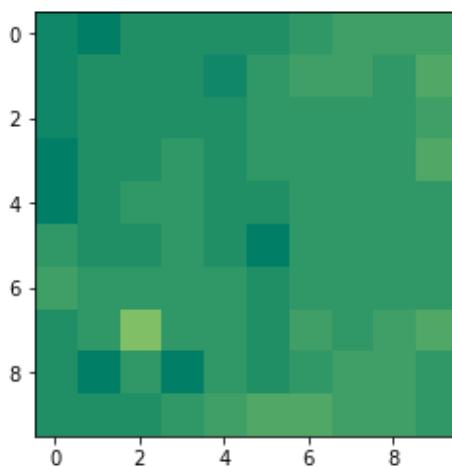
Updated direction: [ 0 -1 ]



Step: 221

Updated position: [ 3 8 ]

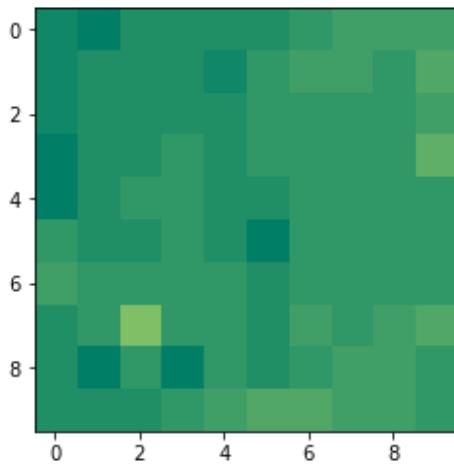
Updated direction: [ 0 1 ]



Step: 222

Updated position: [ 3 9 ]

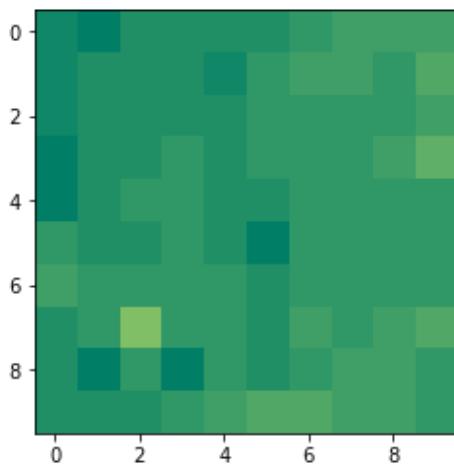
Updated direction: [ 0 -1 ]



Step: 223

Updated position: [ 3 8 ]

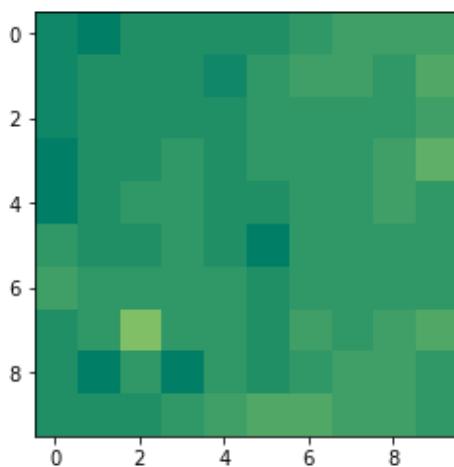
Updated direction: [ 1 0 ]



Step: 224

Updated position: [ 4 8 ]

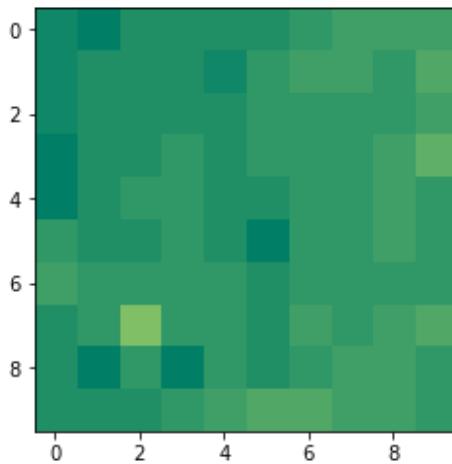
Updated direction: [ 1 0 ]



Step: 225

Updated position: [ 5 8 ]

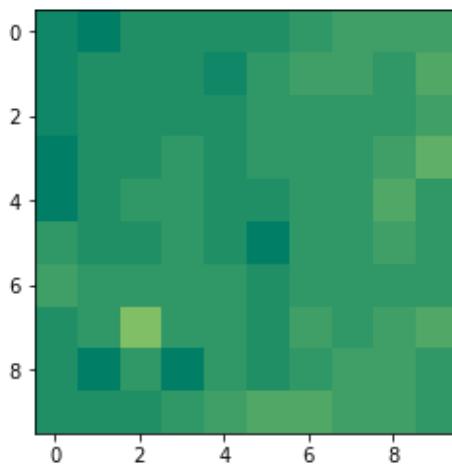
Updated direction: [ -1 0 ]



Step: 226

Updated position: [ 4 8 ]

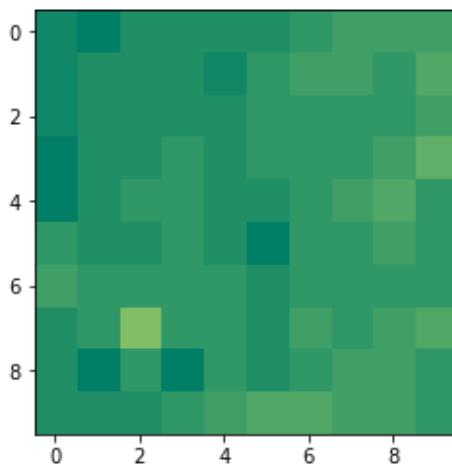
Updated direction: [ 0 -1 ]



Step: 227

Updated position: [ 4 7 ]

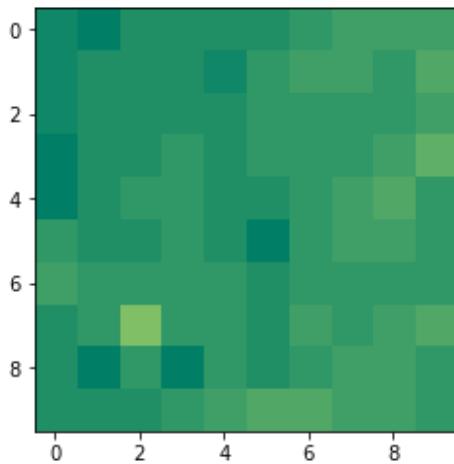
Updated direction: [ 1 0 ]



Step: 228

Updated position: [ 5 7 ]

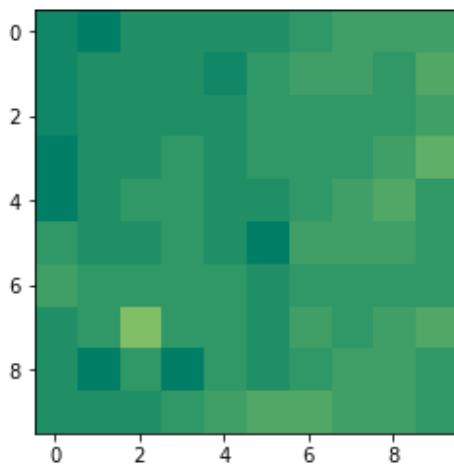
Updated direction: [ 0 -1 ]



Step: 229

Updated position: [ 5 6 ]

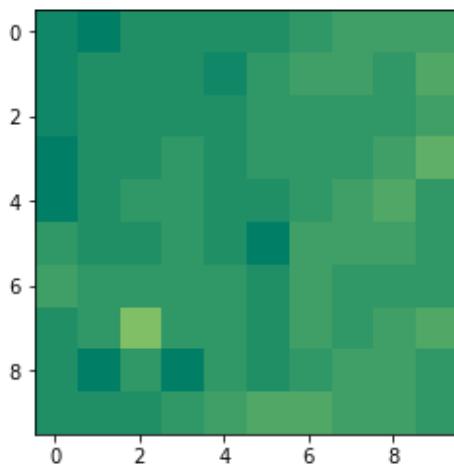
Updated direction: [ 1 0 ]



Step: 230

Updated position: [ 6 6 ]

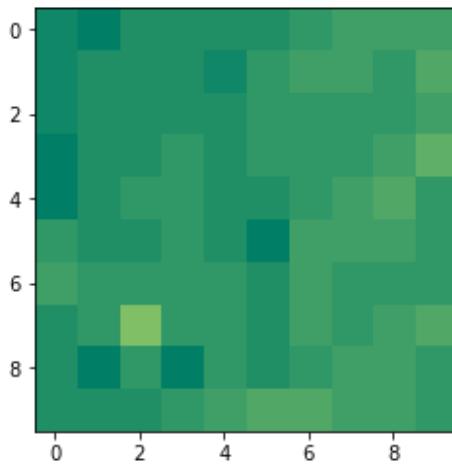
Updated direction: [ 0 -1 ]



Step: 231

Updated position: [ 6 5 ]

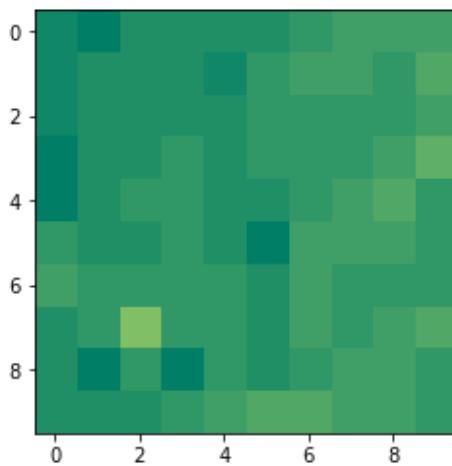
Updated direction: [ 0 -1 ]



Step: 232

Updated position: [ 6 4 ]

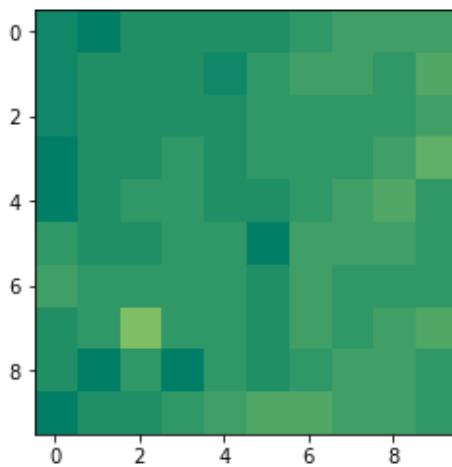
Updated direction: [ -1 0 ]



Step: 233

Updated position: [ 5 4 ]

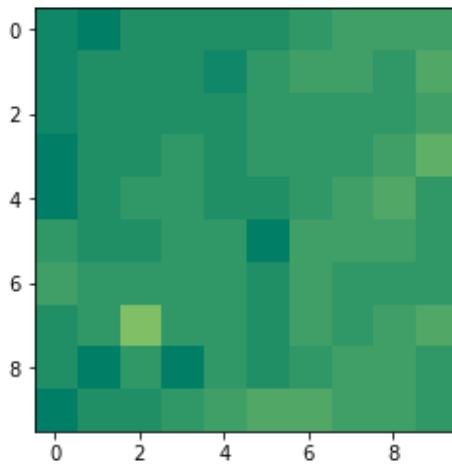
Updated direction: [ 0 -1 ]



Step: 234

Updated position: [ 5 3 ]

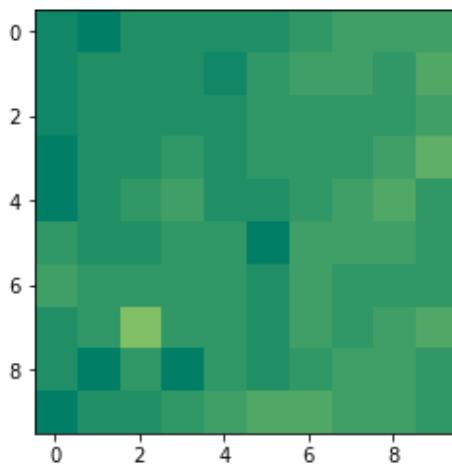
Updated direction: [ -1 0 ]



Step: 235

Updated position: [ 4 3 ]

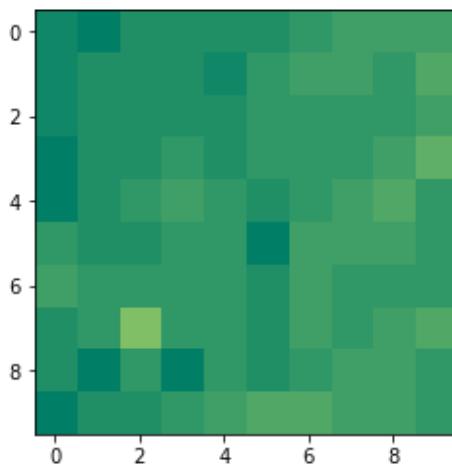
Updated direction: [ 0 1 ]



Step: 236

Updated position: [ 4 4 ]

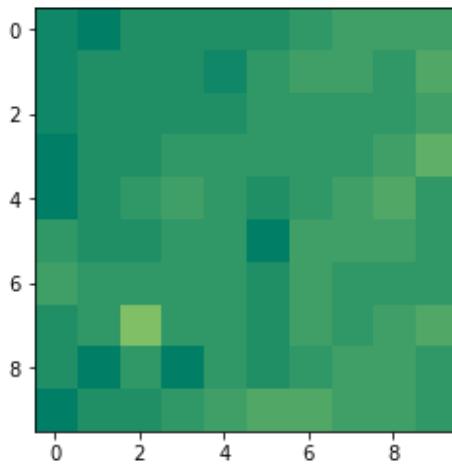
Updated direction: [ -1 0 ]



Step: 237

Updated position: [ 3 4 ]

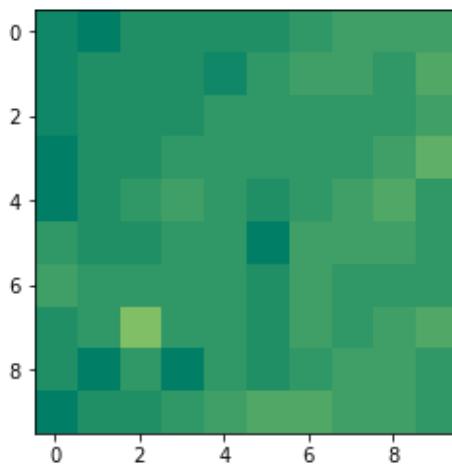
Updated direction: [ -1 0 ]



Step: 238

Updated position: [ 2 4 ]

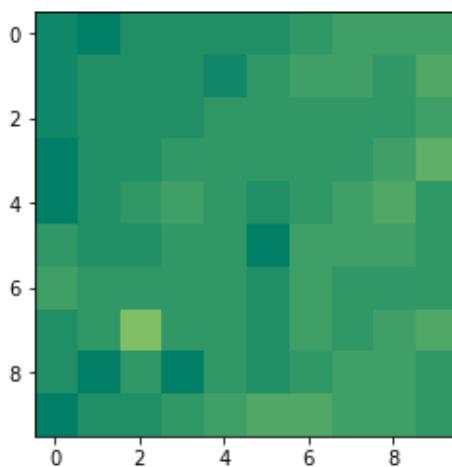
Updated direction: [-1 0 ]



Step: 239

Updated position: [ 1 4 ]

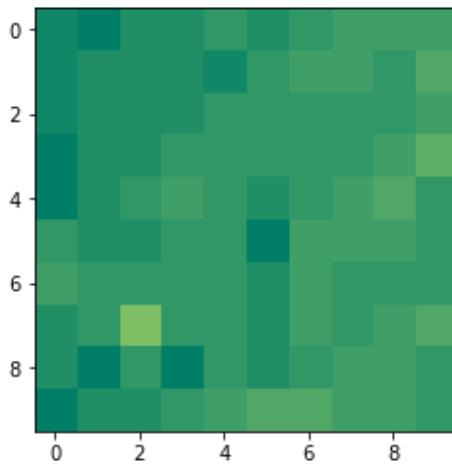
Updated direction: [-1 0 ]



Step: 240

Updated position: [ 0 4 ]

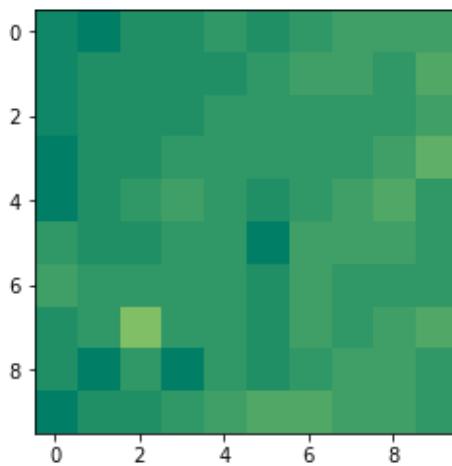
Updated direction: [ 1 0 ]



Step: 241

Updated position: [1 4]

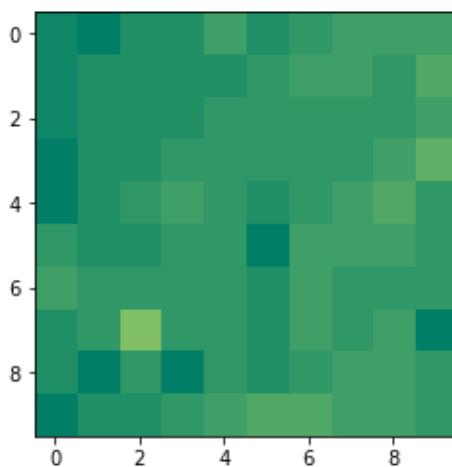
Updated direction: [-1 0]



Step: 242

Updated position: [0 4]

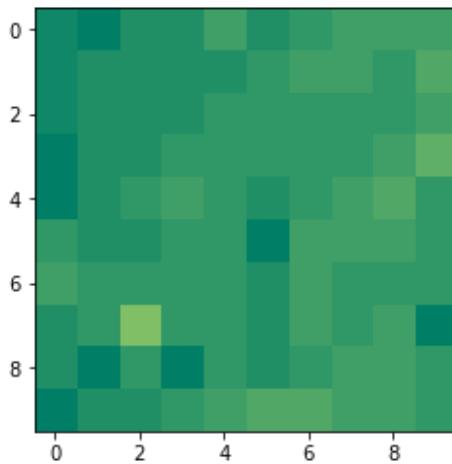
Updated direction: [1 0]



Step: 243

Updated position: [1 4]

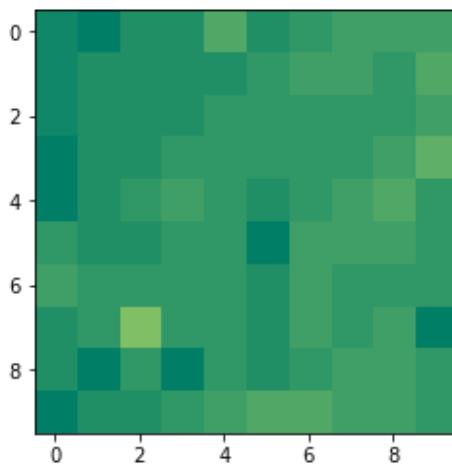
Updated direction: [-1 0]



Step: 244

Updated position: [ 0 4 ]

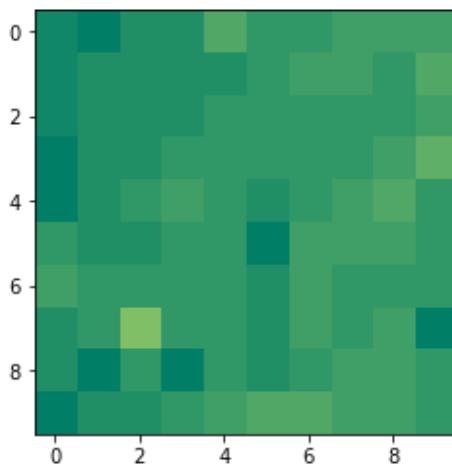
Updated direction: [ 0 1 ]



Step: 245

Updated position: [ 0 5 ]

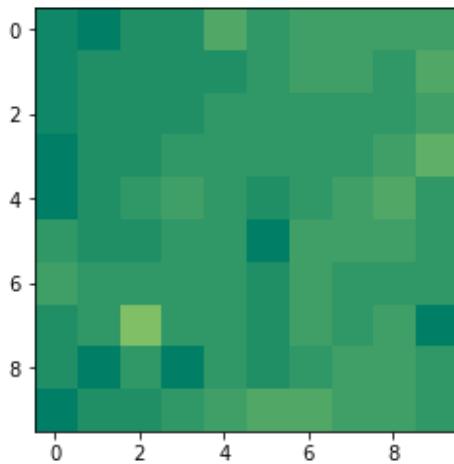
Updated direction: [ 0 1 ]



Step: 246

Updated position: [ 0 6 ]

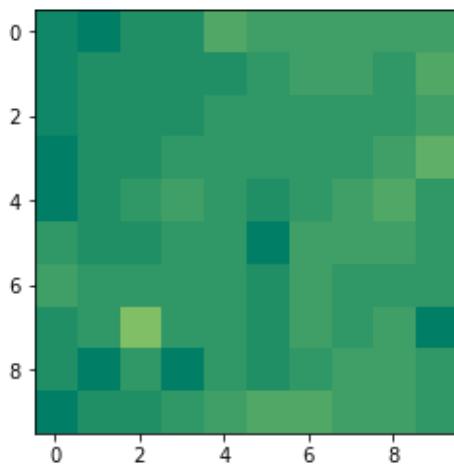
Updated direction: [ 0 -1 ]



Step: 247

Updated position: [0 5]

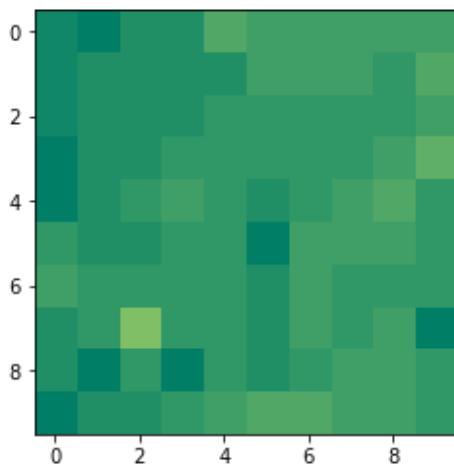
Updated direction: [1 0]



Step: 248

Updated position: [1 5]

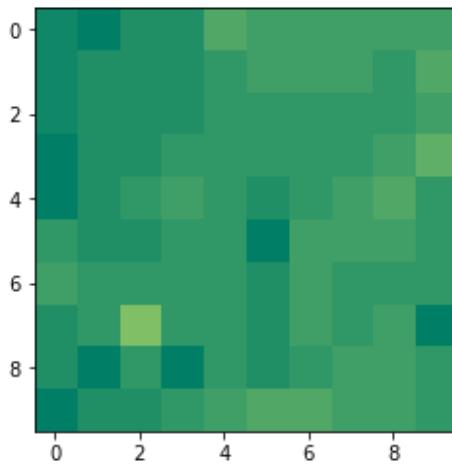
Updated direction: [0 -1]



Step: 249

Updated position: [1 4]

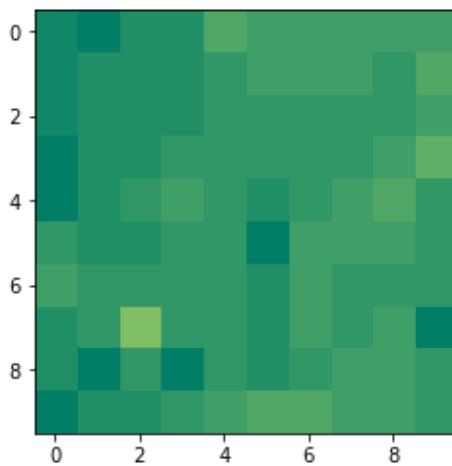
Updated direction: [1 0]



Step: 250

Updated position: [ 2 4 ]

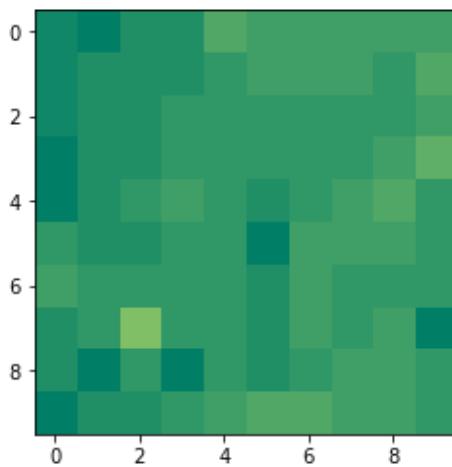
Updated direction: [ 0 -1 ]



Step: 251

Updated position: [ 2 3 ]

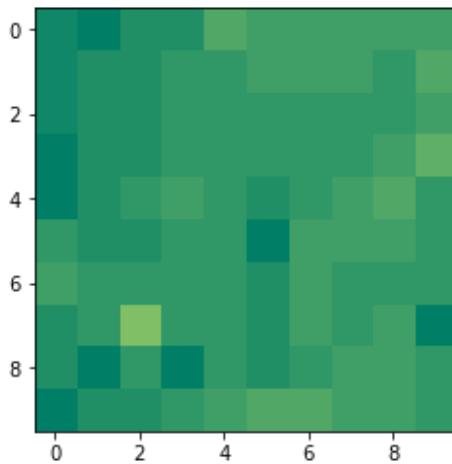
Updated direction: [-1 0]



Step: 252

Updated position: [ 1 3 ]

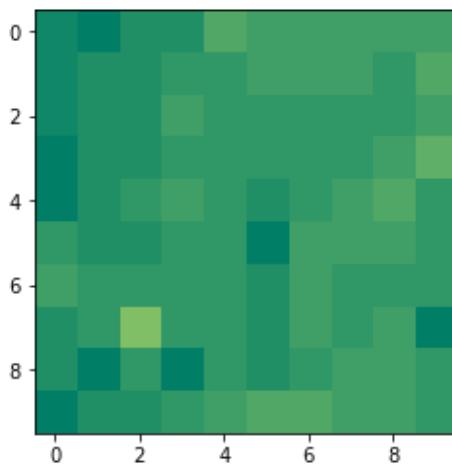
Updated direction: [ 1 0 ]



Step: 253

Updated position: [ 2 3 ]

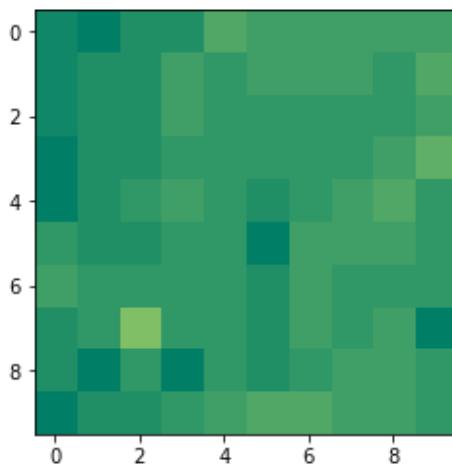
Updated direction: [ -1 0 ]



Step: 254

Updated position: [ 1 3 ]

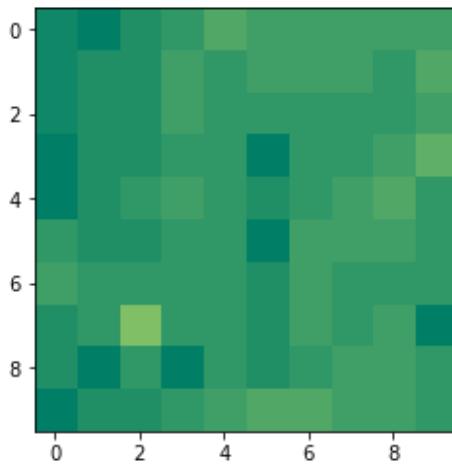
Updated direction: [ -1 0 ]



Step: 255

Updated position: [ 0 3 ]

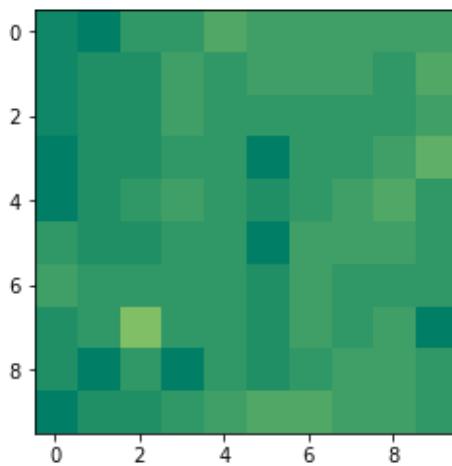
Updated direction: [ 0 -1 ]



Step: 256

Updated position: [0 2]

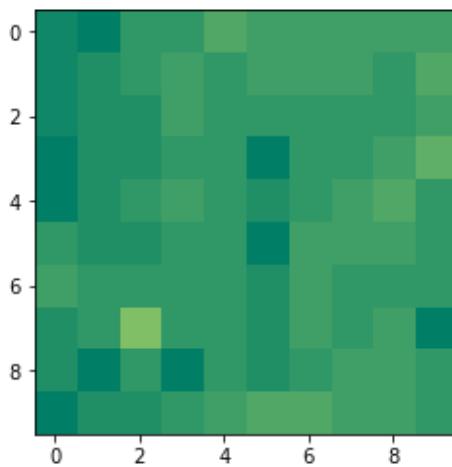
Updated direction: [1 0]



Step: 257

Updated position: [1 2]

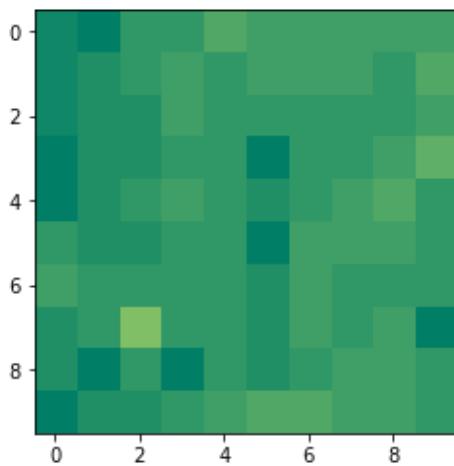
Updated direction: [1 0]



Step: 258

Updated position: [2 2]

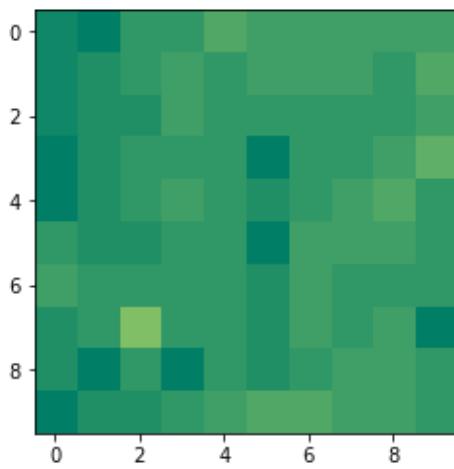
Updated direction: [1 0]



Step: 259

Updated position: [ 3 2 ]

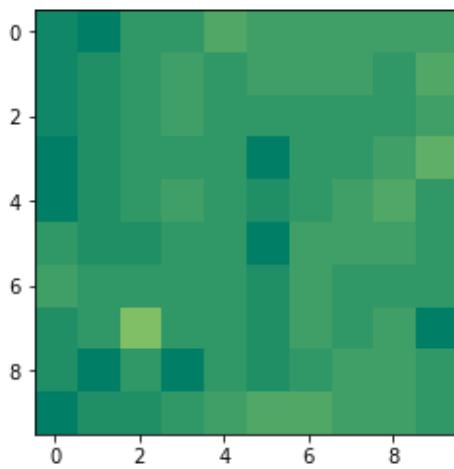
Updated direction: [ -1 0 ]



Step: 260

Updated position: [ 2 2 ]

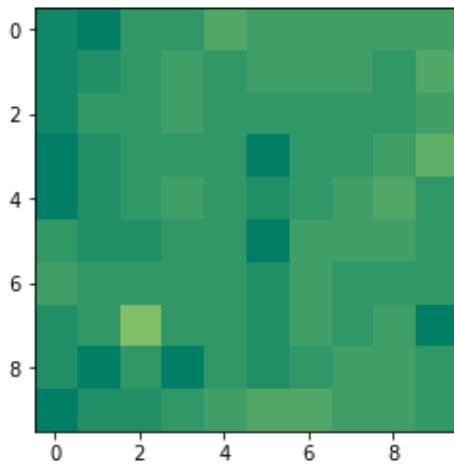
Updated direction: [ 0 -1 ]



Step: 261

Updated position: [ 2 1 ]

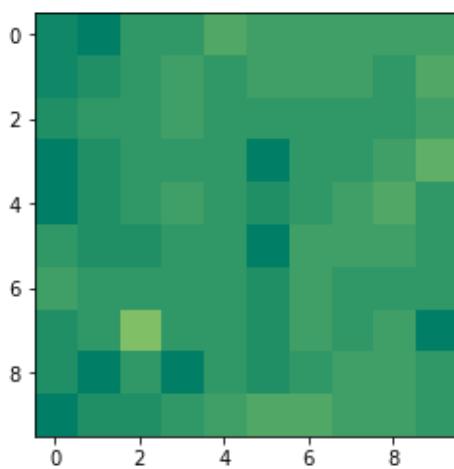
Updated direction: [ 0 -1 ]



Step: 262

Updated position: [ 2 0 ]

Updated direction: [ 0 1 ]



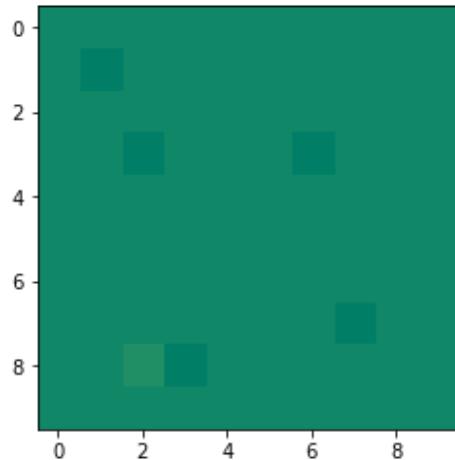
Total amount of time: 1874

```
In [165]: # Visualization of the floor - Roomba 3
roomba_3 = RoombaSimulation(0.05, 0.05, 0.05, 0.05, 0.8, 10)
roomba_3.initialize()
steps_3 = 0
while len(np.where(roomba_3.config == 0)[0]) > 0.02*roomba_1.size**2 and
steps_3 < 1000:
    print("Step: " + str(steps_3))
    roomba_3.cell_change()
    print("Updated position: " + str(roomba_3.pos))
    roomba_3.roomba_3()
    print("Updated direction: " + str(roomba_3.current_dir))
    steps_3 += 1
    plt.cla()
    plt.imshow(roomba_3.config, vmin = -1, vmax = 15, cmap = cm.summer)
    plt.show()
print("Total amount of time: " + str(roomba_3.T))
```

Step: 0

Updated position: [ 8 2 ]

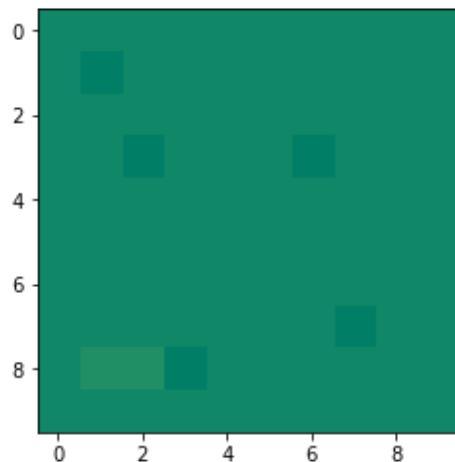
Updated direction: [ 0 -1 ]



Step: 1

Updated position: [ 8 1 ]

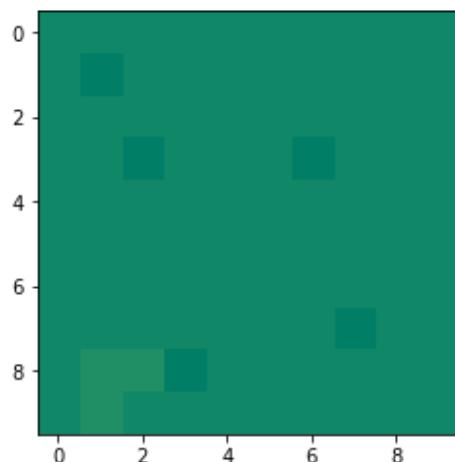
Updated direction: [ 1 0 ]



Step: 2

Updated position: [ 9 1 ]

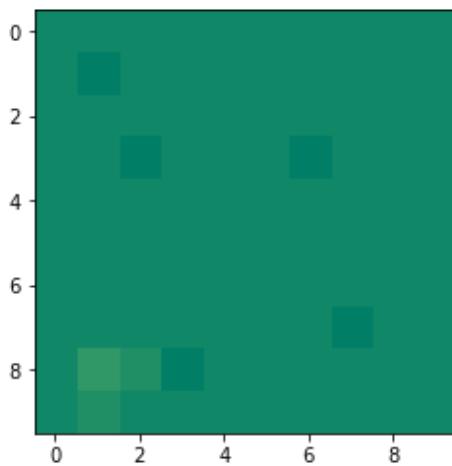
Updated direction: [-1 0 ]



Step: 3

Updated position: [ 8 1 ]

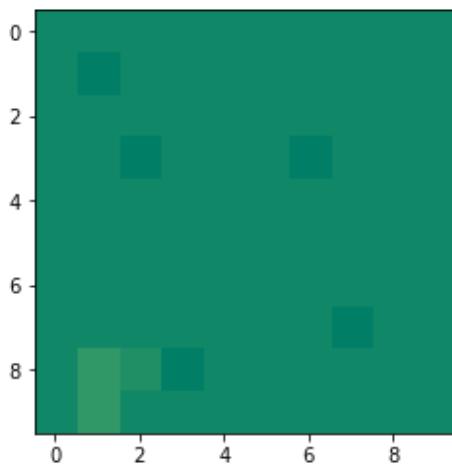
Updated direction: [ 1 0 ]



Step: 4

Updated position: [ 9 1 ]

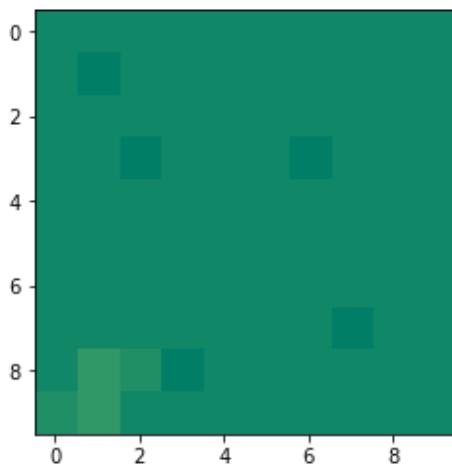
Updated direction: [ 0 -1 ]



Step: 5

Updated position: [ 9 0 ]

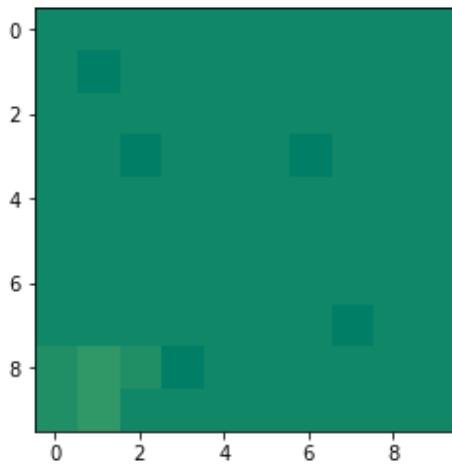
Updated direction: [-1 0 ]



Step: 6

Updated position: [ 8 0 ]

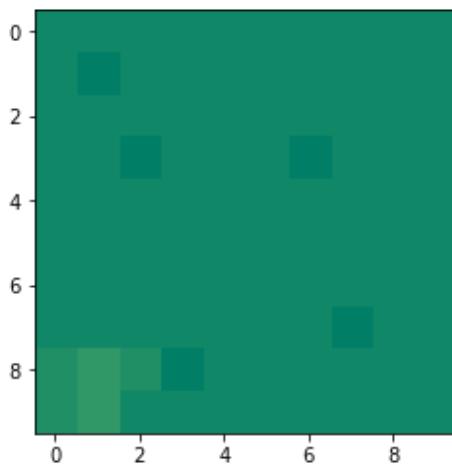
Updated direction: [-1 0 ]



Step: 7

Updated position: [ 7 0 ]

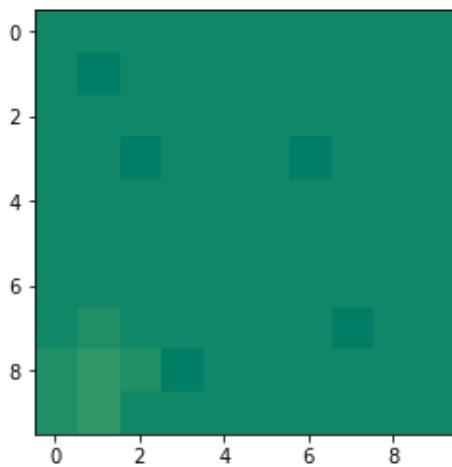
Updated direction: [ 0 1 ]



Step: 8

Updated position: [ 7 1 ]

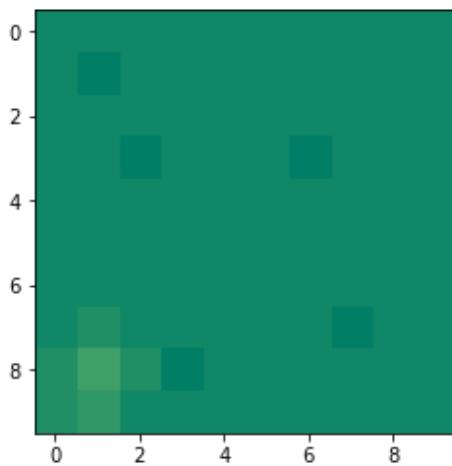
Updated direction: [ 1 0 ]



Step: 9

Updated position: [ 8 1 ]

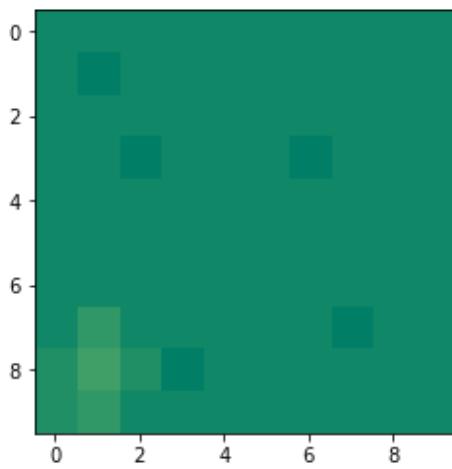
Updated direction: [ -1 0 ]



Step: 10

Updated position: [ 7 1 ]

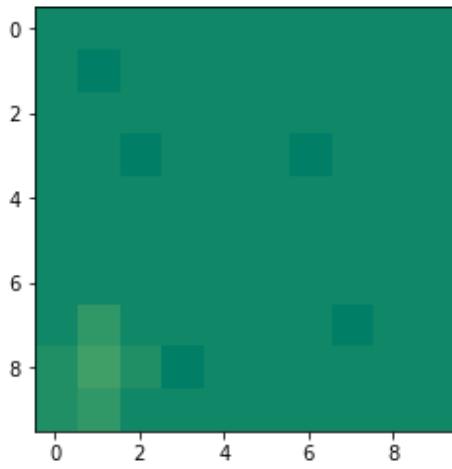
Updated direction: [ 1 0 ]



Step: 11

Updated position: [ 8 1 ]

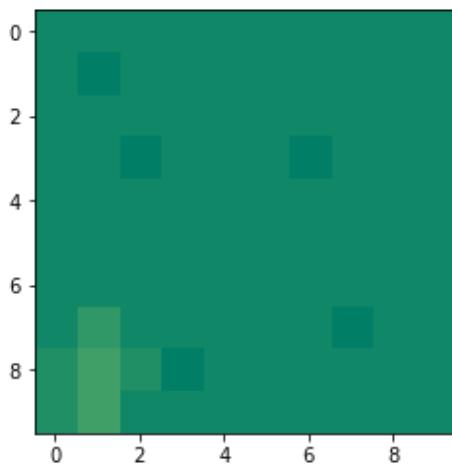
Updated direction: [ 1 0 ]



Step: 12

Updated position: [ 9 1 ]

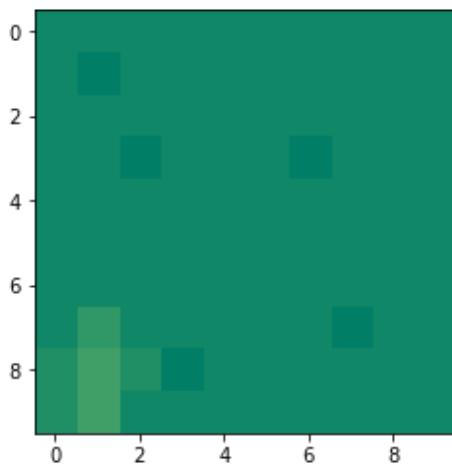
Updated direction: [ -1 0 ]



Step: 13

Updated position: [8 1]

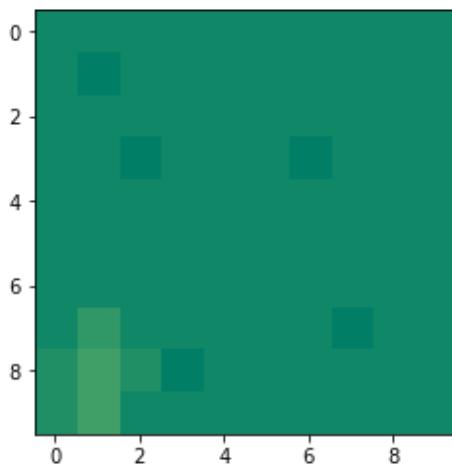
Updated direction: [ 0 -1 ]



Step: 14

Updated position: [8 0]

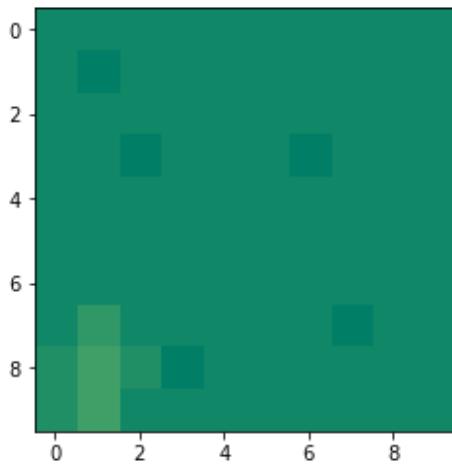
Updated direction: [ 0 1 ]



Step: 15

Updated position: [8 1]

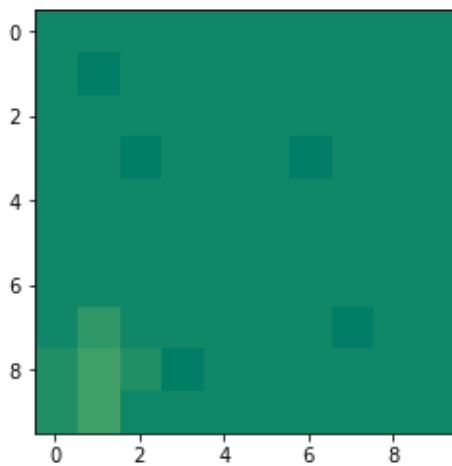
Updated direction: [ 1 0 ]



Step: 16

Updated position: [9 1]

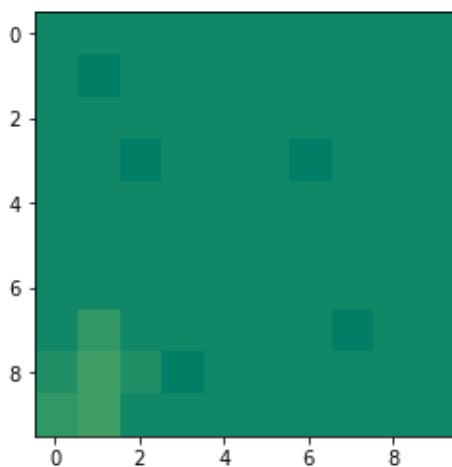
Updated direction: [ 0 -1 ]



Step: 17

Updated position: [9 0]

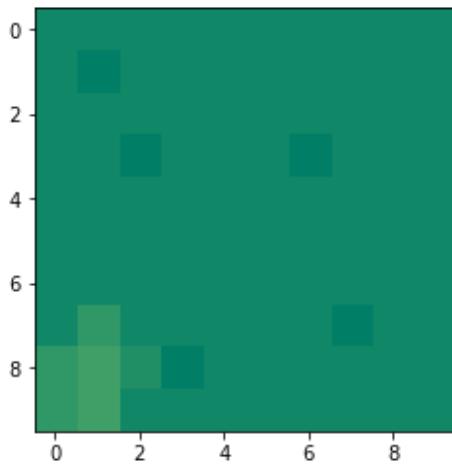
Updated direction: [-1 0 ]



Step: 18

Updated position: [8 0]

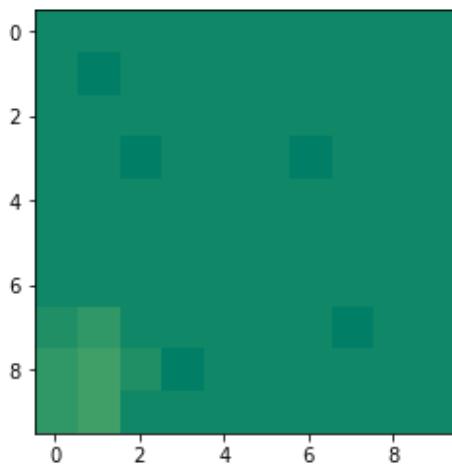
Updated direction: [-1 0 ]



Step: 19

Updated position: [ 7 0 ]

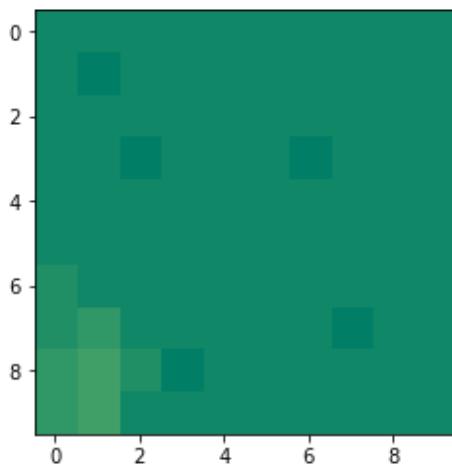
Updated direction: [-1 0 ]



Step: 20

Updated position: [ 6 0 ]

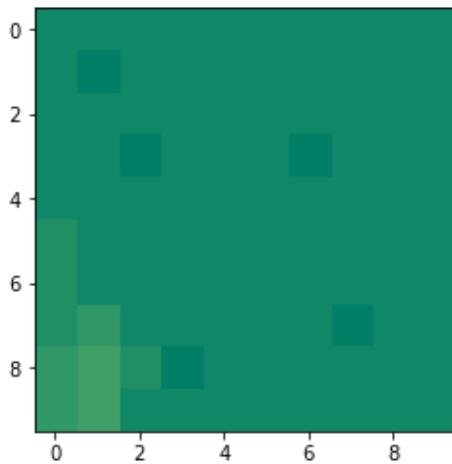
Updated direction: [-1 0 ]



Step: 21

Updated position: [ 5 0 ]

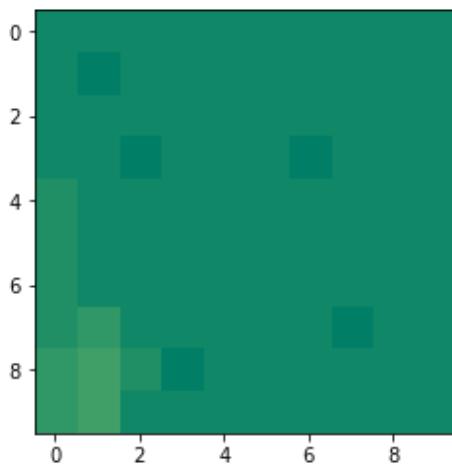
Updated direction: [-1 0 ]



Step: 22

Updated position: [ 4 0 ]

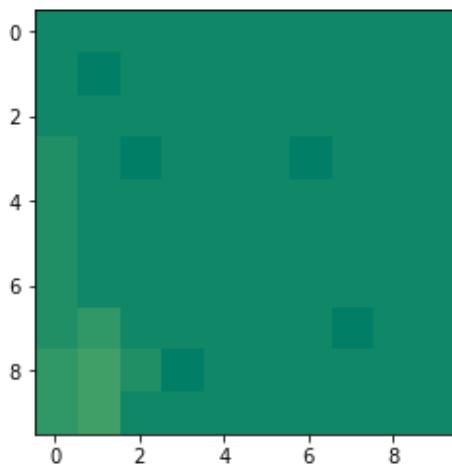
Updated direction: [ -1 0 ]



Step: 23

Updated position: [ 3 0 ]

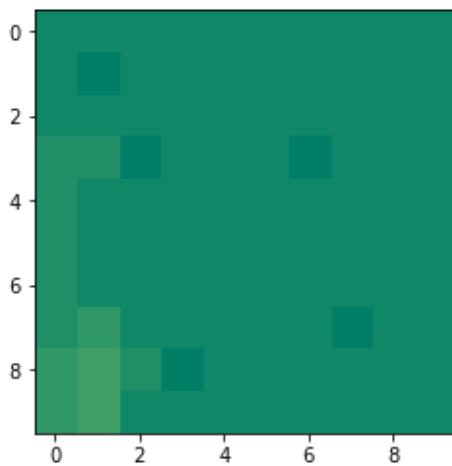
Updated direction: [ 0 1 ]



Step: 24

Updated position: [ 3 1 ]

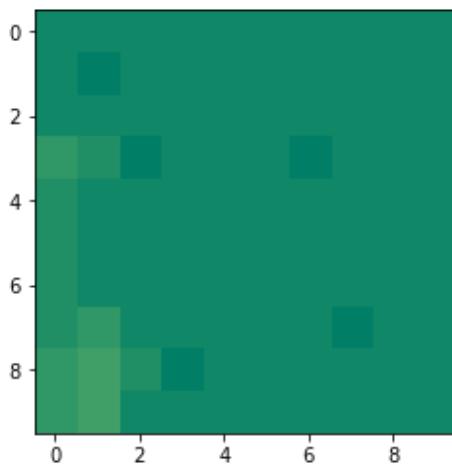
Updated direction: [ 0 -1 ]



Step: 25

Updated position: [ 3 0 ]

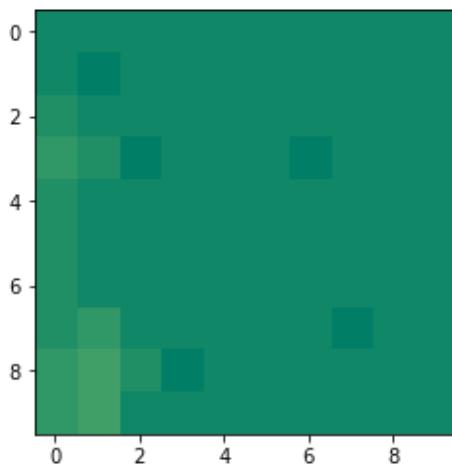
Updated direction: [ -1 0 ]



Step: 26

Updated position: [ 2 0 ]

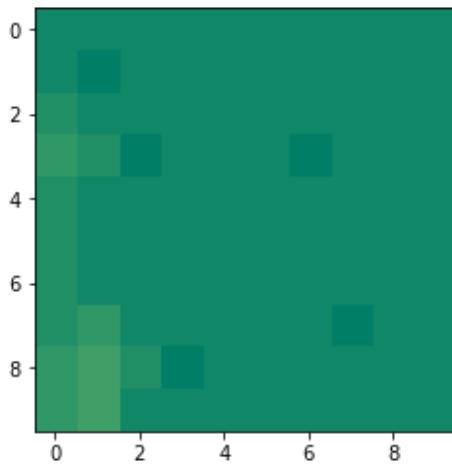
Updated direction: [ -1 0 ]



Step: 27

Updated position: [ 1 0 ]

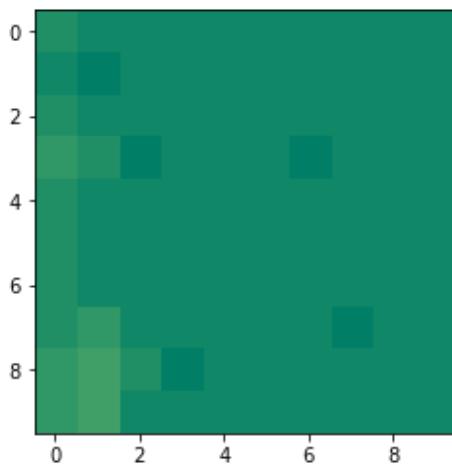
Updated direction: [ -1 0 ]



Step: 28

Updated position: [ 0 0 ]

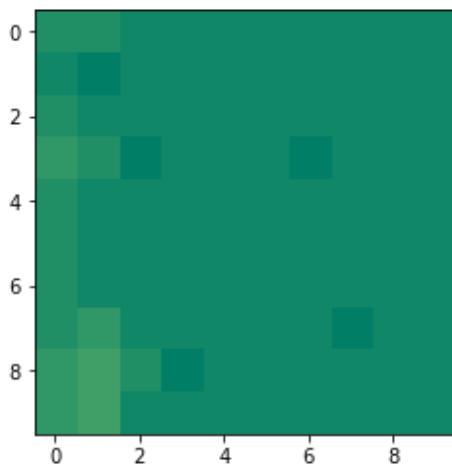
Updated direction: [ 0 1 ]



Step: 29

Updated position: [ 0 1 ]

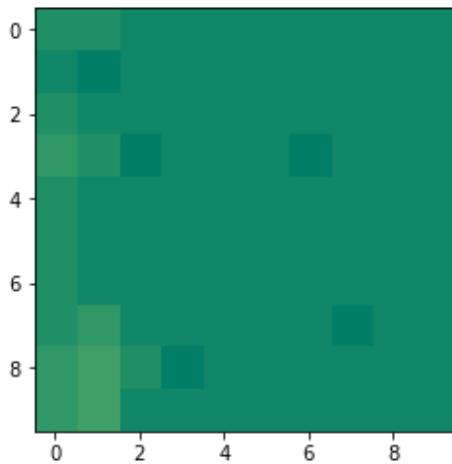
Updated direction: [ 0 1 ]



Step: 30

Updated position: [ 0 2 ]

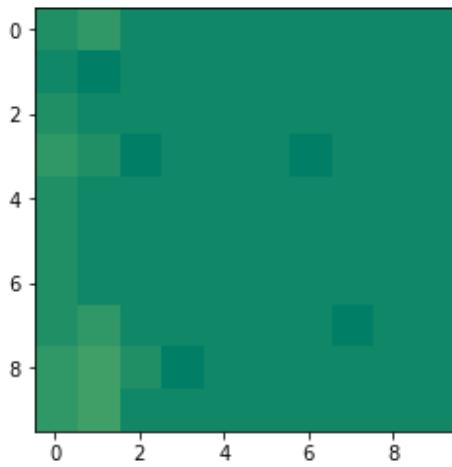
Updated direction: [ 0 -1 ]



Step: 31

Updated position: [ 0 1 ]

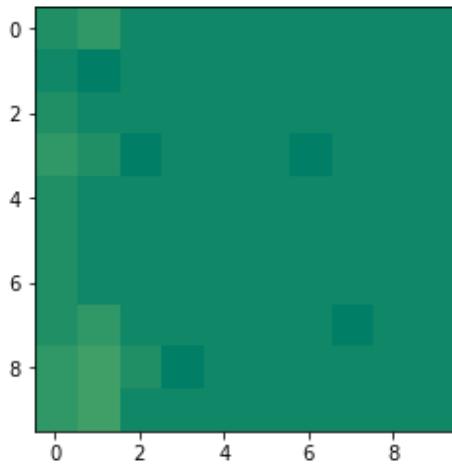
Updated direction: [ 0 -1 ]



Step: 32

Updated position: [ 0 0 ]

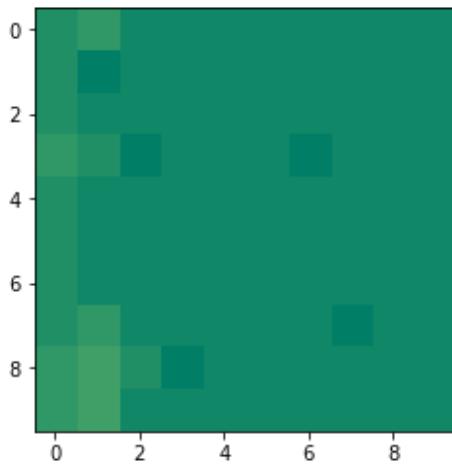
Updated direction: [ 1 0 ]



Step: 33

Updated position: [ 1 0 ]

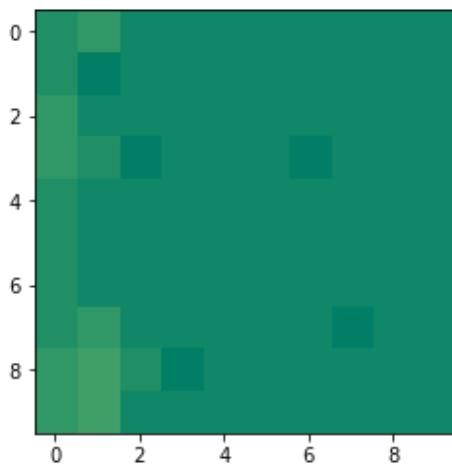
Updated direction: [ 1 0 ]



Step: 34

Updated position: [ 2 0 ]

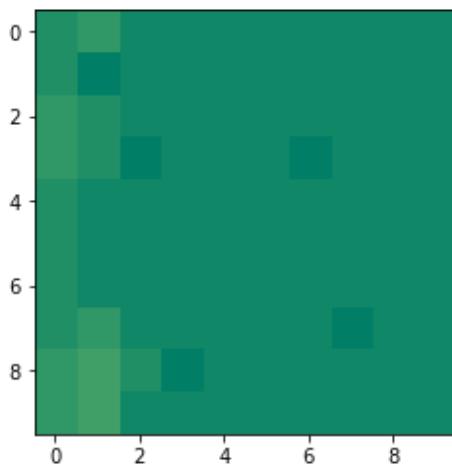
Updated direction: [ 0 1 ]



Step: 35

Updated position: [ 2 1 ]

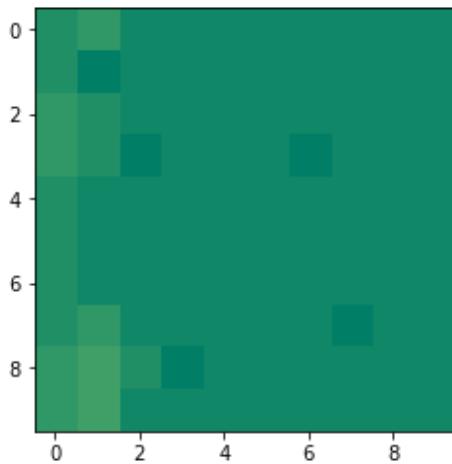
Updated direction: [ 1 0 ]



Step: 36

Updated position: [ 3 1 ]

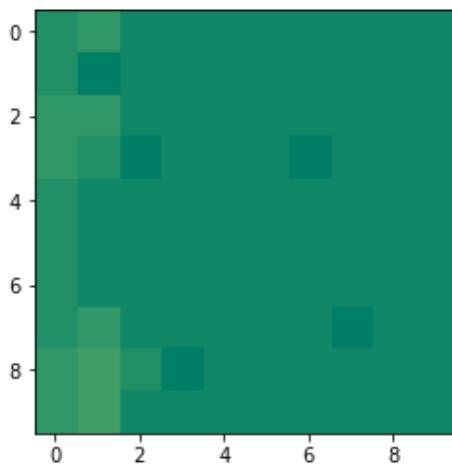
Updated direction: [ -1 0 ]



Step: 37

Updated position: [ 2 1 ]

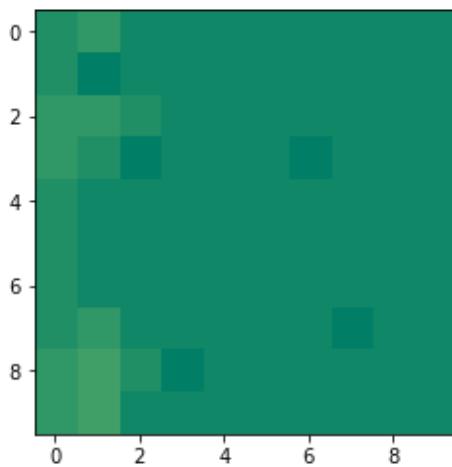
Updated direction: [ 0 1 ]



Step: 38

Updated position: [ 2 2 ]

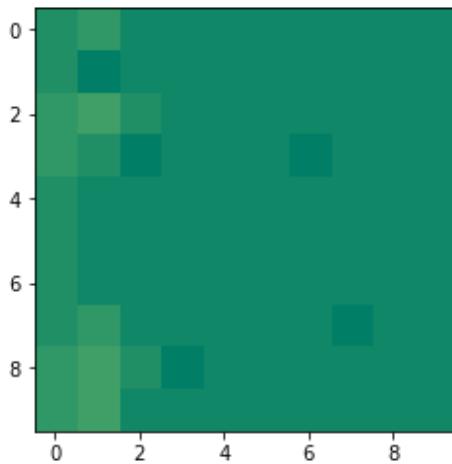
Updated direction: [ 0 -1 ]



Step: 39

Updated position: [ 2 1 ]

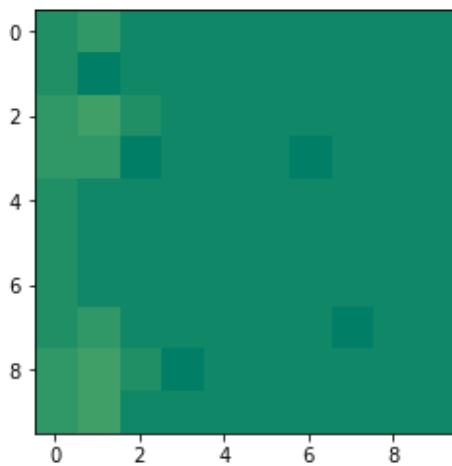
Updated direction: [ 1 0 ]



Step: 40

Updated position: [ 3 1 ]

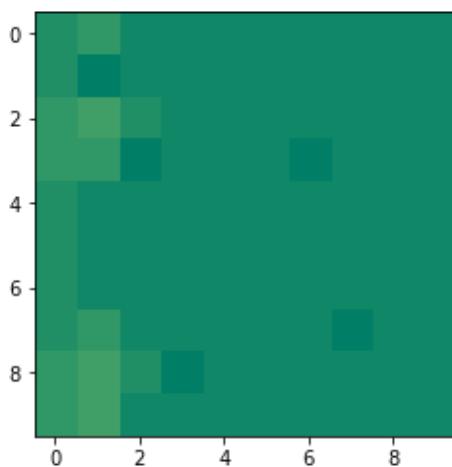
Updated direction: [ -1 0 ]



Step: 41

Updated position: [ 2 1 ]

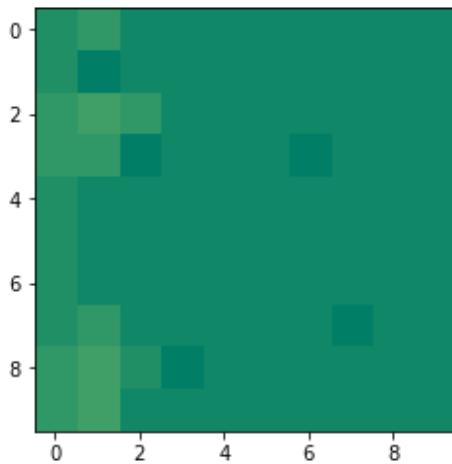
Updated direction: [ 0 1 ]



Step: 42

Updated position: [ 2 2 ]

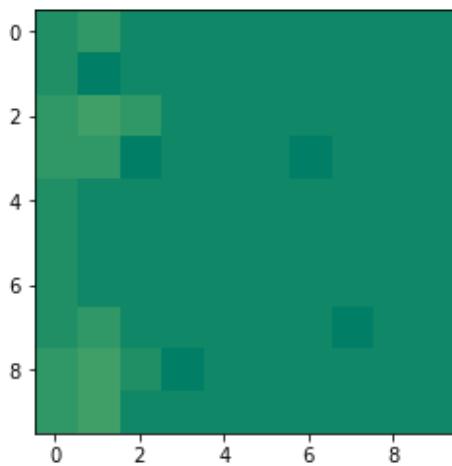
Updated direction: [ -1 0 ]



Step: 43

Updated position: [ 1 2 ]

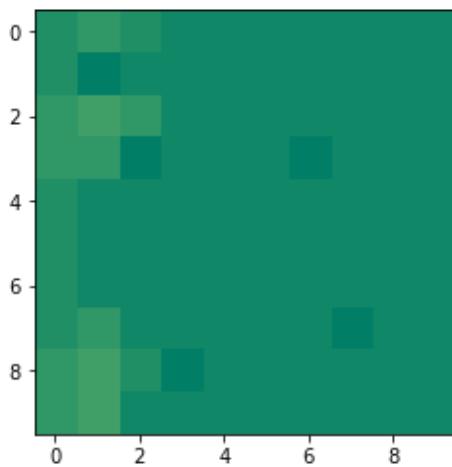
Updated direction: [ -1 0 ]



Step: 44

Updated position: [ 0 2 ]

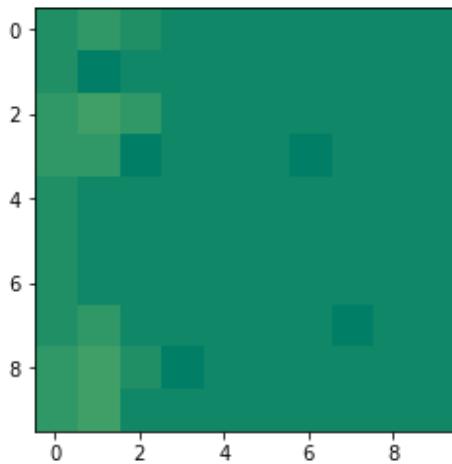
Updated direction: [ 1 0 ]



Step: 45

Updated position: [ 1 2 ]

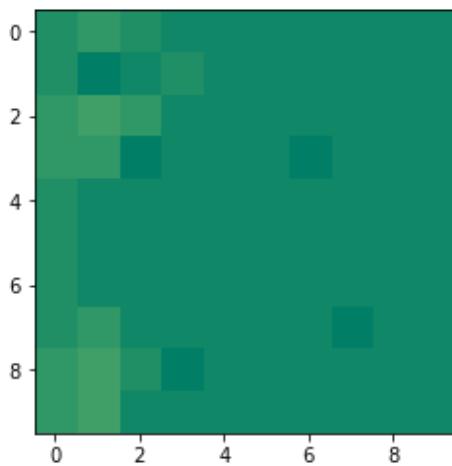
Updated direction: [ 0 1 ]



Step: 46

Updated position: [1 3]

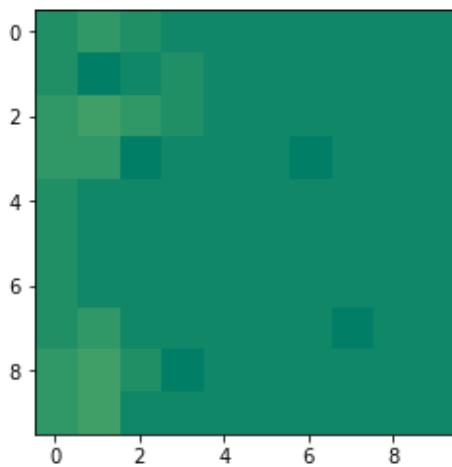
Updated direction: [1 0]



Step: 47

Updated position: [2 3]

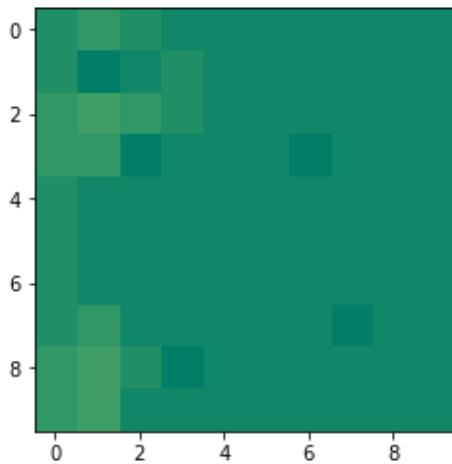
Updated direction: [0 1]



Step: 48

Updated position: [2 4]

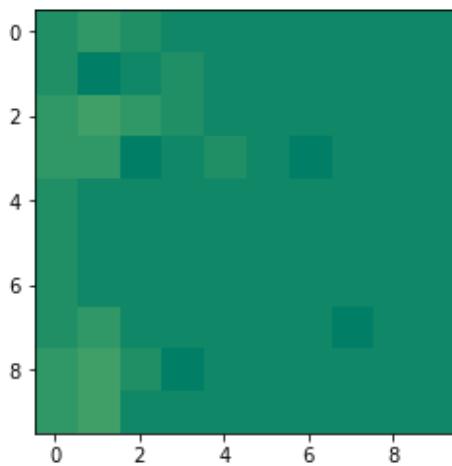
Updated direction: [1 0]



Step: 49

Updated position: [ 3 4 ]

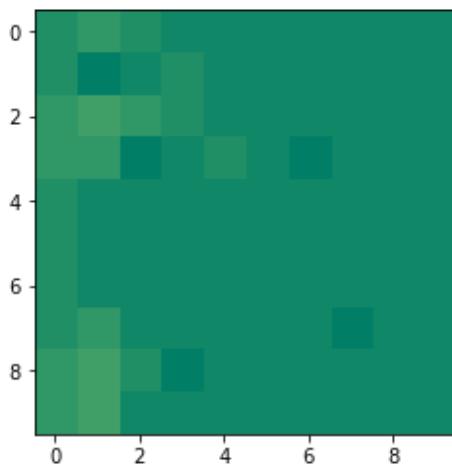
Updated direction: [ 1 0 ]



Step: 50

Updated position: [ 4 4 ]

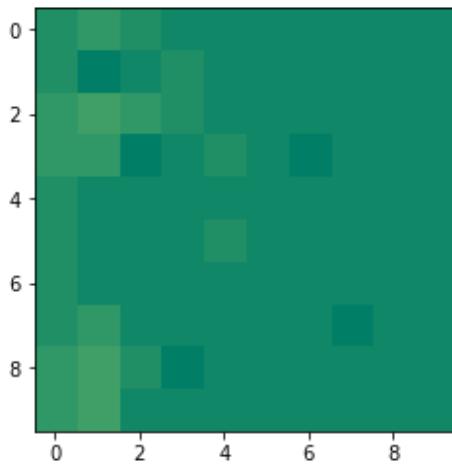
Updated direction: [ 1 0 ]



Step: 51

Updated position: [ 5 4 ]

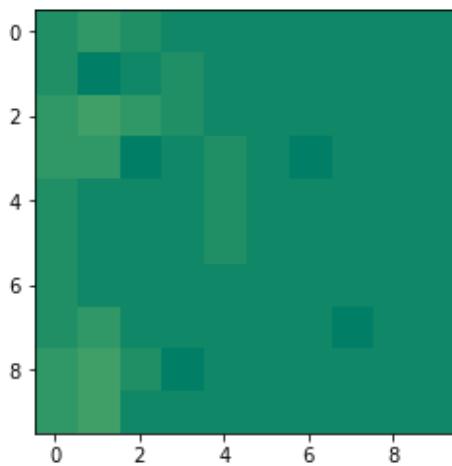
Updated direction: [ -1 0 ]



Step: 52

Updated position: [ 4 4 ]

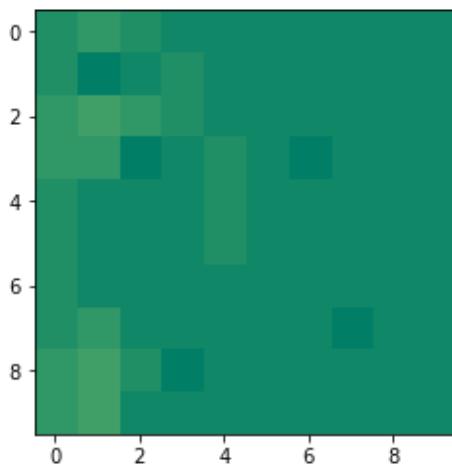
Updated direction: [ 0 -1 ]



Step: 53

Updated position: [ 4 3 ]

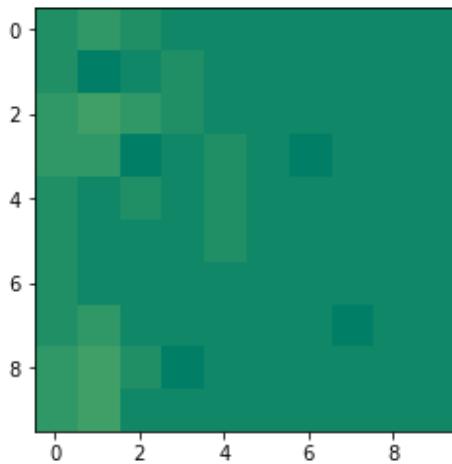
Updated direction: [ 0 -1 ]



Step: 54

Updated position: [ 4 2 ]

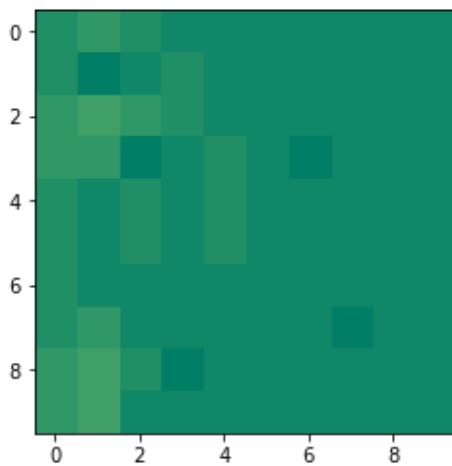
Updated direction: [ 1 0 ]



Step: 55

Updated position: [5 2]

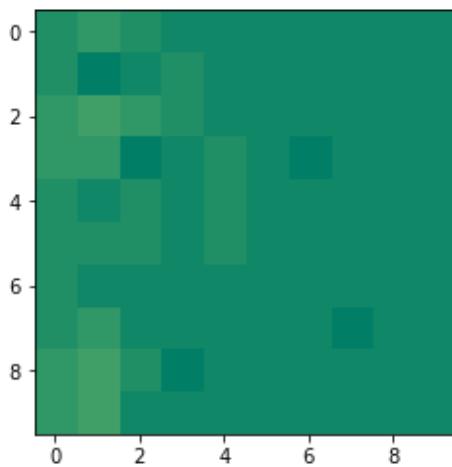
Updated direction: [ 0 -1 ]



Step: 56

Updated position: [5 1]

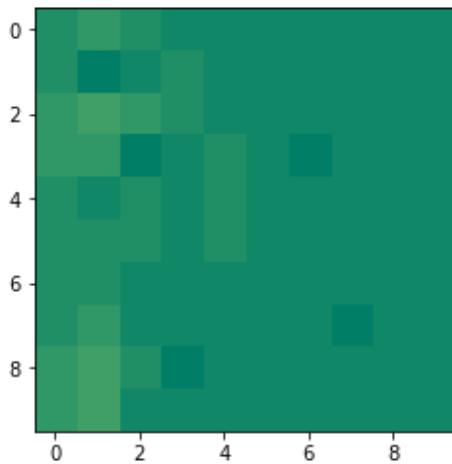
Updated direction: [1 0]



Step: 57

Updated position: [6 1]

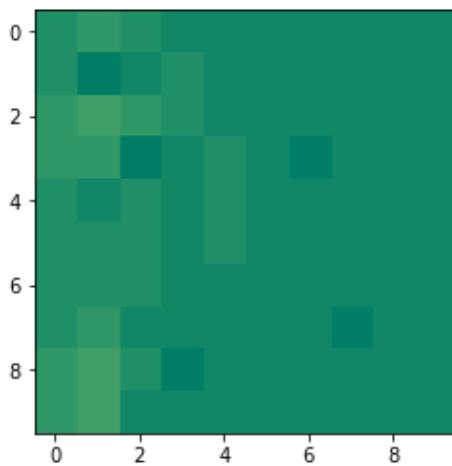
Updated direction: [0 1]



Step: 58

Updated position: [ 6 2 ]

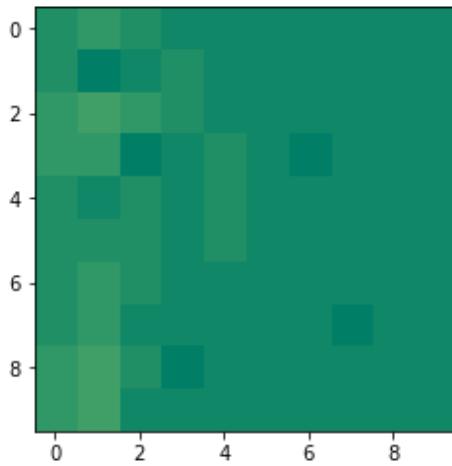
Updated direction: [ 0 -1 ]



Step: 59

Updated position: [ 6 1 ]

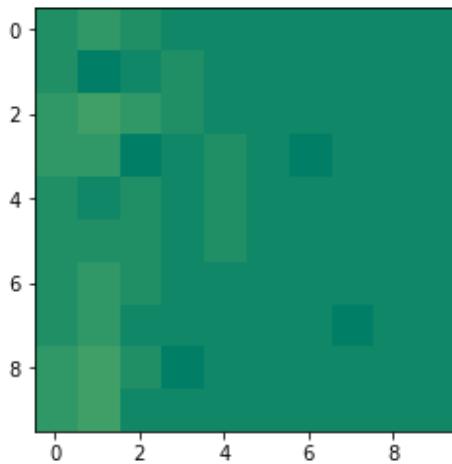
Updated direction: [-1 0 ]



Step: 60

Updated position: [ 5 1 ]

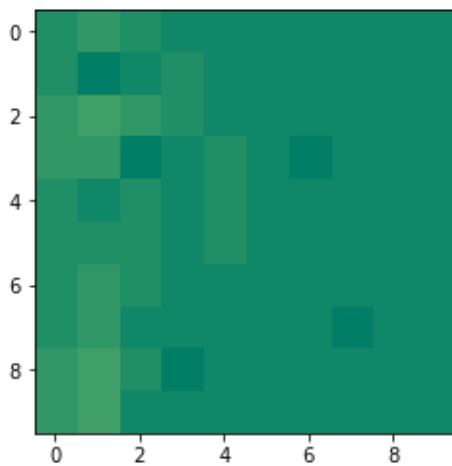
Updated direction: [-1 0 ]



Step: 61

Updated position: [ 4 1 ]

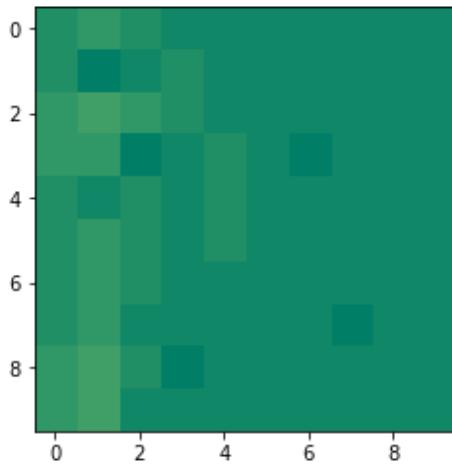
Updated direction: [ 1 0 ]



Step: 62

Updated position: [ 5 1 ]

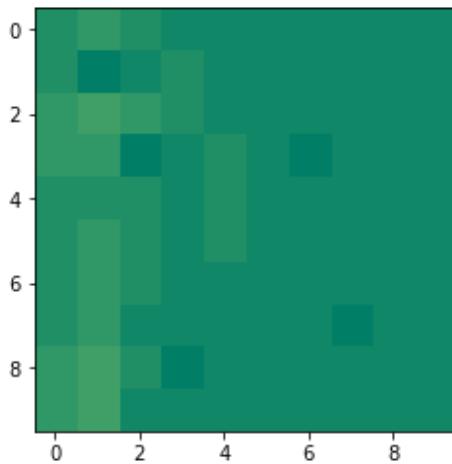
Updated direction: [ -1 0 ]



Step: 63

Updated position: [ 4 1 ]

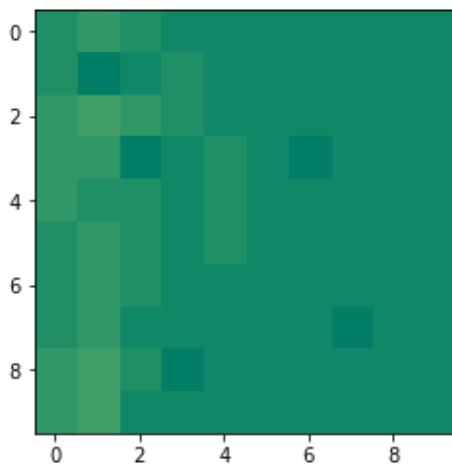
Updated direction: [ 0 -1 ]



Step: 64

Updated position: [ 4 0 ]

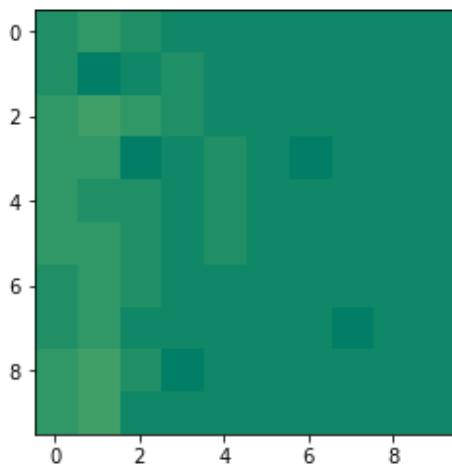
Updated direction: [ 1 0 ]



Step: 65

Updated position: [ 5 0 ]

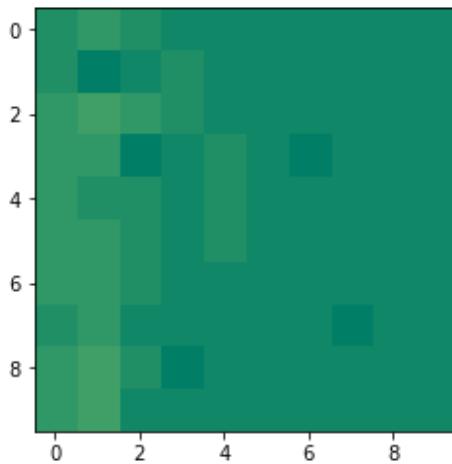
Updated direction: [ 1 0 ]



Step: 66

Updated position: [ 6 0 ]

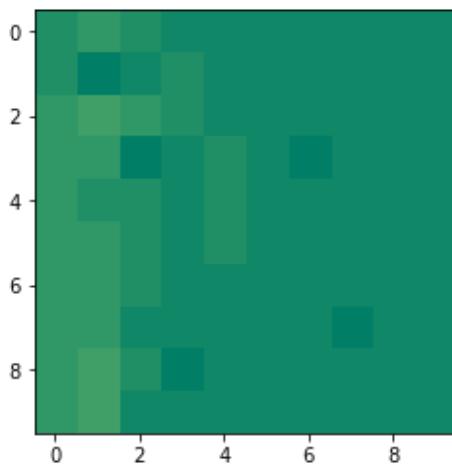
Updated direction: [ 1 0 ]



Step: 67

Updated position: [ 7 0 ]

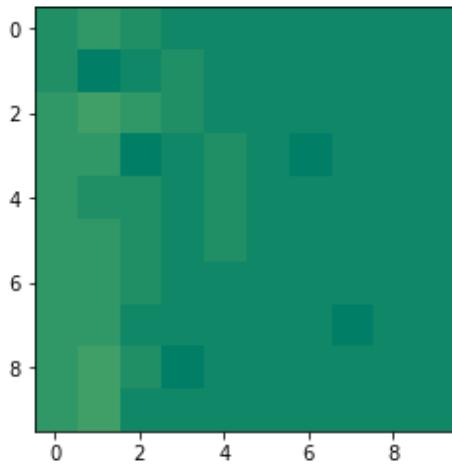
Updated direction: [ 1 0 ]



Step: 68

Updated position: [ 8 0 ]

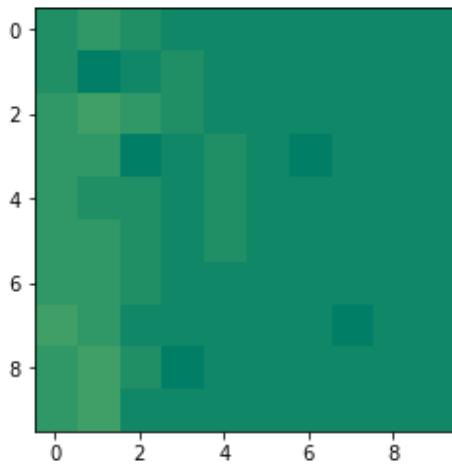
Updated direction: [ -1 0 ]



Step: 69

Updated position: [ 7 0 ]

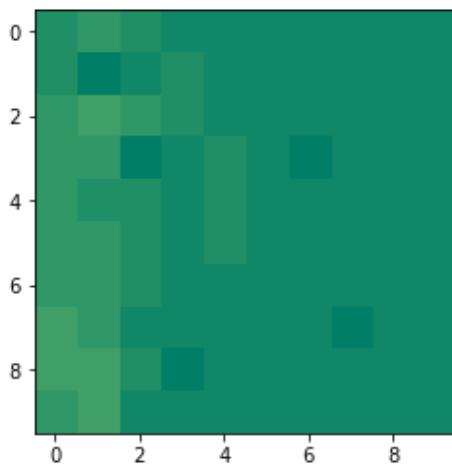
Updated direction: [ 1 0 ]



Step: 70

Updated position: [8 0]

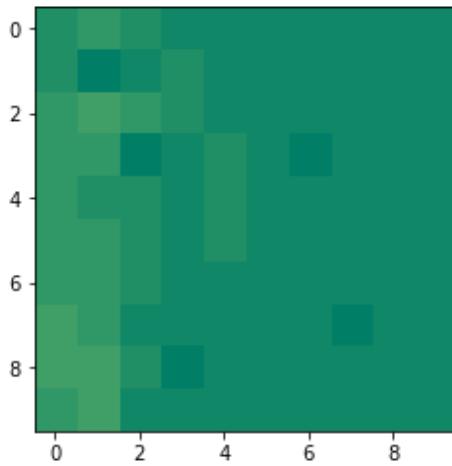
Updated direction: [1 0]



Step: 71

Updated position: [9 0]

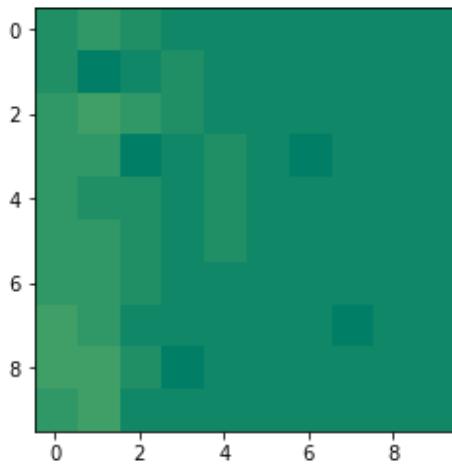
Updated direction: [-1 0]



Step: 72

Updated position: [8 0]

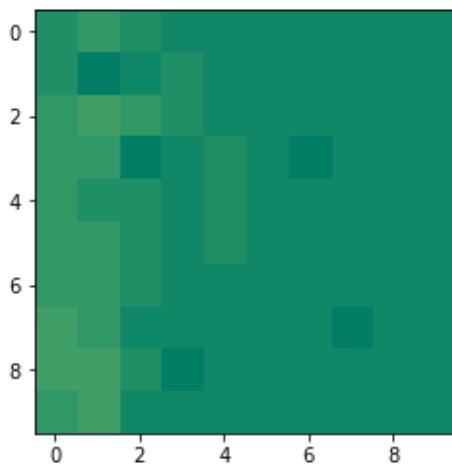
Updated direction: [0 1]



Step: 73

Updated position: [ 8 1 ]

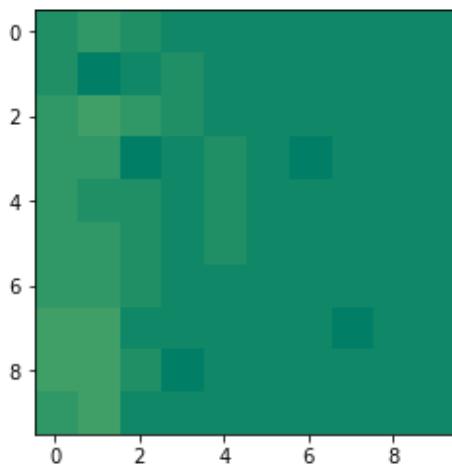
Updated direction: [ -1 0 ]



Step: 74

Updated position: [ 7 1 ]

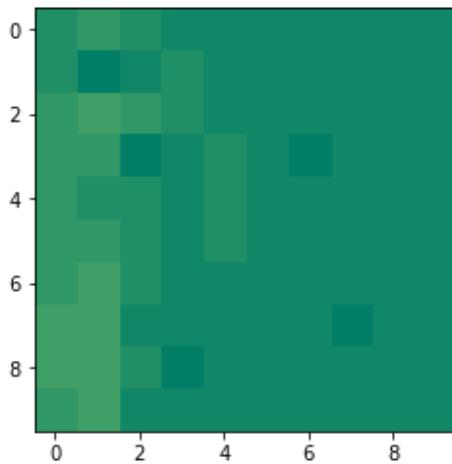
Updated direction: [ -1 0 ]



Step: 75

Updated position: [ 6 1 ]

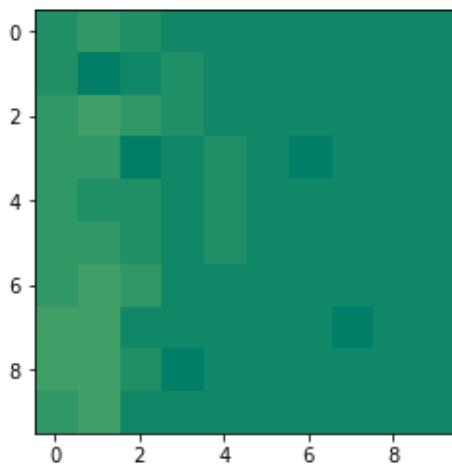
Updated direction: [ 0 1 ]



Step: 76

Updated position: [ 6 2 ]

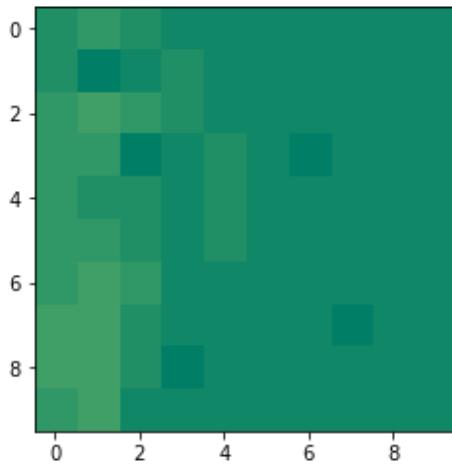
Updated direction: [ 1 0 ]



Step: 77

Updated position: [ 7 2 ]

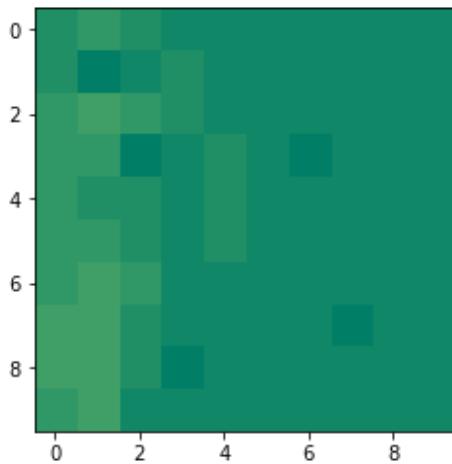
Updated direction: [ 0 -1 ]



Step: 78

Updated position: [ 7 1 ]

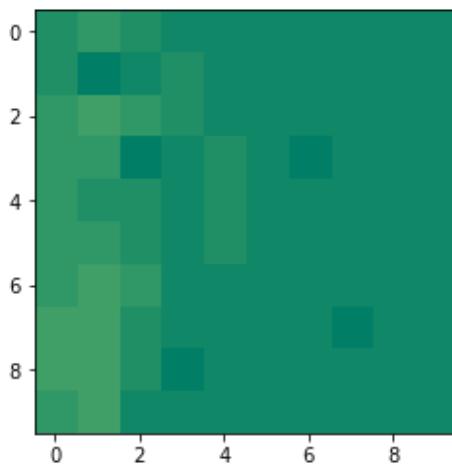
Updated direction: [ 1 0 ]



Step: 79

Updated position: [ 8 1 ]

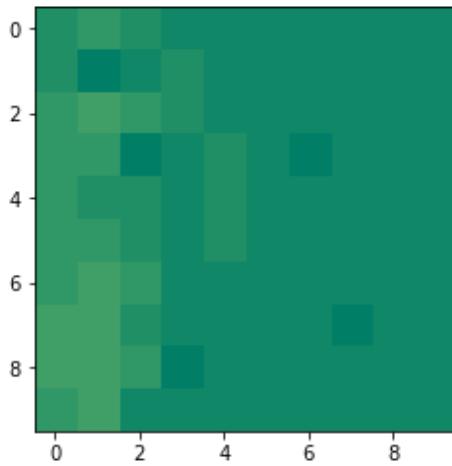
Updated direction: [ 0 1 ]



Step: 80

Updated position: [ 8 2 ]

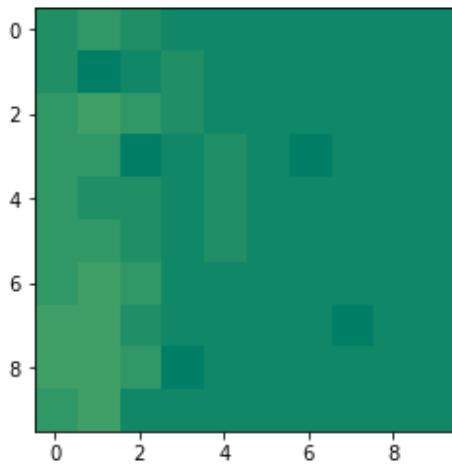
Updated direction: [ 0 -1 ]



Step: 81

Updated position: [ 8 1 ]

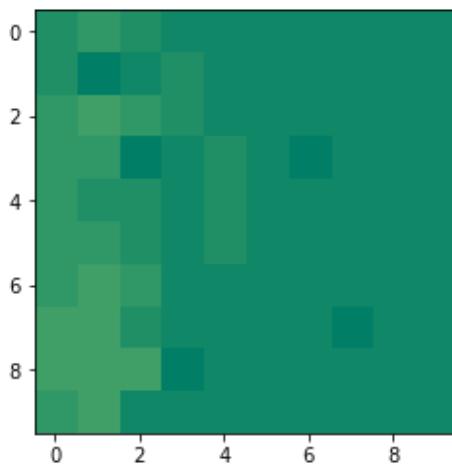
Updated direction: [ 0 1 ]



Step: 82

Updated position: [ 8 2 ]

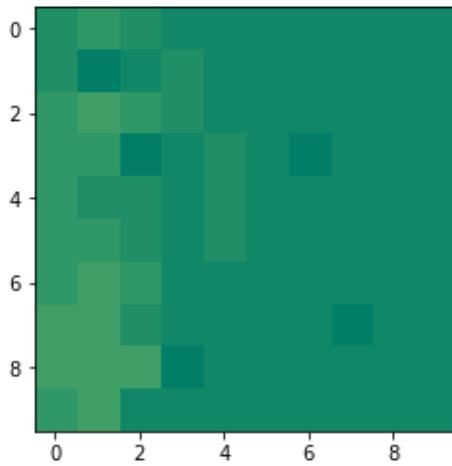
Updated direction: [ 1 0 ]



Step: 83

Updated position: [ 9 2 ]

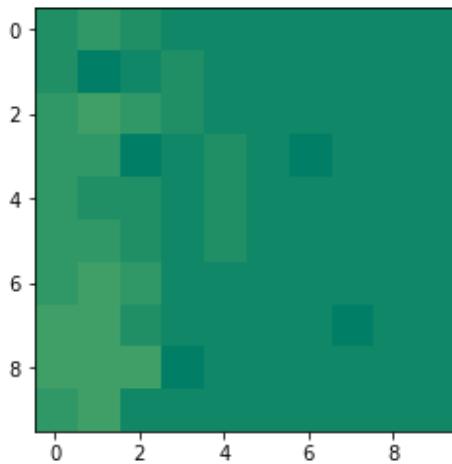
Updated direction: [ 0 -1 ]



Step: 84

Updated position: [ 9 1 ]

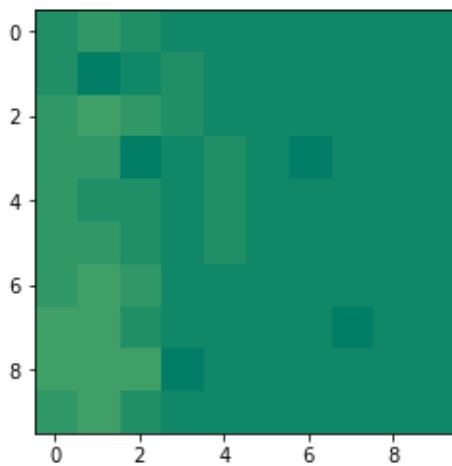
Updated direction: [ 0 1 ]



Step: 85

Updated position: [ 9 2 ]

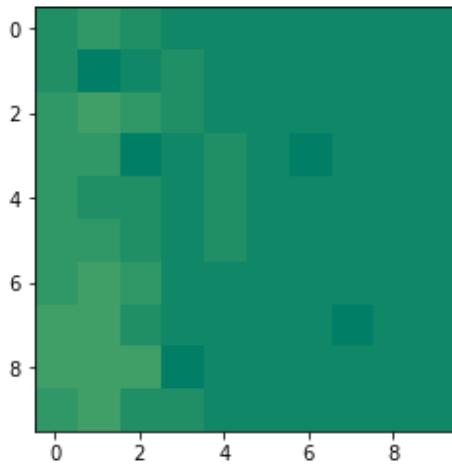
Updated direction: [ 0 1 ]



Step: 86

Updated position: [ 9 3 ]

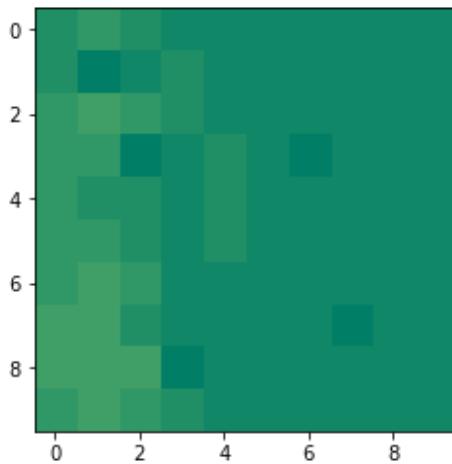
Updated direction: [ 0 -1 ]



Step: 87

Updated position: [ 9 2 ]

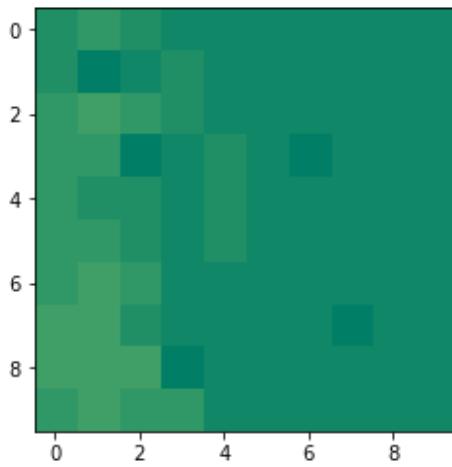
Updated direction: [ 0 1 ]



Step: 88

Updated position: [ 9 3 ]

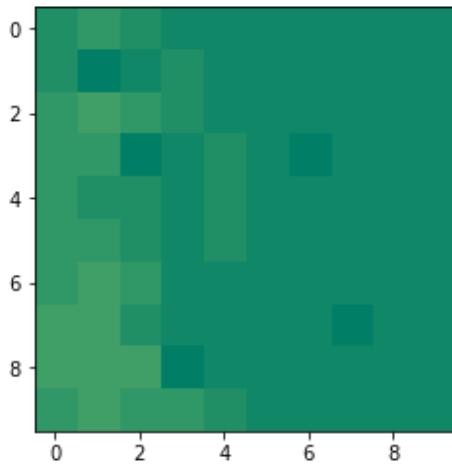
Updated direction: [ 0 1 ]



Step: 89

Updated position: [ 9 4 ]

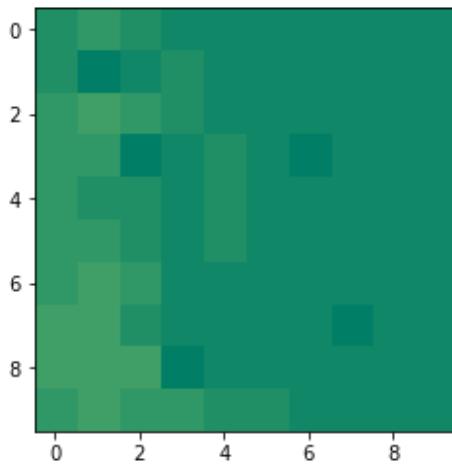
Updated direction: [ 0 1 ]



Step: 90

Updated position: [ 9 5 ]

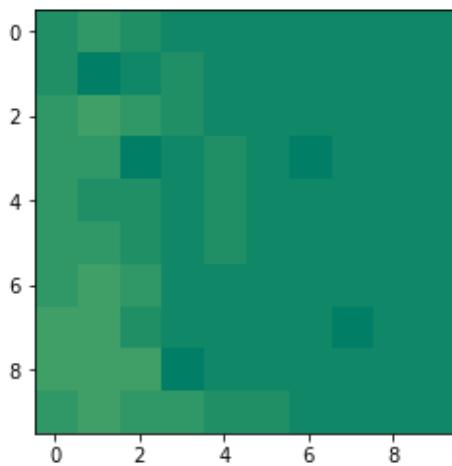
Updated direction: [ 0 1 ]



Step: 91

Updated position: [ 9 6 ]

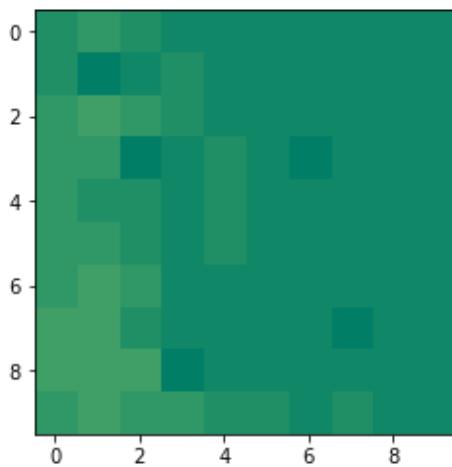
Updated direction: [ 0 1 ]



Step: 92

Updated position: [ 9 7 ]

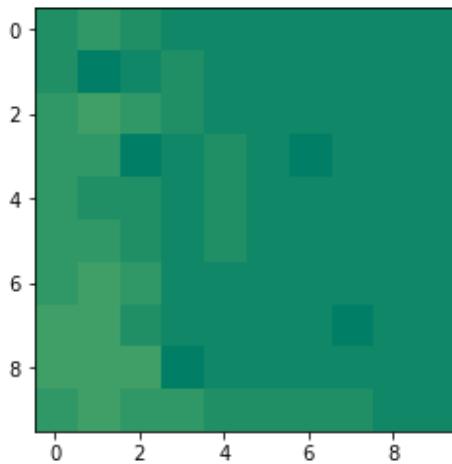
Updated direction: [ 0 -1 ]



Step: 93

Updated position: [ 9 6 ]

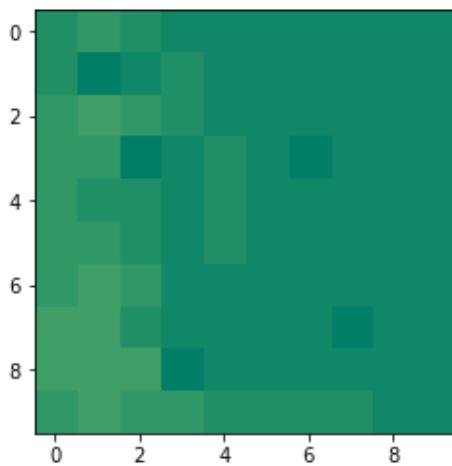
Updated direction: [-1 0 ]



Step: 94

Updated position: [ 8 6 ]

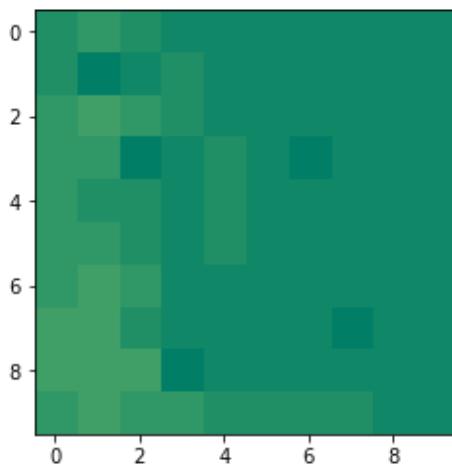
Updated direction: [ -1 0 ]



Step: 95

Updated position: [ 7 6 ]

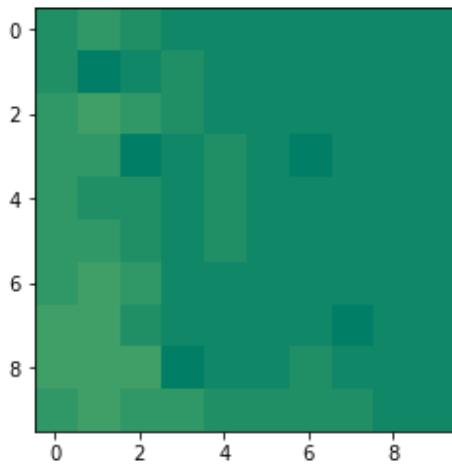
Updated direction: [ 1 0 ]



Step: 96

Updated position: [ 8 6 ]

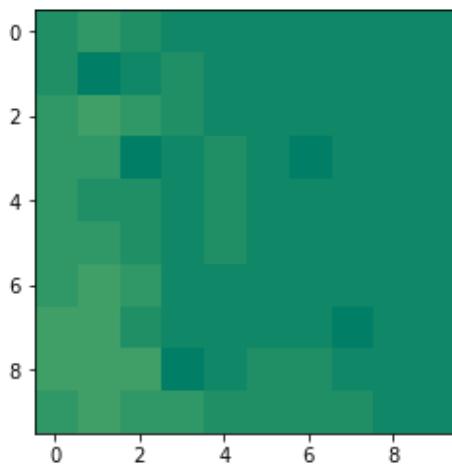
Updated direction: [ 0 -1 ]



Step: 97

Updated position: [ 8 5 ]

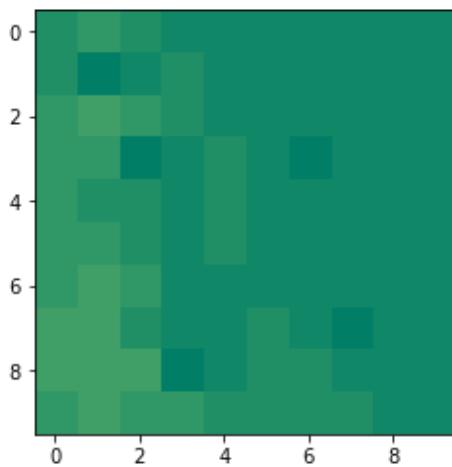
Updated direction: [ -1 0 ]



Step: 98

Updated position: [ 7 5 ]

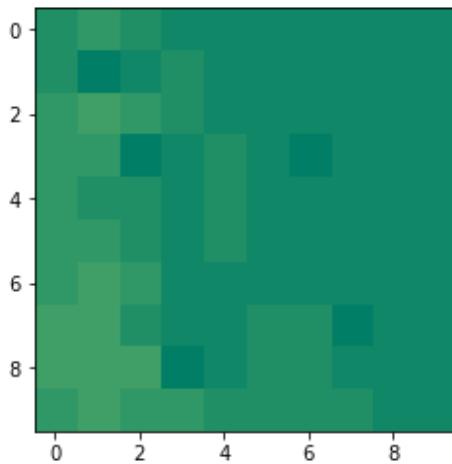
Updated direction: [ 0 1 ]



Step: 99

Updated position: [ 7 6 ]

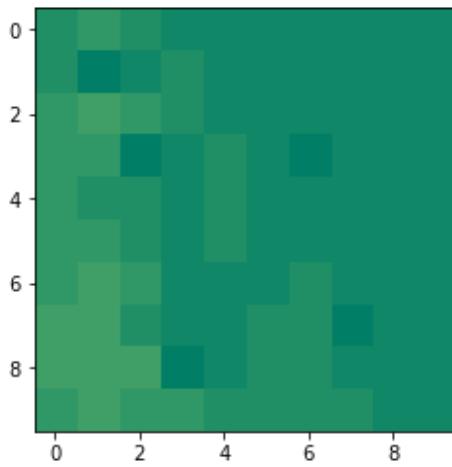
Updated direction: [ -1 0 ]



Step: 100

Updated position: [ 6 6 ]

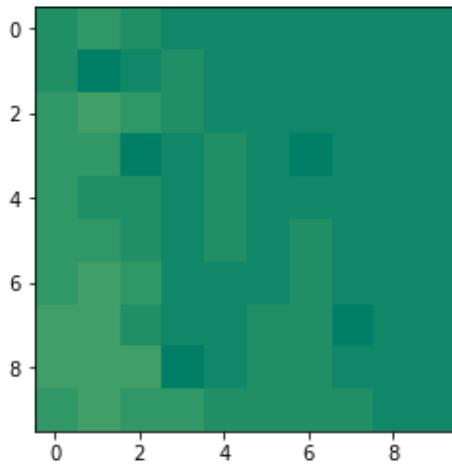
Updated direction: [ -1 0 ]



Step: 101

Updated position: [ 5 6 ]

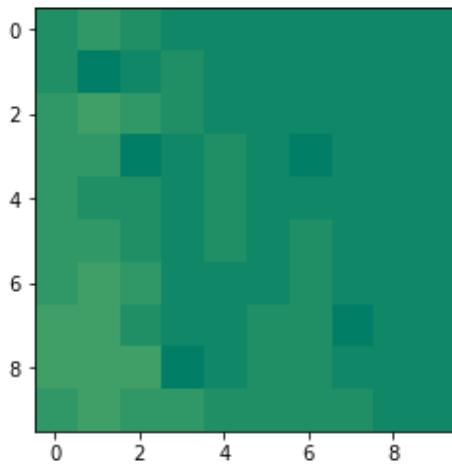
Updated direction: [ -1 0 ]



Step: 102

Updated position: [ 4 6 ]

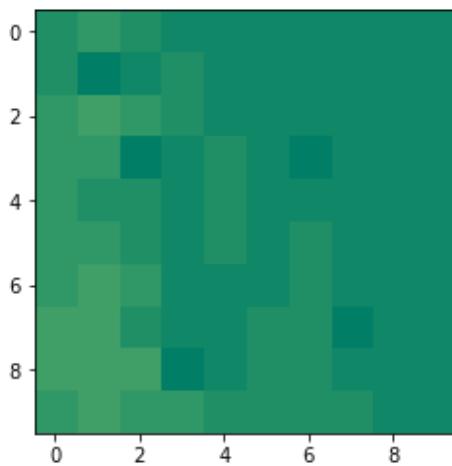
Updated direction: [ 0 -1 ]



Step: 103

Updated position: [ 4 5 ]

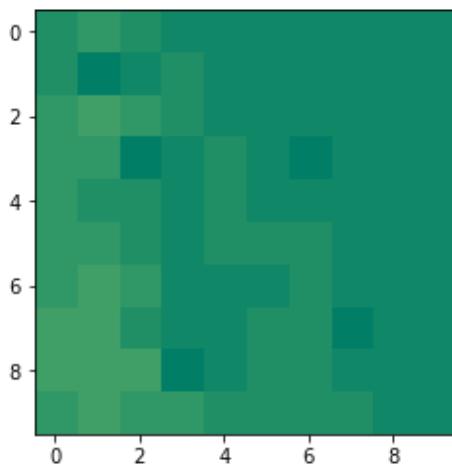
Updated direction: [ 1 0 ]



Step: 104

Updated position: [ 5 5 ]

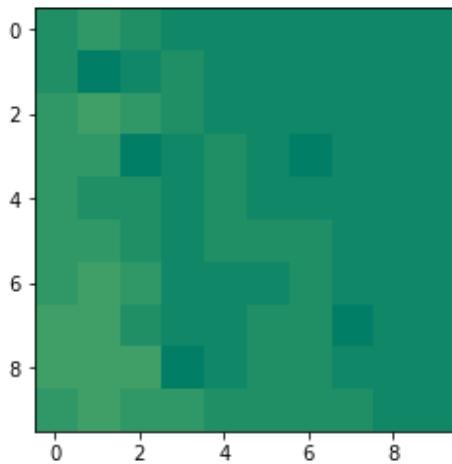
Updated direction: [ 1 0 ]



Step: 105

Updated position: [ 6 5 ]

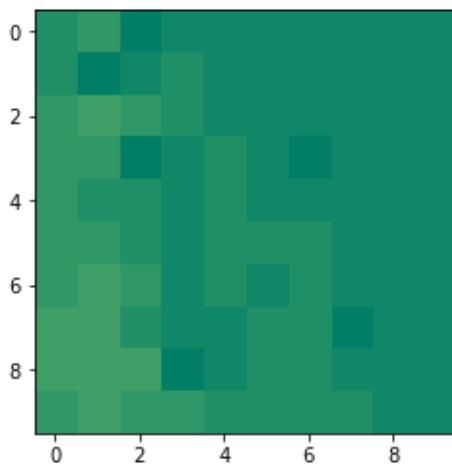
Updated direction: [ 0 -1 ]



Step: 106

Updated position: [ 6 4 ]

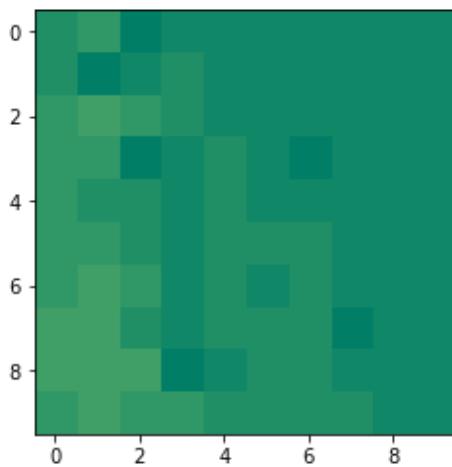
Updated direction: [ 1 0 ]



Step: 107

Updated position: [ 7 4 ]

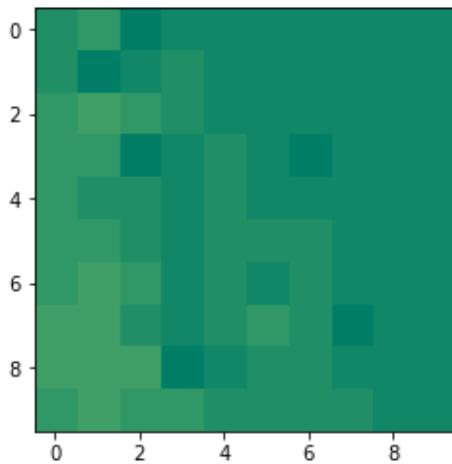
Updated direction: [ 0 1 ]



Step: 108

Updated position: [ 7 5 ]

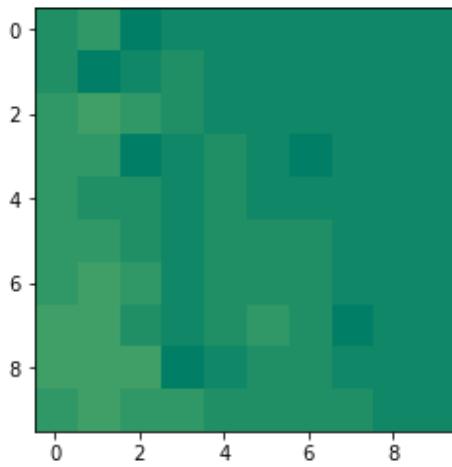
Updated direction: [ -1 0 ]



Step: 109

Updated position: [ 6 5 ]

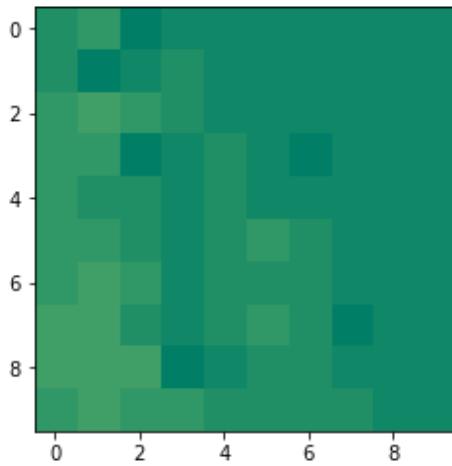
Updated direction: [-1 0 ]



Step: 110

Updated position: [ 5 5 ]

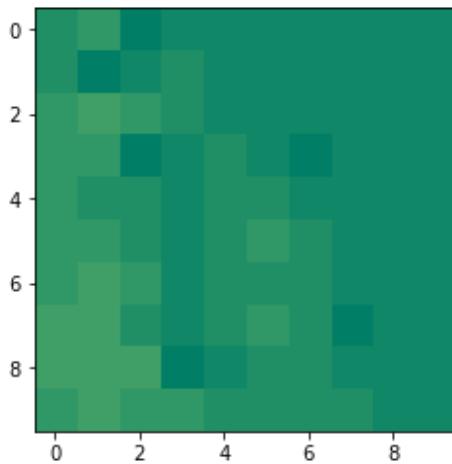
Updated direction: [-1 0 ]



Step: 111

Updated position: [ 4 5 ]

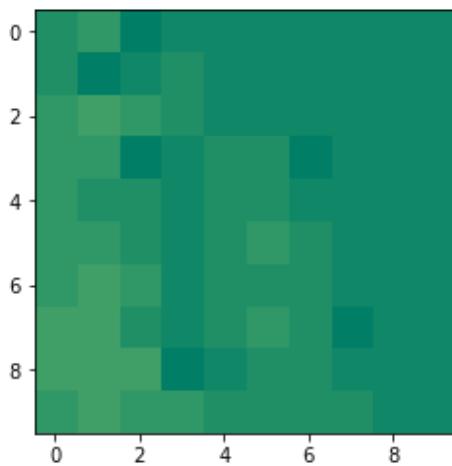
Updated direction: [-1 0 ]



Step: 112

Updated position: [ 3 5 ]

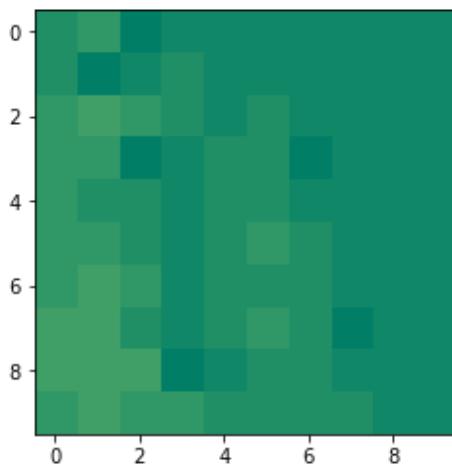
Updated direction: [-1 0 ]



Step: 113

Updated position: [ 2 5 ]

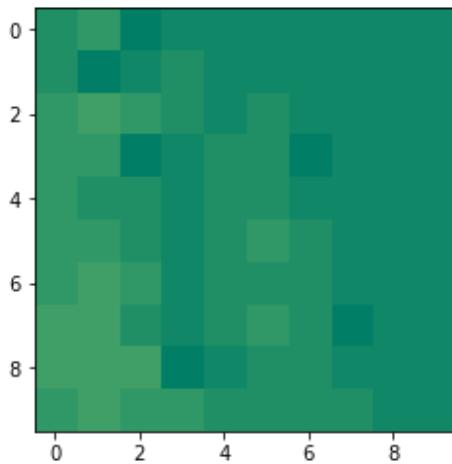
Updated direction: [-1 0 ]



Step: 114

Updated position: [ 1 5 ]

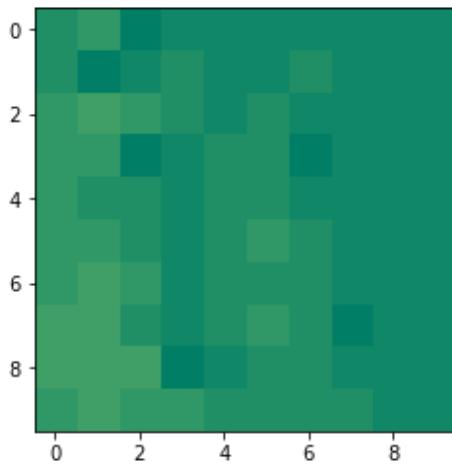
Updated direction: [ 0 1 ]



Step: 115

Updated position: [ 1 6 ]

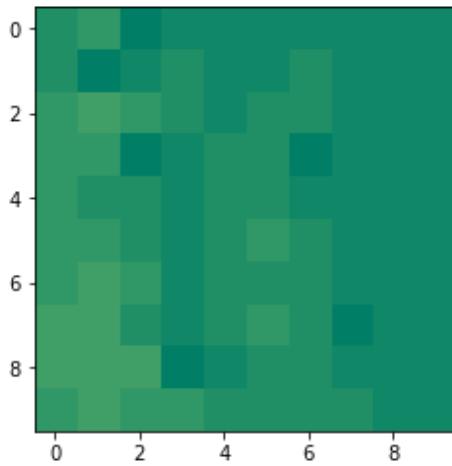
Updated direction: [ 1 0 ]



Step: 116

Updated position: [ 2 6 ]

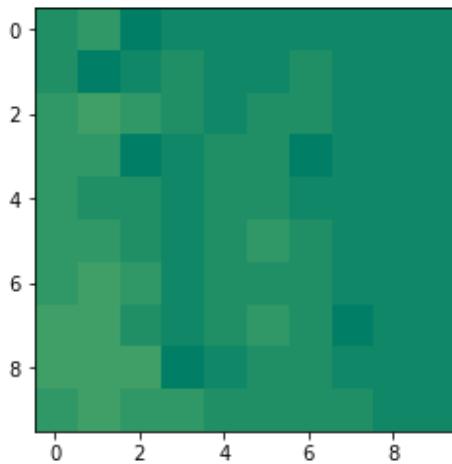
Updated direction: [ 0 1 ]



Step: 117

Updated position: [ 2 7 ]

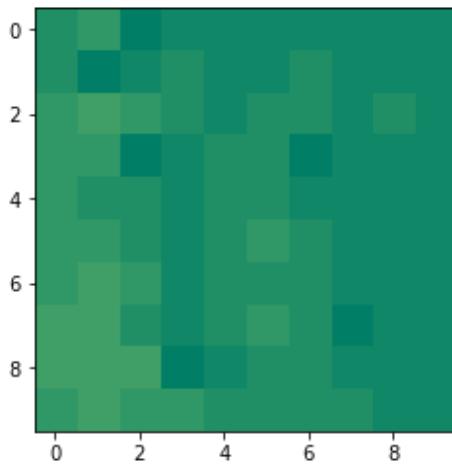
Updated direction: [ 0 1 ]



Step: 118

Updated position: [ 2 8 ]

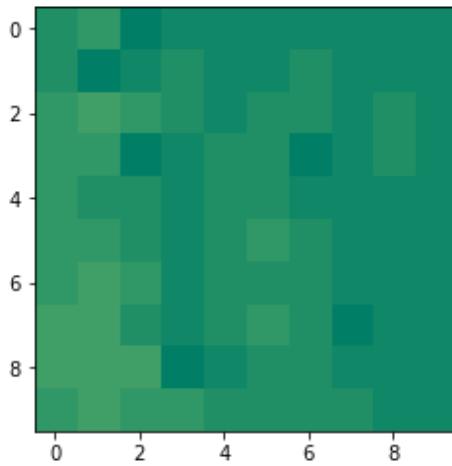
Updated direction: [ 1 0 ]



Step: 119

Updated position: [ 3 8 ]

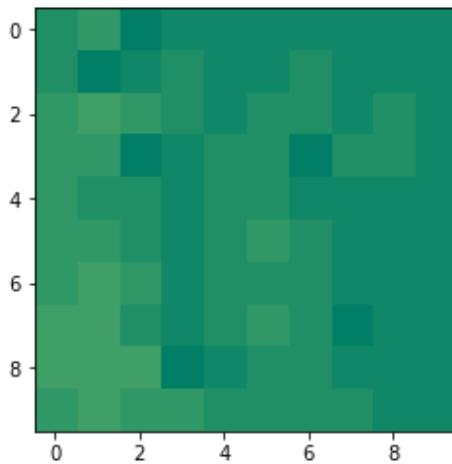
Updated direction: [ 0 -1 ]



Step: 120

Updated position: [ 3 7 ]

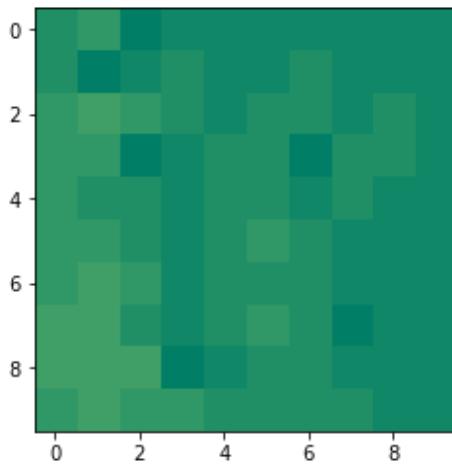
Updated direction: [ 1 0 ]



Step: 121

Updated position: [ 4 7 ]

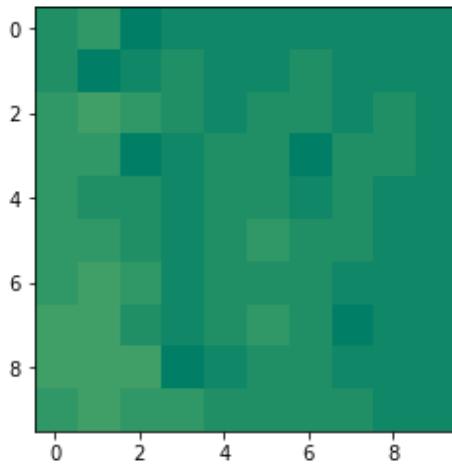
Updated direction: [ 1 0 ]



Step: 122

Updated position: [ 5 7 ]

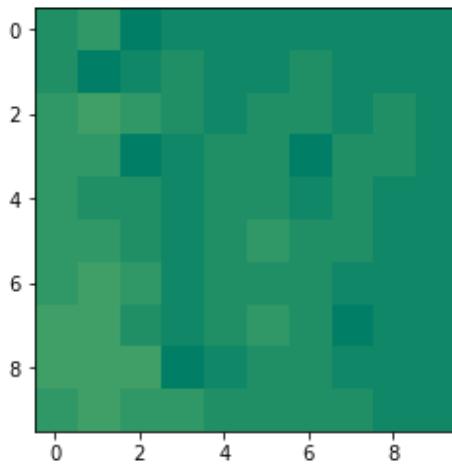
Updated direction: [ 1 0 ]



Step: 123

Updated position: [ 6 7 ]

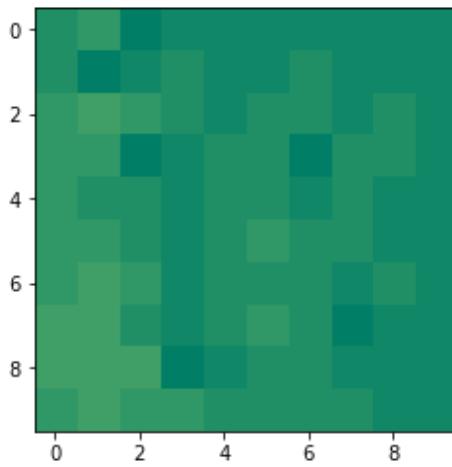
Updated direction: [ 0 1 ]



Step: 124

Updated position: [ 6 8 ]

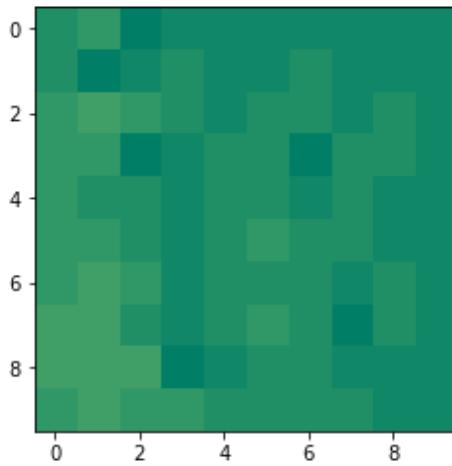
Updated direction: [ 1 0 ]



Step: 125

Updated position: [ 7 8 ]

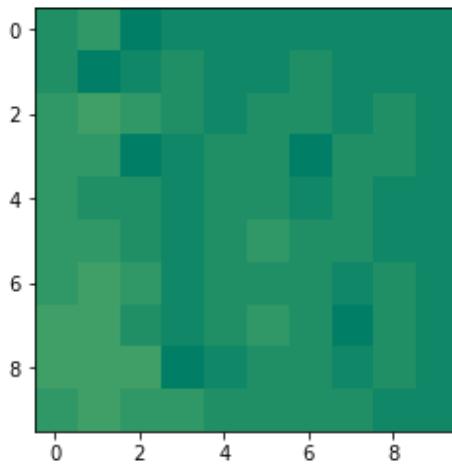
Updated direction: [ 1 0 ]



Step: 126

Updated position: [ 8 8 ]

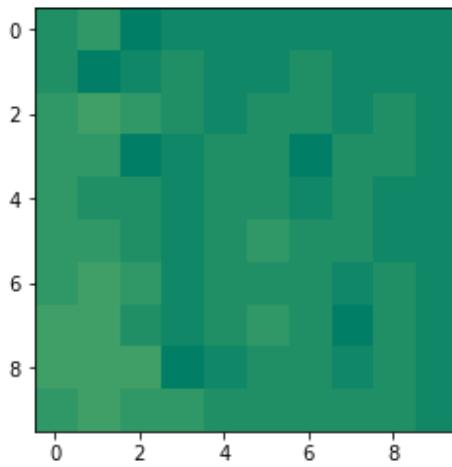
Updated direction: [ 1 0 ]



Step: 127

Updated position: [ 9 8 ]

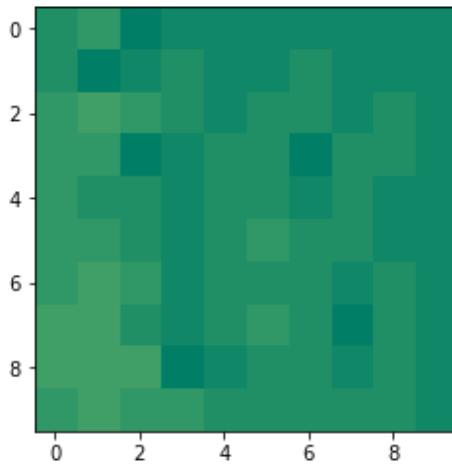
Updated direction: [ 0 1 ]



Step: 128

Updated position: [ 9 9 ]

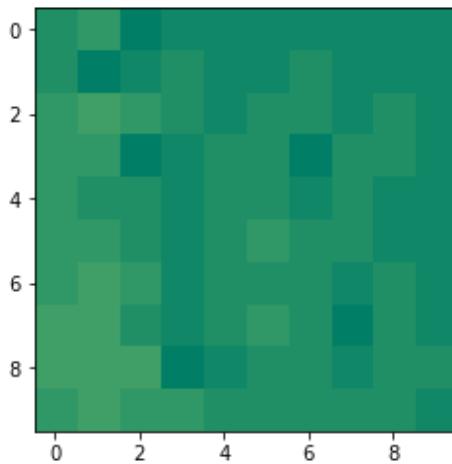
Updated direction: [ -1 0 ]



Step: 129

Updated position: [ 8 9 ]

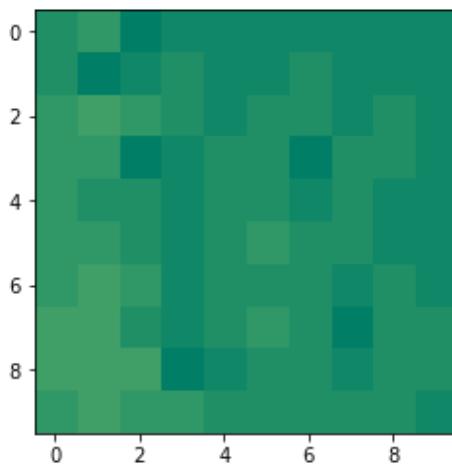
Updated direction: [ -1 0 ]



Step: 130

Updated position: [ 7 9 ]

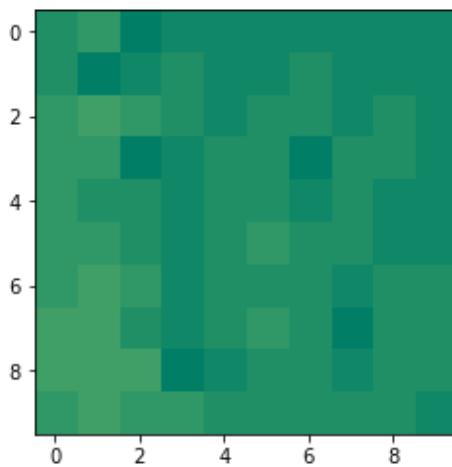
Updated direction: [-1 0 ]



Step: 131

Updated position: [ 6 9 ]

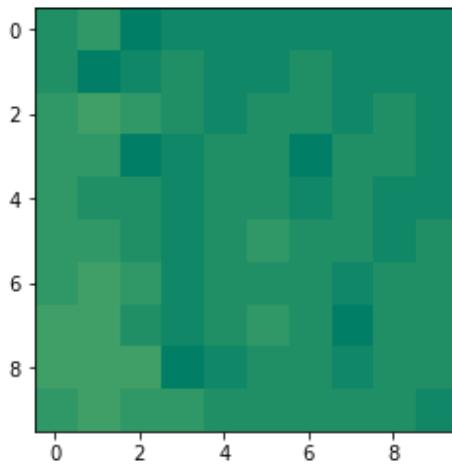
Updated direction: [-1 0 ]



Step: 132

Updated position: [ 5 9 ]

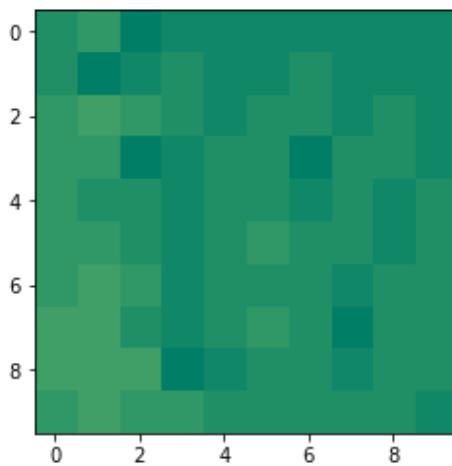
Updated direction: [-1 0 ]



Step: 133

Updated position: [ 4 9 ]

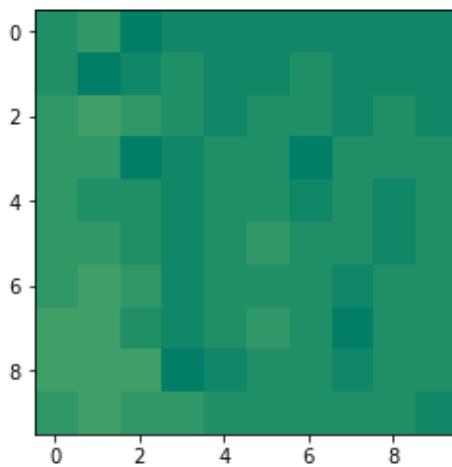
Updated direction: [-1 0 ]



Step: 134

Updated position: [ 3 9 ]

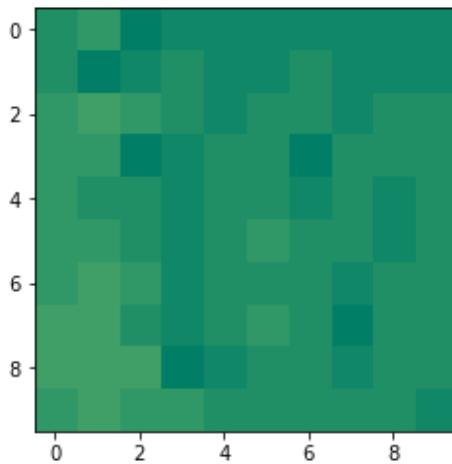
Updated direction: [-1 0 ]



Step: 135

Updated position: [ 2 9 ]

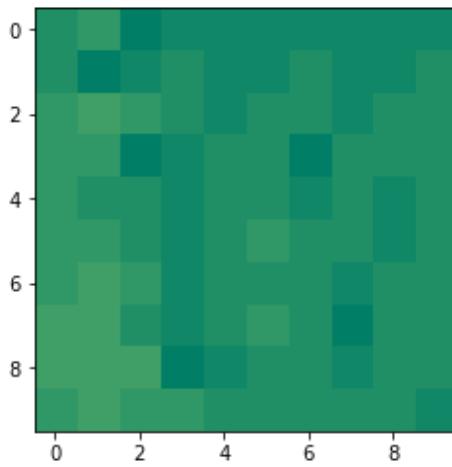
Updated direction: [-1 0 ]



Step: 136

Updated position: [1 9]

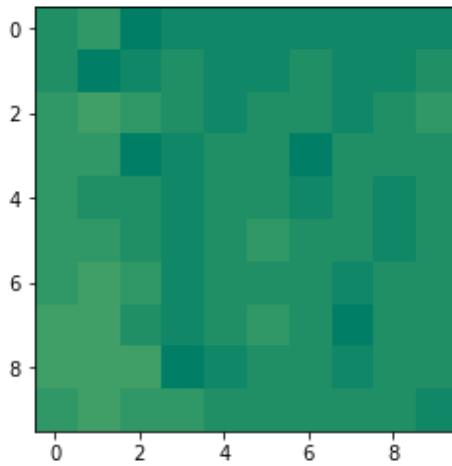
Updated direction: [1 0]



Step: 137

Updated position: [2 9]

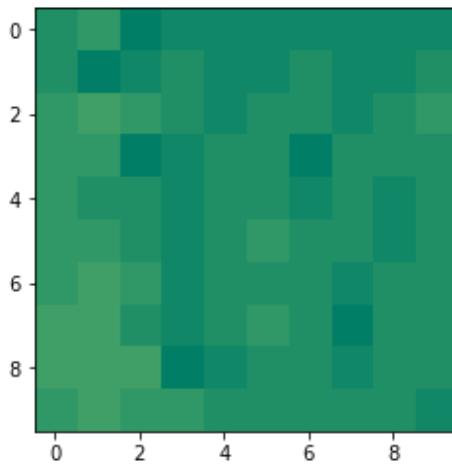
Updated direction: [1 0]



Step: 138

Updated position: [3 9]

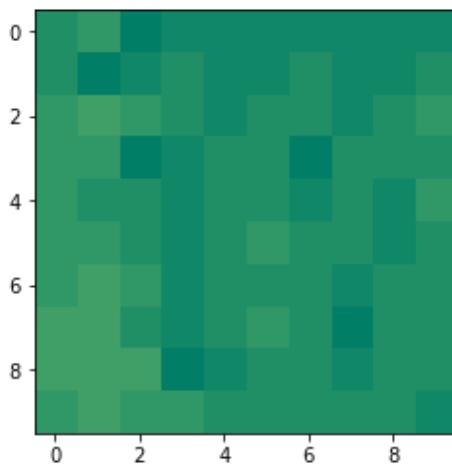
Updated direction: [1 0]



Step: 139

Updated position: [ 4 9 ]

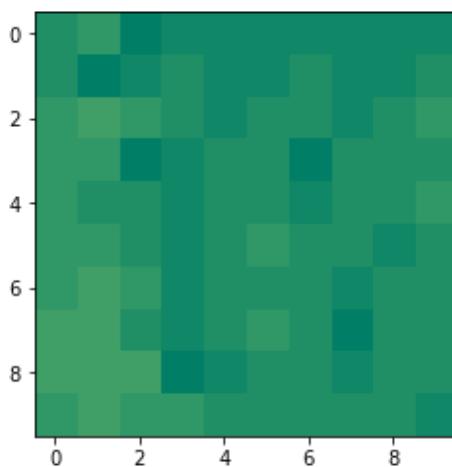
Updated direction: [ 0 -1 ]



Step: 140

Updated position: [ 4 8 ]

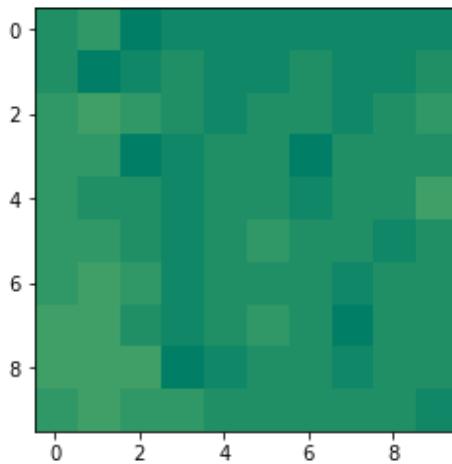
Updated direction: [ 0 1 ]



Step: 141

Updated position: [ 4 9 ]

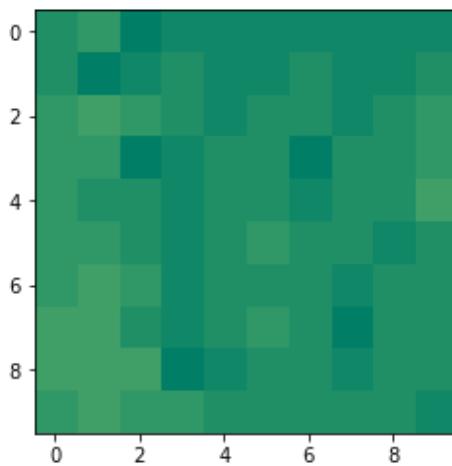
Updated direction: [-1 0 ]



Step: 142

Updated position: [ 3 9 ]

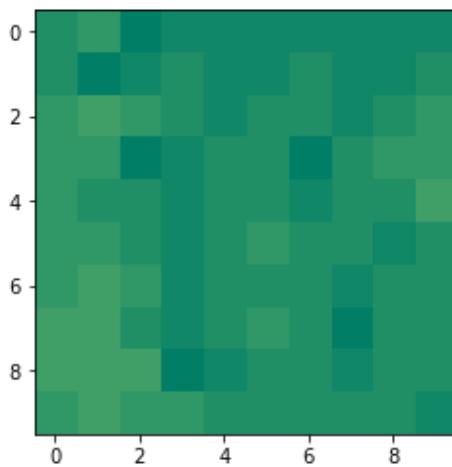
Updated direction: [ 0 -1 ]



Step: 143

Updated position: [ 3 8 ]

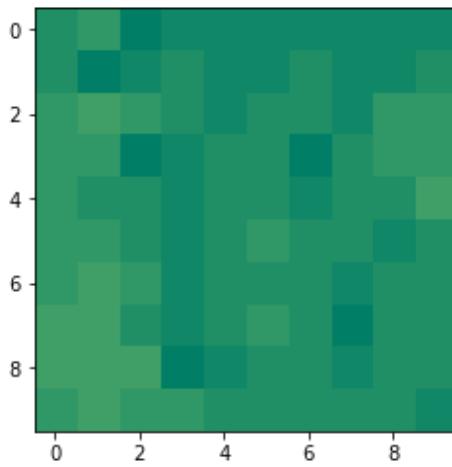
Updated direction: [-1 0 ]



Step: 144

Updated position: [ 2 8 ]

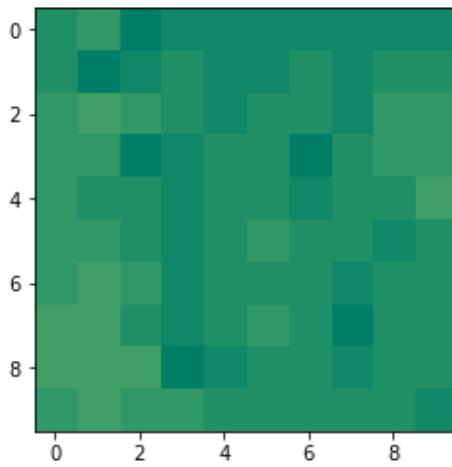
Updated direction: [-1 0 ]



Step: 145

Updated position: [ 1 8 ]

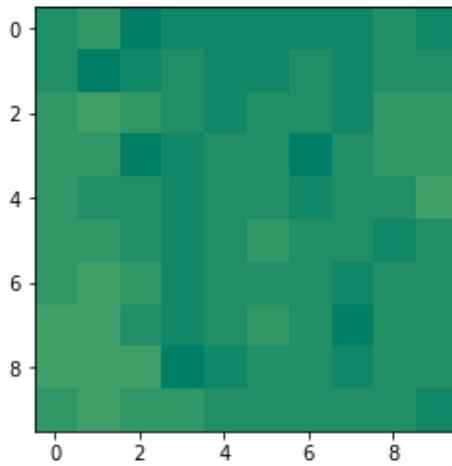
Updated direction: [ -1 0 ]



Step: 146

Updated position: [ 0 8 ]

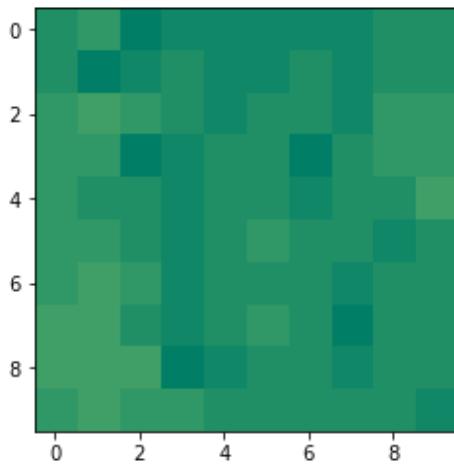
Updated direction: [ 0 1 ]



Step: 147

Updated position: [ 0 9 ]

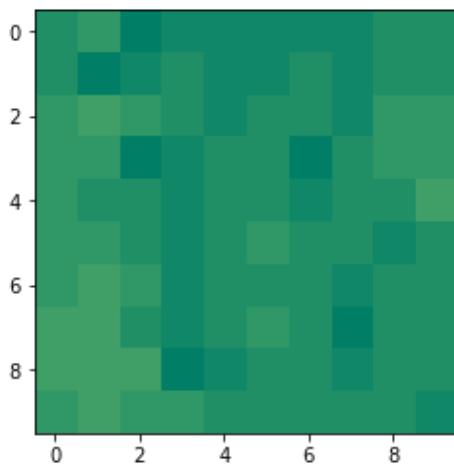
Updated direction: [ 0 -1 ]



Step: 148

Updated position: [ 0 8 ]

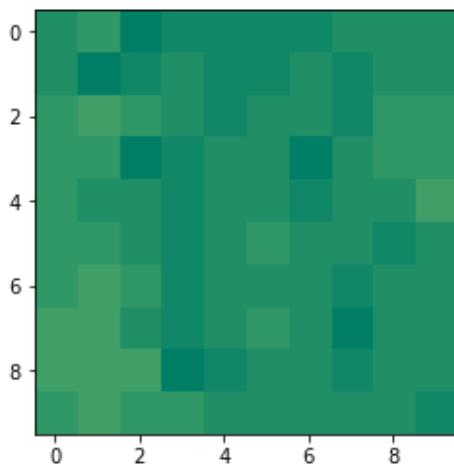
Updated direction: [ 0 -1 ]



Step: 149

Updated position: [ 0 7 ]

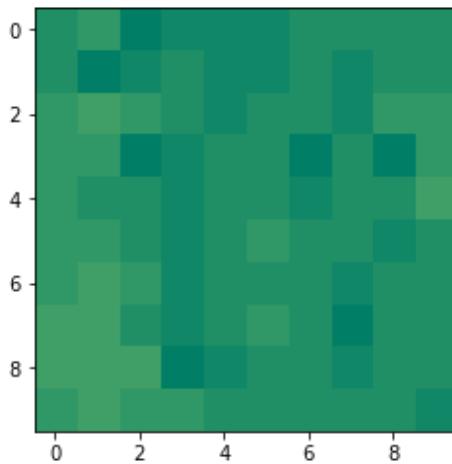
Updated direction: [ 0 -1 ]



Step: 150

Updated position: [ 0 6 ]

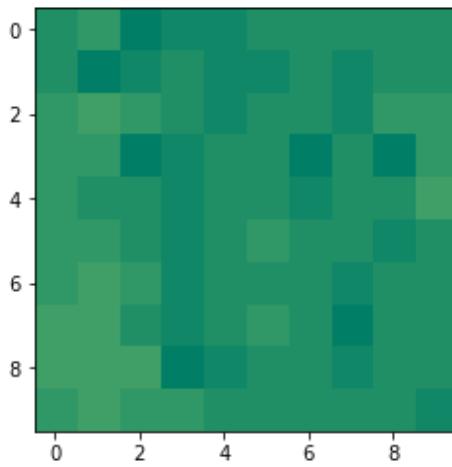
Updated direction: [ 0 -1 ]



Step: 151

Updated position: [0 5]

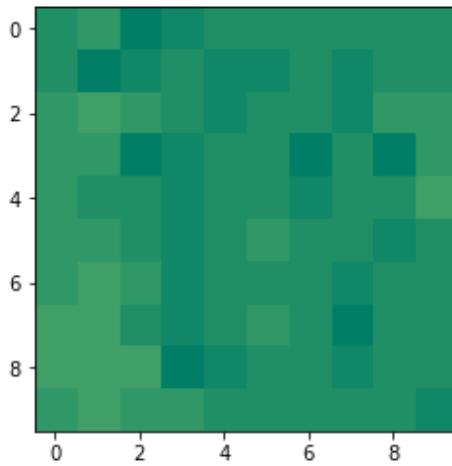
Updated direction: [ 0 -1 ]



Step: 152

Updated position: [0 4]

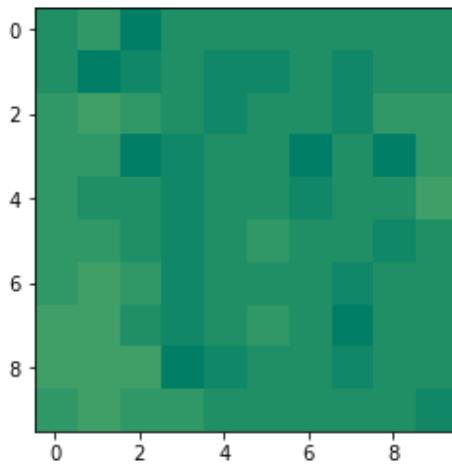
Updated direction: [ 0 -1 ]



Step: 153

Updated position: [0 3]

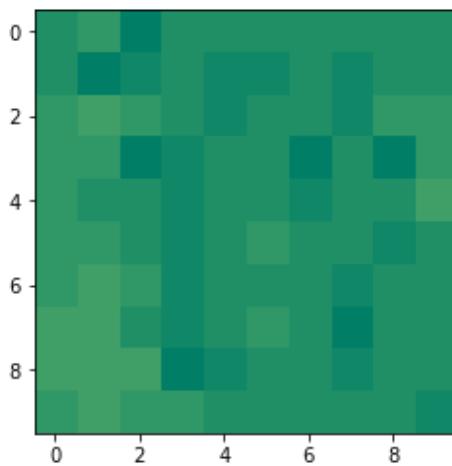
Updated direction: [ 1 0 ]



Step: 154

Updated position: [1 3]

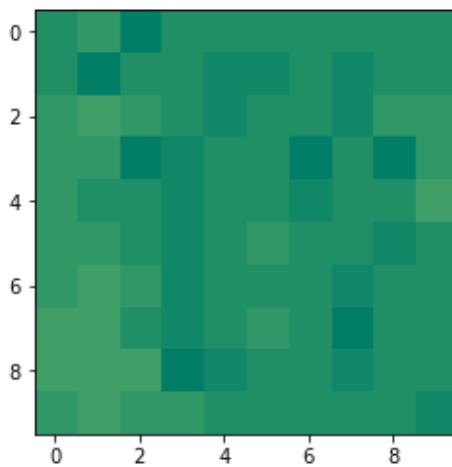
Updated direction: [ 0 -1]



Step: 155

Updated position: [1 2]

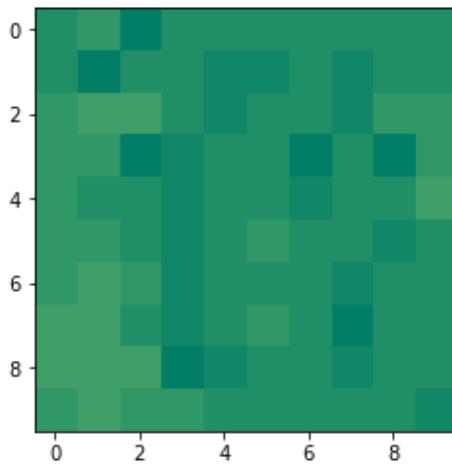
Updated direction: [1 0]



Step: 156

Updated position: [2 2]

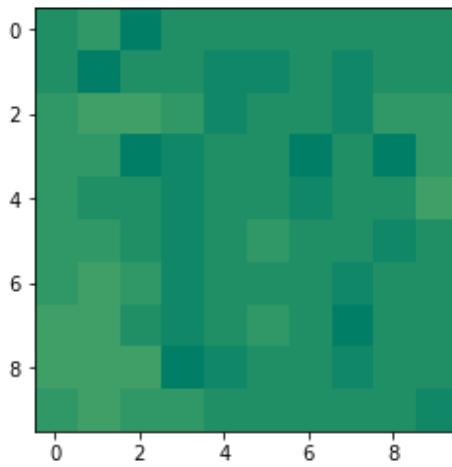
Updated direction: [0 1]



Step: 157

Updated position: [ 2 3 ]

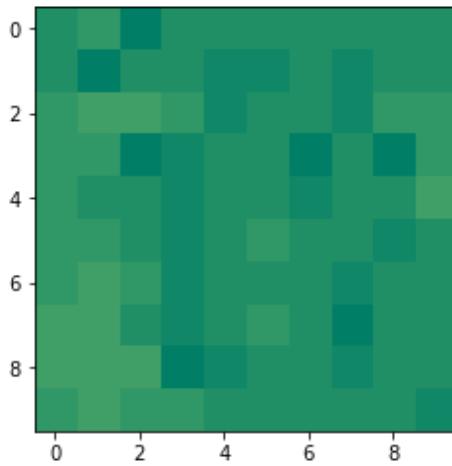
Updated direction: [ 1 0 ]



Step: 158

Updated position: [ 3 3 ]

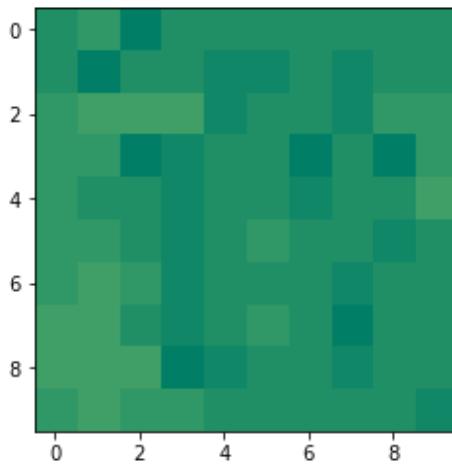
Updated direction: [ -1 0 ]



Step: 159

Updated position: [ 2 3 ]

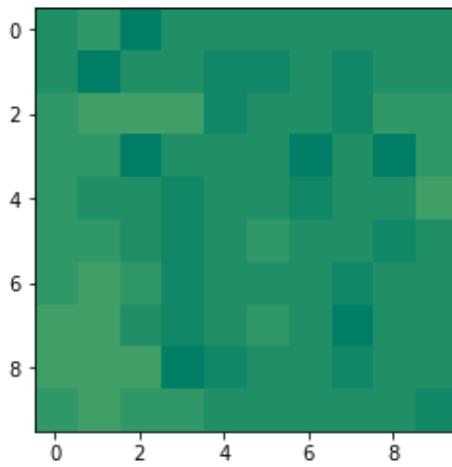
Updated direction: [ 1 0 ]



Step: 160

Updated position: [ 3 3 ]

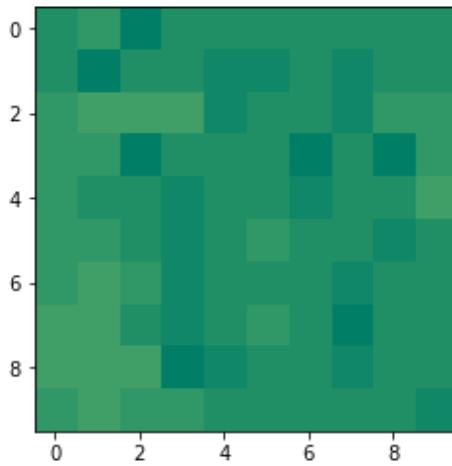
Updated direction: [ 0 1 ]



Step: 161

Updated position: [ 3 4 ]

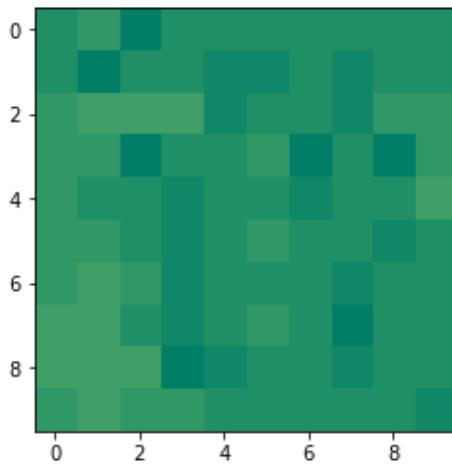
Updated direction: [ 0 1 ]



Step: 162

Updated position: [ 3 5 ]

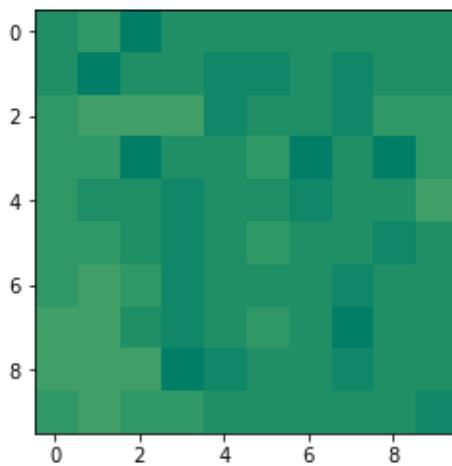
Updated direction: [ 1 0 ]



Step: 163

Updated position: [ 4 5 ]

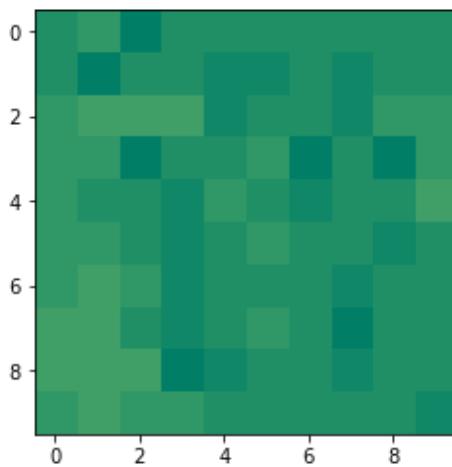
Updated direction: [ 0 -1 ]



Step: 164

Updated position: [ 4 4 ]

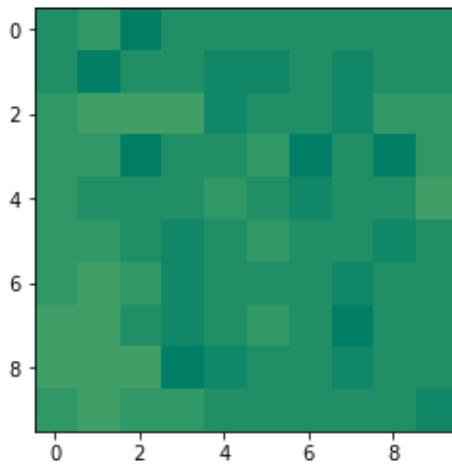
Updated direction: [ 0 -1 ]



Step: 165

Updated position: [ 4 3 ]

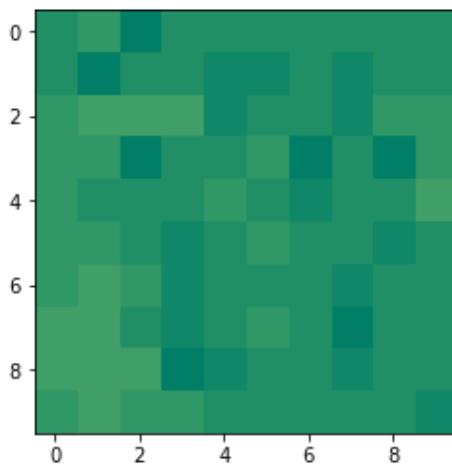
Updated direction: [ 1 0 ]



Step: 166

Updated position: [ 5 3 ]

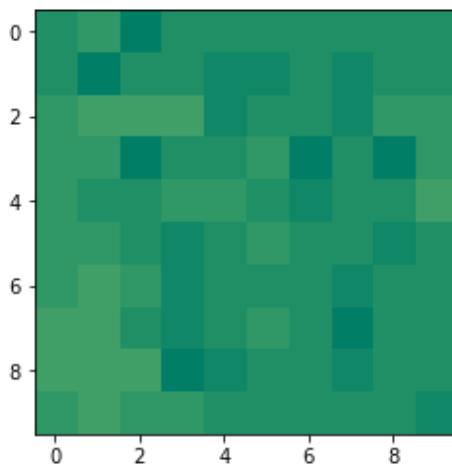
Updated direction: [ -1 0 ]



Step: 167

Updated position: [ 4 3 ]

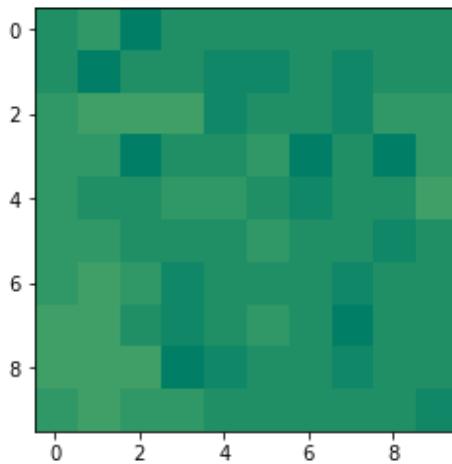
Updated direction: [ 1 0 ]



Step: 168

Updated position: [ 5 3 ]

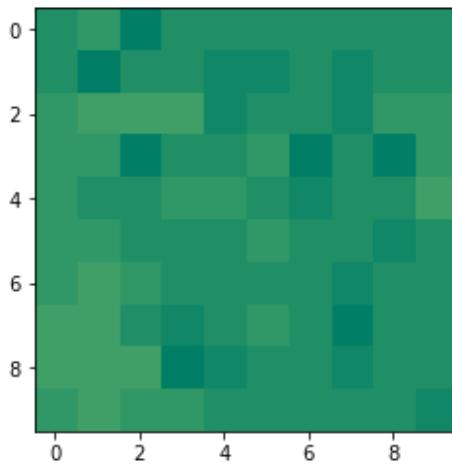
Updated direction: [ 1 0 ]



Step: 169

Updated position: [ 6 3 ]

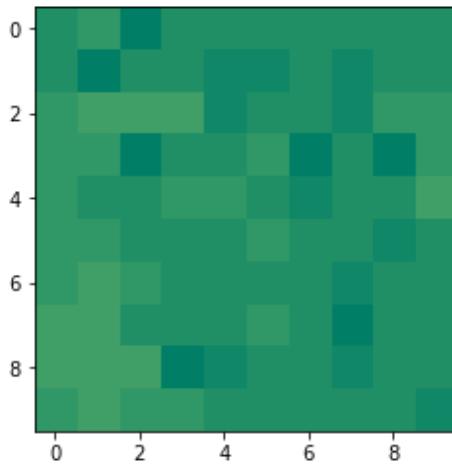
Updated direction: [ 1 0 ]



Step: 170

Updated position: [ 7 3 ]

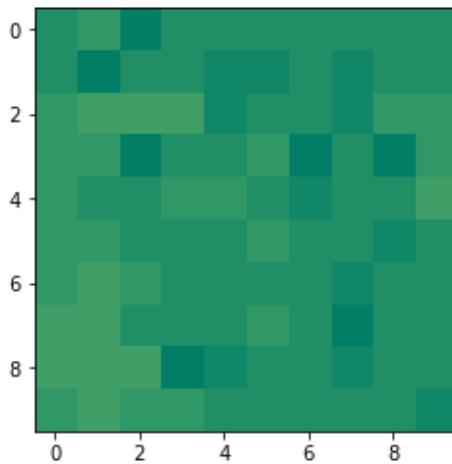
Updated direction: [ -1 0 ]



Step: 171

Updated position: [ 6 3 ]

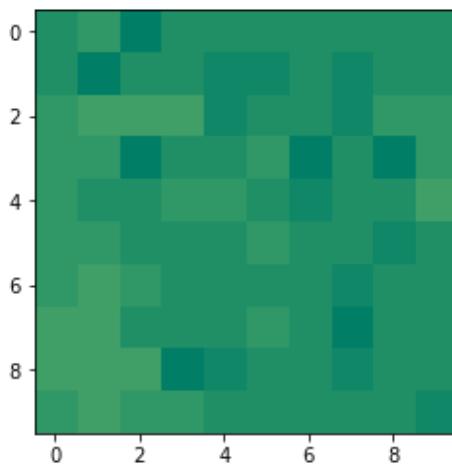
Updated direction: [ 1 0 ]



Step: 172

Updated position: [ 7 3 ]

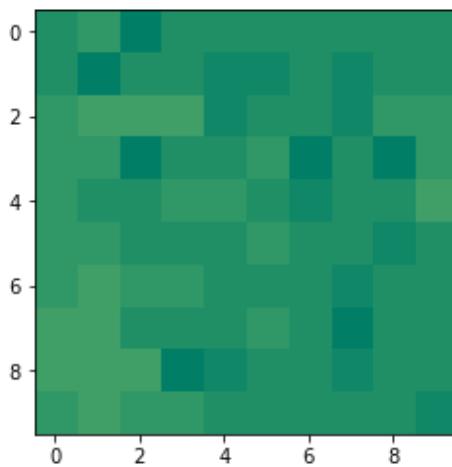
Updated direction: [ -1 0 ]



Step: 173

Updated position: [ 6 3 ]

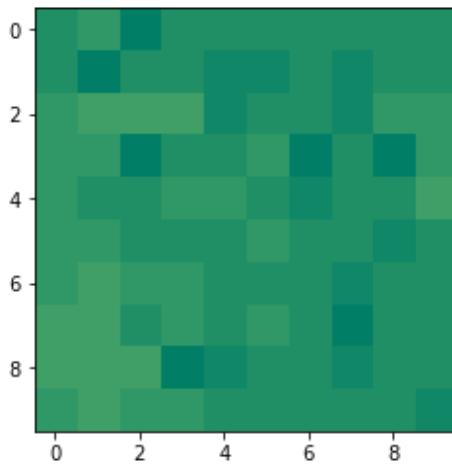
Updated direction: [ 1 0 ]



Step: 174

Updated position: [ 7 3 ]

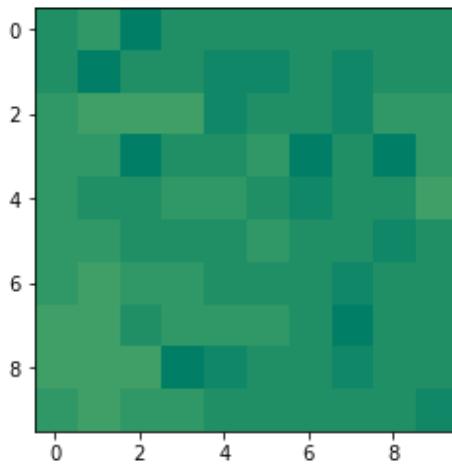
Updated direction: [ 0 1 ]



Step: 175

Updated position: [ 7 4 ]

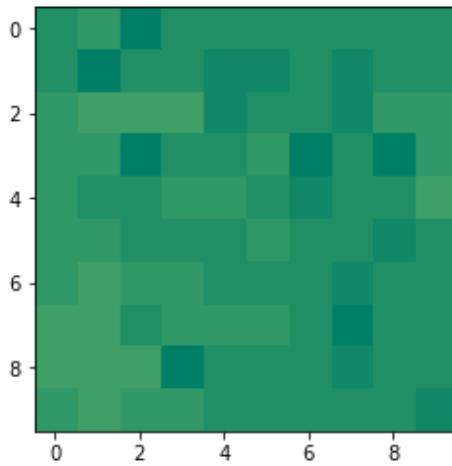
Updated direction: [ 1 0 ]



Step: 176

Updated position: [ 8 4 ]

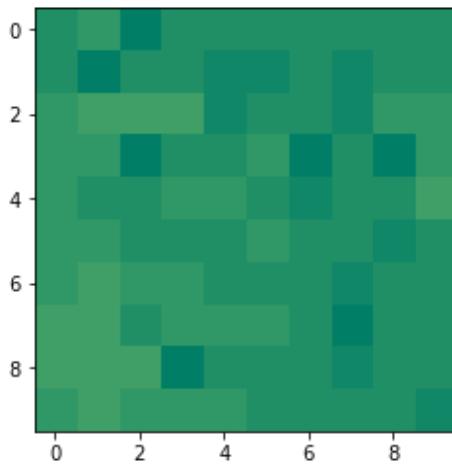
Updated direction: [ 1 0 ]



Step: 177

Updated position: [ 9 4 ]

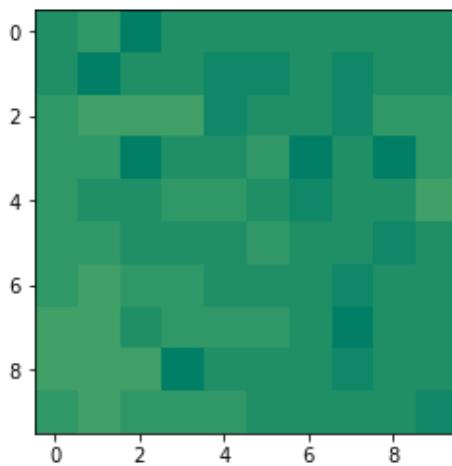
Updated direction: [ 0 1 ]



Step: 178

Updated position: [9 5]

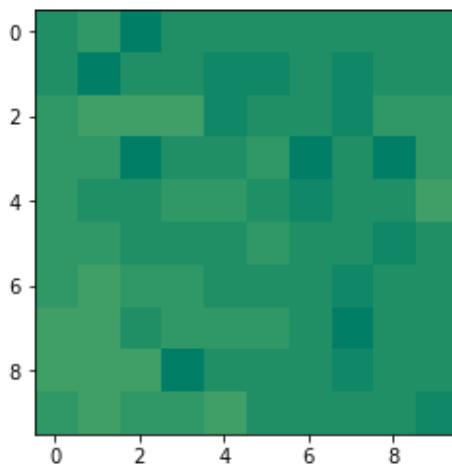
Updated direction: [ 0 -1 ]



Step: 179

Updated position: [9 4]

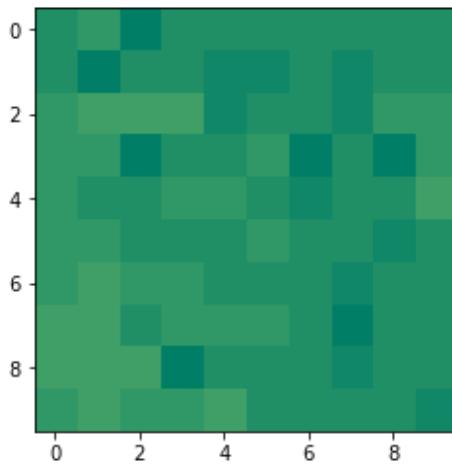
Updated direction: [ 0 1 ]



Step: 180

Updated position: [9 5]

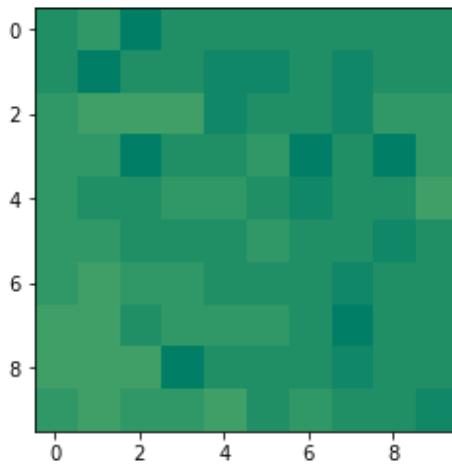
Updated direction: [ 0 1 ]



Step: 181

Updated position: [ 9 6 ]

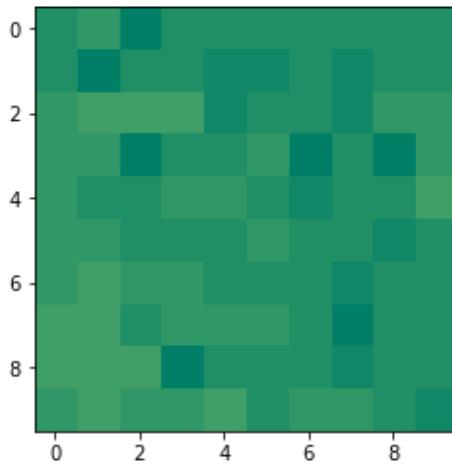
Updated direction: [ 0 1 ]



Step: 182

Updated position: [ 9 7 ]

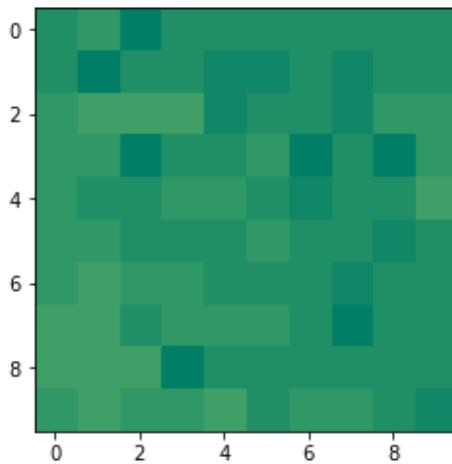
Updated direction: [ -1 0 ]



Step: 183

Updated position: [ 8 7 ]

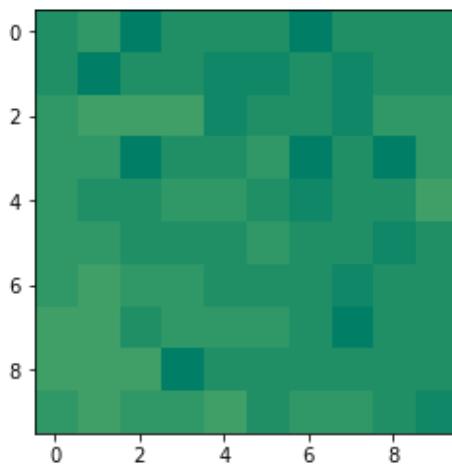
Updated direction: [ 0 -1 ]



Step: 184

Updated position: [8 6]

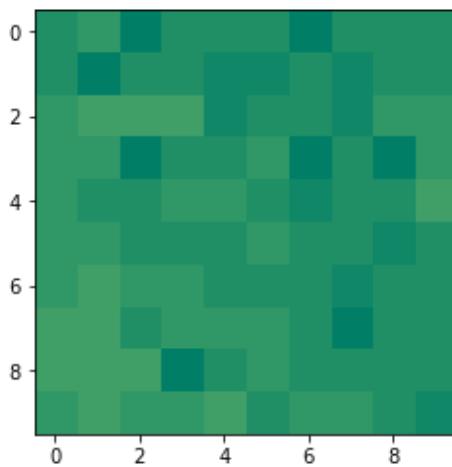
Updated direction: [ 0 -1 ]



Step: 185

Updated position: [8 5]

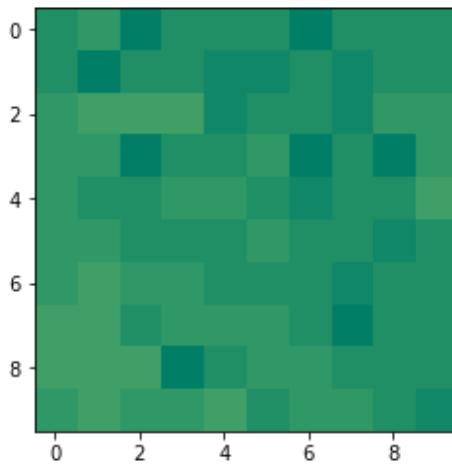
Updated direction: [ 0 1 ]



Step: 186

Updated position: [8 6]

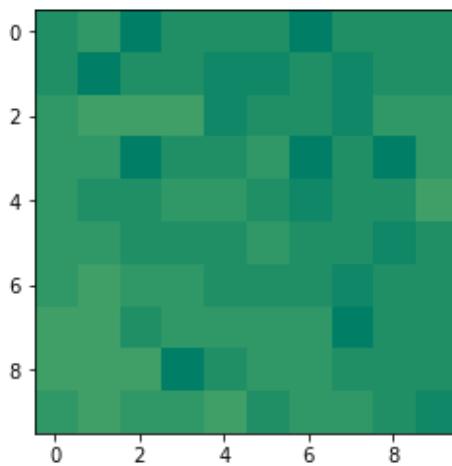
Updated direction: [-1 0 ]



Step: 187

Updated position: [ 7 6 ]

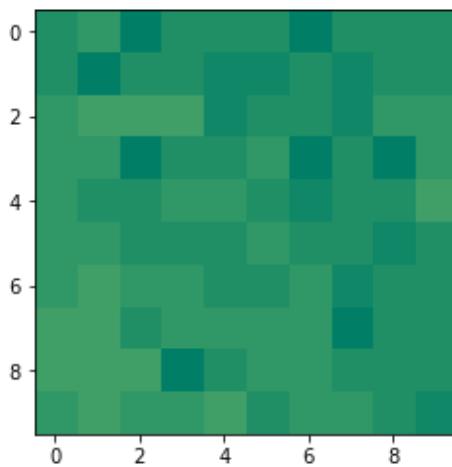
Updated direction: [ -1 0 ]



Step: 188

Updated position: [ 6 6 ]

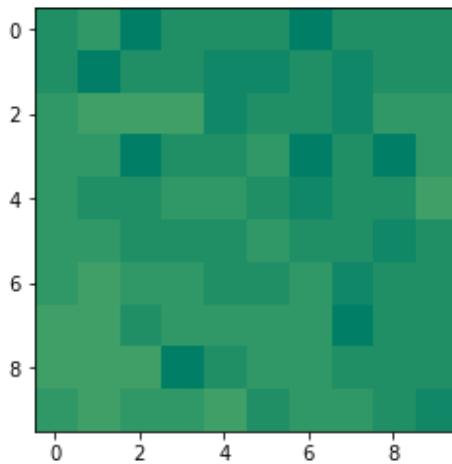
Updated direction: [ 0 1 ]



Step: 189

Updated position: [ 6 7 ]

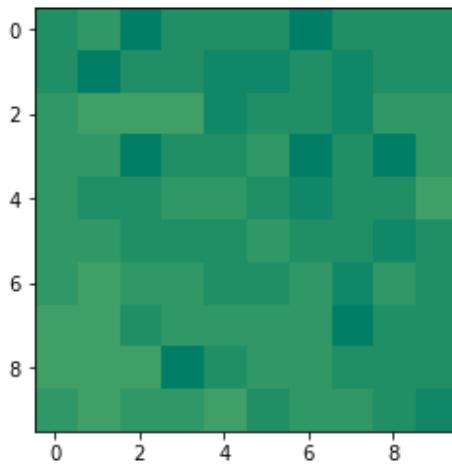
Updated direction: [ 0 1 ]



Step: 190

Updated position: [ 6 8 ]

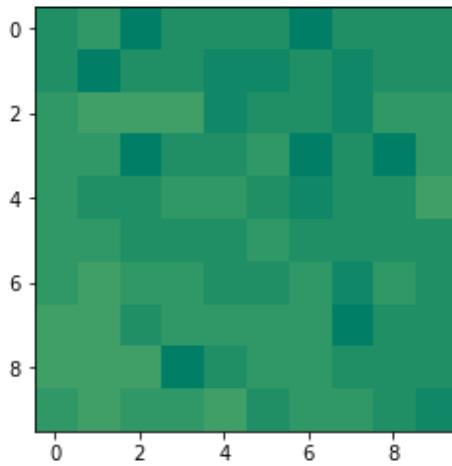
Updated direction: [ -1 0 ]



Step: 191

Updated position: [ 5 8 ]

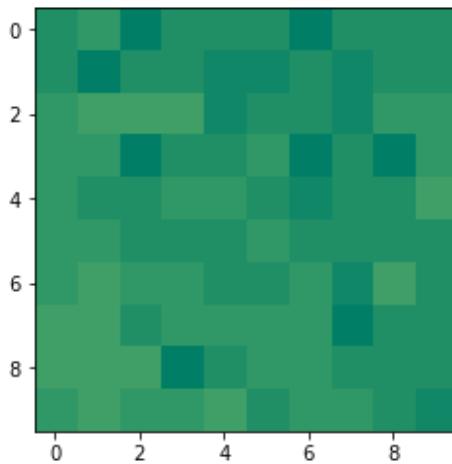
Updated direction: [ 1 0 ]



Step: 192

Updated position: [ 6 8 ]

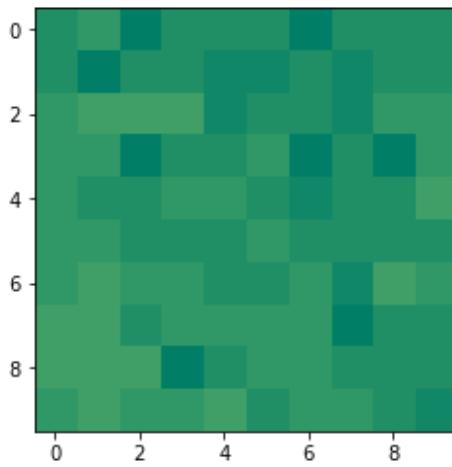
Updated direction: [ 0 1 ]



Step: 193

Updated position: [ 6 9 ]

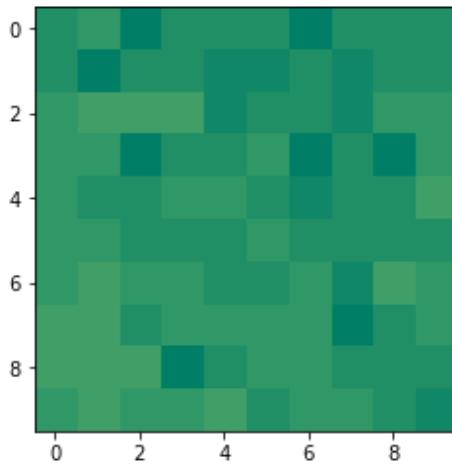
Updated direction: [ 1 0 ]



Step: 194

Updated position: [ 7 9 ]

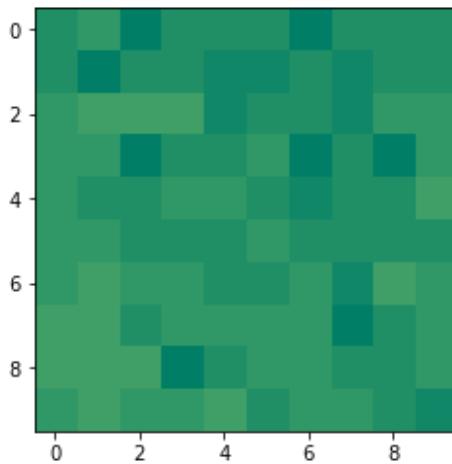
Updated direction: [ 1 0 ]



Step: 195

Updated position: [ 8 9 ]

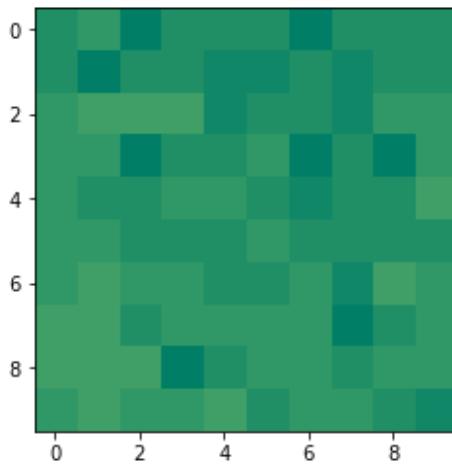
Updated direction: [ 0 -1 ]



Step: 196

Updated position: [ 8 8 ]

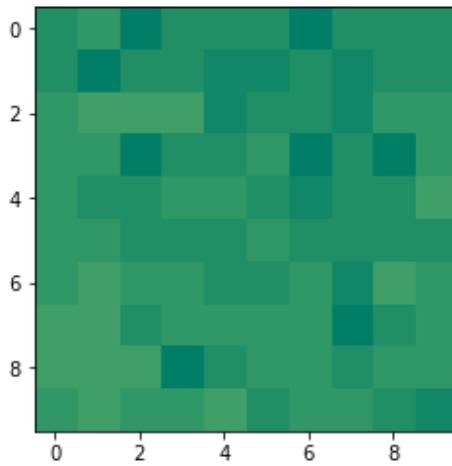
Updated direction: [ 1 0 ]



Step: 197

Updated position: [ 9 8 ]

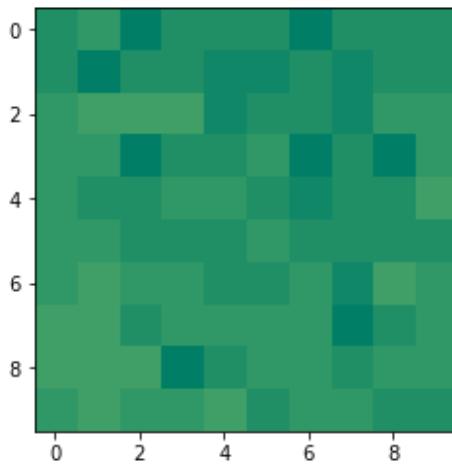
Updated direction: [ 0 1 ]



Step: 198

Updated position: [ 9 9 ]

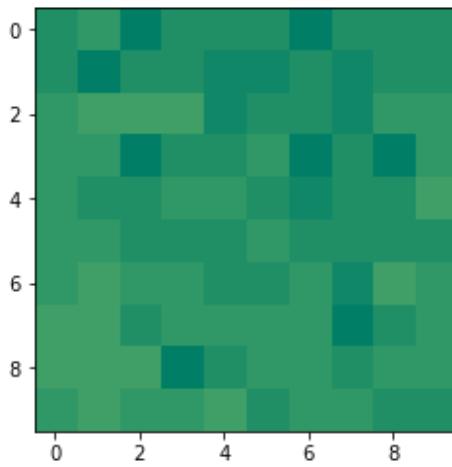
Updated direction: [ 0 -1 ]



Step: 199

Updated position: [ 9 8 ]

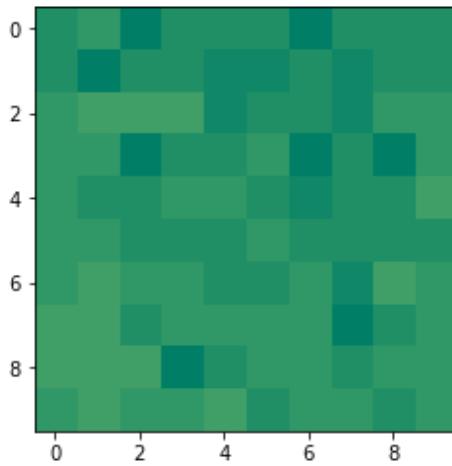
Updated direction: [ 0 1 ]



Step: 200

Updated position: [ 9 9 ]

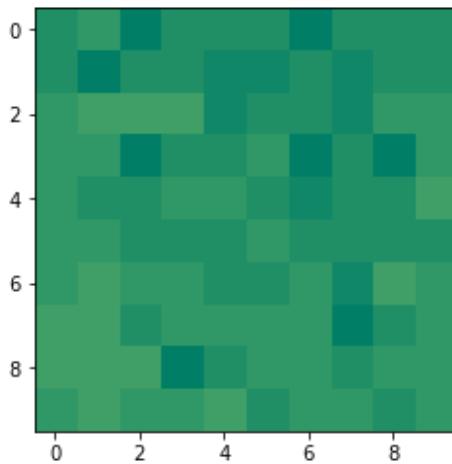
Updated direction: [ 0 -1 ]



Step: 201

Updated position: [ 9 8 ]

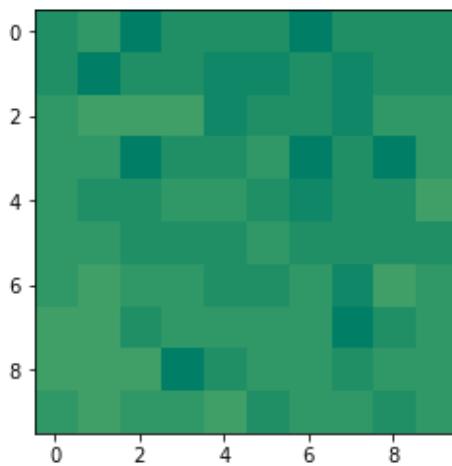
Updated direction: [ 0 -1 ]



Step: 202

Updated position: [9 7]

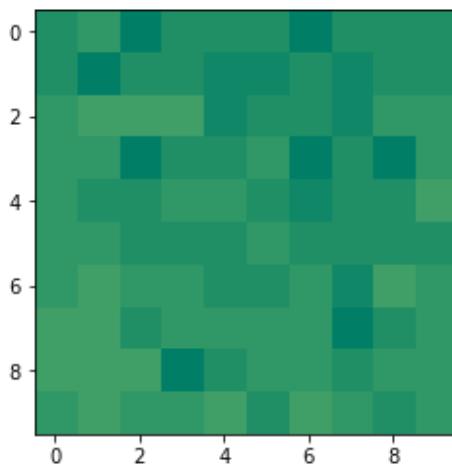
Updated direction: [ 0 -1 ]



Step: 203

Updated position: [9 6]

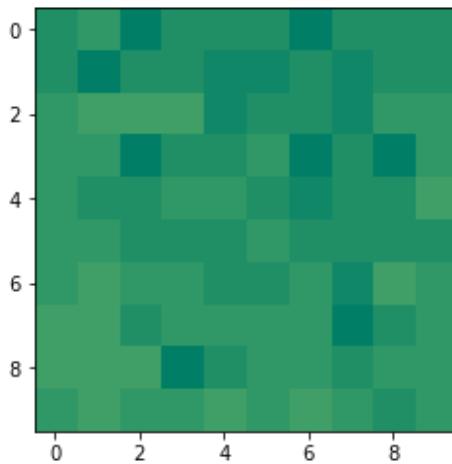
Updated direction: [ 0 -1 ]



Step: 204

Updated position: [9 5]

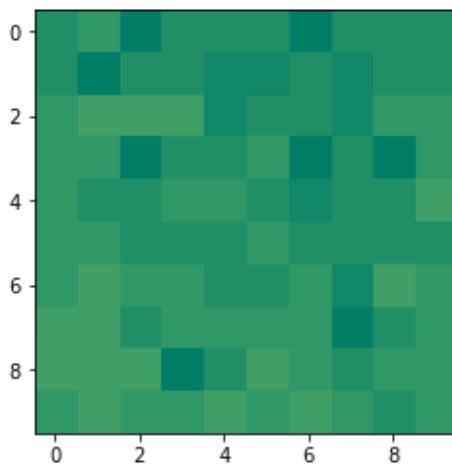
Updated direction: [-1 0 ]



Step: 205

Updated position: [ 8 5 ]

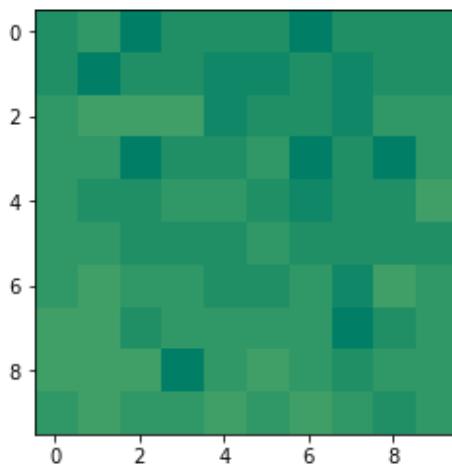
Updated direction: [ 0 -1 ]



Step: 206

Updated position: [ 8 4 ]

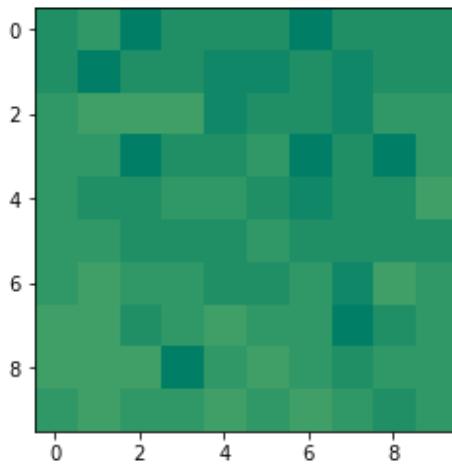
Updated direction: [-1 0 ]



Step: 207

Updated position: [ 7 4 ]

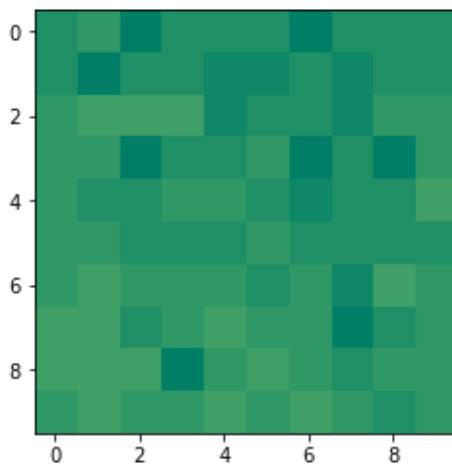
Updated direction: [-1 0 ]



Step: 208

Updated position: [ 6 4 ]

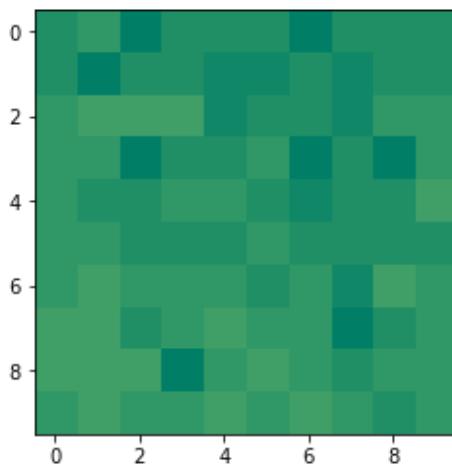
Updated direction: [ -1 0 ]



Step: 209

Updated position: [ 5 4 ]

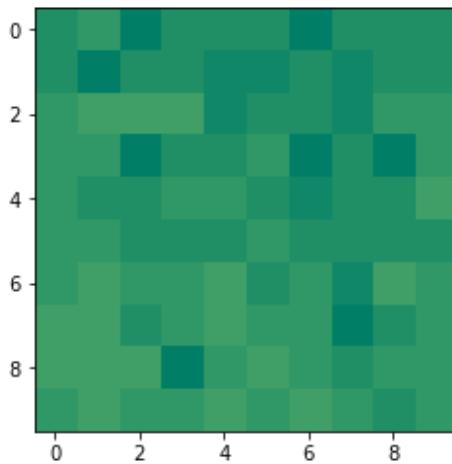
Updated direction: [ 1 0 ]



Step: 210

Updated position: [ 6 4 ]

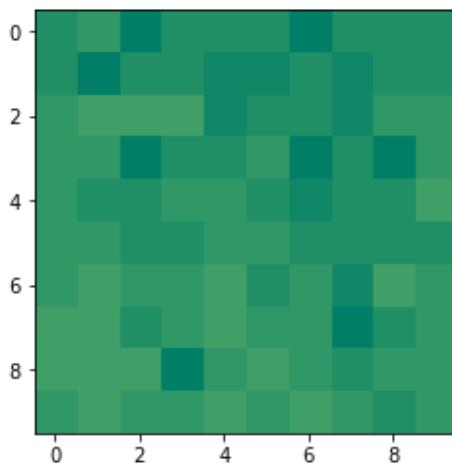
Updated direction: [ -1 0 ]



Step: 211

Updated position: [ 5 4 ]

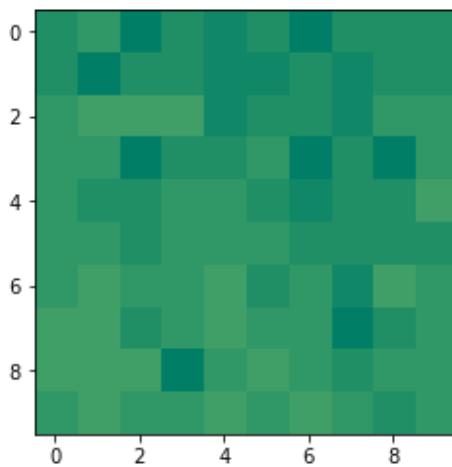
Updated direction: [ 0 -1 ]



Step: 212

Updated position: [ 5 3 ]

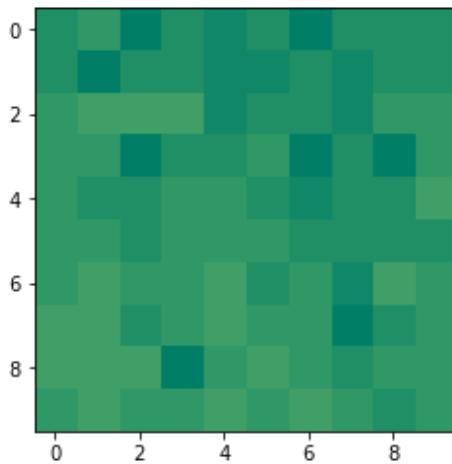
Updated direction: [ 0 -1 ]



Step: 213

Updated position: [ 5 2 ]

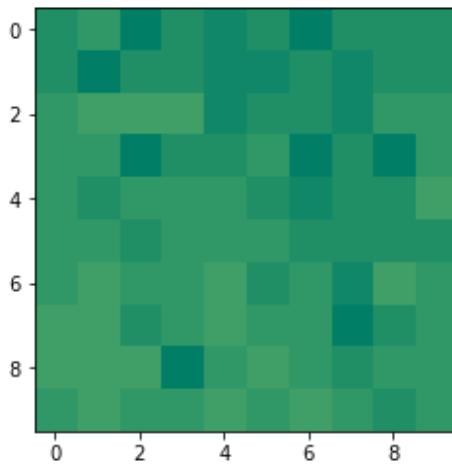
Updated direction: [-1 0 ]



Step: 214

Updated position: [ 4 2 ]

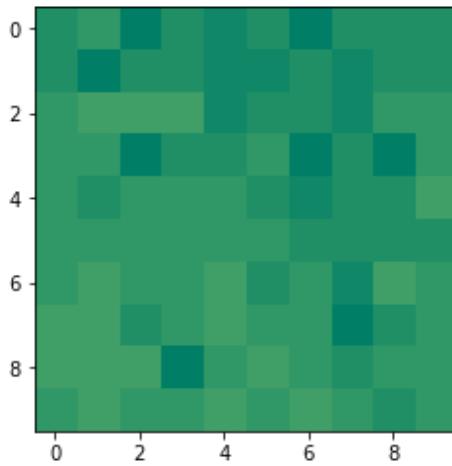
Updated direction: [ 1 0 ]



Step: 215

Updated position: [ 5 2 ]

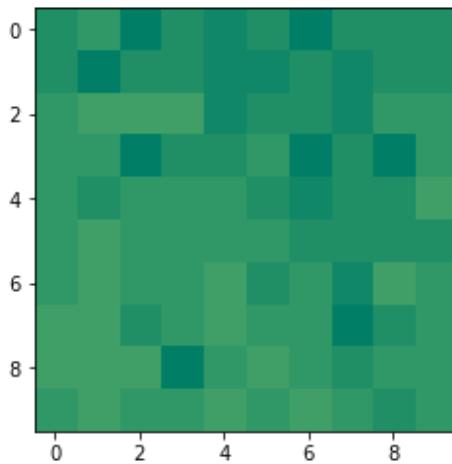
Updated direction: [ 0 -1 ]



Step: 216

Updated position: [ 5 1 ]

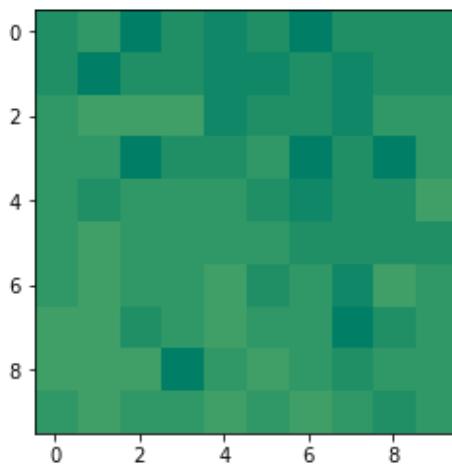
Updated direction: [-1 0 ]



Step: 217

Updated position: [ 4 1 ]

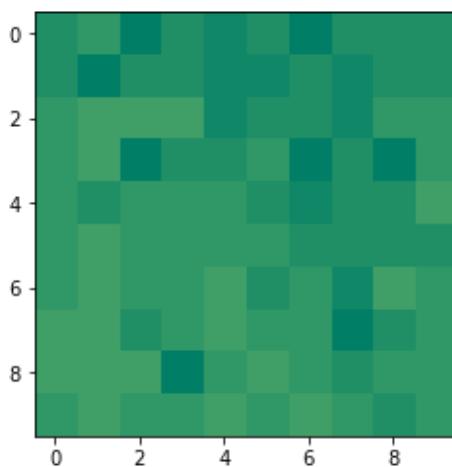
Updated direction: [ -1 0 ]



Step: 218

Updated position: [ 3 1 ]

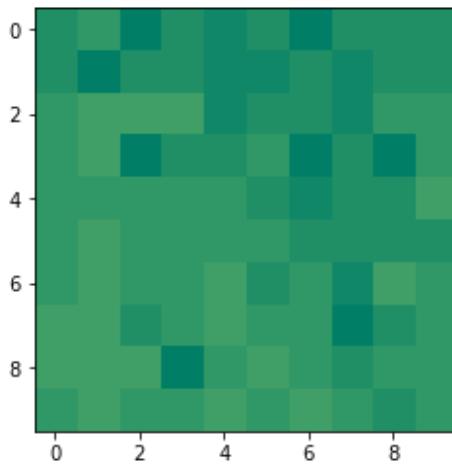
Updated direction: [ 1 0 ]



Step: 219

Updated position: [ 4 1 ]

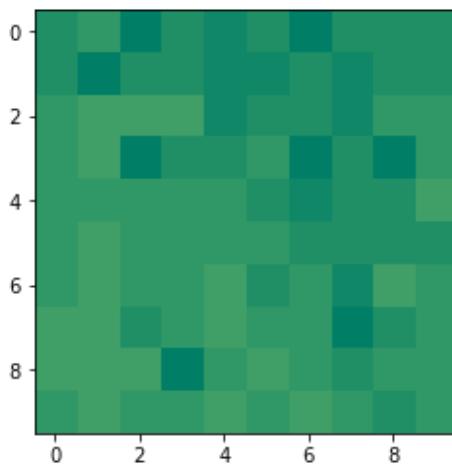
Updated direction: [ 0 -1 ]



Step: 220

Updated position: [ 4 0 ]

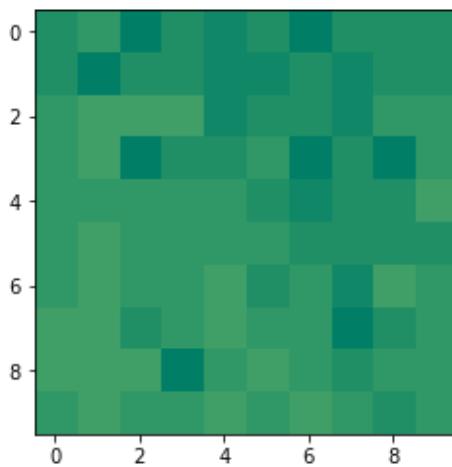
Updated direction: [ 1 0 ]



Step: 221

Updated position: [ 5 0 ]

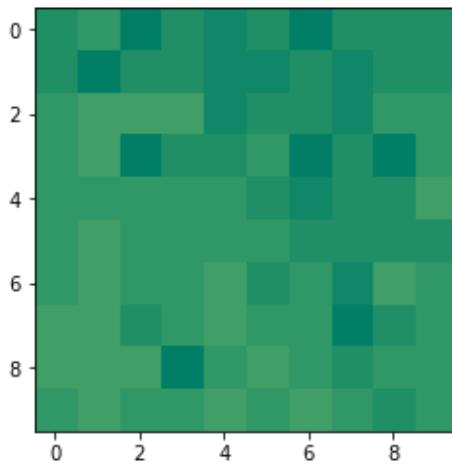
Updated direction: [ 0 1 ]



Step: 222

Updated position: [ 5 1 ]

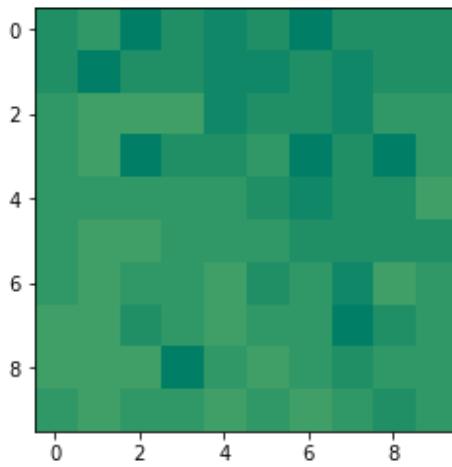
Updated direction: [ 0 1 ]



Step: 223

Updated position: [ 5 2 ]

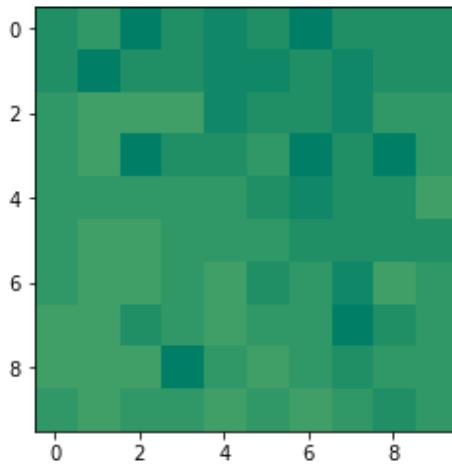
Updated direction: [ 1 0 ]



Step: 224

Updated position: [ 6 2 ]

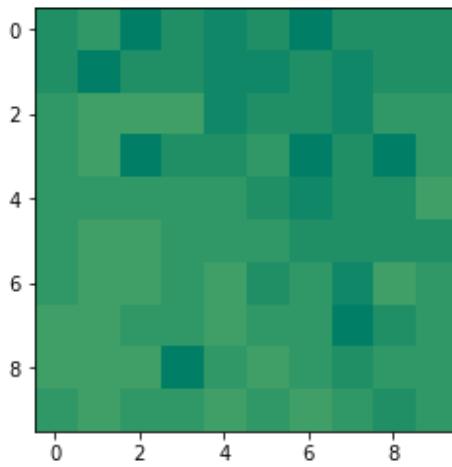
Updated direction: [ 1 0 ]



Step: 225

Updated position: [ 7 2 ]

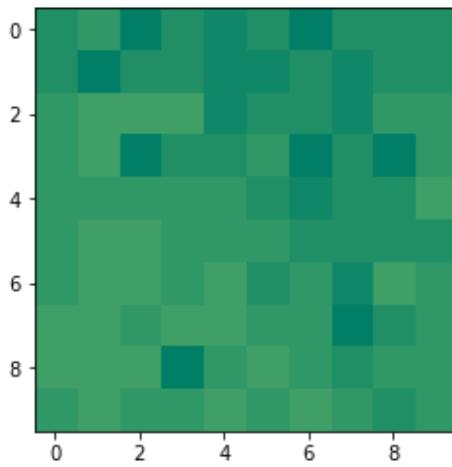
Updated direction: [ 0 1 ]



Step: 226

Updated position: [ 7 3 ]

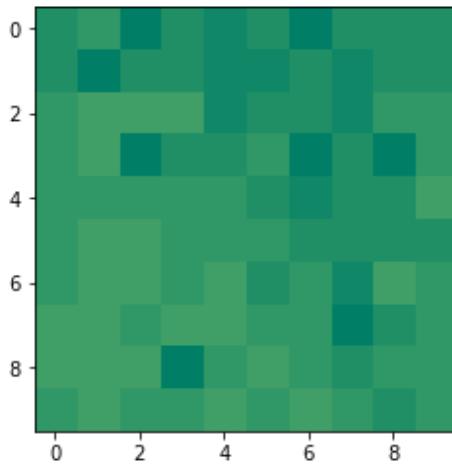
Updated direction: [ -1 0 ]



Step: 227

Updated position: [ 6 3 ]

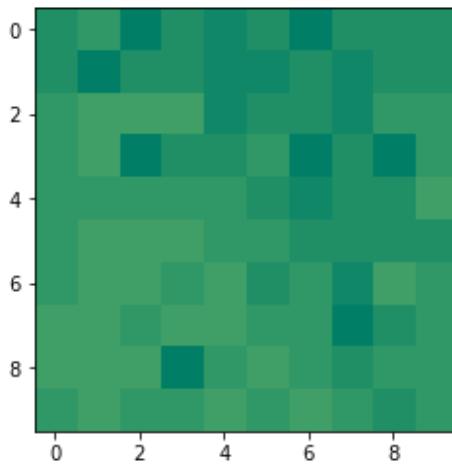
Updated direction: [ -1 0 ]



Step: 228

Updated position: [ 5 3 ]

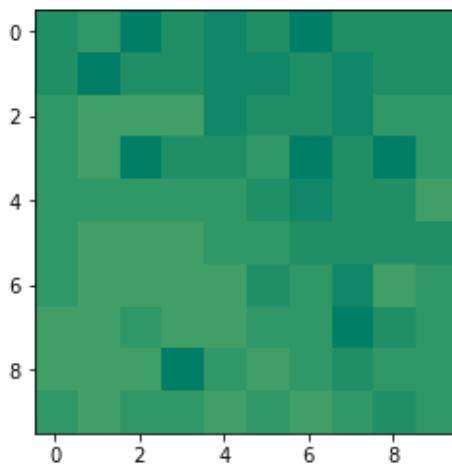
Updated direction: [ 1 0 ]



Step: 229

Updated position: [ 6 3 ]

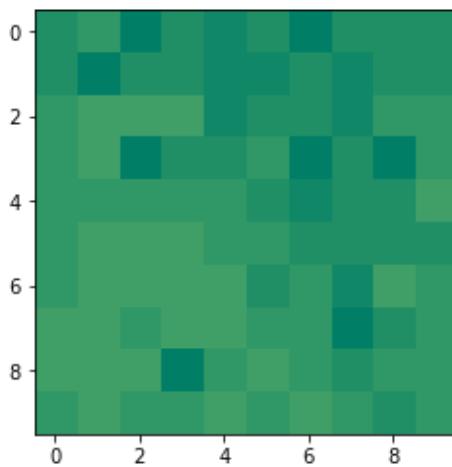
Updated direction: [ 0 -1 ]



Step: 230

Updated position: [ 6 2 ]

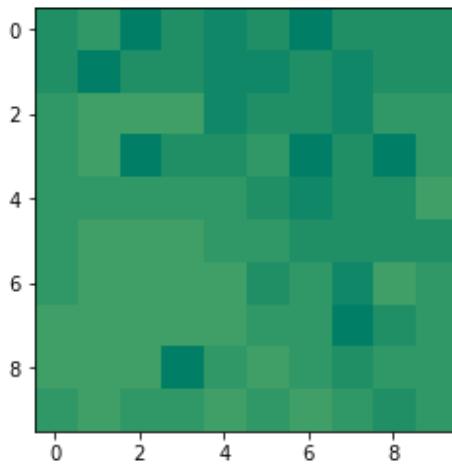
Updated direction: [ 1 0 ]



Step: 231

Updated position: [ 7 2 ]

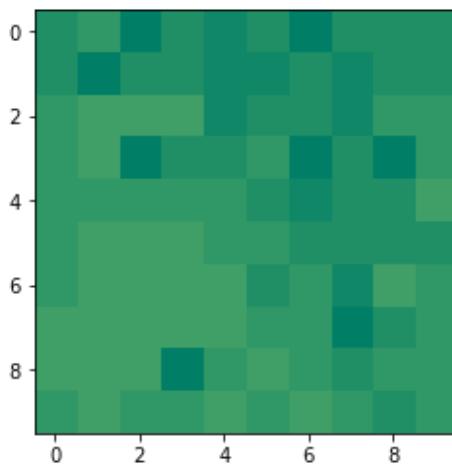
Updated direction: [ 0 1 ]



Step: 232

Updated position: [ 7 3 ]

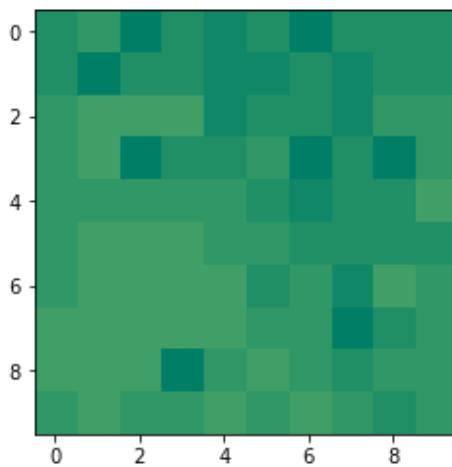
Updated direction: [ -1 0 ]



Step: 233

Updated position: [ 6 3 ]

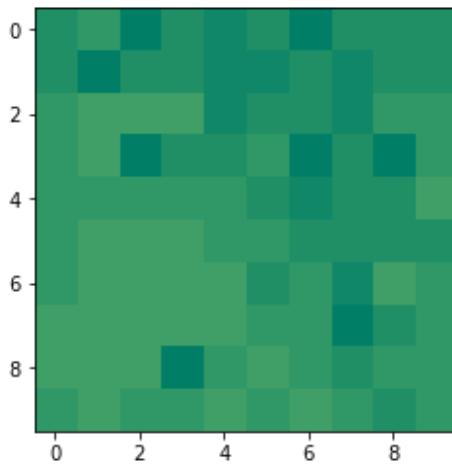
Updated direction: [ 1 0 ]



Step: 234

Updated position: [ 7 3 ]

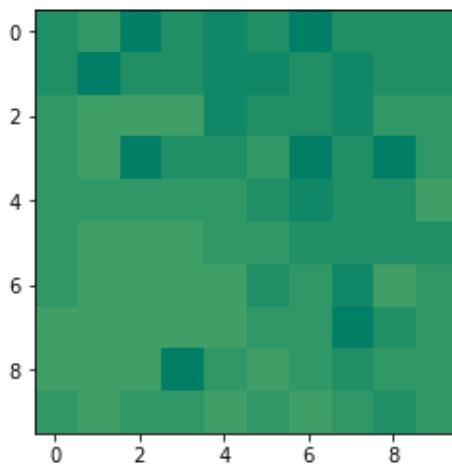
Updated direction: [ -1 0 ]



Step: 235

Updated position: [ 6 3 ]

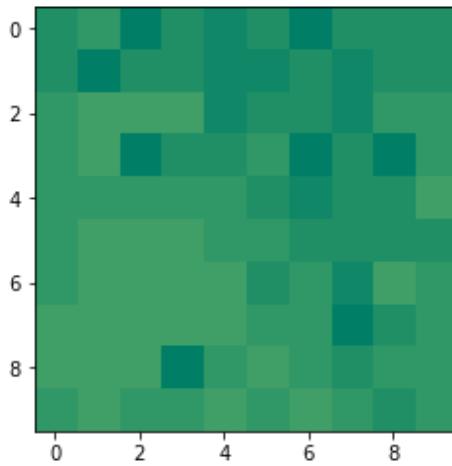
Updated direction: [ 1 0 ]



Step: 236

Updated position: [ 7 3 ]

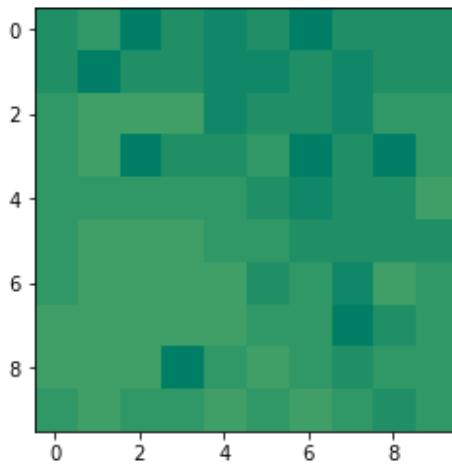
Updated direction: [ -1 0 ]



Step: 237

Updated position: [ 6 3 ]

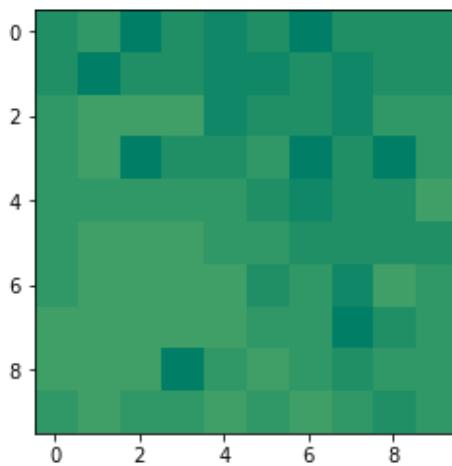
Updated direction: [ 0 1 ]



Step: 238

Updated position: [ 6 4 ]

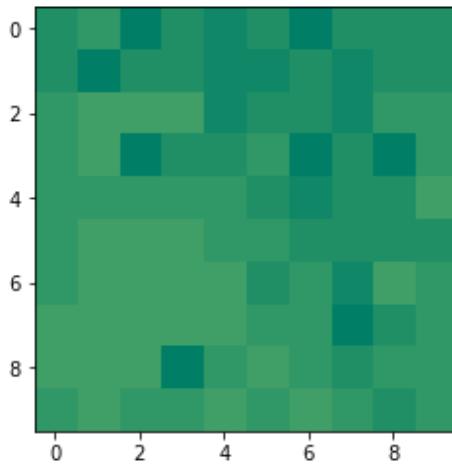
Updated direction: [ 1 0 ]



Step: 239

Updated position: [ 7 4 ]

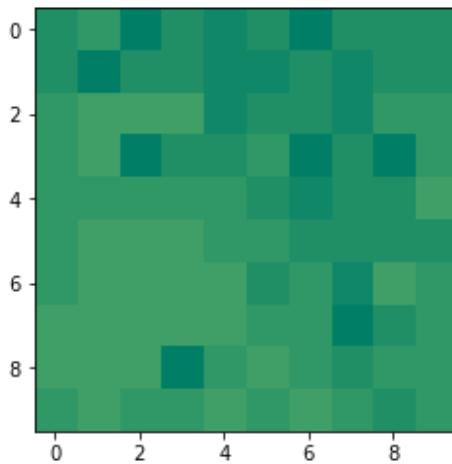
Updated direction: [ 0 -1 ]



Step: 240

Updated position: [ 7 3 ]

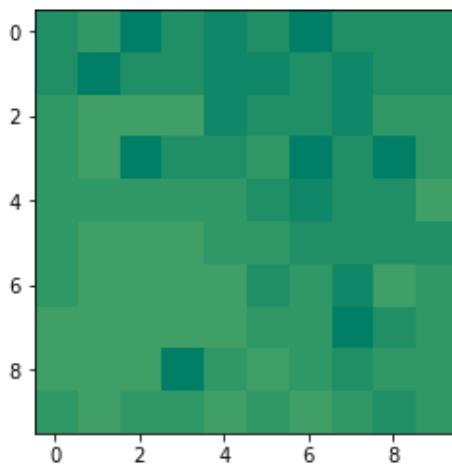
Updated direction: [-1 0 ]



Step: 241

Updated position: [ 6 3 ]

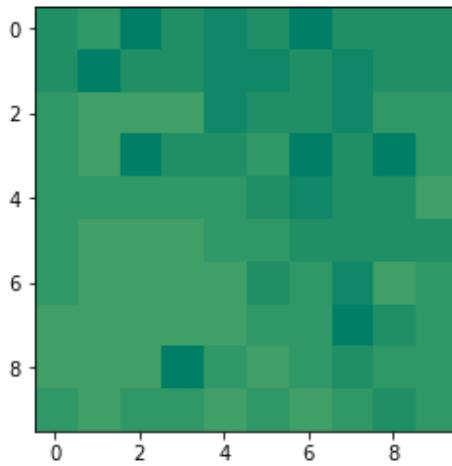
Updated direction: [ 1 0 ]



Step: 242

Updated position: [ 7 3 ]

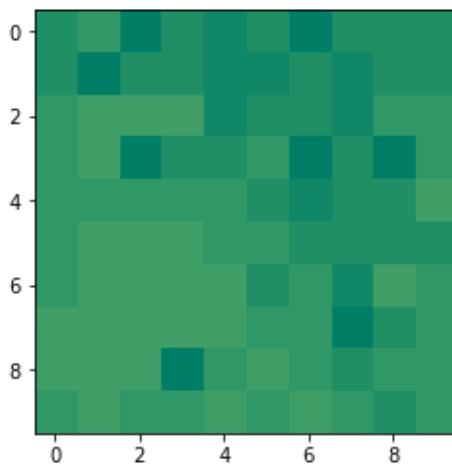
Updated direction: [ -1 0 ]



Step: 243

Updated position: [ 6 3 ]

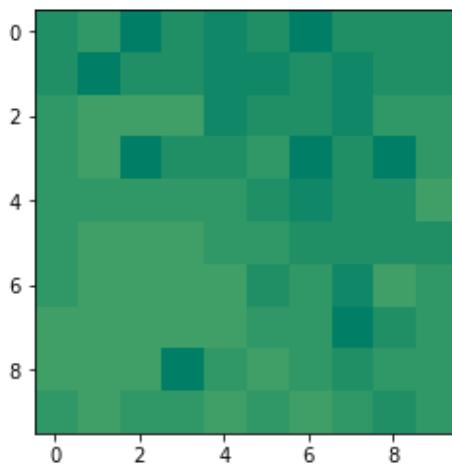
Updated direction: [ 0 -1 ]



Step: 244

Updated position: [ 6 2 ]

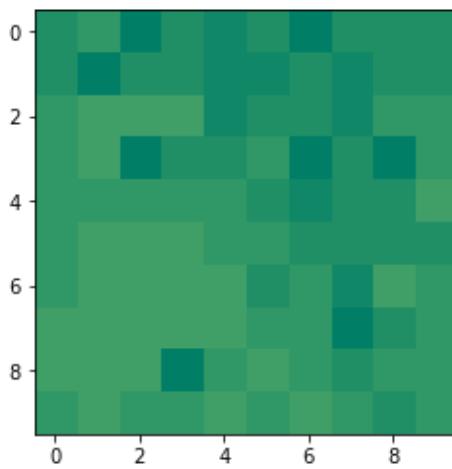
Updated direction: [ -1 0 ]



Step: 245

Updated position: [ 5 2 ]

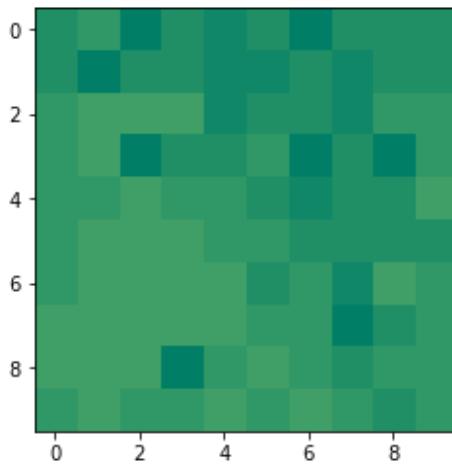
Updated direction: [ -1 0 ]



Step: 246

Updated position: [ 4 2 ]

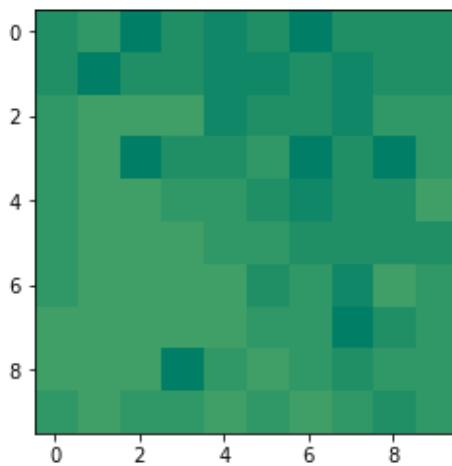
Updated direction: [ 0 -1 ]



Step: 247

Updated position: [ 4 1 ]

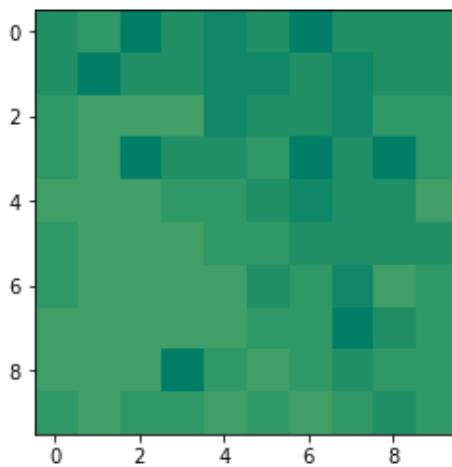
Updated direction: [ 0 -1 ]



Step: 248

Updated position: [ 4 0 ]

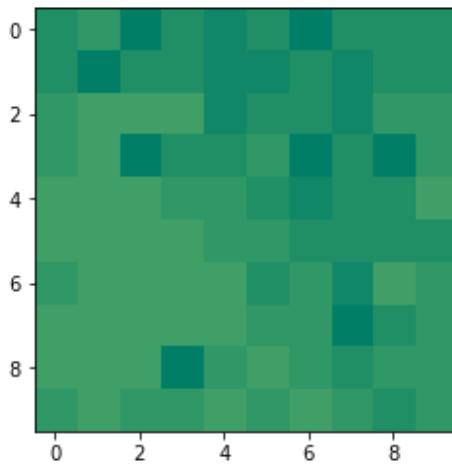
Updated direction: [ 1 0 ]



Step: 249

Updated position: [ 5 0 ]

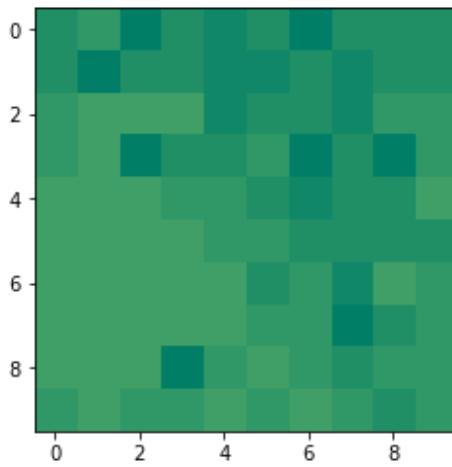
Updated direction: [ 1 0 ]



Step: 250

Updated position: [ 6 0 ]

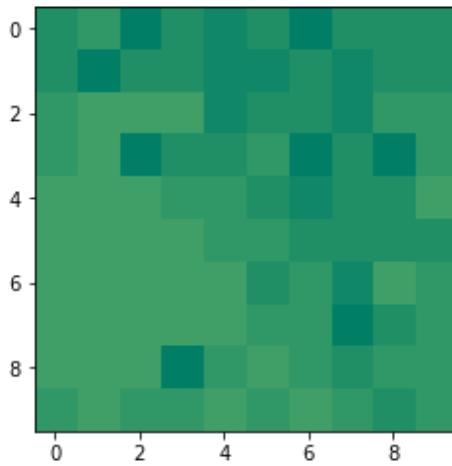
Updated direction: [ 1 0 ]



Step: 251

Updated position: [ 7 0 ]

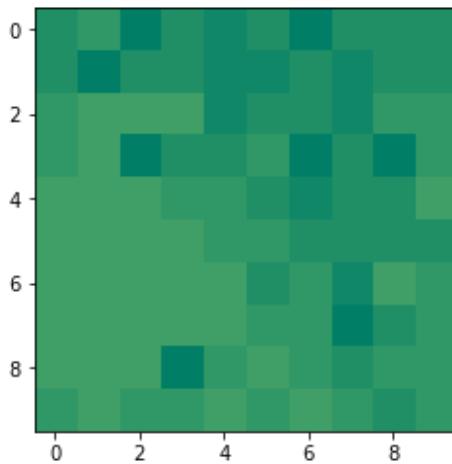
Updated direction: [ -1 0 ]



Step: 252

Updated position: [ 6 0 ]

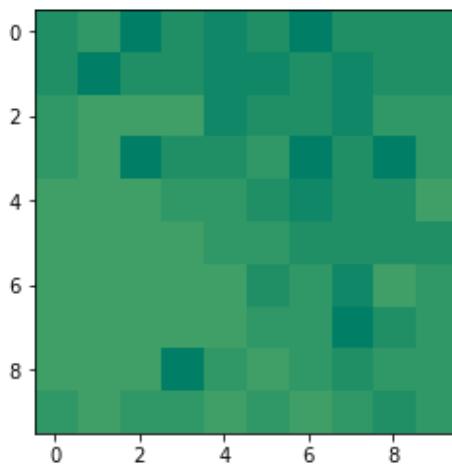
Updated direction: [ 1 0 ]



Step: 253

Updated position: [ 7 0 ]

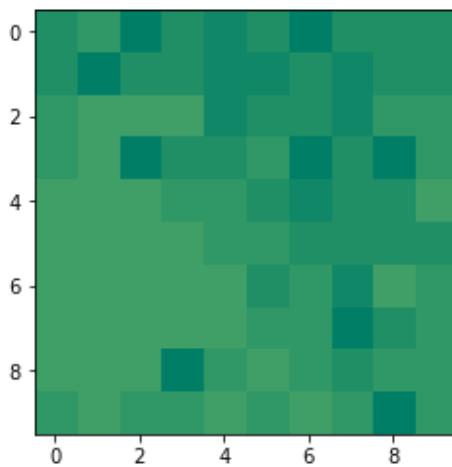
Updated direction: [ 1 0 ]



Step: 254

Updated position: [ 8 0 ]

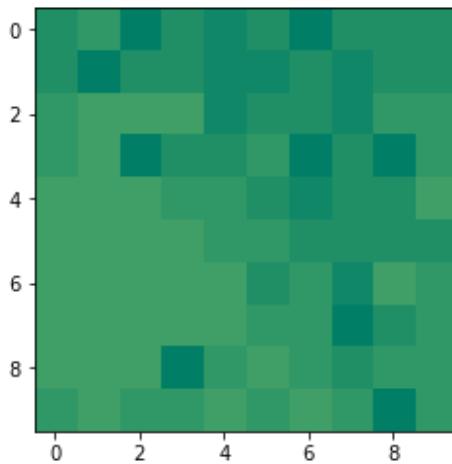
Updated direction: [ 0 1 ]



Step: 255

Updated position: [ 8 1 ]

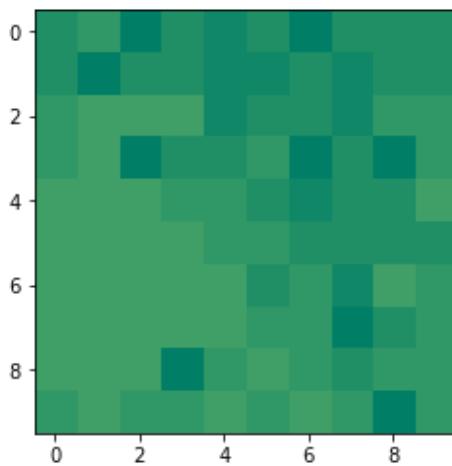
Updated direction: [ 1 0 ]



Step: 256

Updated position: [9 1]

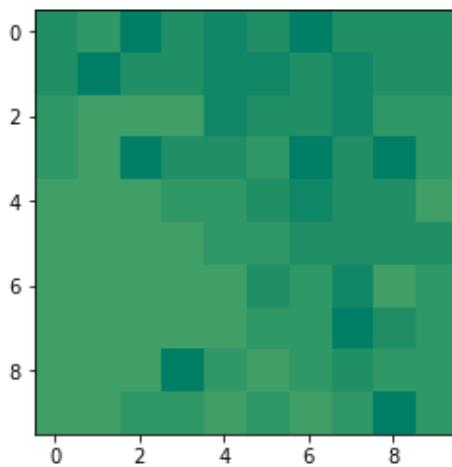
Updated direction: [ 0 -1]



Step: 257

Updated position: [9 0]

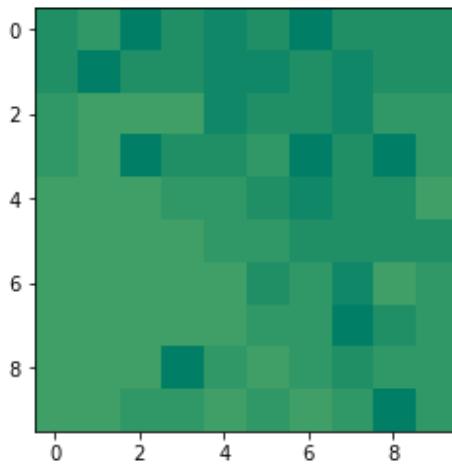
Updated direction: [ 0 1]



Step: 258

Updated position: [9 1]

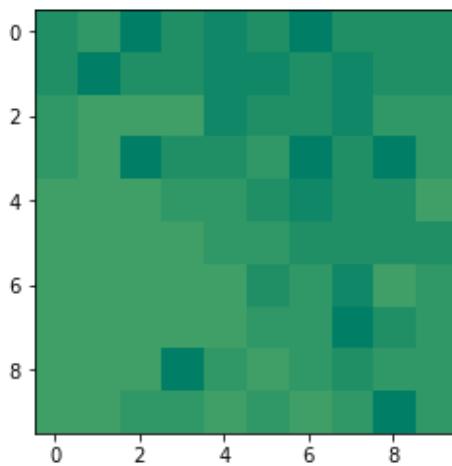
Updated direction: [ 0 -1]



Step: 259

Updated position: [9 0]

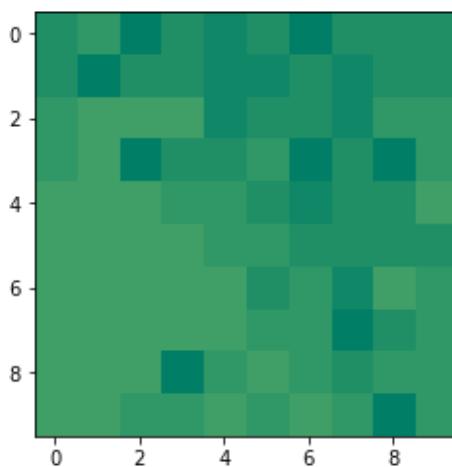
Updated direction: [-1 0]



Step: 260

Updated position: [8 0]

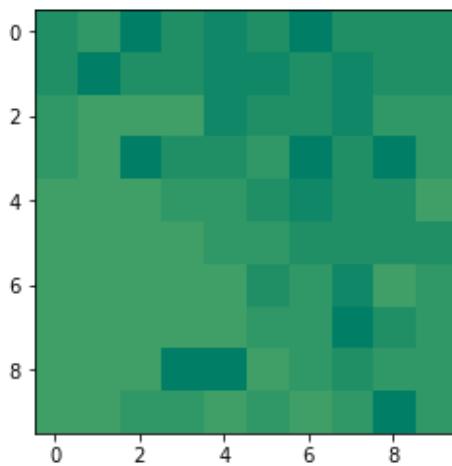
Updated direction: [1 0]



Step: 261

Updated position: [9 0]

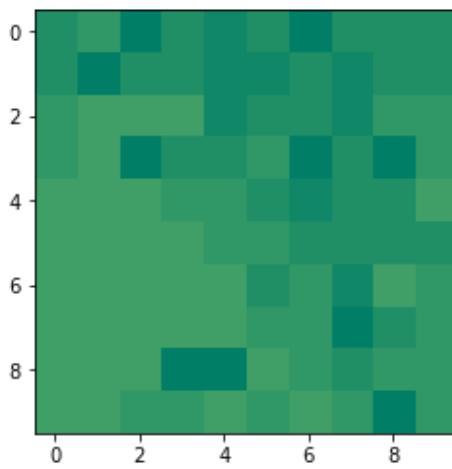
Updated direction: [0 1]



Step: 262

Updated position: [9 1]

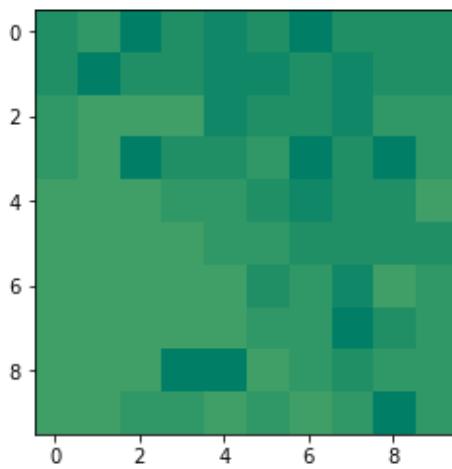
Updated direction: [ 0 -1 ]



Step: 263

Updated position: [9 0]

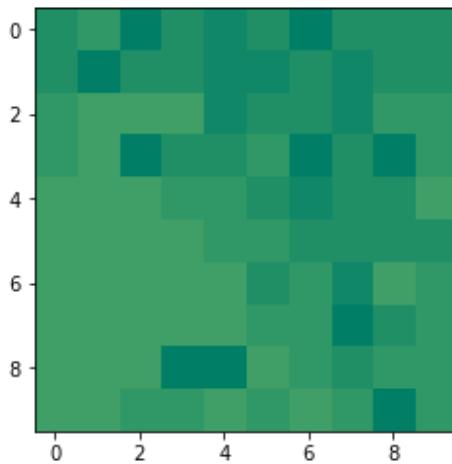
Updated direction: [ 0 1 ]



Step: 264

Updated position: [9 1]

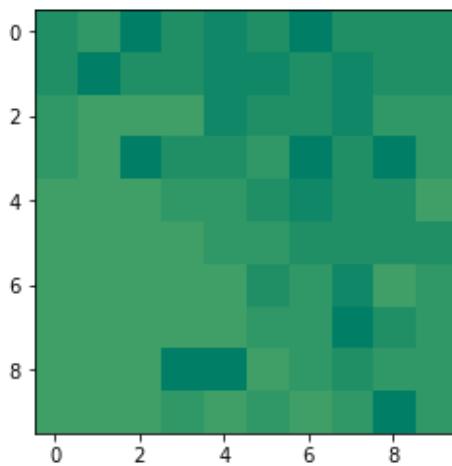
Updated direction: [ 0 1 ]



Step: 265

Updated position: [ 9 2 ]

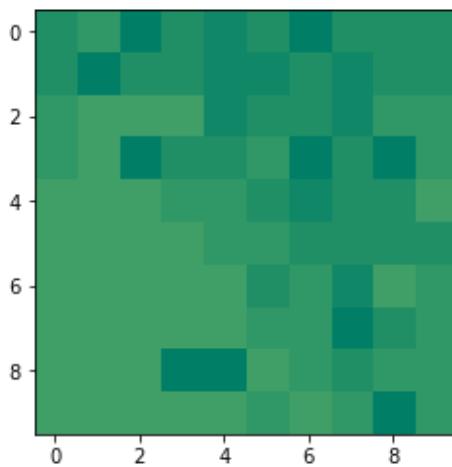
Updated direction: [ 0 1 ]



Step: 266

Updated position: [ 9 3 ]

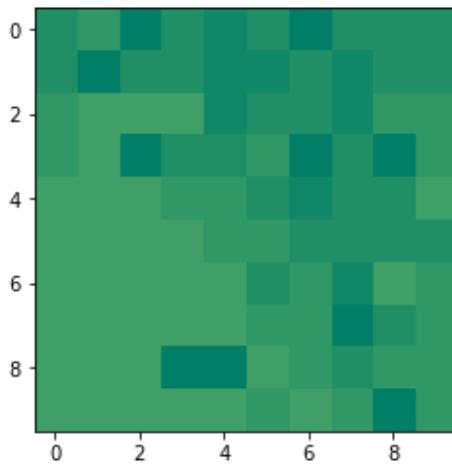
Updated direction: [ 0 -1 ]



Step: 267

Updated position: [ 9 2 ]

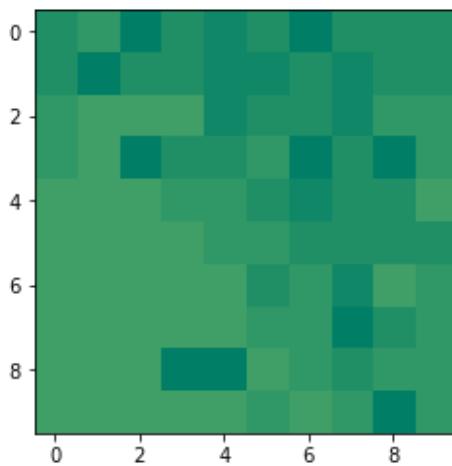
Updated direction: [ 0 -1 ]



Step: 268

Updated position: [ 9 1 ]

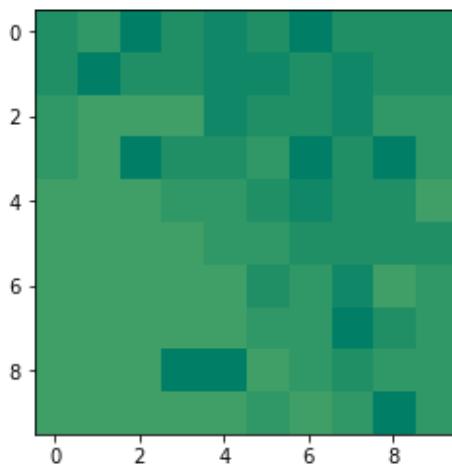
Updated direction: [ -1 0 ]



Step: 269

Updated position: [ 8 1 ]

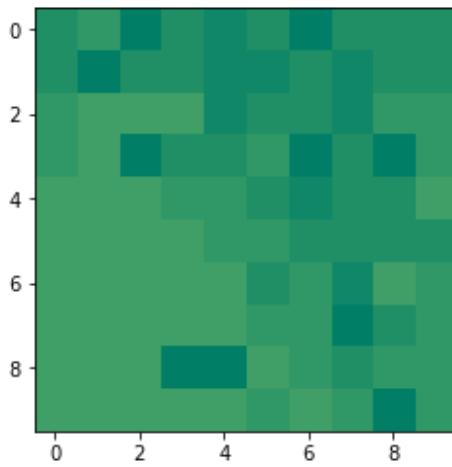
Updated direction: [ 1 0 ]



Step: 270

Updated position: [ 9 1 ]

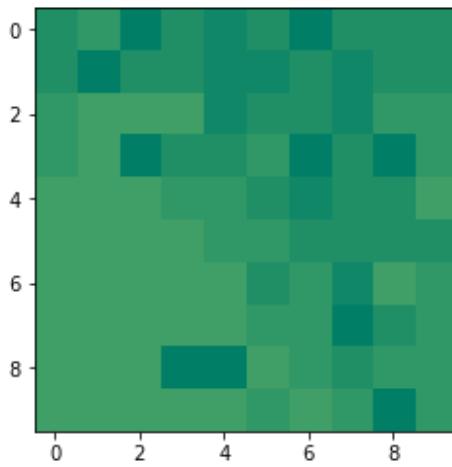
Updated direction: [ 0 -1 ]



Step: 271

Updated position: [9 0]

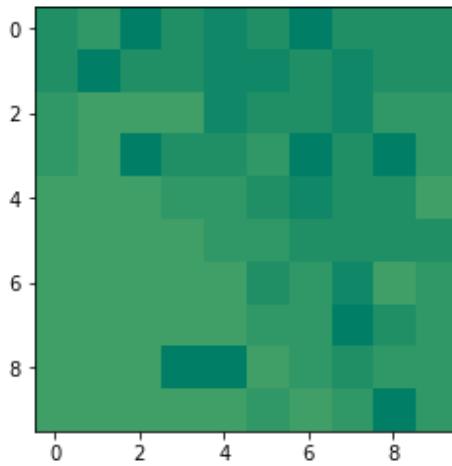
Updated direction: [-1 0]



Step: 272

Updated position: [8 0]

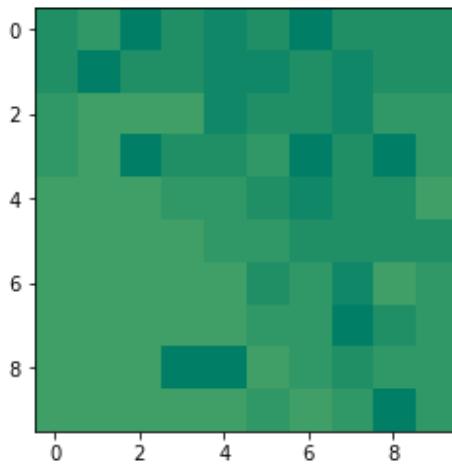
Updated direction: [0 1]



Step: 273

Updated position: [8 1]

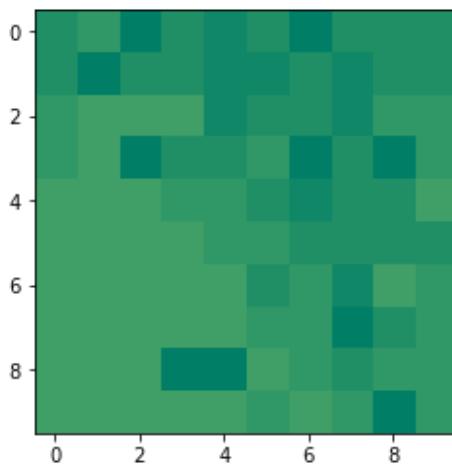
Updated direction: [1 0]



Step: 274

Updated position: [ 9 1 ]

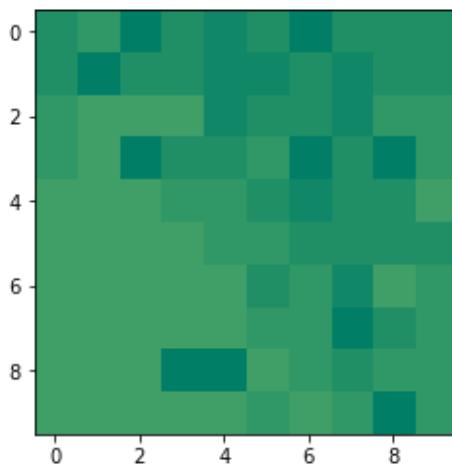
Updated direction: [ -1 0 ]



Step: 275

Updated position: [ 8 1 ]

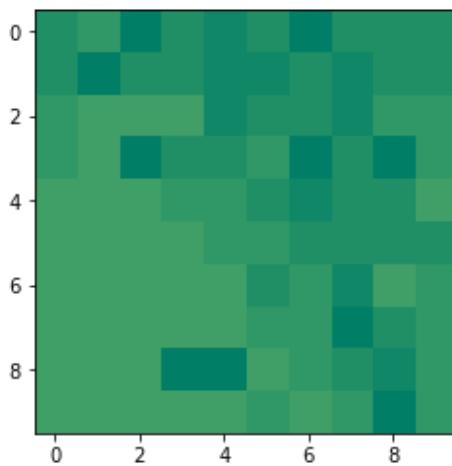
Updated direction: [ 0 -1 ]



Step: 276

Updated position: [ 8 0 ]

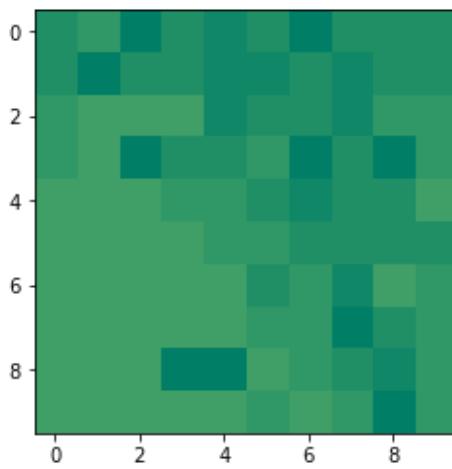
Updated direction: [ 1 0 ]



Step: 277

Updated position: [9 0]

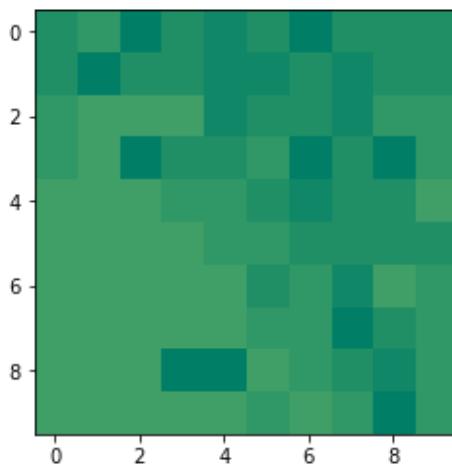
Updated direction: [0 1]



Step: 278

Updated position: [9 1]

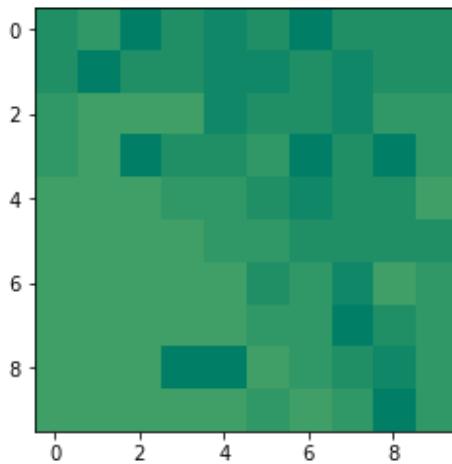
Updated direction: [0 -1]



Step: 279

Updated position: [9 0]

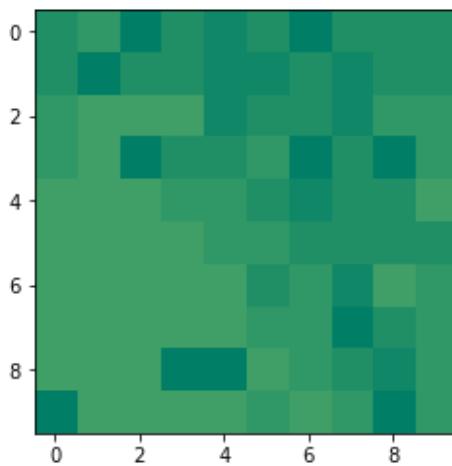
Updated direction: [0 1]



Step: 280

Updated position: [9 1]

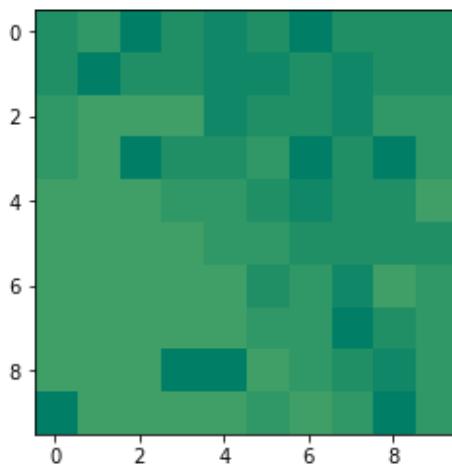
Updated direction: [0 1]



Step: 281

Updated position: [9 2]

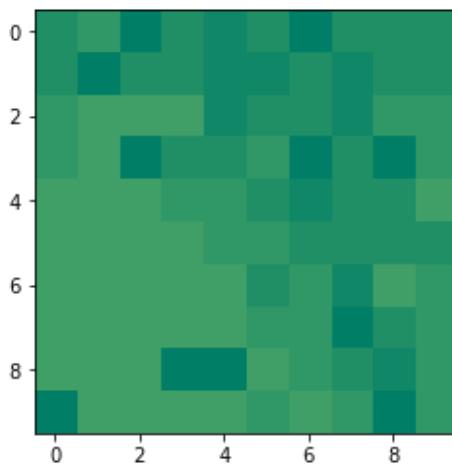
Updated direction: [-1 0]



Step: 282

Updated position: [8 2]

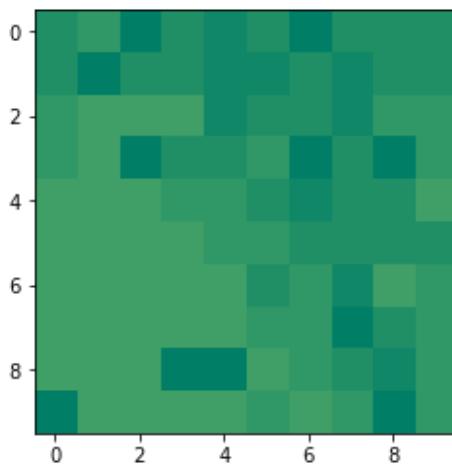
Updated direction: [1 0]



Step: 283

Updated position: [9 2]

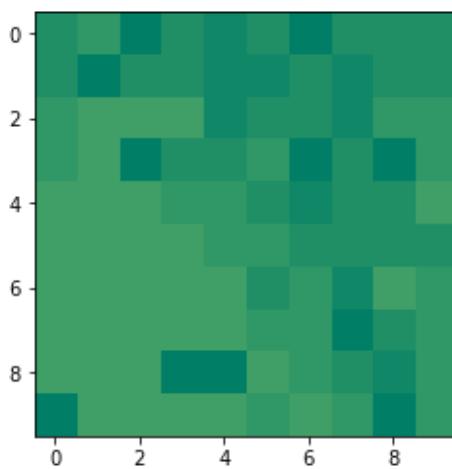
Updated direction: [ 0 -1]



Step: 284

Updated position: [9 1]

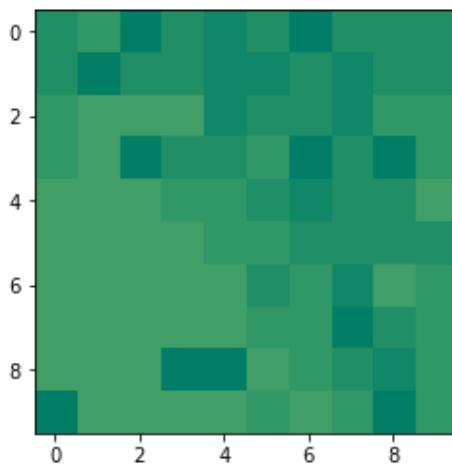
Updated direction: [ 0 1]



Step: 285

Updated position: [9 2]

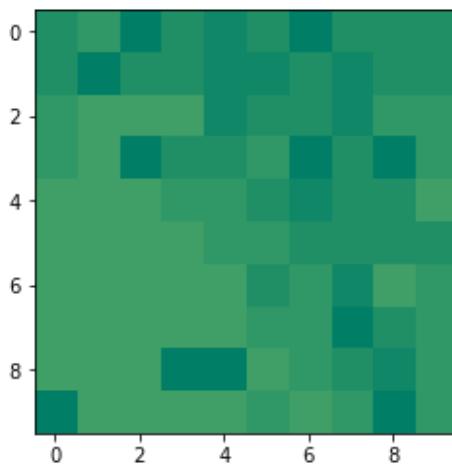
Updated direction: [ 0 -1]



Step: 286

Updated position: [9 1]

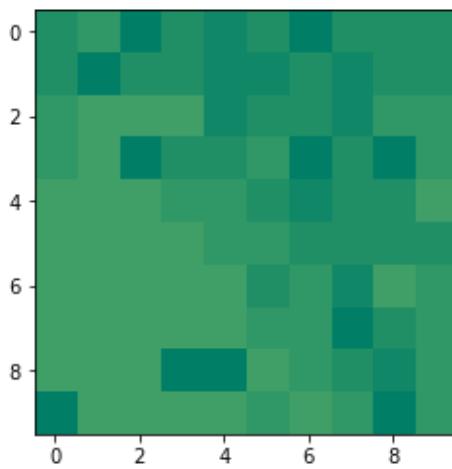
Updated direction: [ 0 1 ]



Step: 287

Updated position: [9 2]

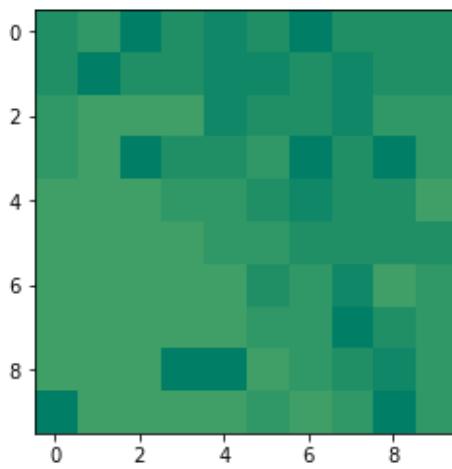
Updated direction: [ 0 -1 ]



Step: 288

Updated position: [9 1]

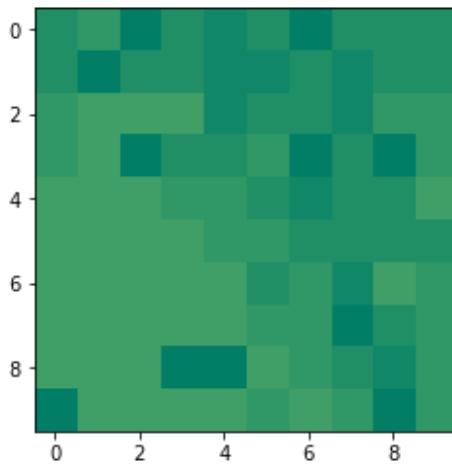
Updated direction: [ 0 1 ]



Step: 289

Updated position: [9 2]

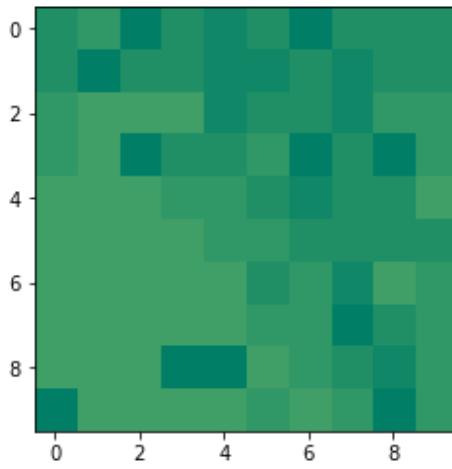
Updated direction: [ 0 -1 ]



Step: 290

Updated position: [9 1]

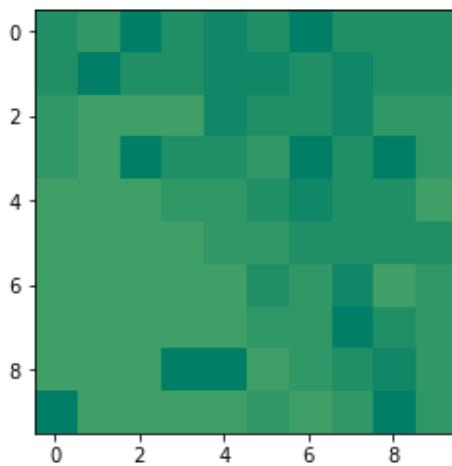
Updated direction: [-1 0 ]



Step: 291

Updated position: [8 1]

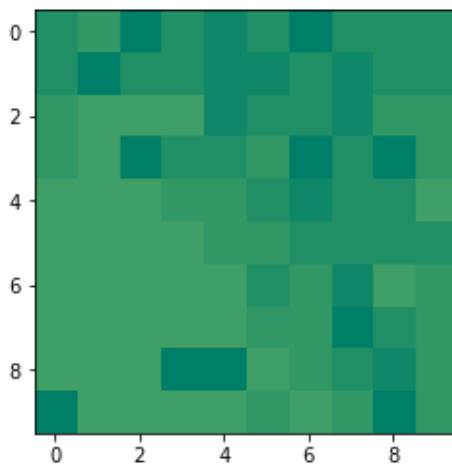
Updated direction: [1 0 ]



Step: 292

Updated position: [9 1]

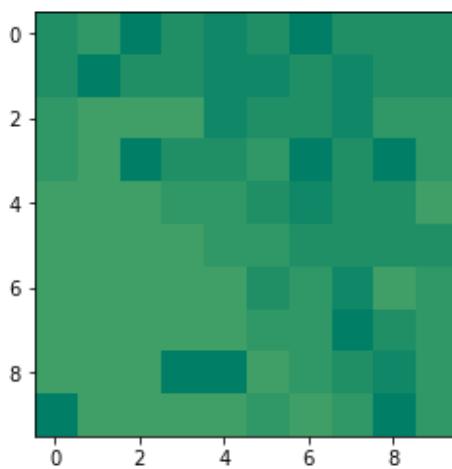
Updated direction: [-1 0]



Step: 293

Updated position: [8 1]

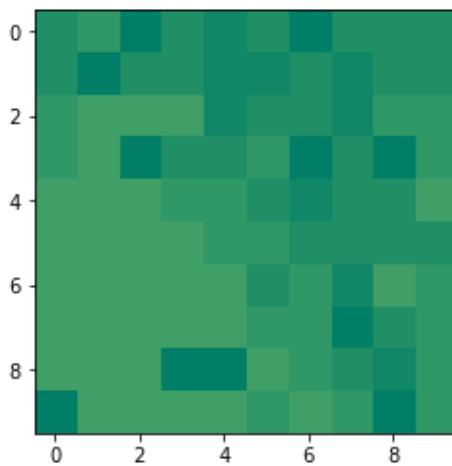
Updated direction: [1 0]



Step: 294

Updated position: [9 1]

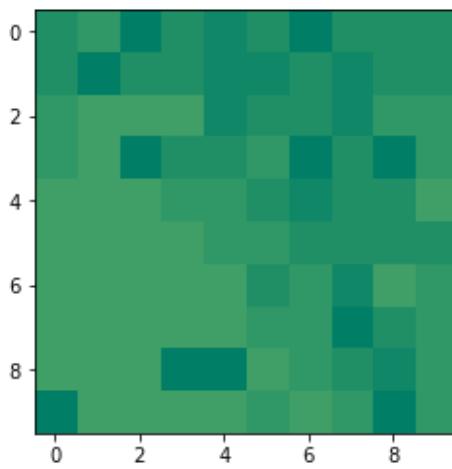
Updated direction: [0 1]



Step: 295

Updated position: [9 2]

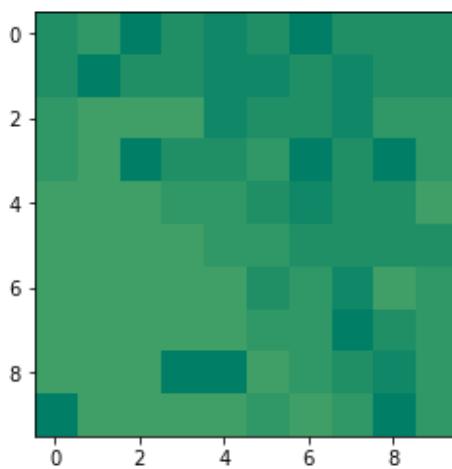
Updated direction: [ 0 -1]



Step: 296

Updated position: [9 1]

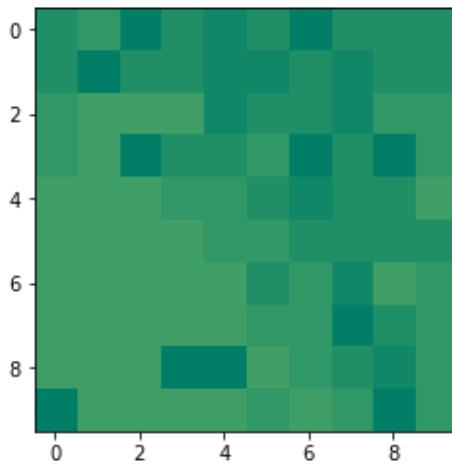
Updated direction: [ 0 1]



Step: 297

Updated position: [9 2]

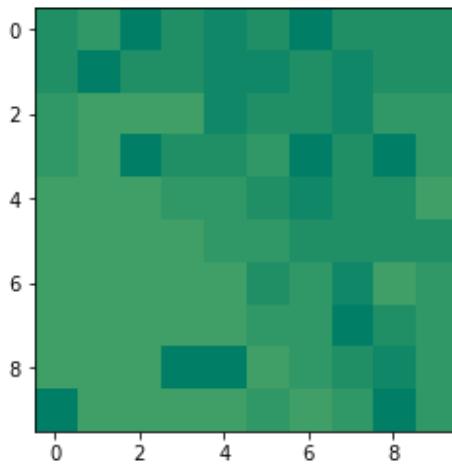
Updated direction: [ 0 -1]



Step: 298

Updated position: [ 9 1 ]

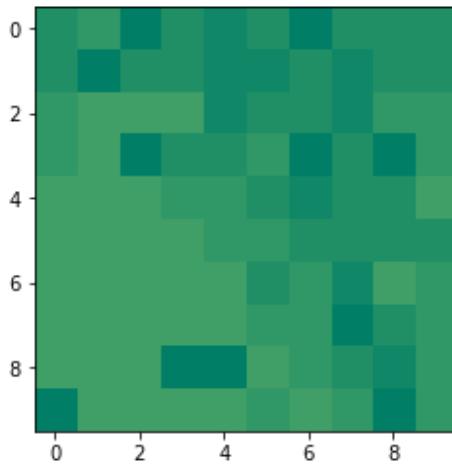
Updated direction: [ 0 1 ]



Step: 299

Updated position: [ 9 2 ]

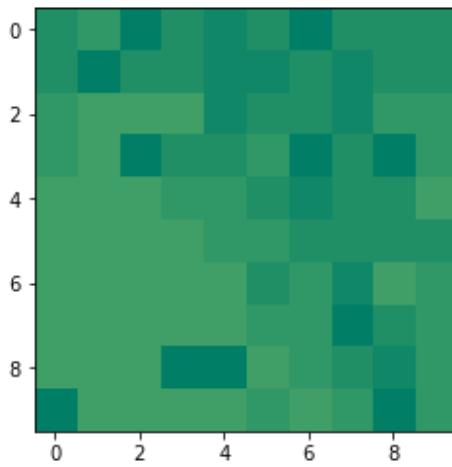
Updated direction: [ -1 0 ]



Step: 300

Updated position: [ 8 2 ]

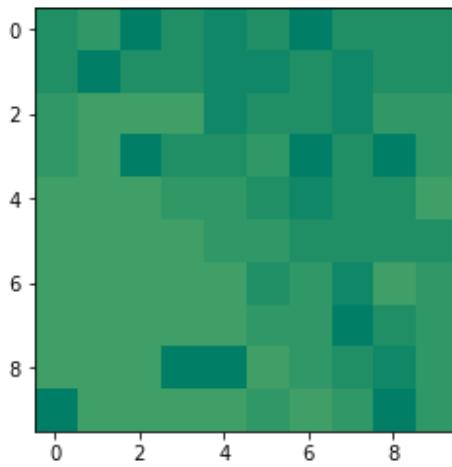
Updated direction: [ 1 0 ]



Step: 301

Updated position: [ 9 2 ]

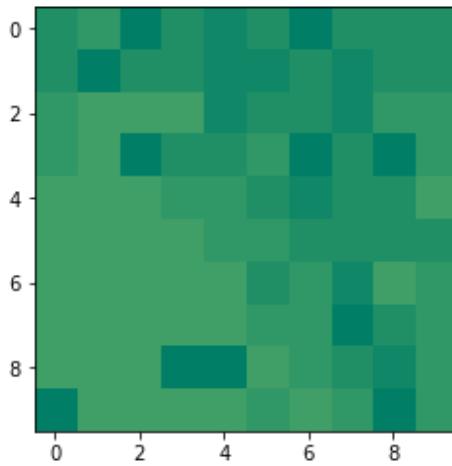
Updated direction: [ -1 0 ]



Step: 302

Updated position: [ 8 2 ]

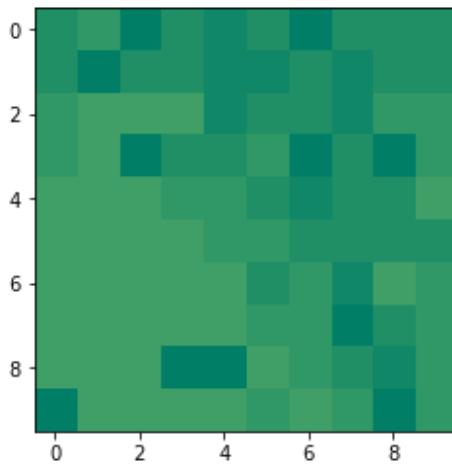
Updated direction: [ -1 0 ]



Step: 303

Updated position: [ 7 2 ]

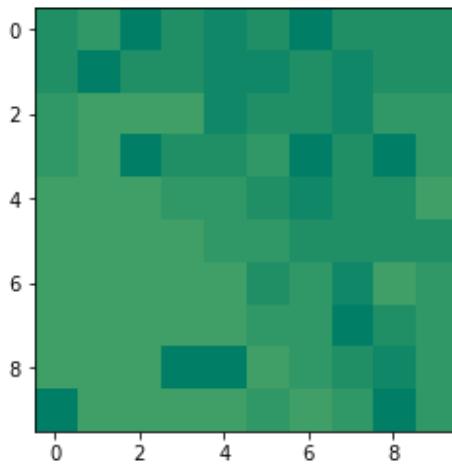
Updated direction: [ 0 -1 ]



Step: 304

Updated position: [ 7 1 ]

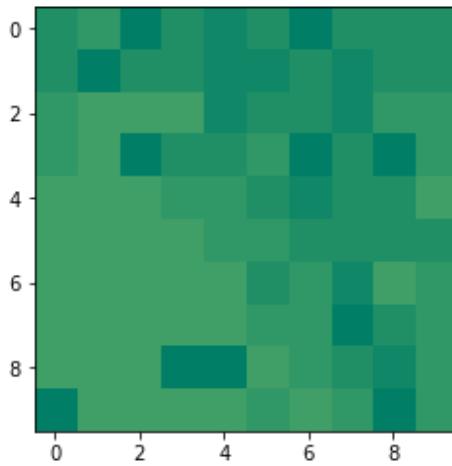
Updated direction: [ 1 0 ]



Step: 305

Updated position: [ 8 1 ]

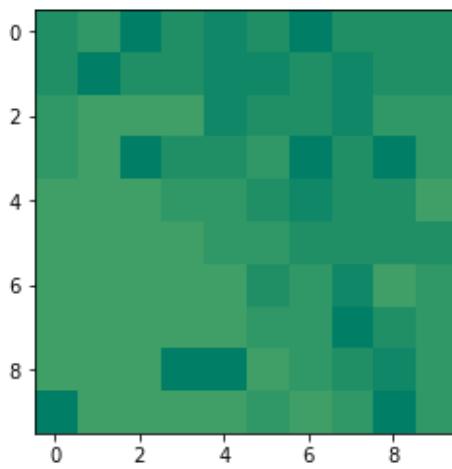
Updated direction: [ -1 0 ]



Step: 306

Updated position: [ 7 1 ]

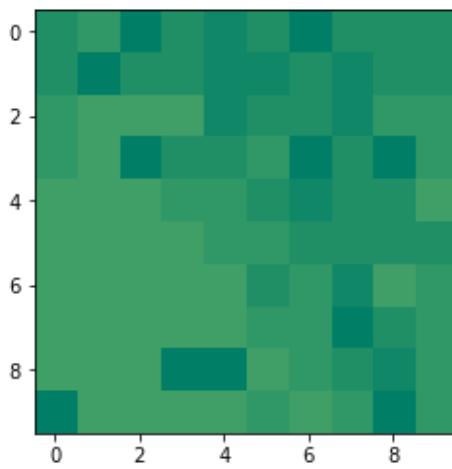
Updated direction: [ -1 0 ]



Step: 307

Updated position: [ 6 1 ]

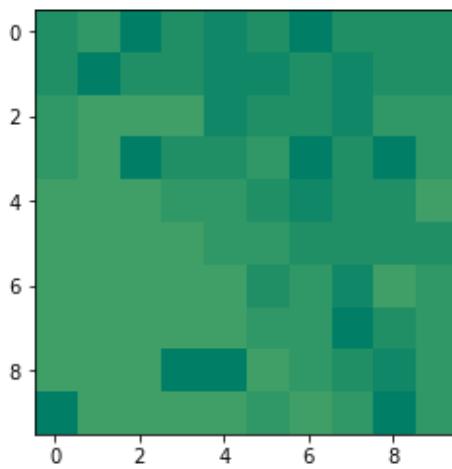
Updated direction: [ 1 0 ]



Step: 308

Updated position: [ 7 1 ]

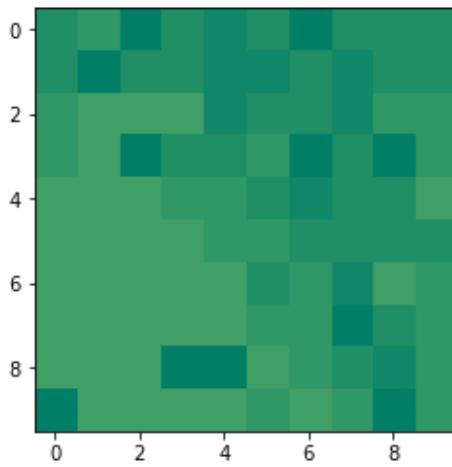
Updated direction: [ 1 0 ]



Step: 309

Updated position: [ 8 1 ]

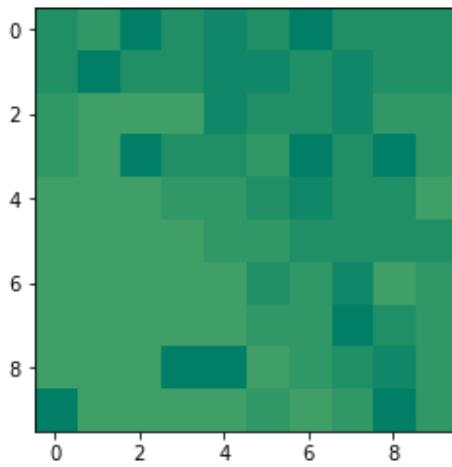
Updated direction: [ 0 1 ]



Step: 310

Updated position: [8 2]

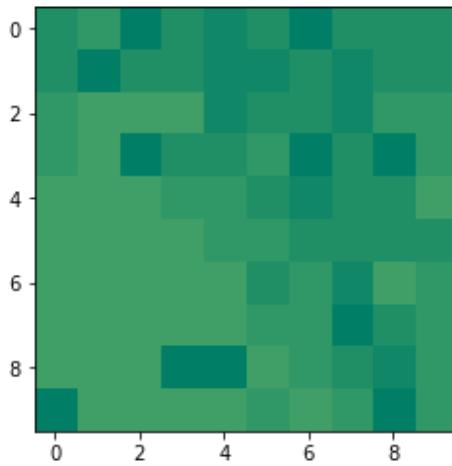
Updated direction: [ 0 -1 ]



Step: 311

Updated position: [8 1]

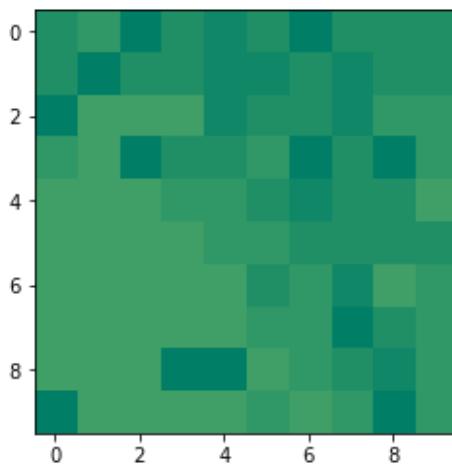
Updated direction: [1 0]



Step: 312

Updated position: [9 1]

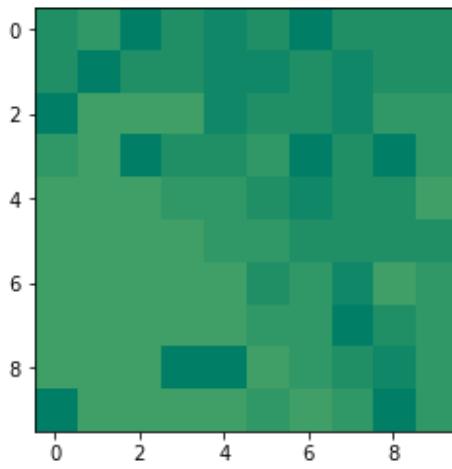
Updated direction: [0 1]



Step: 313

Updated position: [ 9 2 ]

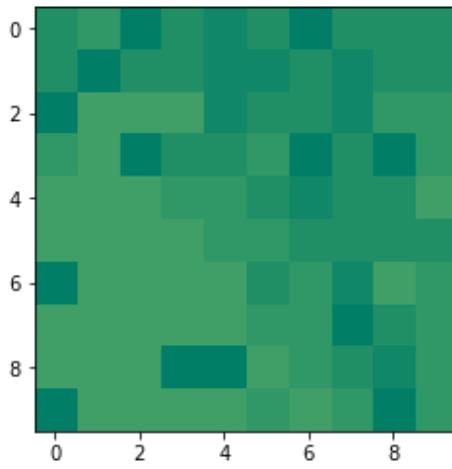
Updated direction: [ 0 -1 ]



Step: 314

Updated position: [ 9 1 ]

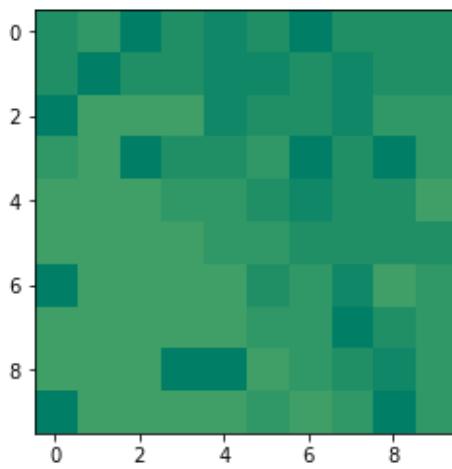
Updated direction: [-1 0 ]



Step: 315

Updated position: [ 8 1 ]

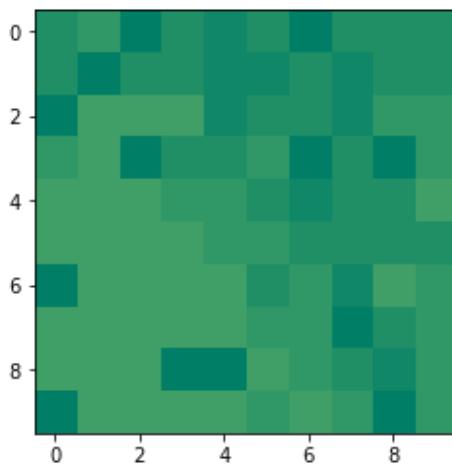
Updated direction: [ 1 0 ]



Step: 316

Updated position: [9 1]

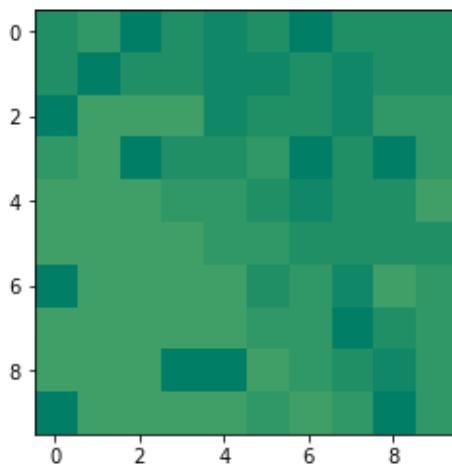
Updated direction: [ 0 1 ]



Step: 317

Updated position: [9 2]

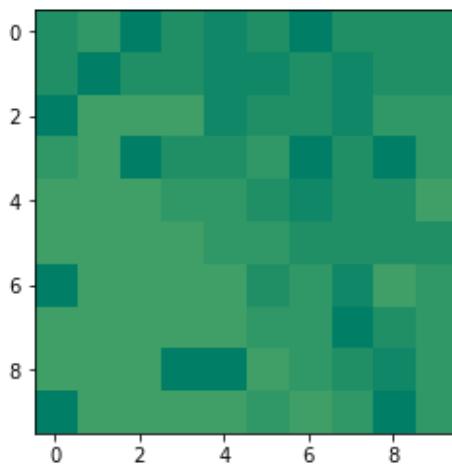
Updated direction: [ 0 -1 ]



Step: 318

Updated position: [9 1]

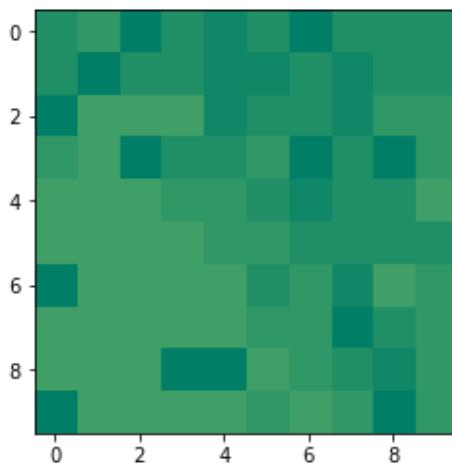
Updated direction: [ 0 1 ]



Step: 319

Updated position: [ 9 2 ]

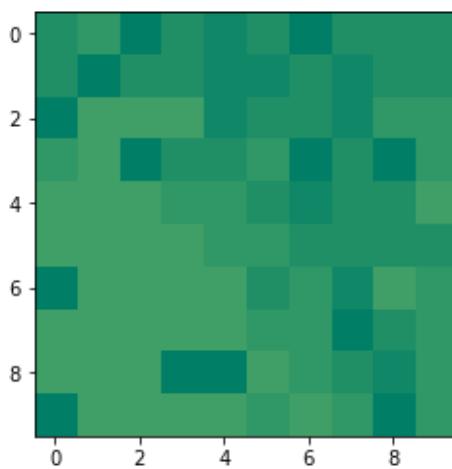
Updated direction: [ -1 0 ]



Step: 320

Updated position: [ 8 2 ]

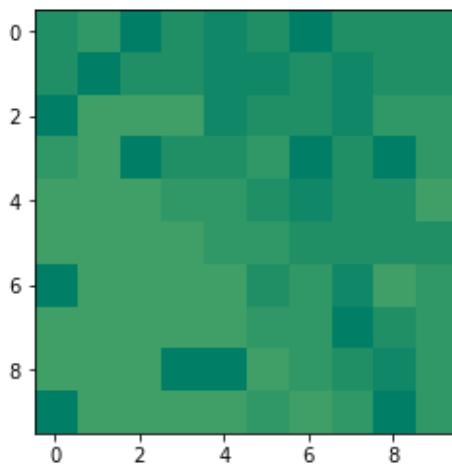
Updated direction: [ 1 0 ]



Step: 321

Updated position: [ 9 2 ]

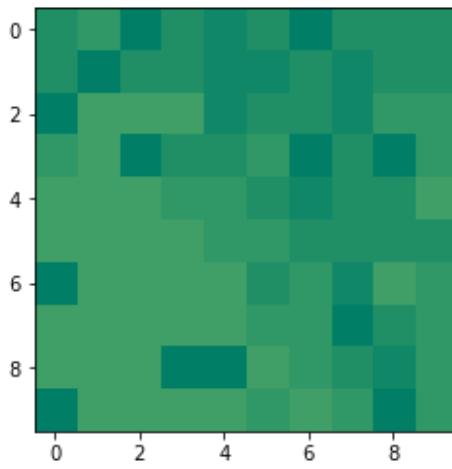
Updated direction: [ 0 -1 ]



Step: 322

Updated position: [ 9 1 ]

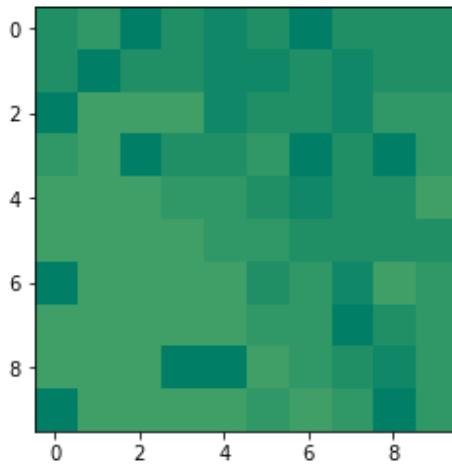
Updated direction: [ -1 0 ]



Step: 323

Updated position: [ 8 1 ]

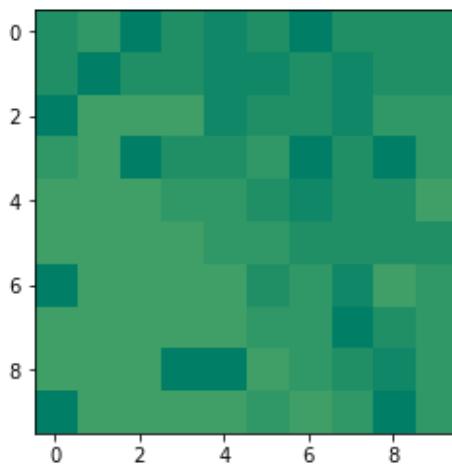
Updated direction: [ 0 1 ]



Step: 324

Updated position: [ 8 2 ]

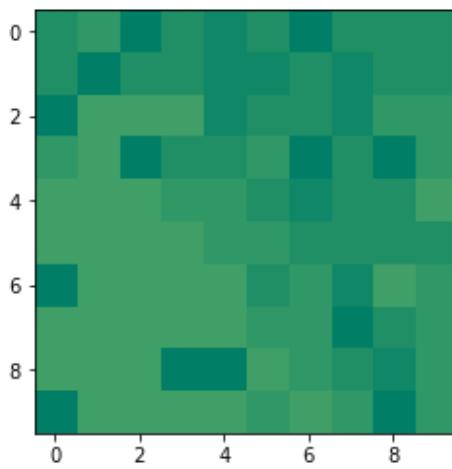
Updated direction: [ 1 0 ]



Step: 325

Updated position: [9 2]

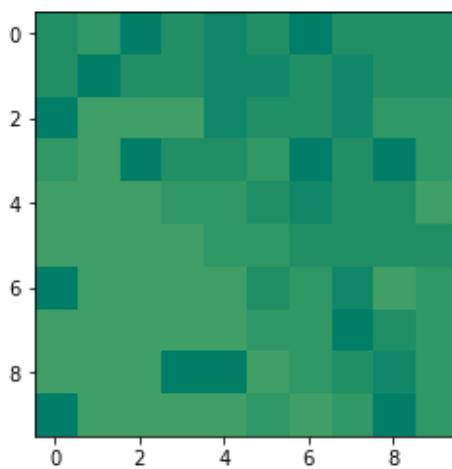
Updated direction: [ 0 -1 ]



Step: 326

Updated position: [9 1]

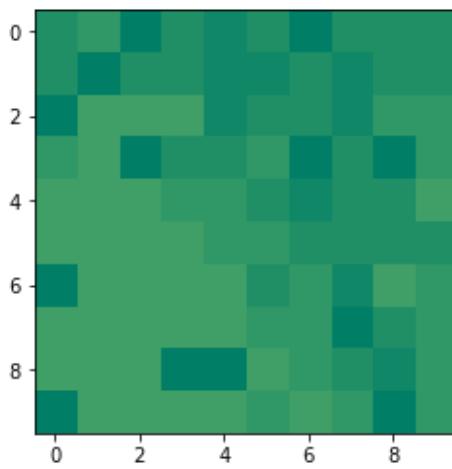
Updated direction: [ 0 1 ]



Step: 327

Updated position: [9 2]

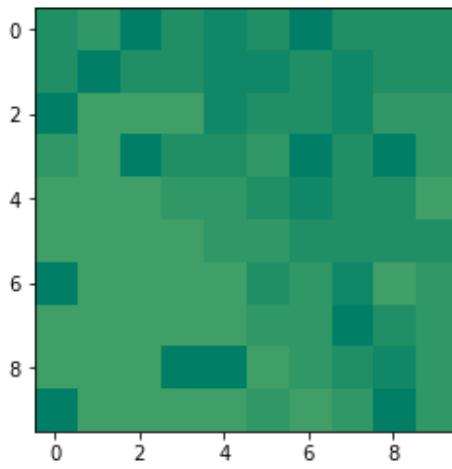
Updated direction: [-1 0 ]



Step: 328

Updated position: [ 8 2 ]

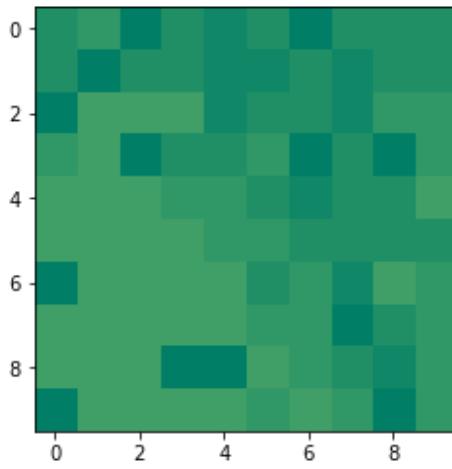
Updated direction: [ 1 0 ]



Step: 329

Updated position: [ 9 2 ]

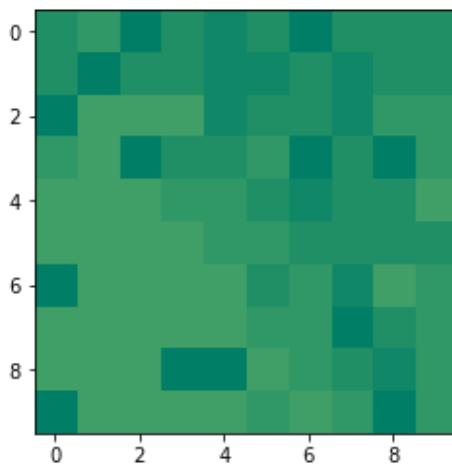
Updated direction: [ 0 1 ]



Step: 330

Updated position: [ 9 3 ]

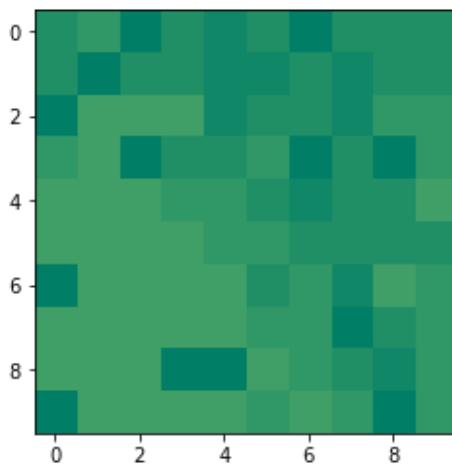
Updated direction: [ 0 -1 ]



Step: 331

Updated position: [9 2]

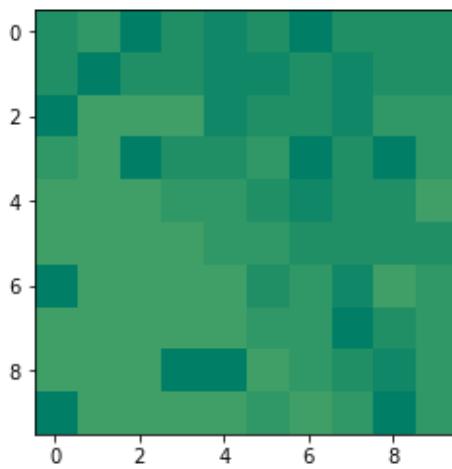
Updated direction: [ 0 -1 ]



Step: 332

Updated position: [9 1]

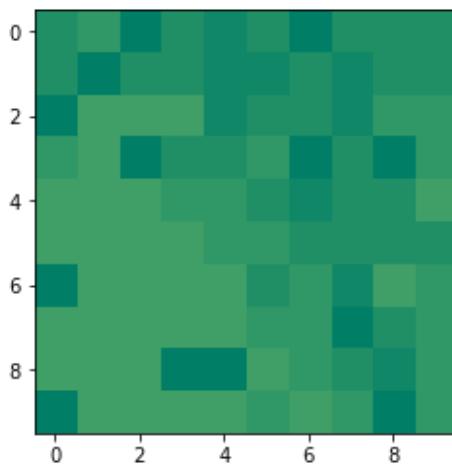
Updated direction: [-1 0]



Step: 333

Updated position: [8 1]

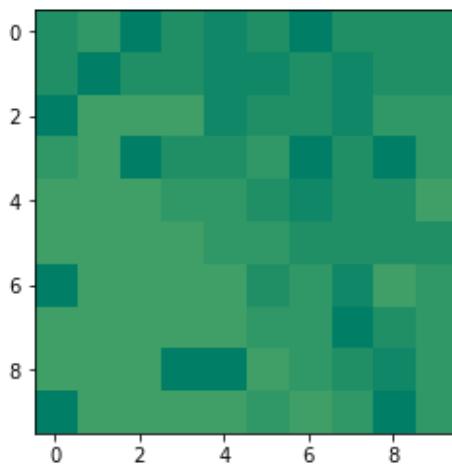
Updated direction: [1 0]



Step: 334

Updated position: [ 9 1 ]

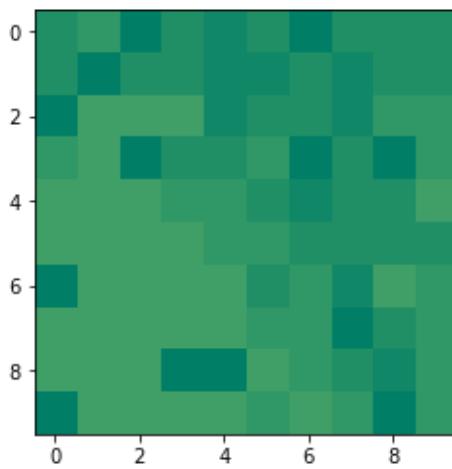
Updated direction: [ 0 1 ]



Step: 335

Updated position: [ 9 2 ]

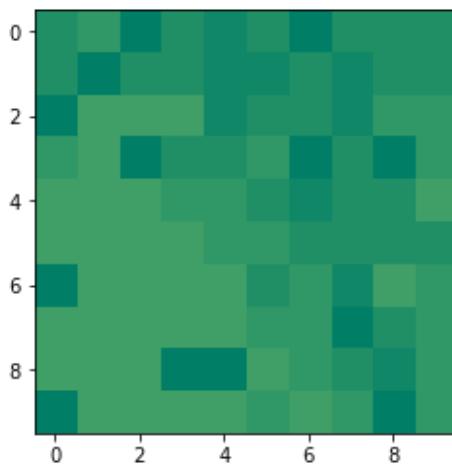
Updated direction: [ 0 -1 ]



Step: 336

Updated position: [ 9 1 ]

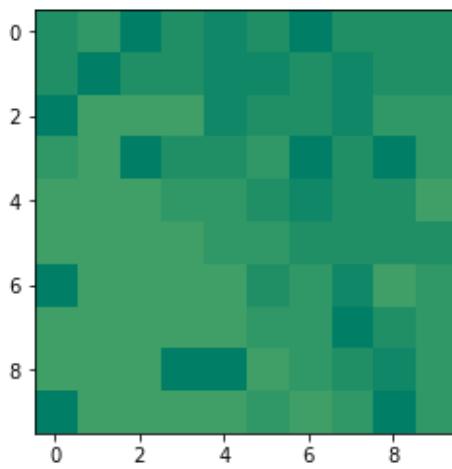
Updated direction: [ 0 1 ]



Step: 337

Updated position: [ 9 2 ]

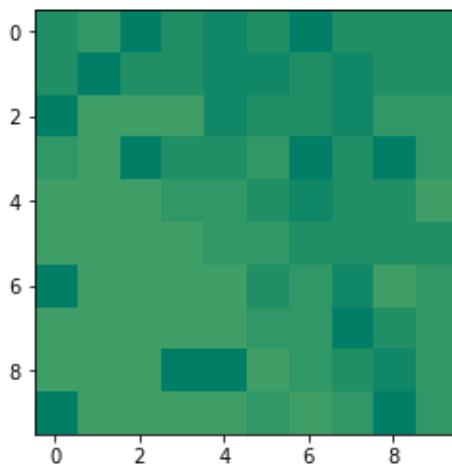
Updated direction: [ -1 0 ]



Step: 338

Updated position: [ 8 2 ]

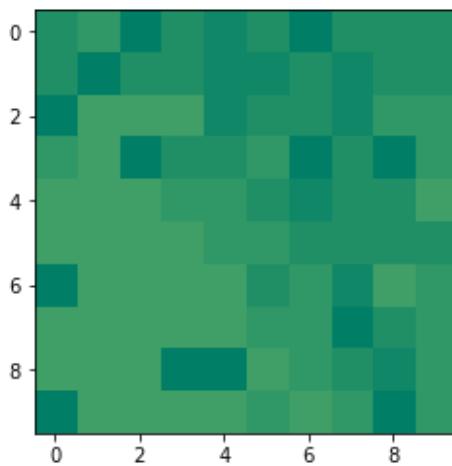
Updated direction: [ 1 0 ]



Step: 339

Updated position: [ 9 2 ]

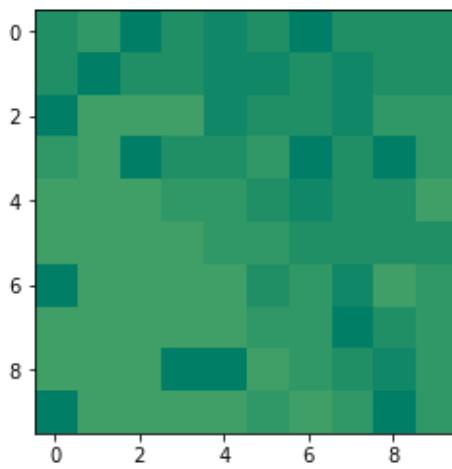
Updated direction: [ 0 -1 ]



Step: 340

Updated position: [9 1]

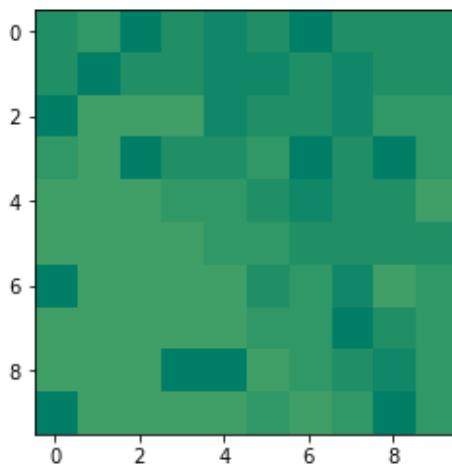
Updated direction: [0 1]



Step: 341

Updated position: [9 2]

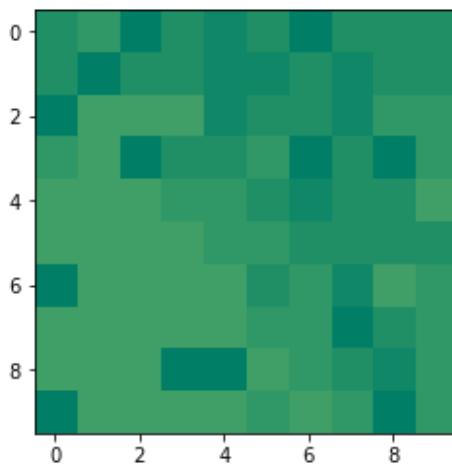
Updated direction: [0 -1]



Step: 342

Updated position: [9 1]

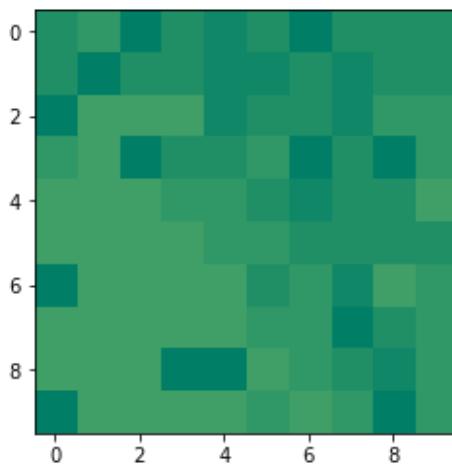
Updated direction: [0 1]



Step: 343

Updated position: [9 2]

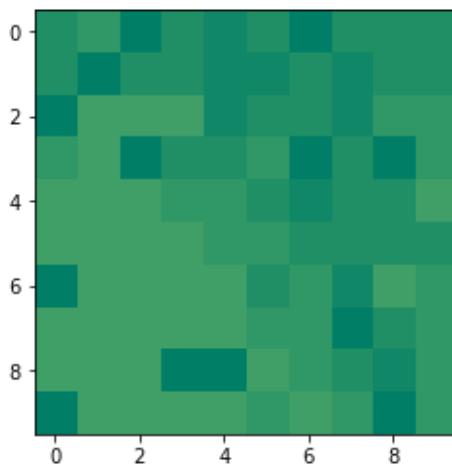
Updated direction: [ 0 -1 ]



Step: 344

Updated position: [9 1]

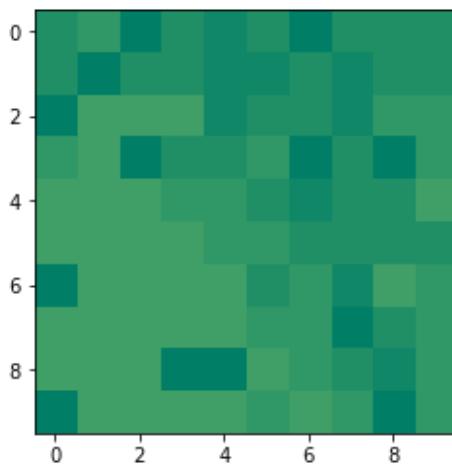
Updated direction: [-1 0 ]



Step: 345

Updated position: [8 1]

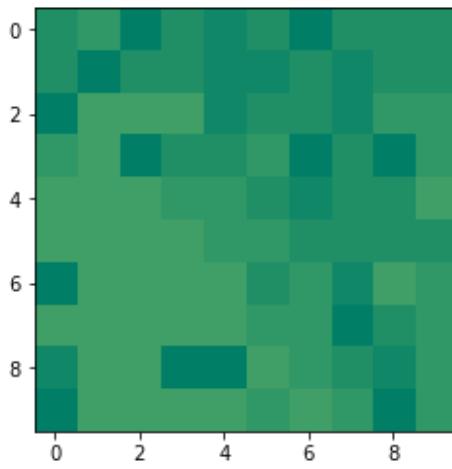
Updated direction: [1 0 ]



Step: 346

Updated position: [ 9 1 ]

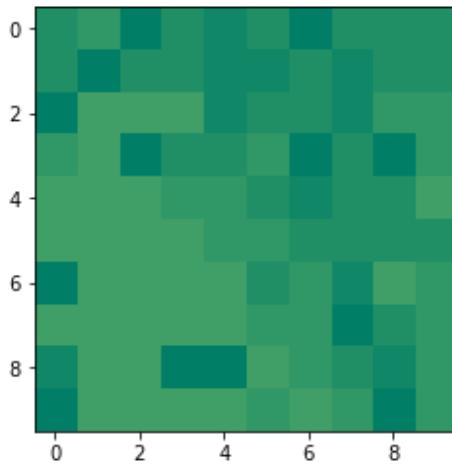
Updated direction: [ 0 1 ]



Step: 347

Updated position: [ 9 2 ]

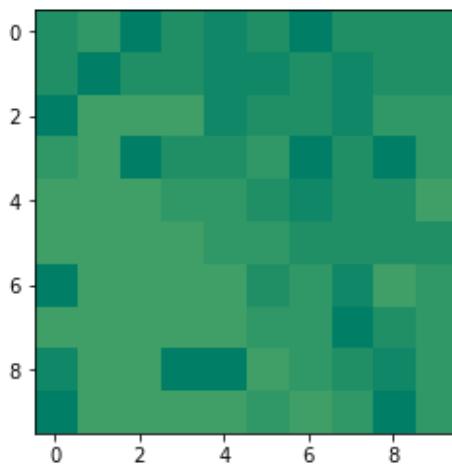
Updated direction: [ 0 -1 ]



Step: 348

Updated position: [ 9 1 ]

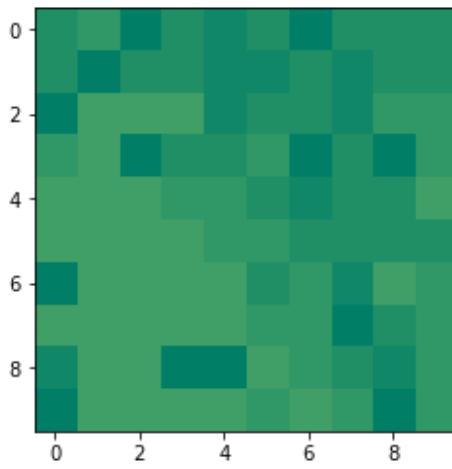
Updated direction: [-1 0 ]



Step: 349

Updated position: [8 1]

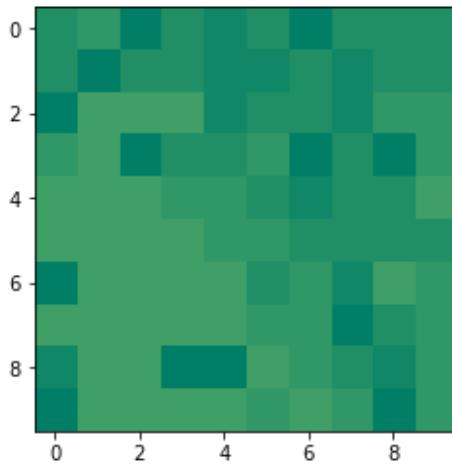
Updated direction: [0 1]



Step: 350

Updated position: [8 2]

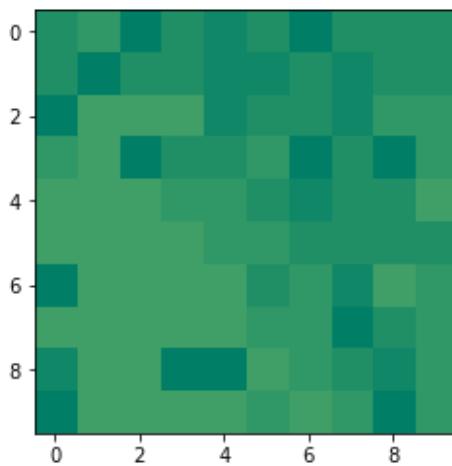
Updated direction: [1 0]



Step: 351

Updated position: [9 2]

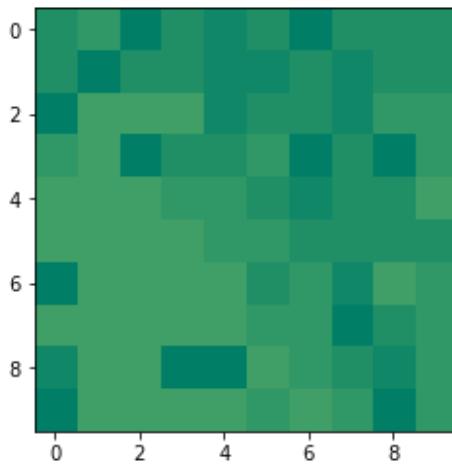
Updated direction: [0 -1]



Step: 352

Updated position: [9 1]

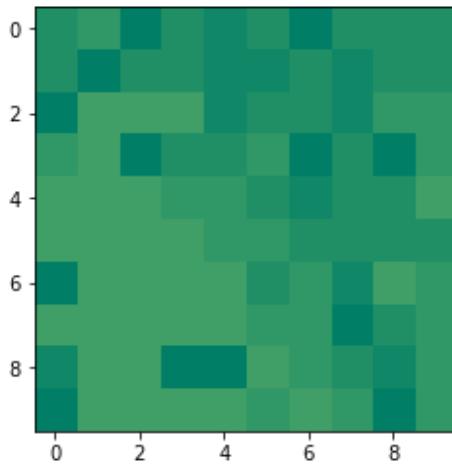
Updated direction: [ 0 1 ]



Step: 353

Updated position: [9 2]

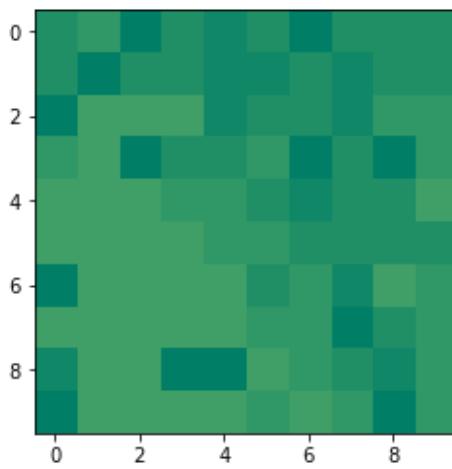
Updated direction: [ 0 -1 ]



Step: 354

Updated position: [9 1]

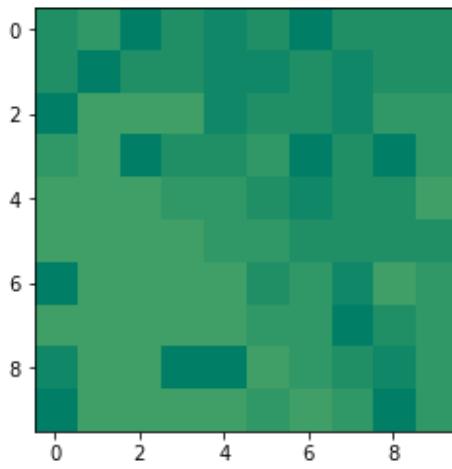
Updated direction: [ 0 1 ]



Step: 355

Updated position: [9 2]

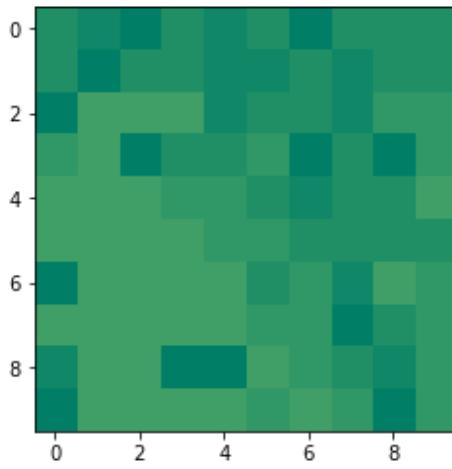
Updated direction: [ 0 -1 ]



Step: 356

Updated position: [9 1]

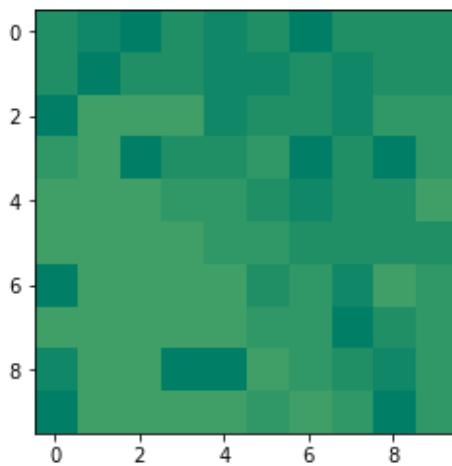
Updated direction: [ 0 1 ]



Step: 357

Updated position: [9 2]

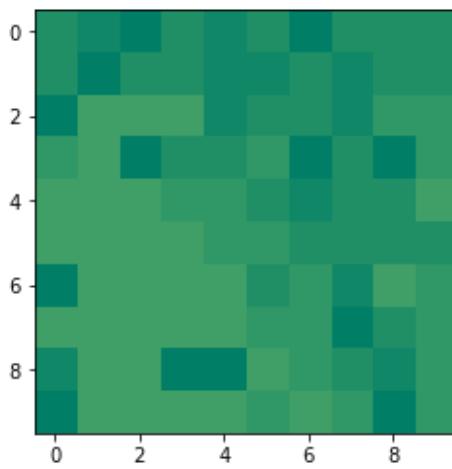
Updated direction: [-1 0 ]



Step: 358

Updated position: [ 8 2 ]

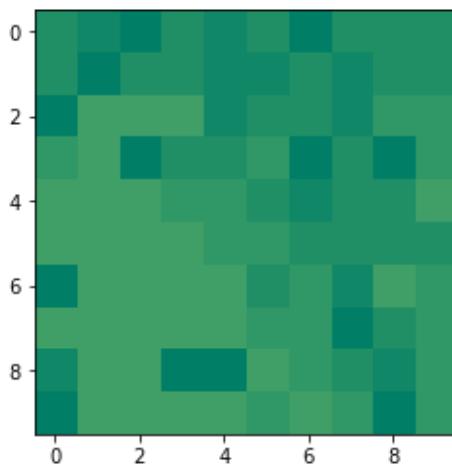
Updated direction: [ 0 -1 ]



Step: 359

Updated position: [ 8 1 ]

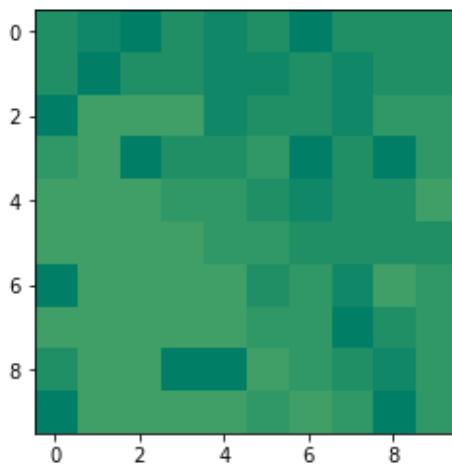
Updated direction: [ 0 -1 ]



Step: 360

Updated position: [ 8 0 ]

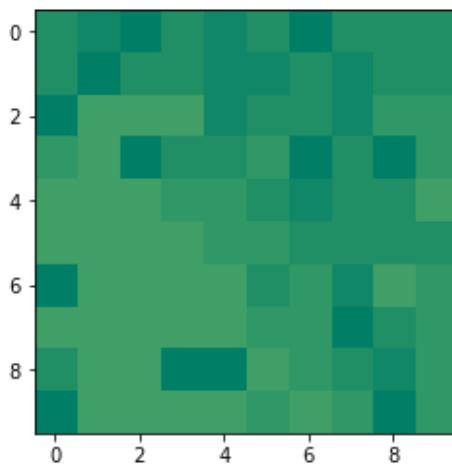
Updated direction: [-1 0 ]



Step: 361

Updated position: [ 7 0 ]

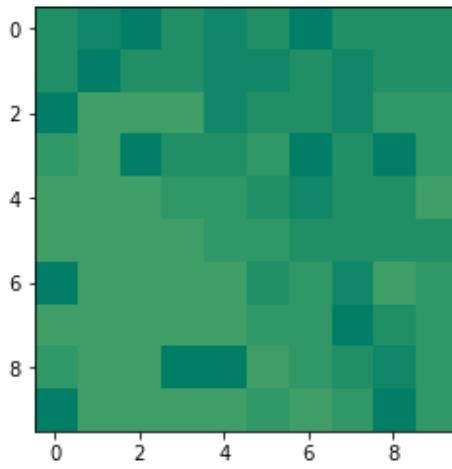
Updated direction: [ 1 0 ]



Step: 362

Updated position: [ 8 0 ]

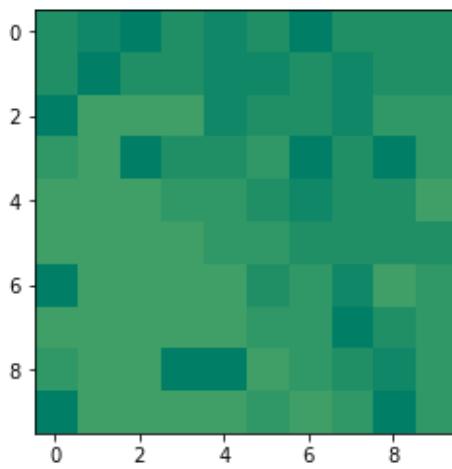
Updated direction: [ -1 0 ]



Step: 363

Updated position: [ 7 0 ]

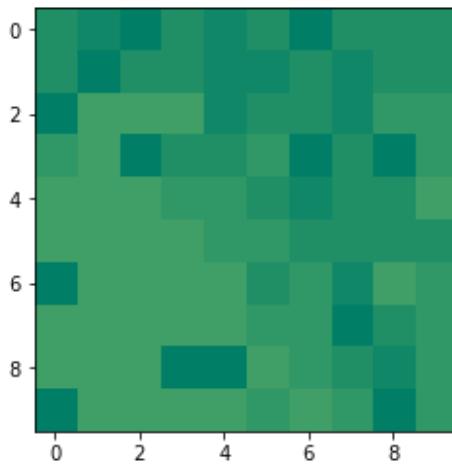
Updated direction: [ 1 0 ]



Step: 364

Updated position: [8 0]

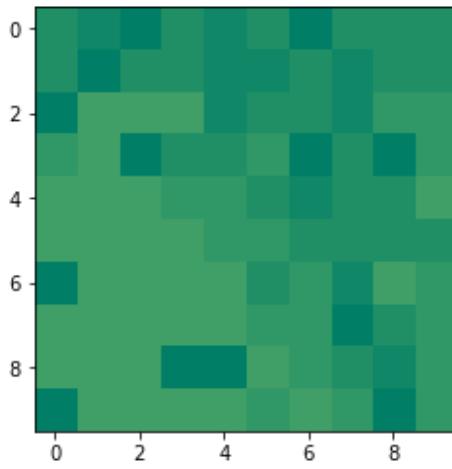
Updated direction: [ 0 1 ]



Step: 365

Updated position: [8 1]

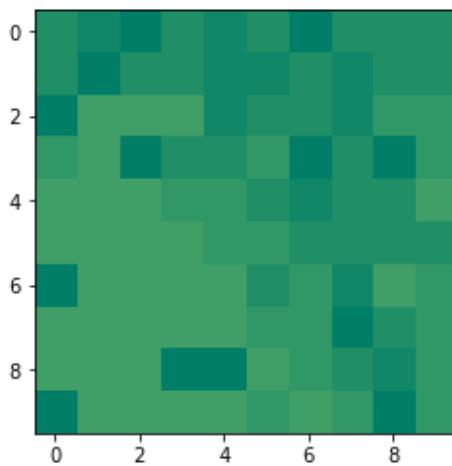
Updated direction: [ 0 -1 ]



Step: 366

Updated position: [8 0]

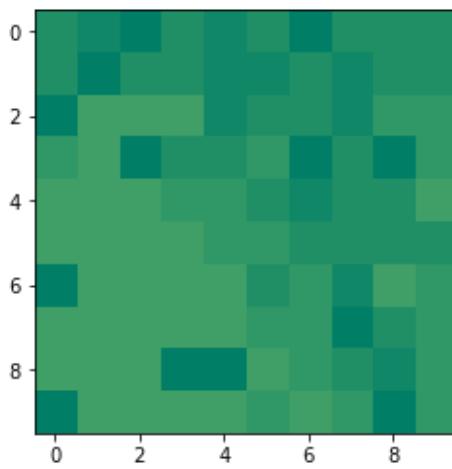
Updated direction: [ 0 1 ]



Step: 367

Updated position: [ 8 1 ]

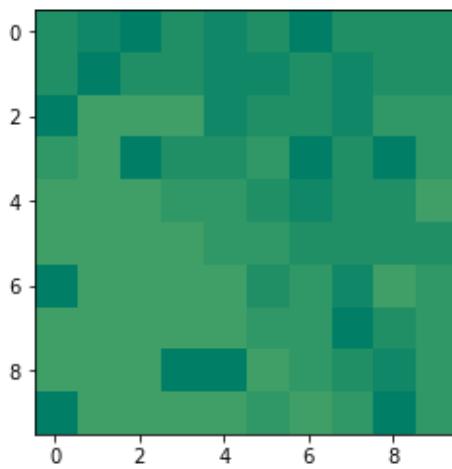
Updated direction: [ -1 0 ]



Step: 368

Updated position: [ 7 1 ]

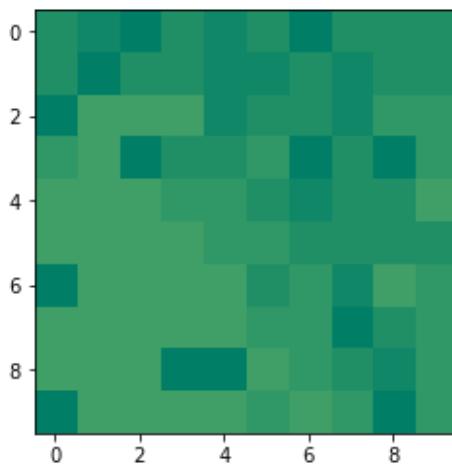
Updated direction: [ 1 0 ]



Step: 369

Updated position: [ 8 1 ]

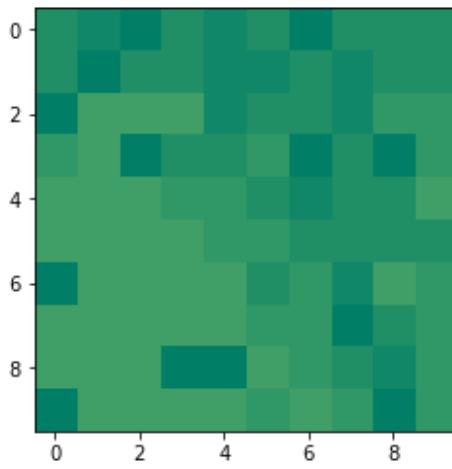
Updated direction: [ 1 0 ]



Step: 370

Updated position: [ 9 1 ]

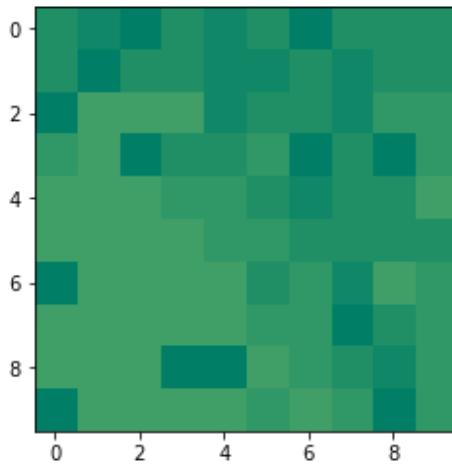
Updated direction: [ -1 0 ]



Step: 371

Updated position: [ 8 1 ]

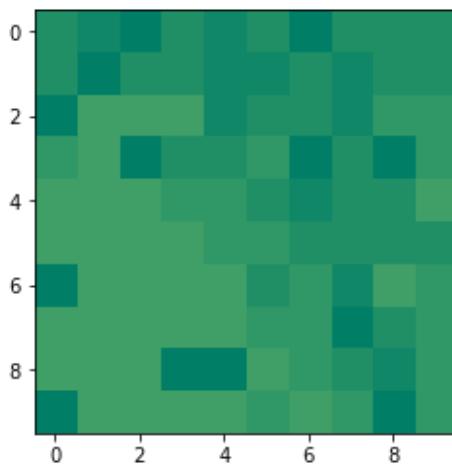
Updated direction: [ 0 1 ]



Step: 372

Updated position: [ 8 2 ]

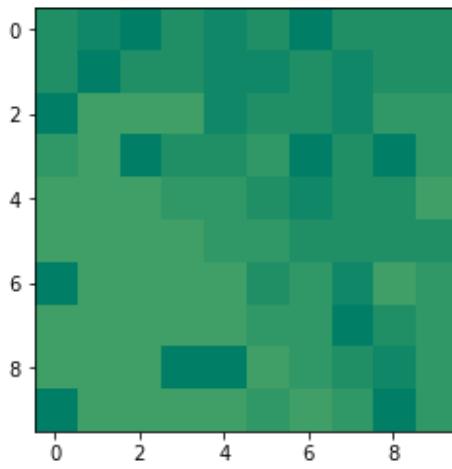
Updated direction: [ -1 0 ]



Step: 373

Updated position: [ 7 2 ]

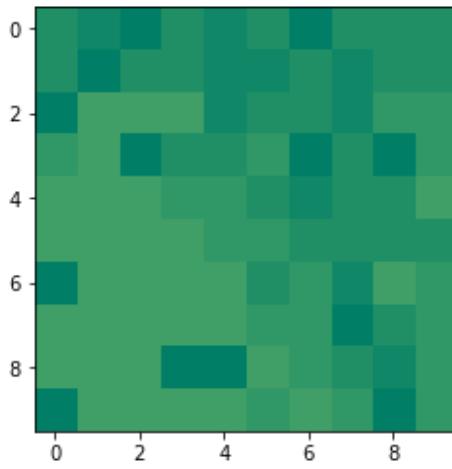
Updated direction: [ 1 0 ]



Step: 374

Updated position: [ 8 2 ]

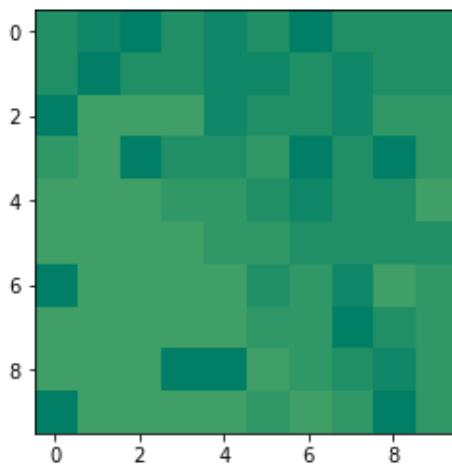
Updated direction: [ 1 0 ]



Step: 375

Updated position: [ 9 2 ]

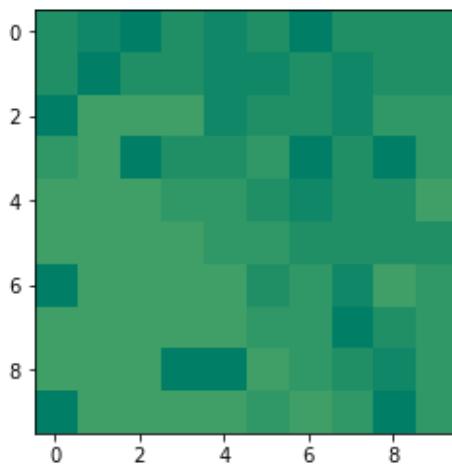
Updated direction: [ 0 -1 ]



Step: 376

Updated position: [ 9 1 ]

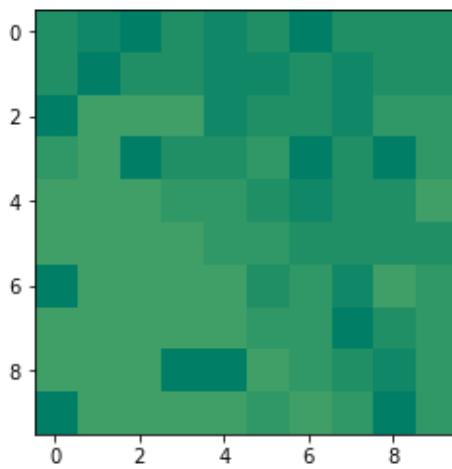
Updated direction: [-1 0 ]



Step: 377

Updated position: [ 8 1 ]

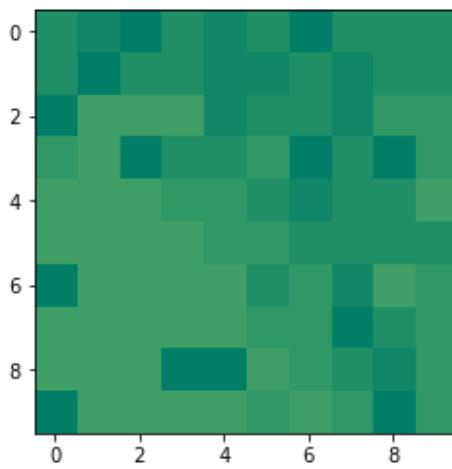
Updated direction: [-1 0 ]



Step: 378

Updated position: [ 7 1 ]

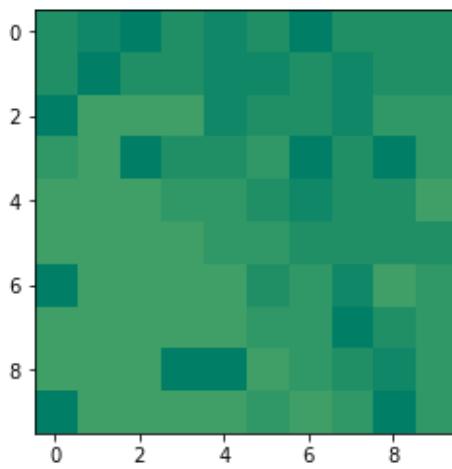
Updated direction: [-1 0 ]



Step: 379

Updated position: [ 6 1 ]

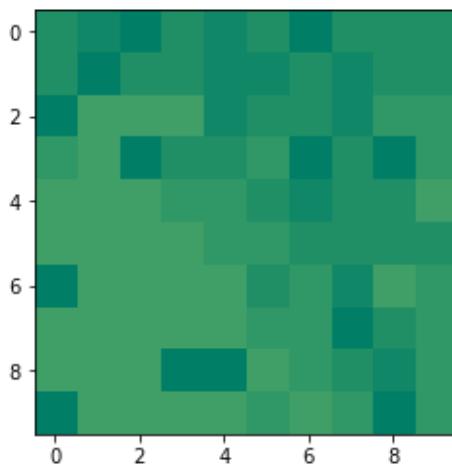
Updated direction: [ 0 1 ]



Step: 380

Updated position: [ 6 2 ]

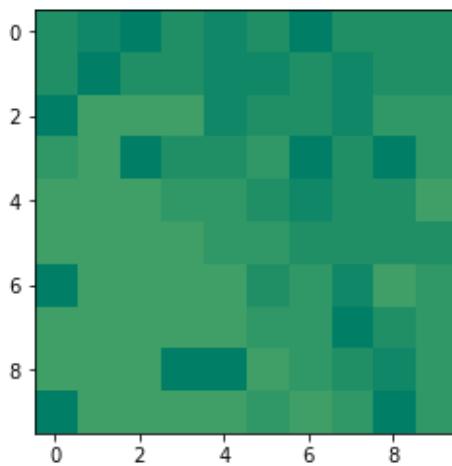
Updated direction: [ 1 0 ]



Step: 381

Updated position: [ 7 2 ]

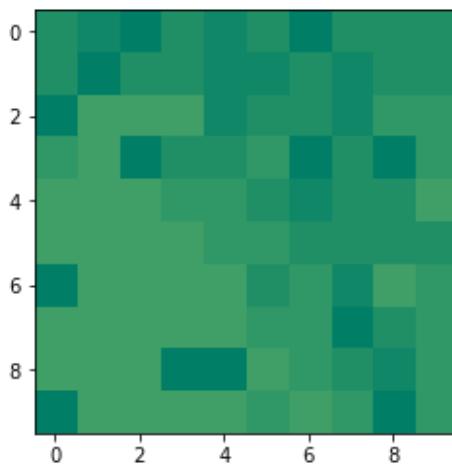
Updated direction: [ 0 1 ]



Step: 382

Updated position: [ 7 3 ]

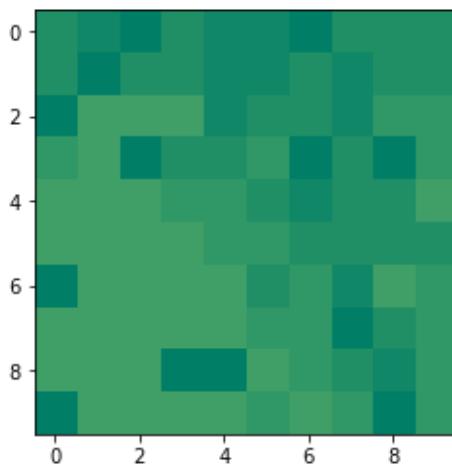
Updated direction: [ 0 -1 ]



Step: 383

Updated position: [ 7 2 ]

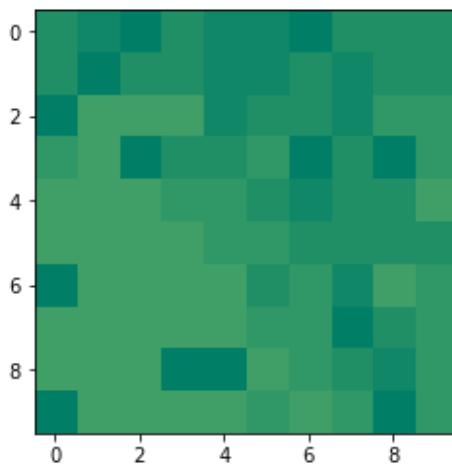
Updated direction: [ 1 0 ]



Step: 384

Updated position: [ 8 2 ]

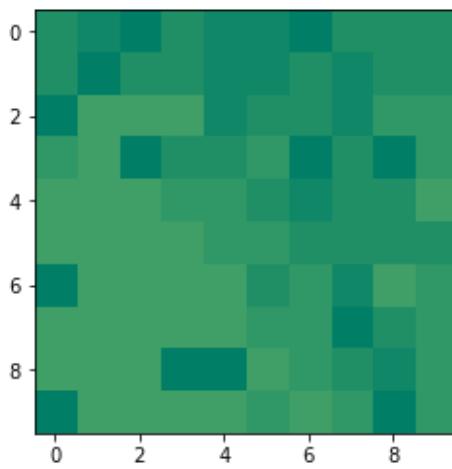
Updated direction: [ 1 0 ]



Step: 385

Updated position: [9 2]

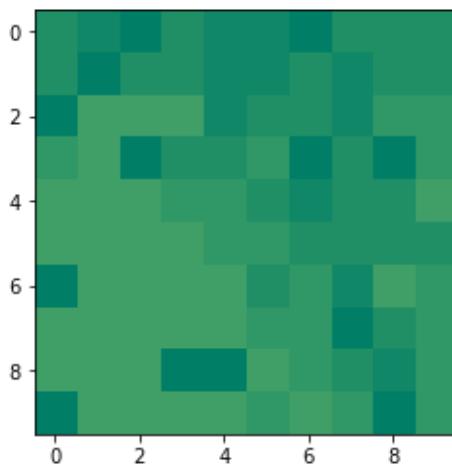
Updated direction: [ 0 -1 ]



Step: 386

Updated position: [9 1]

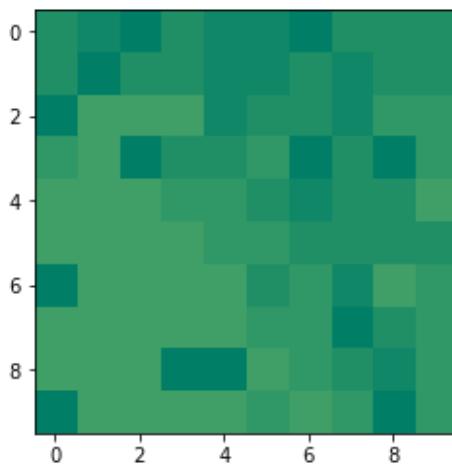
Updated direction: [-1 0 ]



Step: 387

Updated position: [8 1]

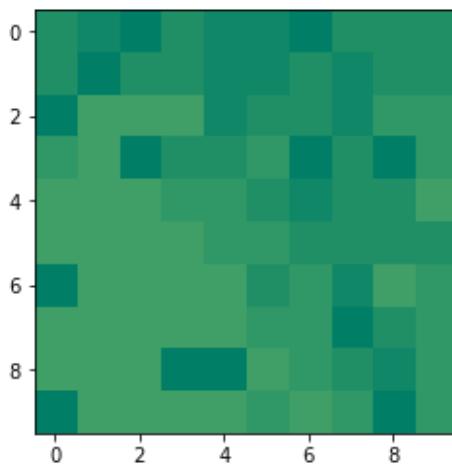
Updated direction: [ 0 -1 ]



Step: 388

Updated position: [ 8 0 ]

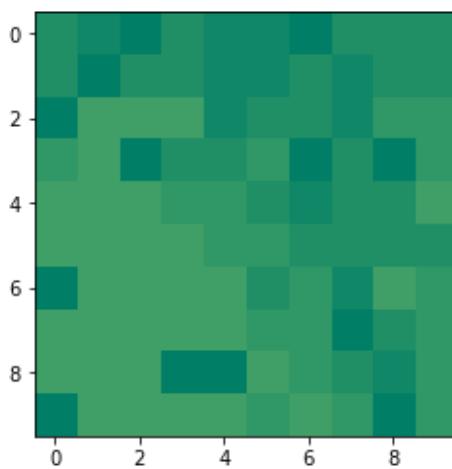
Updated direction: [ -1 0 ]



Step: 389

Updated position: [ 7 0 ]

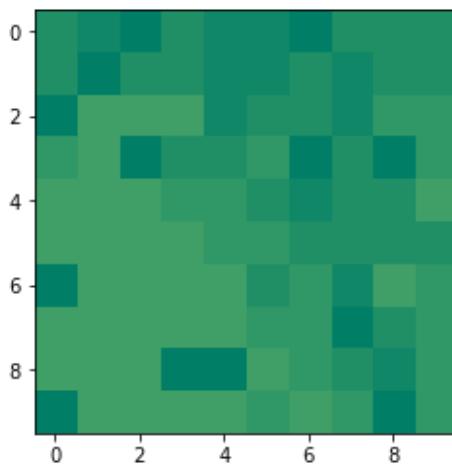
Updated direction: [ 1 0 ]



Step: 390

Updated position: [ 8 0 ]

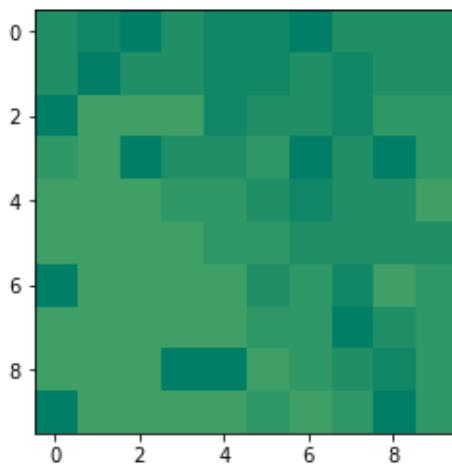
Updated direction: [ 0 1 ]



Step: 391

Updated position: [ 8 1 ]

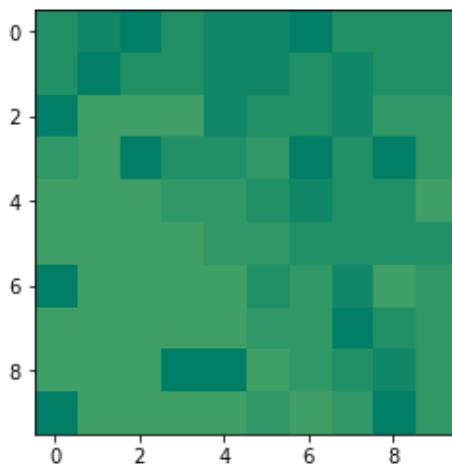
Updated direction: [ 1 0 ]



Step: 392

Updated position: [ 9 1 ]

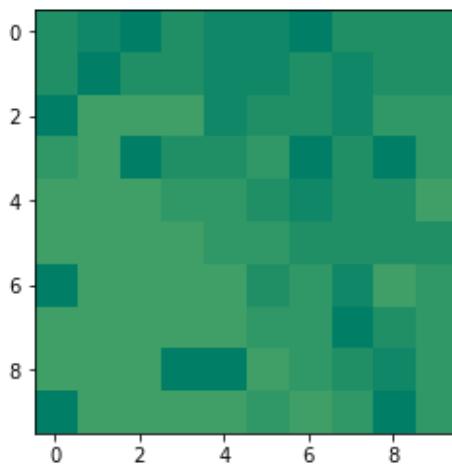
Updated direction: [ 0 1 ]



Step: 393

Updated position: [ 9 2 ]

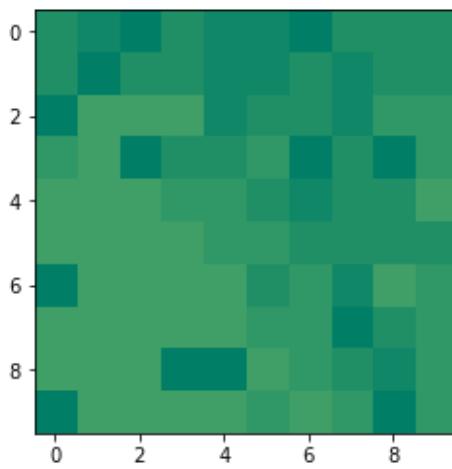
Updated direction: [ 0 1 ]



Step: 394

Updated position: [9 3]

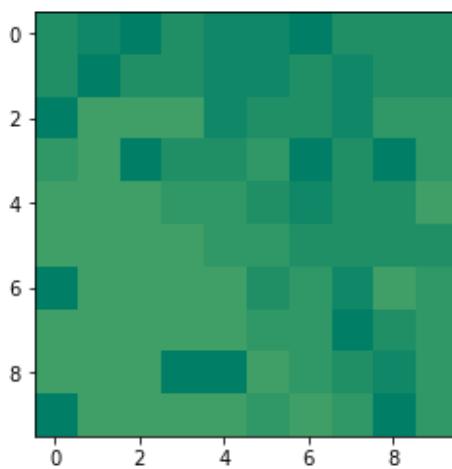
Updated direction: [ 0 -1]



Step: 395

Updated position: [9 2]

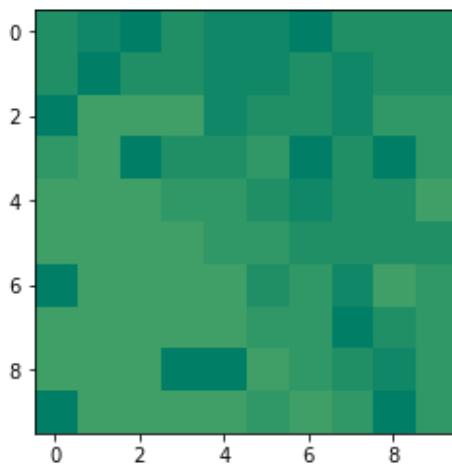
Updated direction: [ 0 1]



Step: 396

Updated position: [9 3]

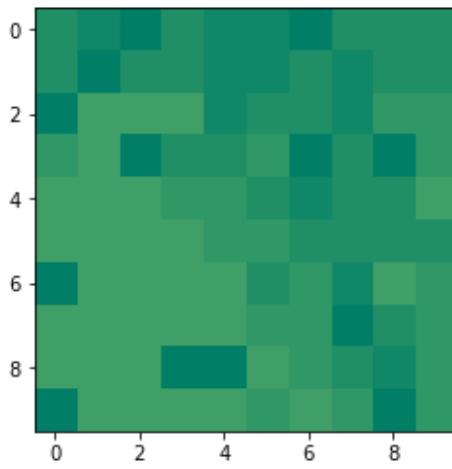
Updated direction: [ 0 -1]



Step: 397

Updated position: [ 9 2 ]

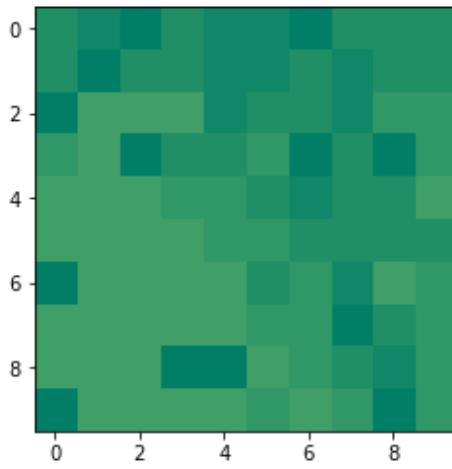
Updated direction: [-1 0 ]



Step: 398

Updated position: [ 8 2 ]

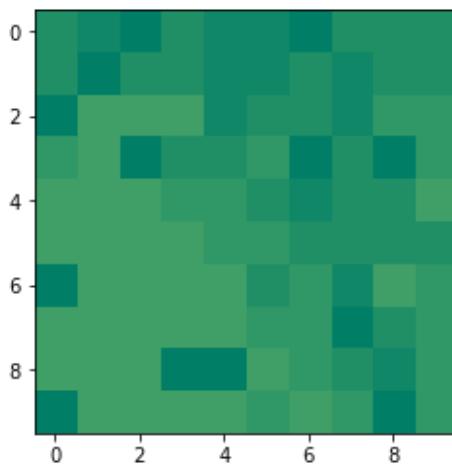
Updated direction: [-1 0 ]



Step: 399

Updated position: [ 7 2 ]

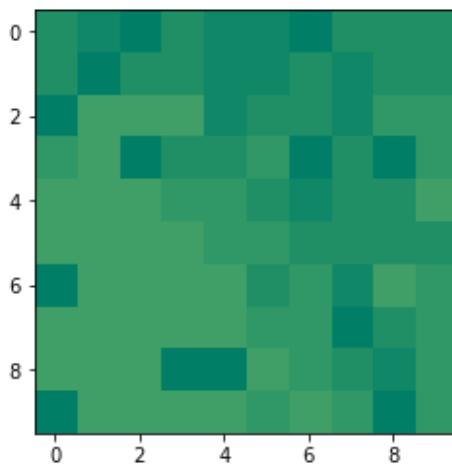
Updated direction: [ 1 0 ]



Step: 400

Updated position: [8 2]

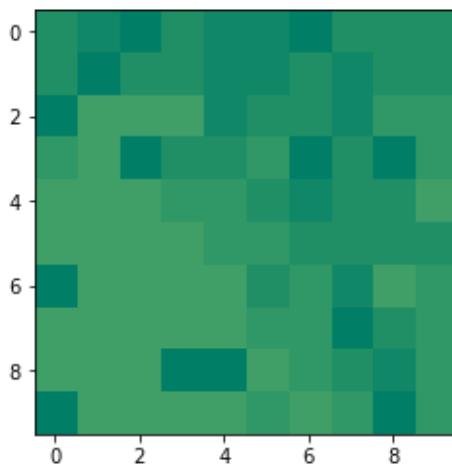
Updated direction: [1 0]



Step: 401

Updated position: [9 2]

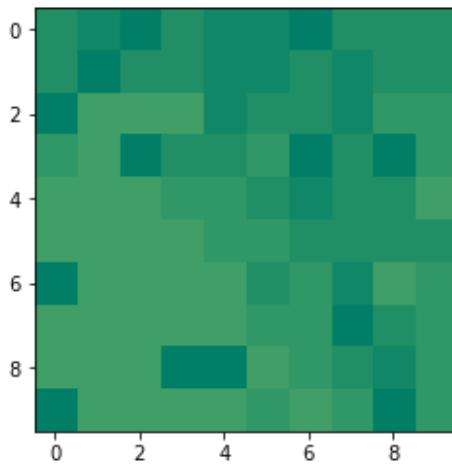
Updated direction: [-1 0]



Step: 402

Updated position: [8 2]

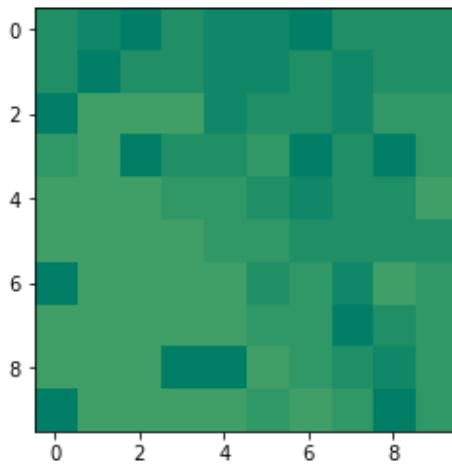
Updated direction: [1 0]



Step: 403

Updated position: [9 2]

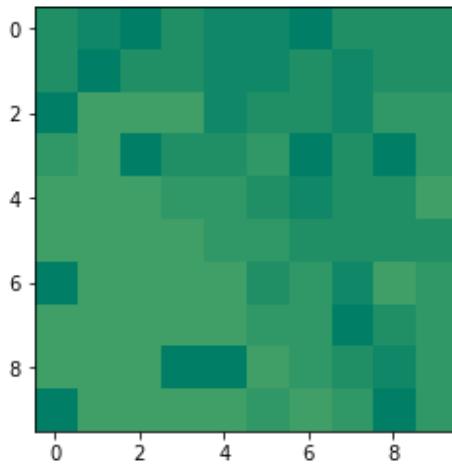
Updated direction: [ 0 -1 ]



Step: 404

Updated position: [9 1]

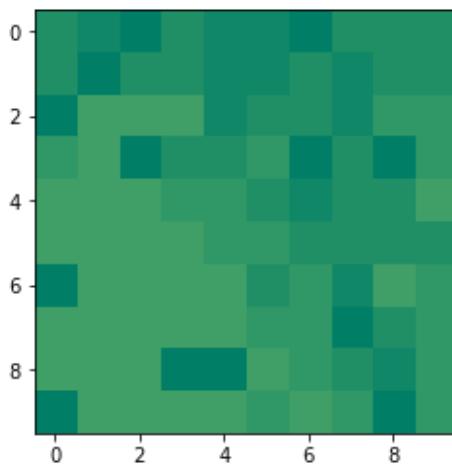
Updated direction: [-1 0 ]



Step: 405

Updated position: [8 1]

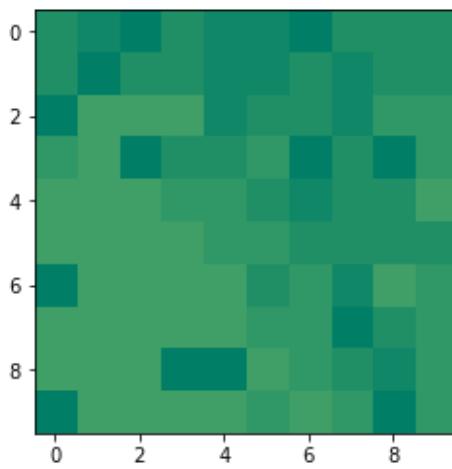
Updated direction: [1 0 ]



Step: 406

Updated position: [9 1]

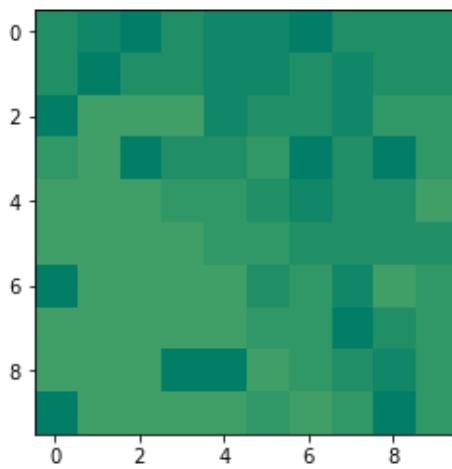
Updated direction: [0 1]



Step: 407

Updated position: [9 2]

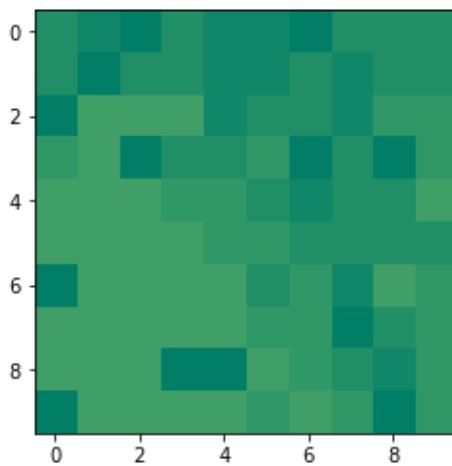
Updated direction: [0 1]



Step: 408

Updated position: [9 3]

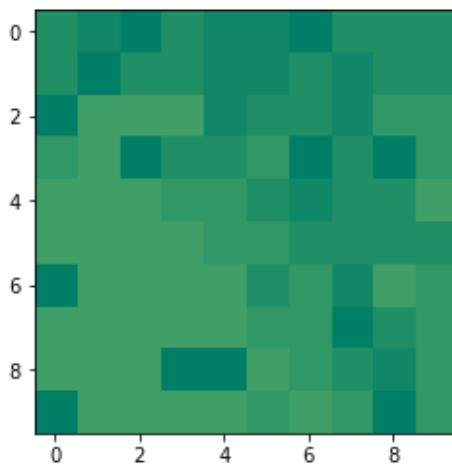
Updated direction: [0 1]



Step: 409

Updated position: [9 4]

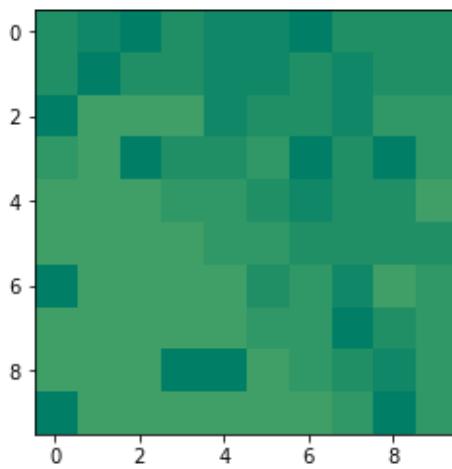
Updated direction: [ 0 1 ]



Step: 410

Updated position: [9 5]

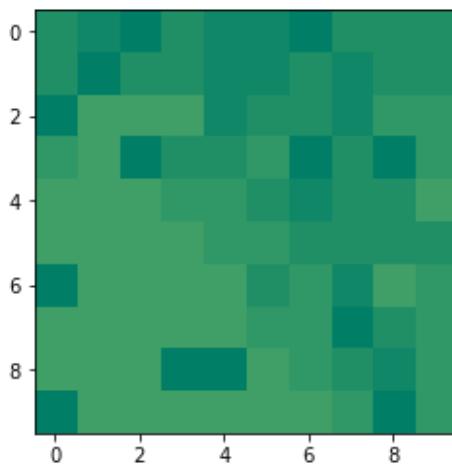
Updated direction: [ 0 -1 ]



Step: 411

Updated position: [9 4]

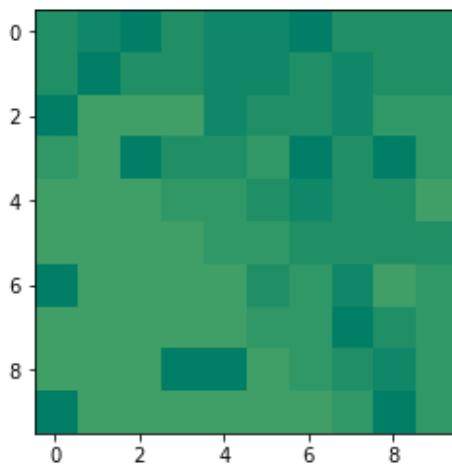
Updated direction: [ 0 1 ]



Step: 412

Updated position: [9 5]

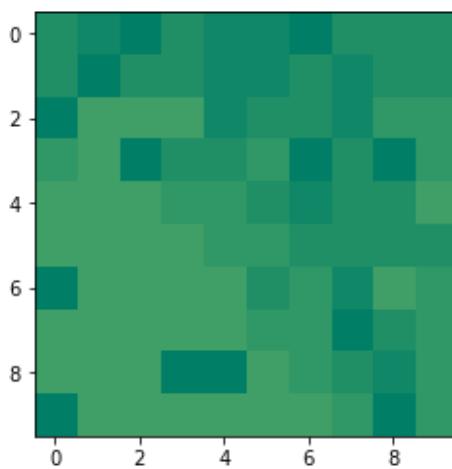
Updated direction: [ 0 -1]



Step: 413

Updated position: [9 4]

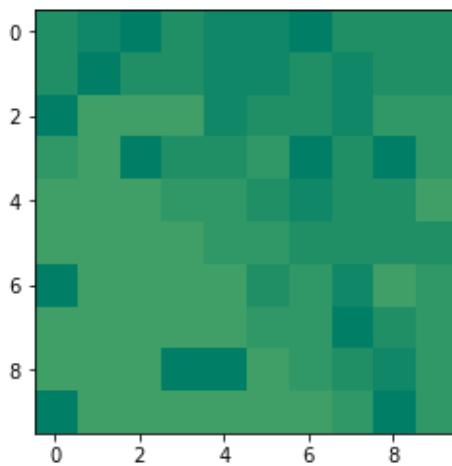
Updated direction: [ 0 1]



Step: 414

Updated position: [9 5]

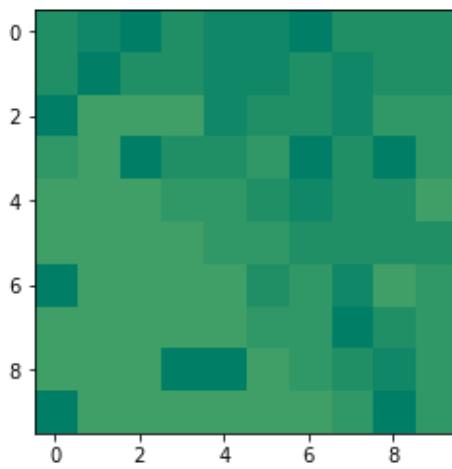
Updated direction: [ 0 -1]



Step: 415

Updated position: [9 4]

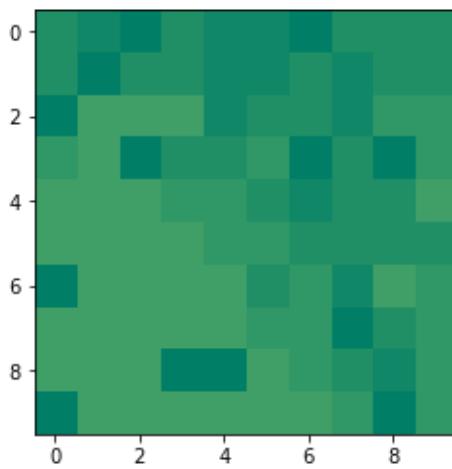
Updated direction: [0 1]



Step: 416

Updated position: [9 5]

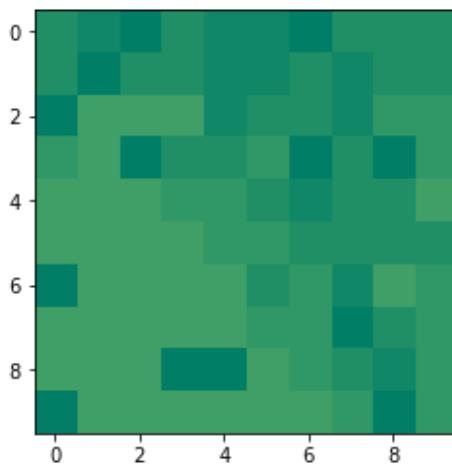
Updated direction: [0 1]



Step: 417

Updated position: [9 6]

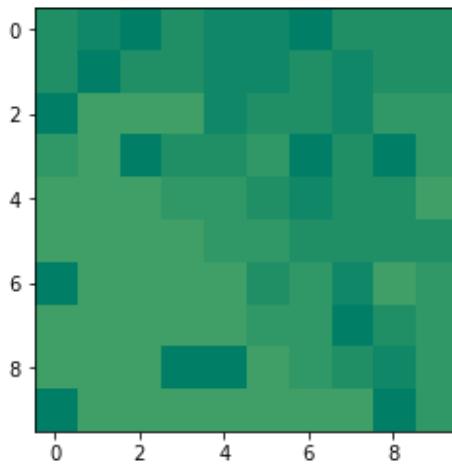
Updated direction: [0 1]



Step: 418

Updated position: [9 7]

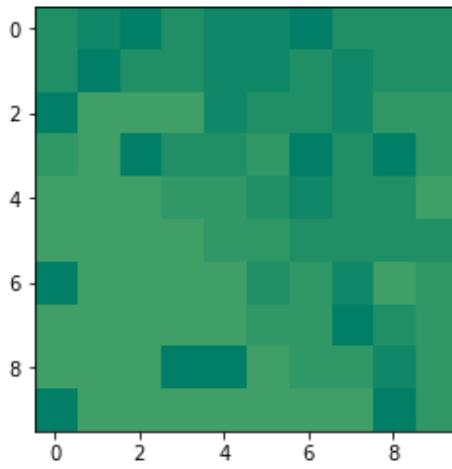
Updated direction: [-1 0]



Step: 419

Updated position: [8 7]

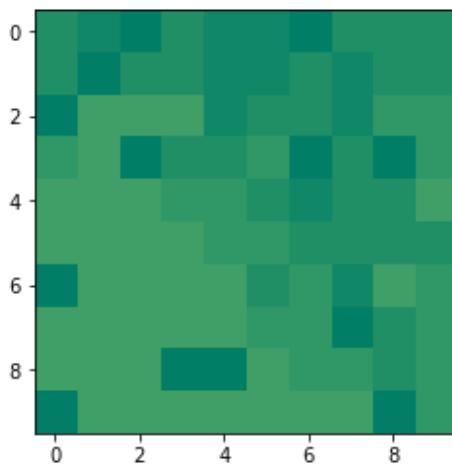
Updated direction: [0 1]



Step: 420

Updated position: [8 8]

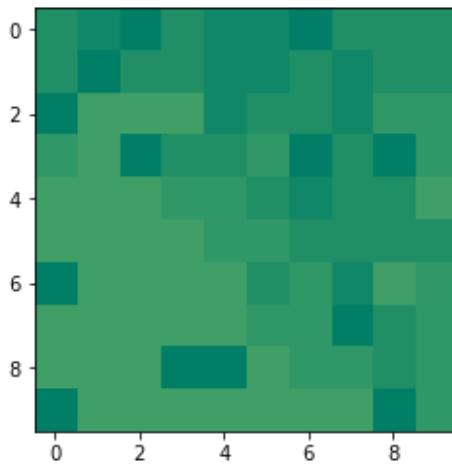
Updated direction: [ 0 -1]



Step: 421

Updated position: [8 7]

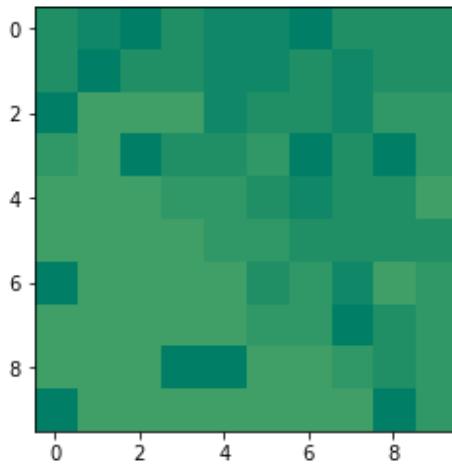
Updated direction: [ 0 -1 ]



Step: 422

Updated position: [8 6]

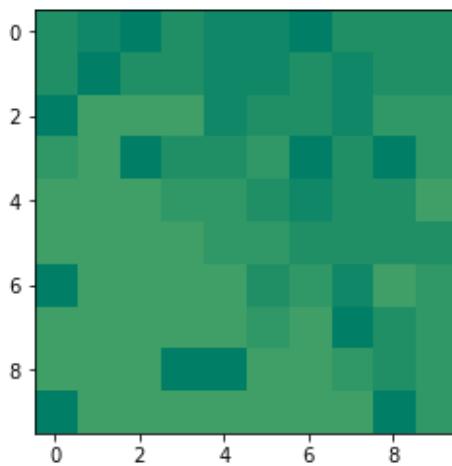
Updated direction: [-1 0 ]



Step: 423

Updated position: [7 6]

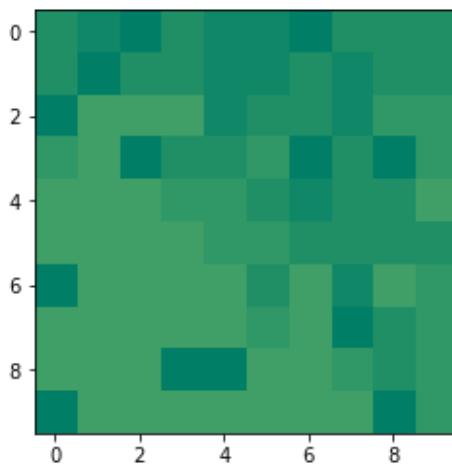
Updated direction: [-1 0 ]



Step: 424

Updated position: [ 6 6 ]

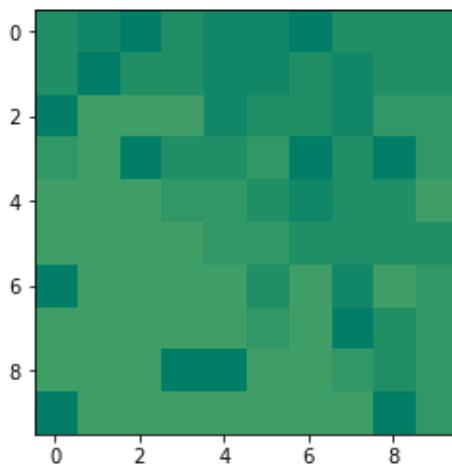
Updated direction: [ 1 0 ]



Step: 425

Updated position: [ 7 6 ]

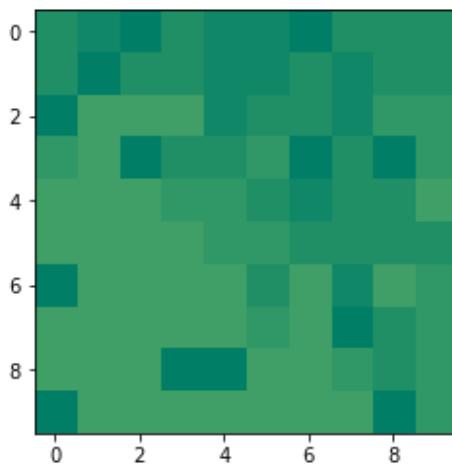
Updated direction: [ -1 0 ]



Step: 426

Updated position: [ 6 6 ]

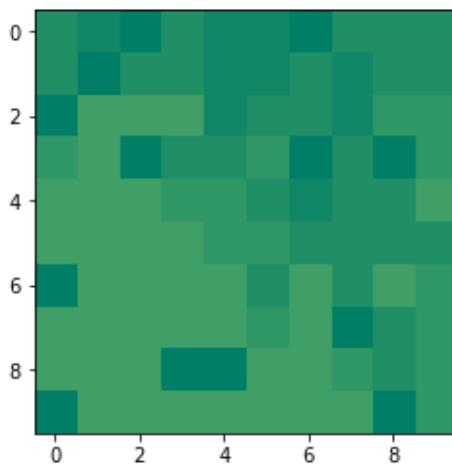
Updated direction: [ 0 1 ]



Step: 427

Updated position: [ 6 7 ]

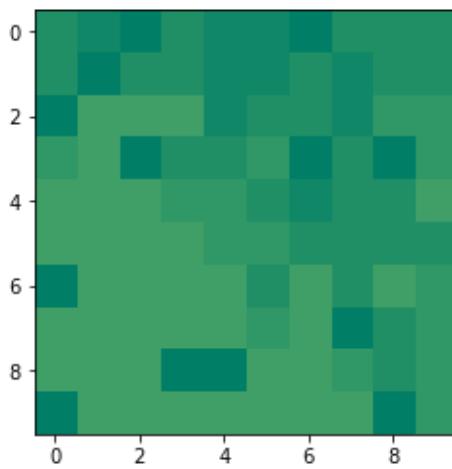
Updated direction: [ 0 1 ]



Step: 428

Updated position: [ 6 8 ]

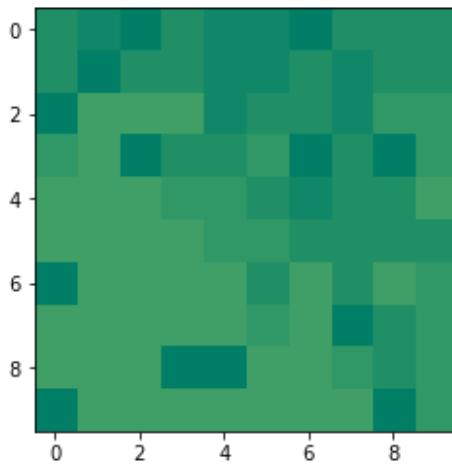
Updated direction: [ 1 0 ]



Step: 429

Updated position: [ 7 8 ]

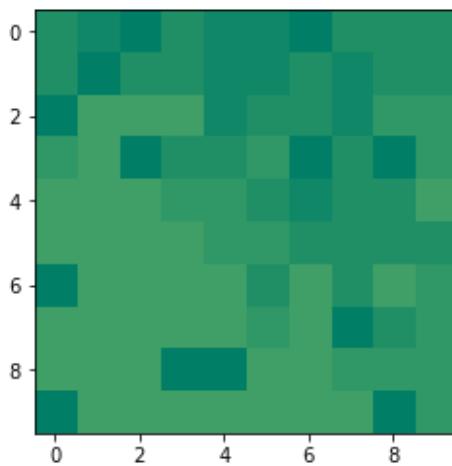
Updated direction: [ 1 0 ]



Step: 430

Updated position: [ 8 8 ]

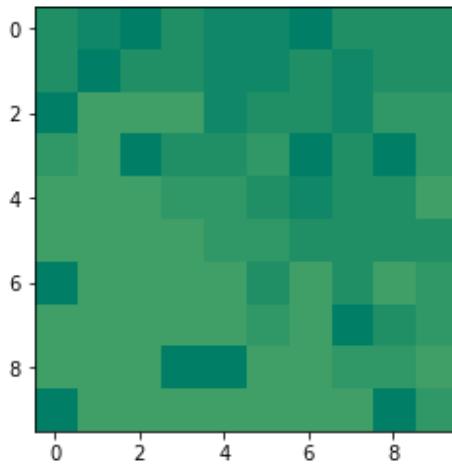
Updated direction: [ 0 1 ]



Step: 431

Updated position: [ 8 9 ]

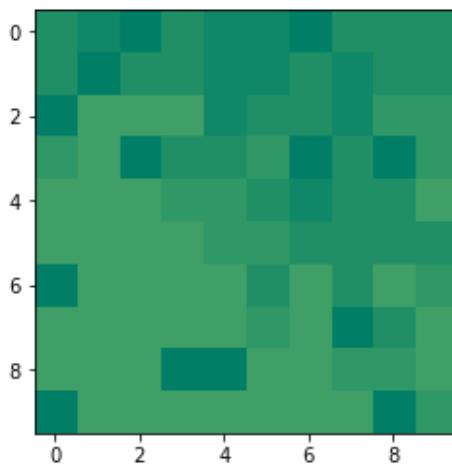
Updated direction: [-1 0]



Step: 432

Updated position: [ 7 9 ]

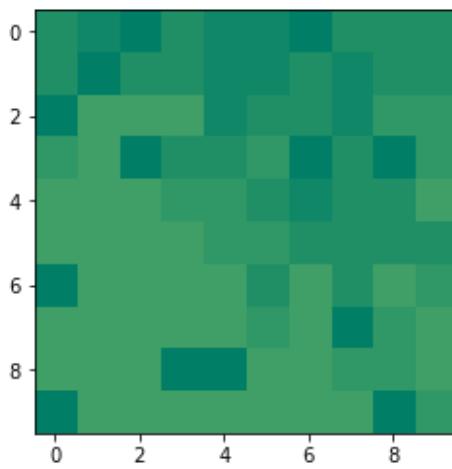
Updated direction: [ 0 -1 ]



Step: 433

Updated position: [ 7 8 ]

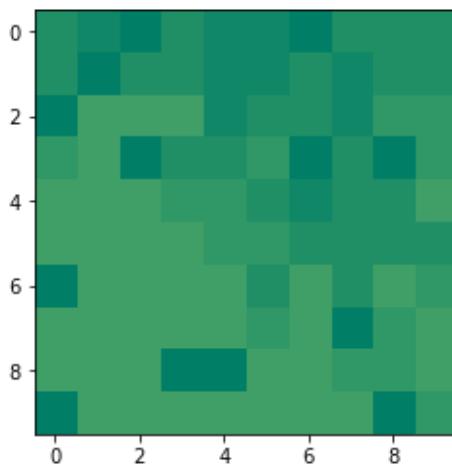
Updated direction: [-1 0 ]



Step: 434

Updated position: [ 6 8 ]

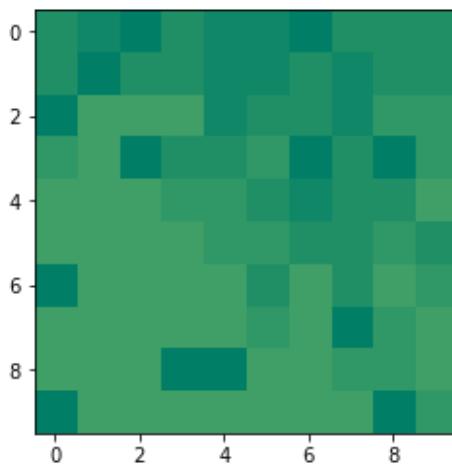
Updated direction: [-1 0 ]



Step: 435

Updated position: [ 5 8 ]

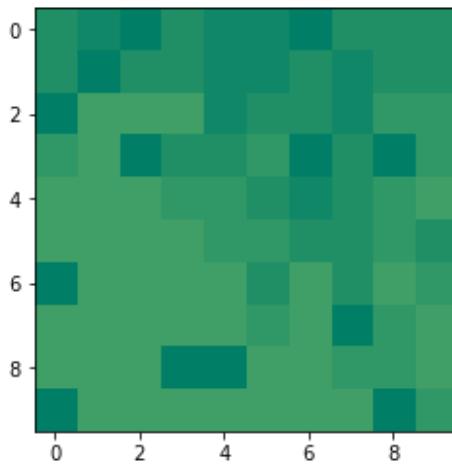
Updated direction: [-1 0 ]



Step: 436

Updated position: [ 4 8 ]

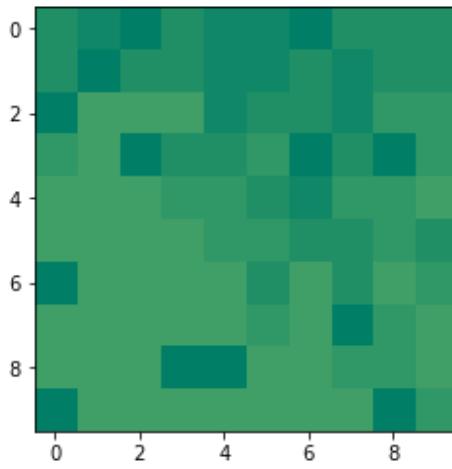
Updated direction: [ 0 -1 ]



Step: 437

Updated position: [ 4 7 ]

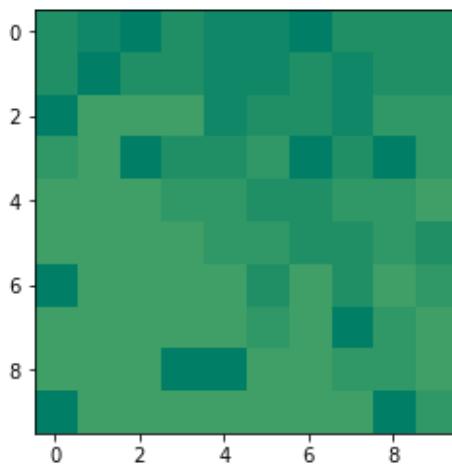
Updated direction: [ 0 -1 ]



Step: 438

Updated position: [ 4 6 ]

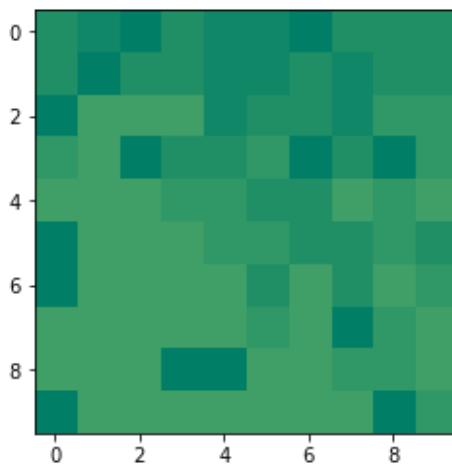
Updated direction: [ 0 1 ]



Step: 439

Updated position: [ 4 7 ]

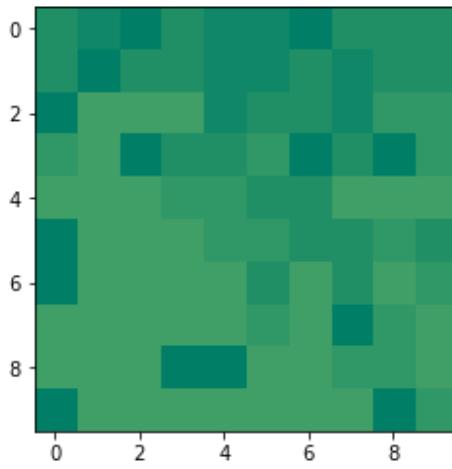
Updated direction: [ 0 1 ]



Step: 440

Updated position: [ 4 8 ]

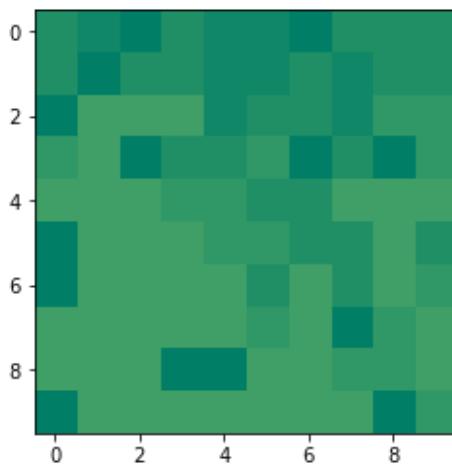
Updated direction: [ 1 0 ]



Step: 441

Updated position: [ 5 8 ]

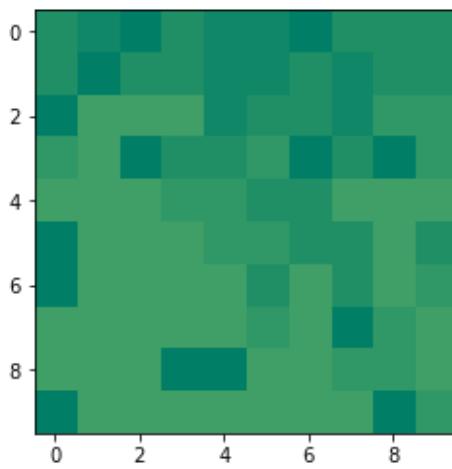
Updated direction: [ 0 -1 ]



Step: 442

Updated position: [ 5 7 ]

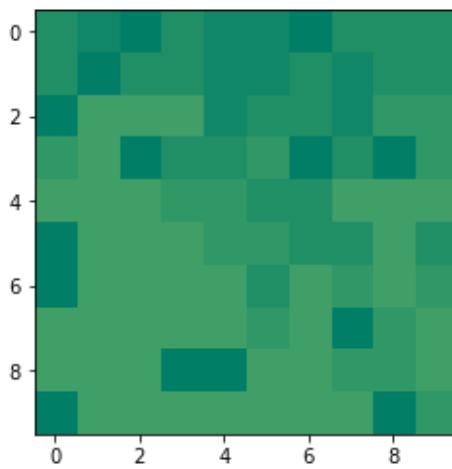
Updated direction: [ 1 0 ]



Step: 443

Updated position: [ 6 7 ]

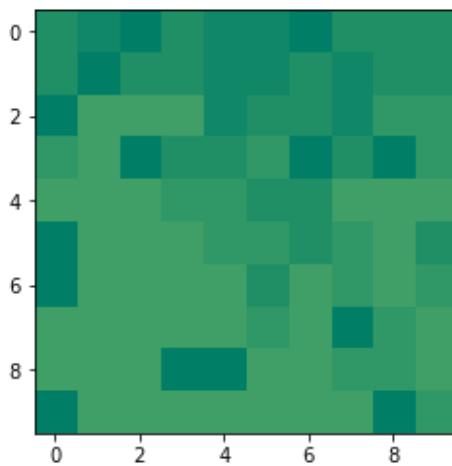
Updated direction: [ -1 0 ]



Step: 444

Updated position: [ 5 7 ]

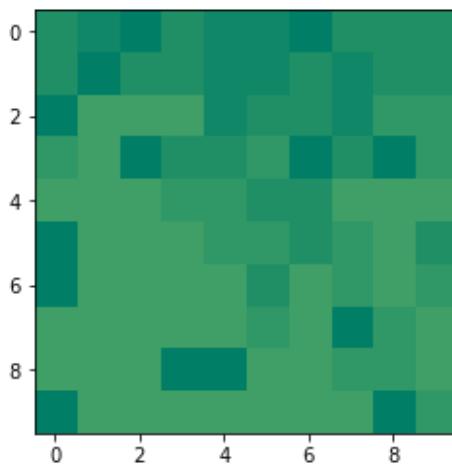
Updated direction: [ 0 1 ]



Step: 445

Updated position: [ 5 8 ]

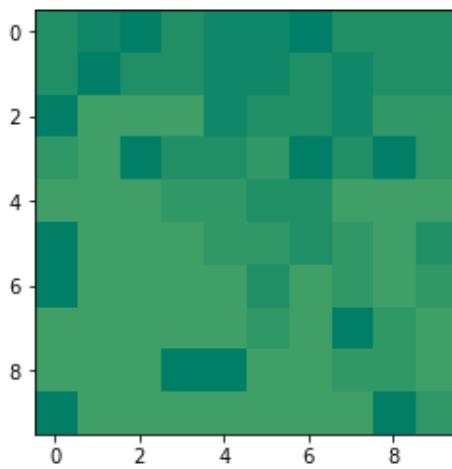
Updated direction: [ 0 1 ]



Step: 446

Updated position: [ 5 9 ]

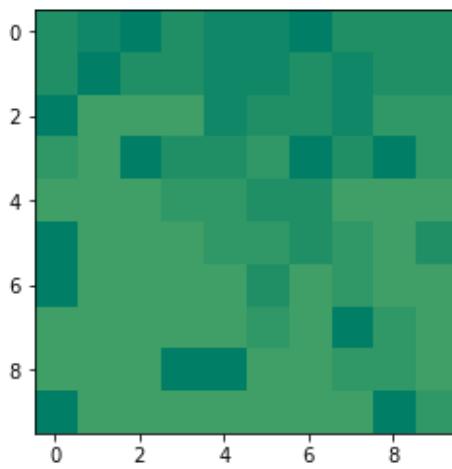
Updated direction: [ 1 0 ]



Step: 447

Updated position: [ 6 9 ]

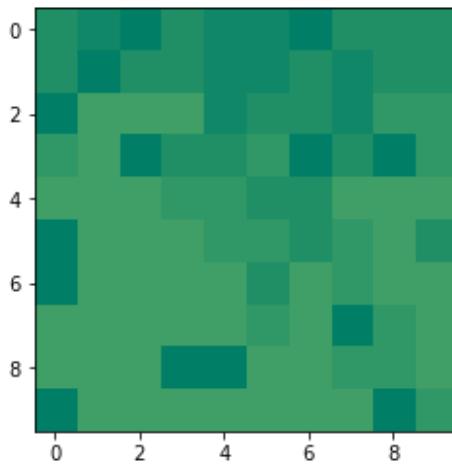
Updated direction: [ 1 0 ]



Step: 448

Updated position: [ 7 9 ]

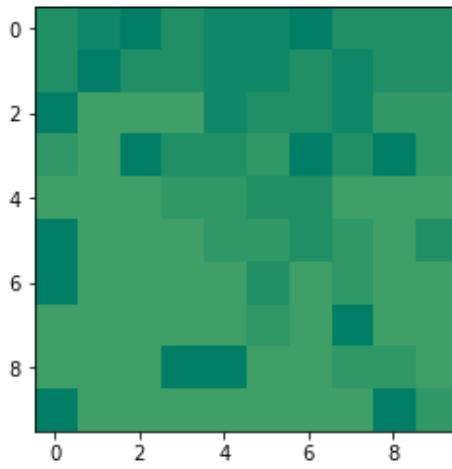
Updated direction: [ 0 -1 ]



Step: 449

Updated position: [ 7 8 ]

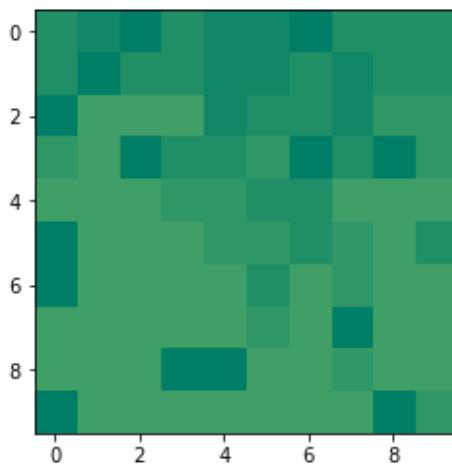
Updated direction: [ 1 0 ]



Step: 450

Updated position: [ 8 8 ]

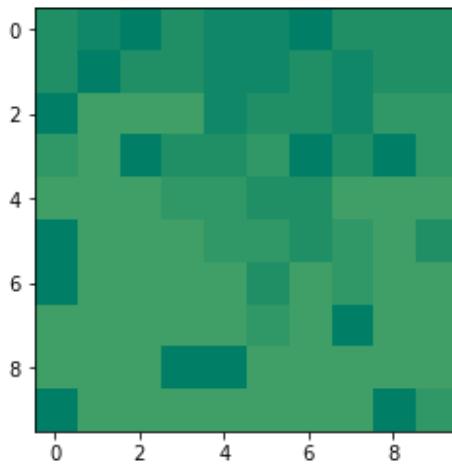
Updated direction: [ 0 -1 ]



Step: 451

Updated position: [ 8 7 ]

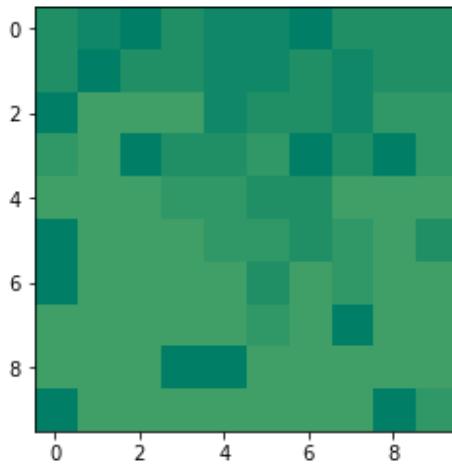
Updated direction: [ 1 0 ]



Step: 452

Updated position: [ 9 7 ]

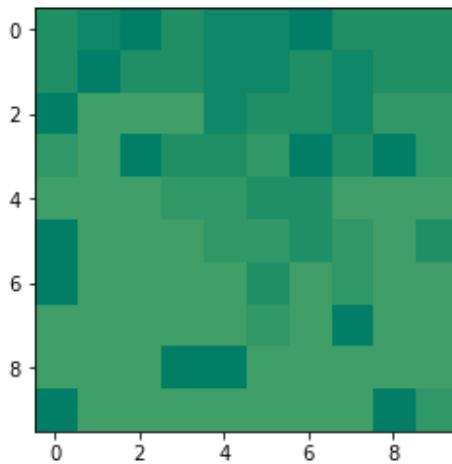
Updated direction: [ 0 -1 ]



Step: 453

Updated position: [ 9 6 ]

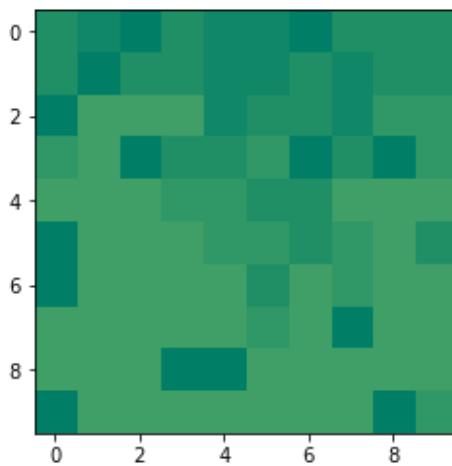
Updated direction: [ 0 -1 ]



Step: 454

Updated position: [9 5]

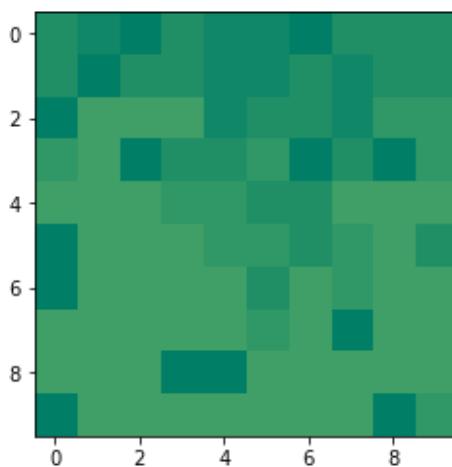
Updated direction: [ 0 -1 ]



Step: 455

Updated position: [9 4]

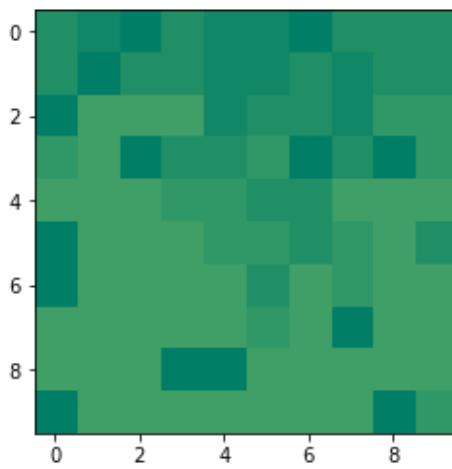
Updated direction: [ 0 -1 ]



Step: 456

Updated position: [9 3]

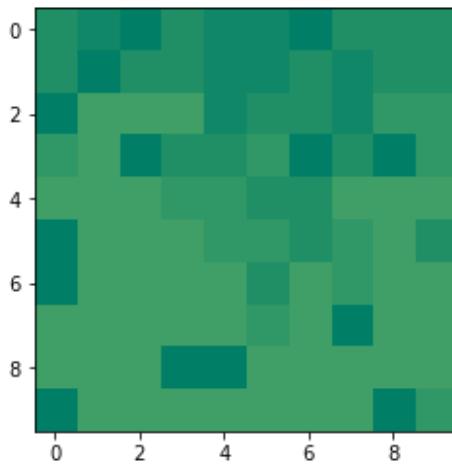
Updated direction: [ 0 1 ]



Step: 457

Updated position: [9 4]

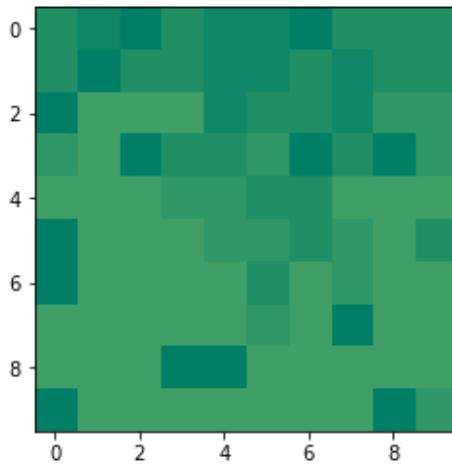
Updated direction: [ 0 -1]



Step: 458

Updated position: [9 3]

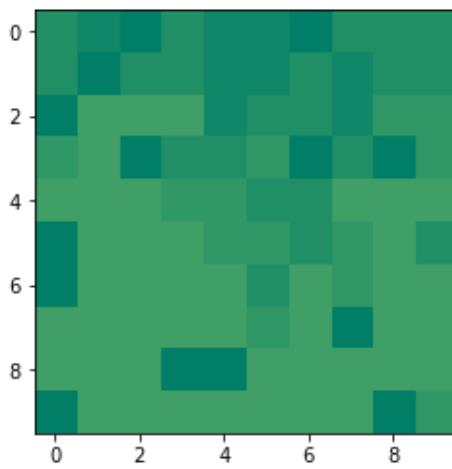
Updated direction: [ 0 -1]



Step: 459

Updated position: [9 2]

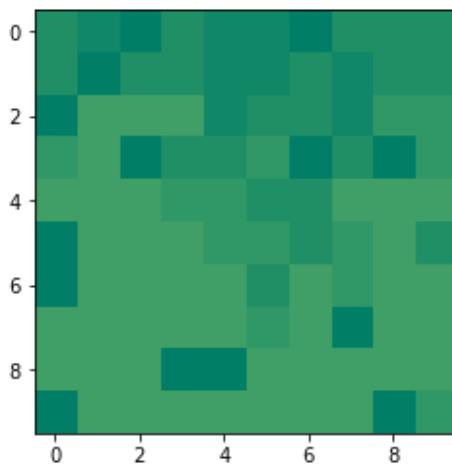
Updated direction: [ 0 -1]



Step: 460

Updated position: [9 1]

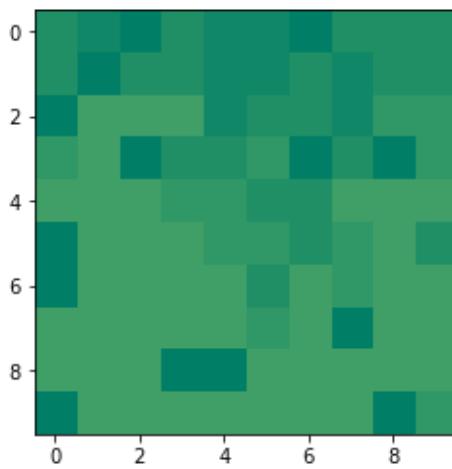
Updated direction: [ 0 1 ]



Step: 461

Updated position: [9 2]

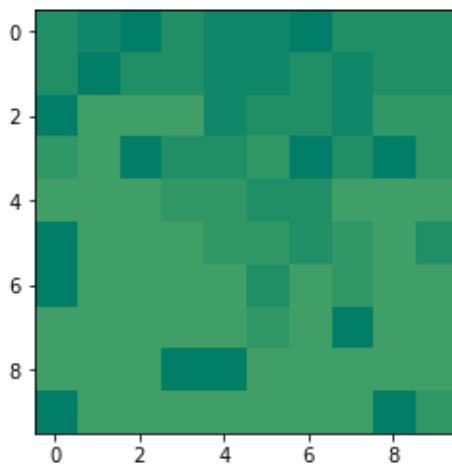
Updated direction: [ 0 -1 ]



Step: 462

Updated position: [9 1]

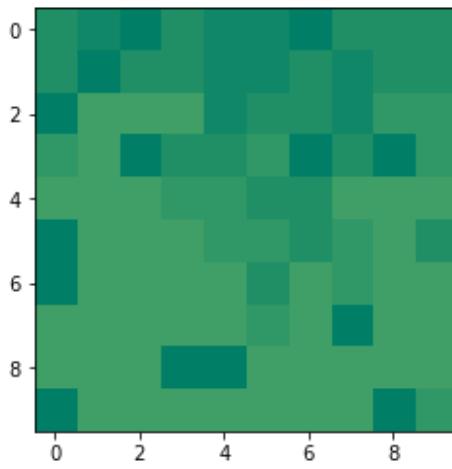
Updated direction: [ 0 1 ]



Step: 463

Updated position: [ 9 2 ]

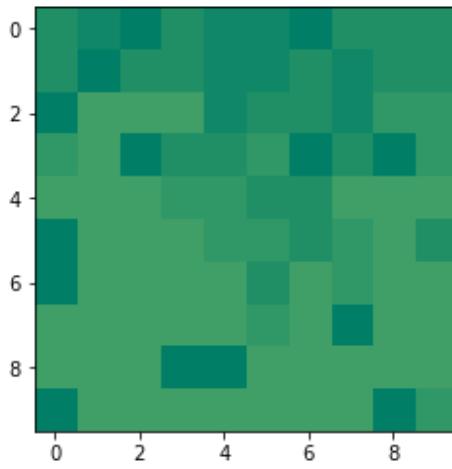
Updated direction: [ 0 1 ]



Step: 464

Updated position: [ 9 3 ]

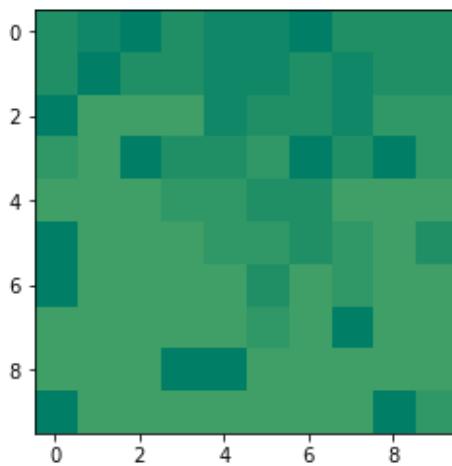
Updated direction: [ 0 -1 ]



Step: 465

Updated position: [ 9 2 ]

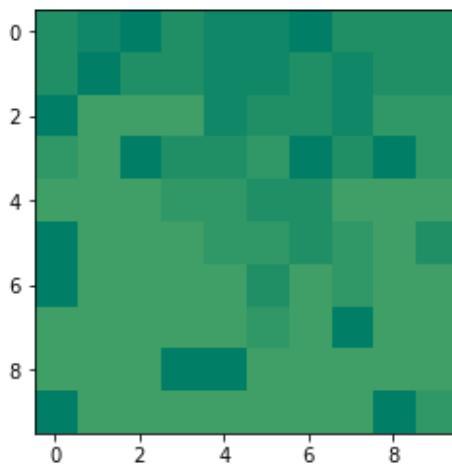
Updated direction: [ 0 -1 ]



Step: 466

Updated position: [9 1]

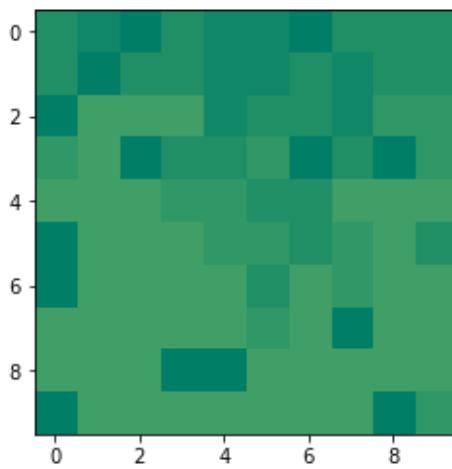
Updated direction: [-1 0]



Step: 467

Updated position: [8 1]

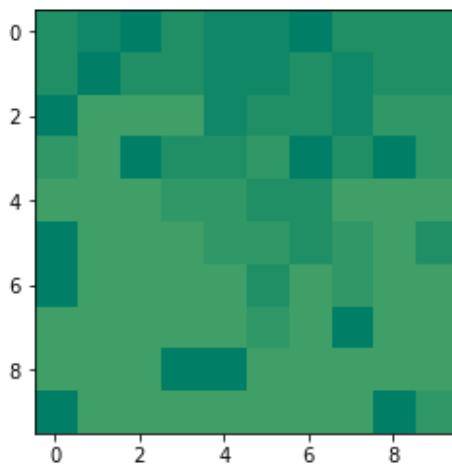
Updated direction: [1 0]



Step: 468

Updated position: [9 1]

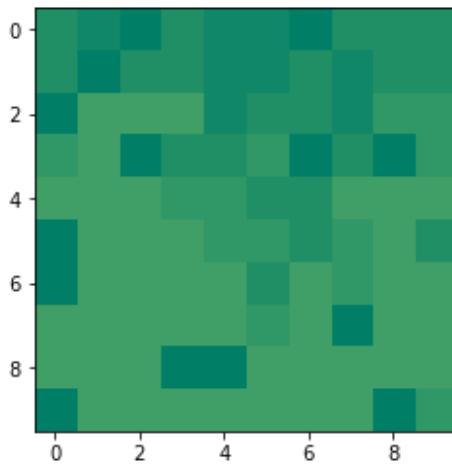
Updated direction: [0 1]



Step: 469

Updated position: [9 2]

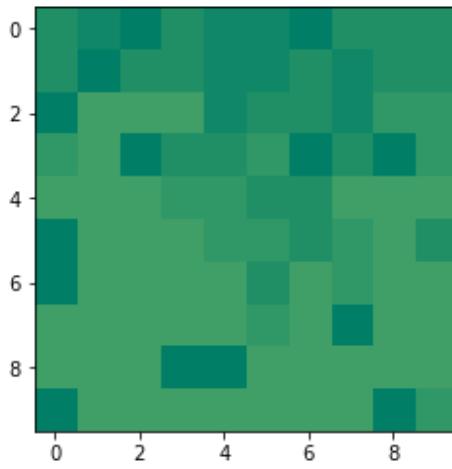
Updated direction: [ 0 -1]



Step: 470

Updated position: [9 1]

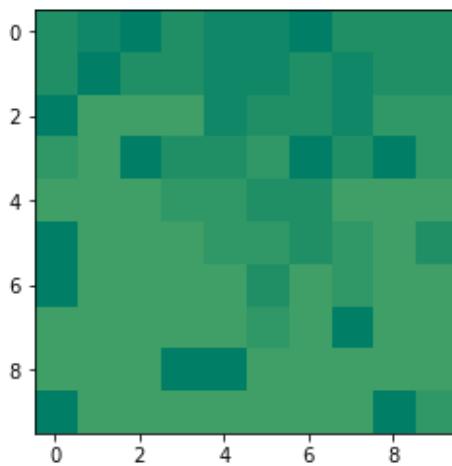
Updated direction: [0 1]



Step: 471

Updated position: [9 2]

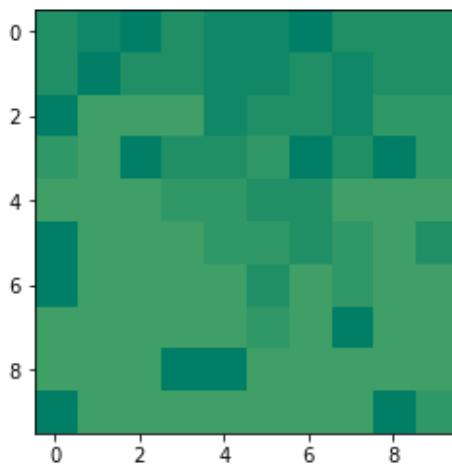
Updated direction: [ 0 -1]



Step: 472

Updated position: [ 9 1 ]

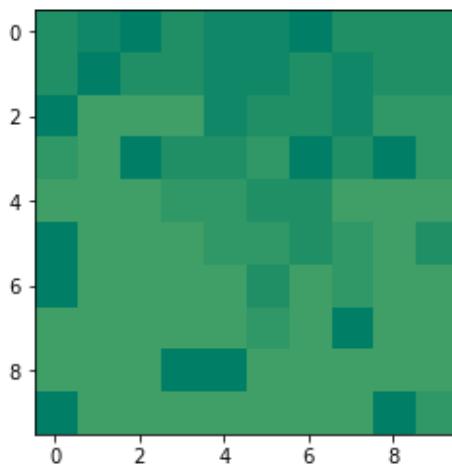
Updated direction: [ 0 1 ]



Step: 473

Updated position: [ 9 2 ]

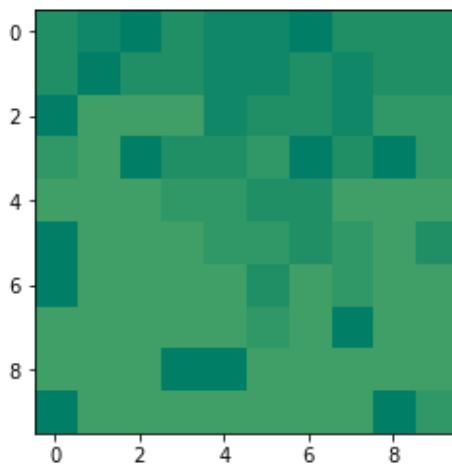
Updated direction: [ 0 1 ]



Step: 474

Updated position: [ 9 3 ]

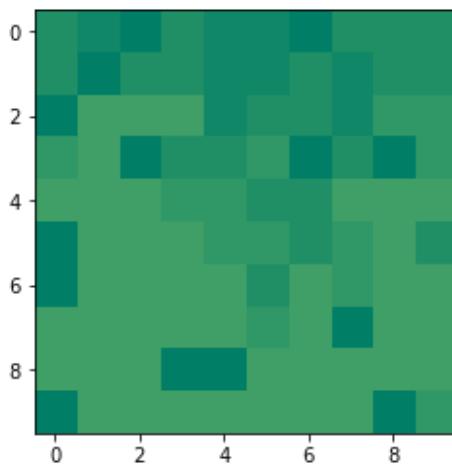
Updated direction: [ 0 -1 ]



Step: 475

Updated position: [9 2]

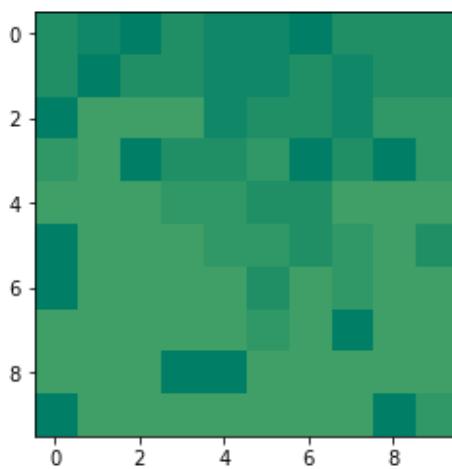
Updated direction: [ 0 -1 ]



Step: 476

Updated position: [9 1]

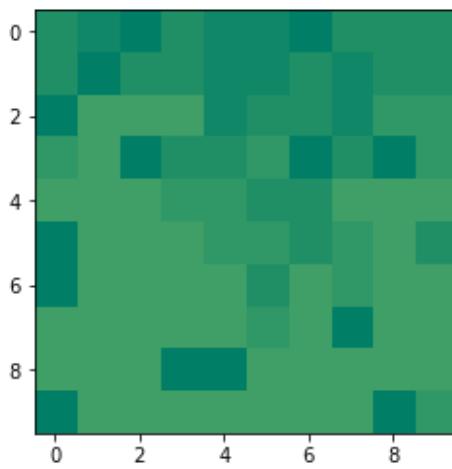
Updated direction: [-1 0 ]



Step: 477

Updated position: [8 1]

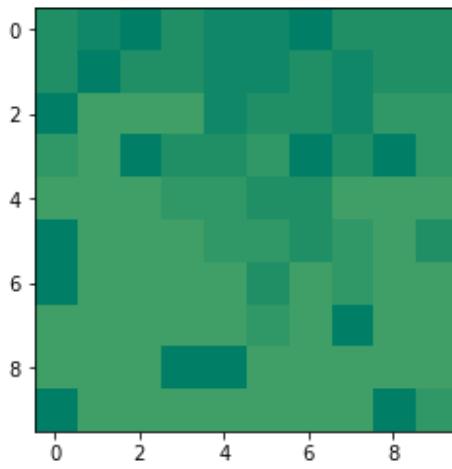
Updated direction: [-1 0 ]



Step: 478

Updated position: [ 7 1 ]

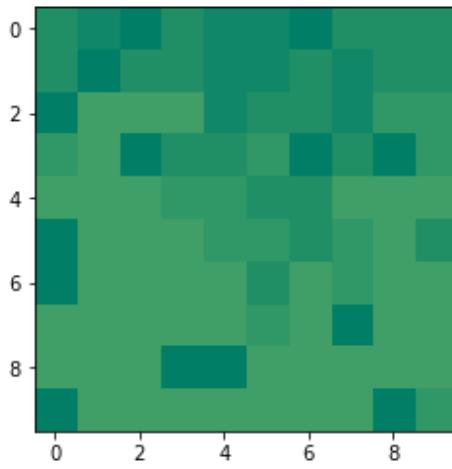
Updated direction: [ 1 0 ]



Step: 479

Updated position: [ 8 1 ]

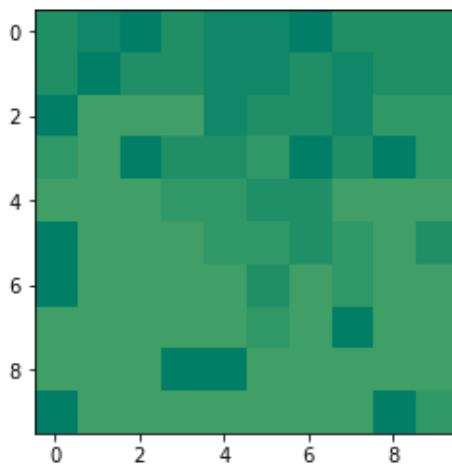
Updated direction: [ 1 0 ]



Step: 480

Updated position: [ 9 1 ]

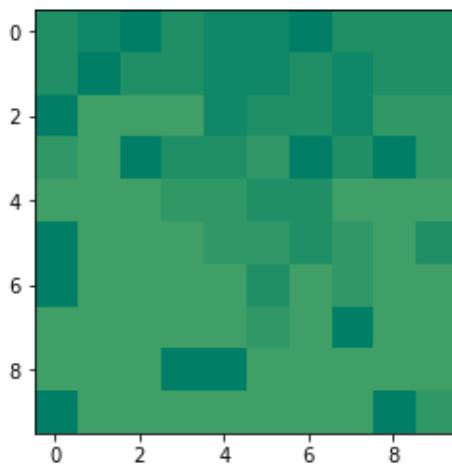
Updated direction: [ -1 0 ]



Step: 481

Updated position: [ 8 1 ]

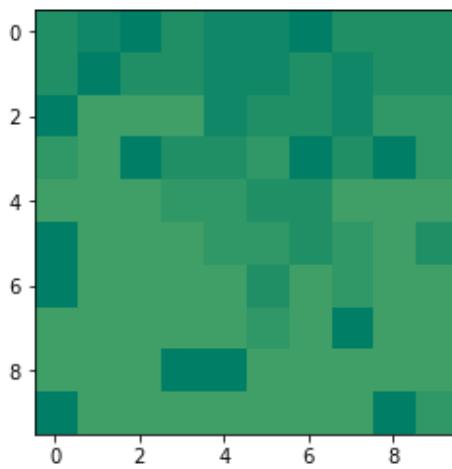
Updated direction: [ 0 -1 ]



Step: 482

Updated position: [ 8 0 ]

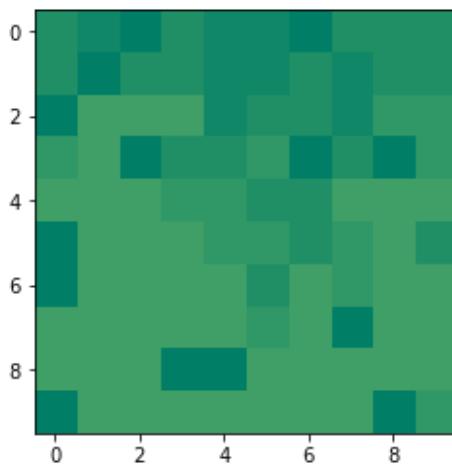
Updated direction: [-1 0 ]



Step: 483

Updated position: [ 7 0 ]

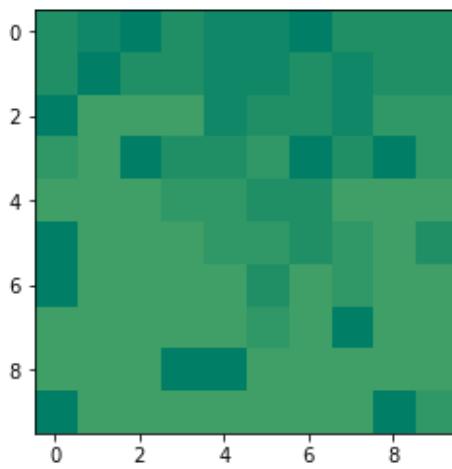
Updated direction: [ 1 0 ]



Step: 484

Updated position: [ 8 0 ]

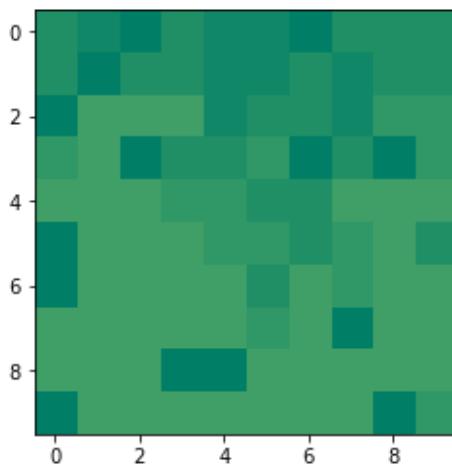
Updated direction: [ -1 0 ]



Step: 485

Updated position: [ 7 0 ]

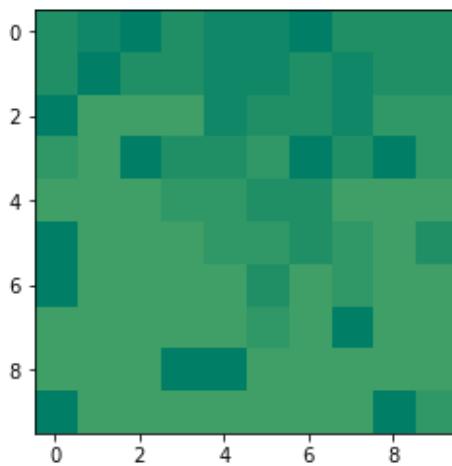
Updated direction: [ 0 1 ]



Step: 486

Updated position: [ 7 1 ]

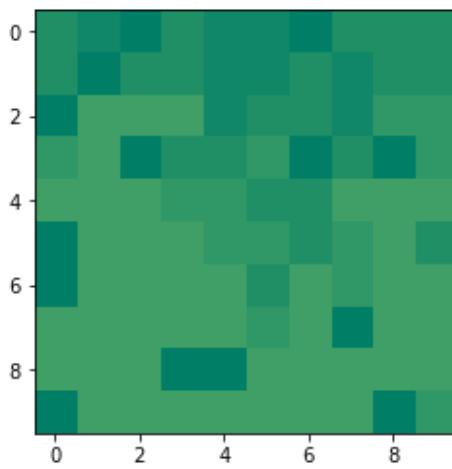
Updated direction: [ 0 -1 ]



Step: 487

Updated position: [ 7 0 ]

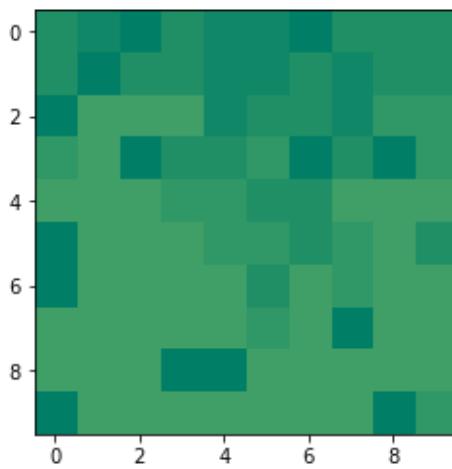
Updated direction: [ 0 1 ]



Step: 488

Updated position: [ 7 1 ]

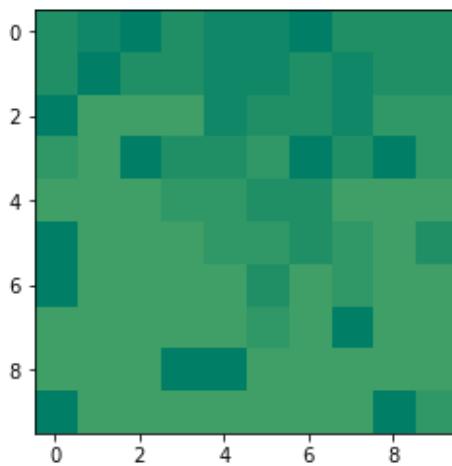
Updated direction: [ -1 0 ]



Step: 489

Updated position: [ 6 1 ]

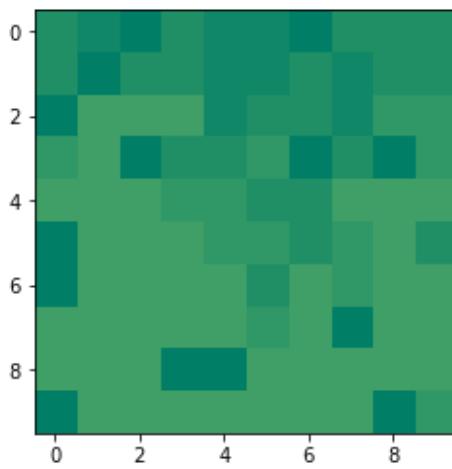
Updated direction: [ 1 0 ]



Step: 490

Updated position: [ 7 1 ]

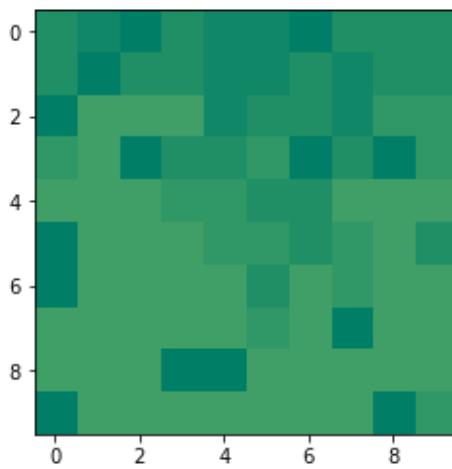
Updated direction: [ 1 0 ]



Step: 491

Updated position: [ 8 1 ]

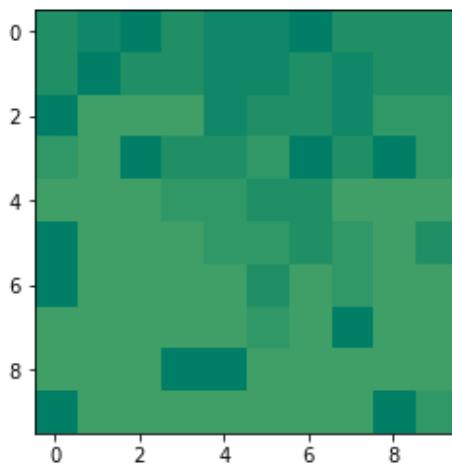
Updated direction: [ 1 0 ]



Step: 492

Updated position: [ 9 1 ]

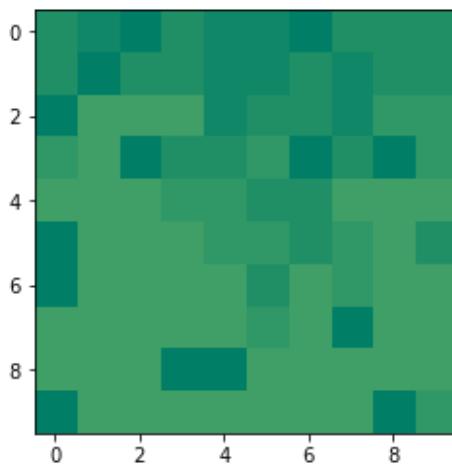
Updated direction: [ 0 1 ]



Step: 493

Updated position: [9 2]

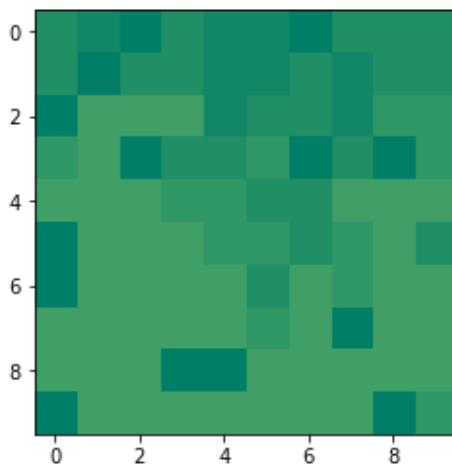
Updated direction: [ 0 -1 ]



Step: 494

Updated position: [9 1]

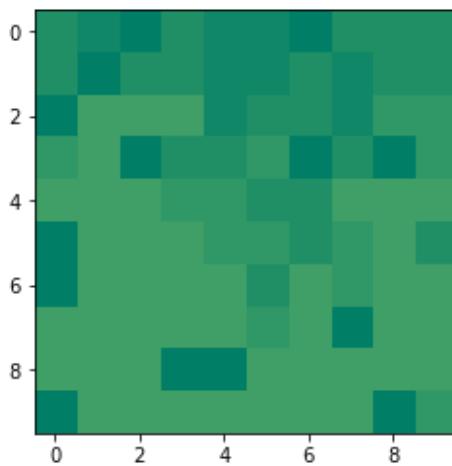
Updated direction: [ 0 1 ]



Step: 495

Updated position: [9 2]

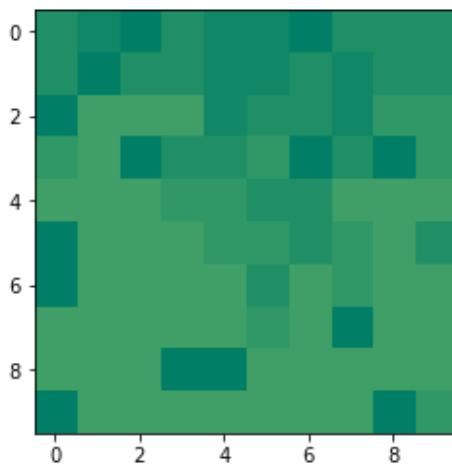
Updated direction: [ 0 1 ]



Step: 496

Updated position: [ 9 3 ]

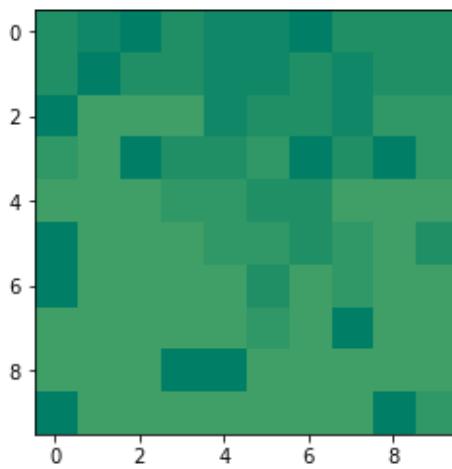
Updated direction: [ 0 1 ]



Step: 497

Updated position: [ 9 4 ]

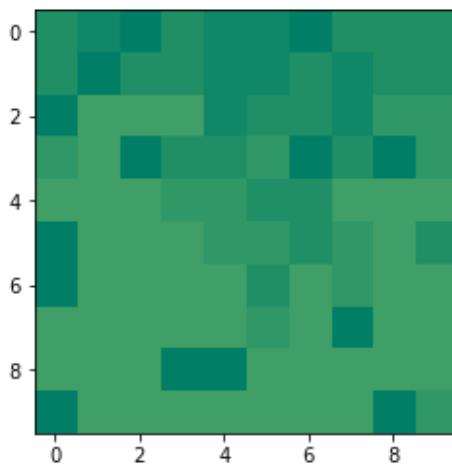
Updated direction: [ 0 -1 ]



Step: 498

Updated position: [ 9 3 ]

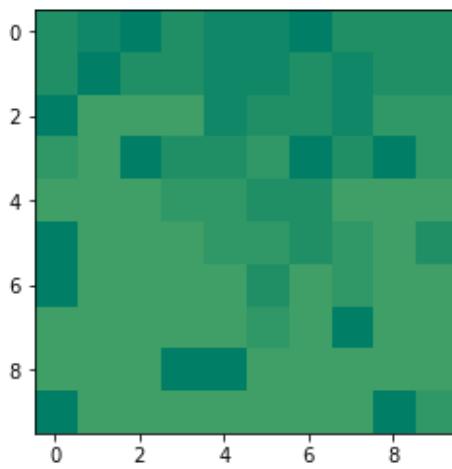
Updated direction: [ 0 -1 ]



Step: 499

Updated position: [9 2]

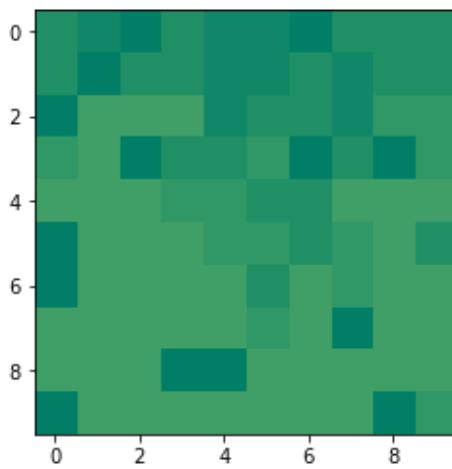
Updated direction: [ 0 -1]



Step: 500

Updated position: [9 1]

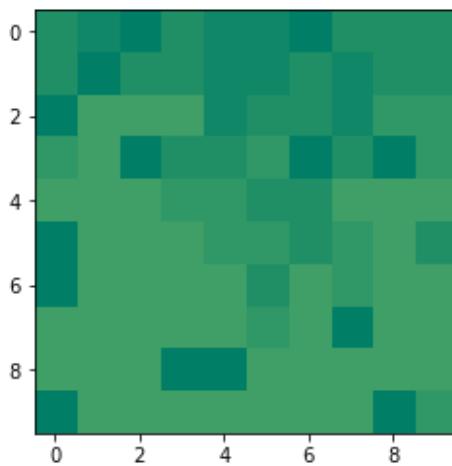
Updated direction: [ 0 1]



Step: 501

Updated position: [9 2]

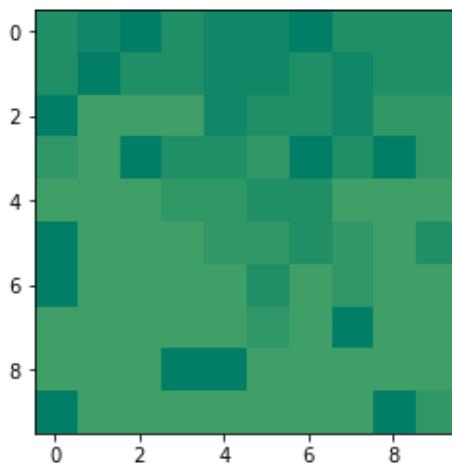
Updated direction: [ 0 -1]



Step: 502

Updated position: [ 9 1 ]

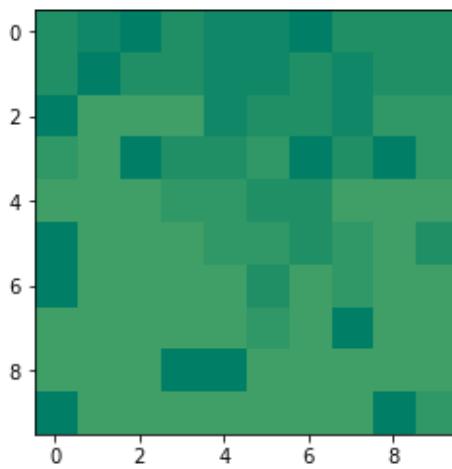
Updated direction: [ 0 1 ]



Step: 503

Updated position: [ 9 2 ]

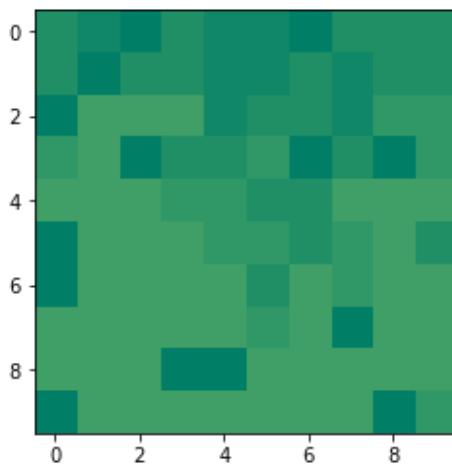
Updated direction: [ 0 -1 ]



Step: 504

Updated position: [ 9 1 ]

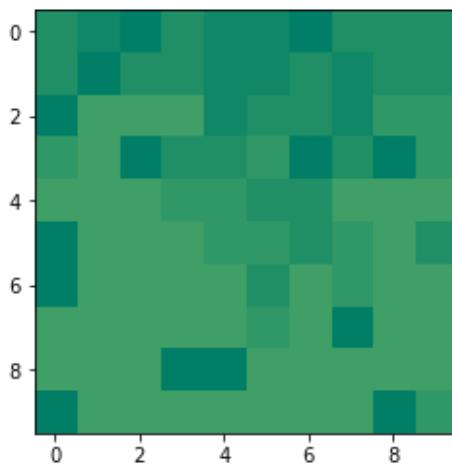
Updated direction: [-1 0 ]



Step: 505

Updated position: [ 8 1 ]

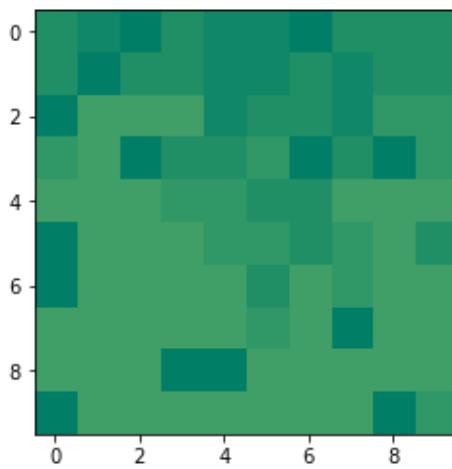
Updated direction: [ 1 0 ]



Step: 506

Updated position: [ 9 1 ]

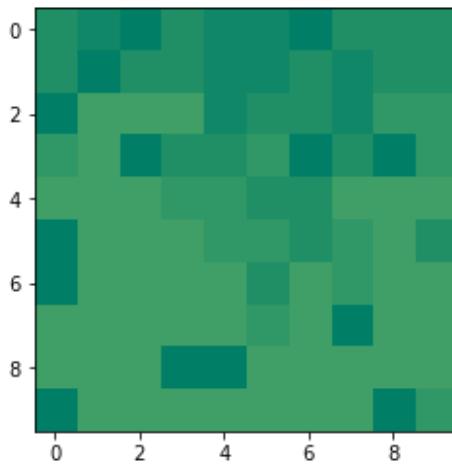
Updated direction: [ -1 0 ]



Step: 507

Updated position: [ 8 1 ]

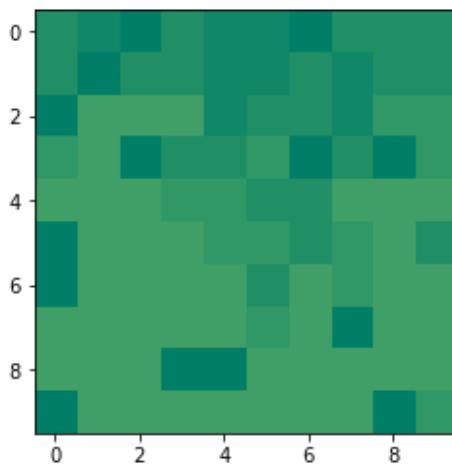
Updated direction: [ 0 1 ]



Step: 508

Updated position: [ 8 2 ]

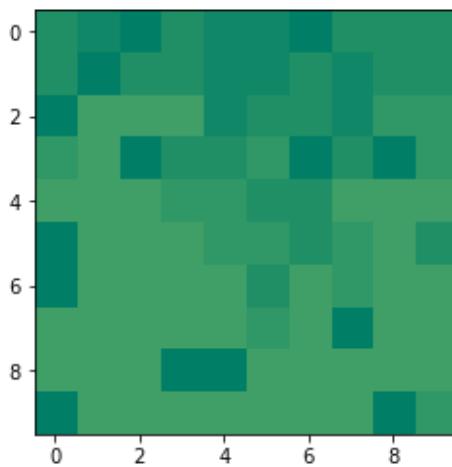
Updated direction: [ 1 0 ]



Step: 509

Updated position: [ 9 2 ]

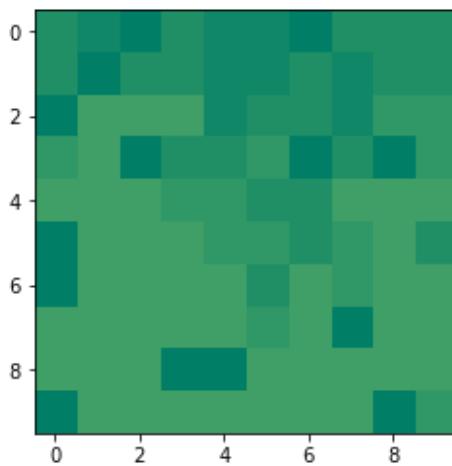
Updated direction: [ 0 -1 ]



Step: 510

Updated position: [ 9 1 ]

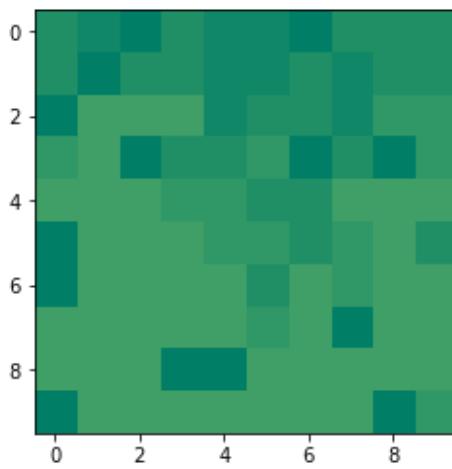
Updated direction: [ 0 1 ]



Step: 511

Updated position: [9 2]

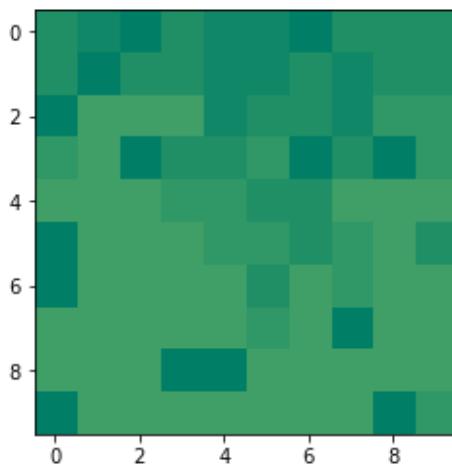
Updated direction: [ 0 -1]



Step: 512

Updated position: [9 1]

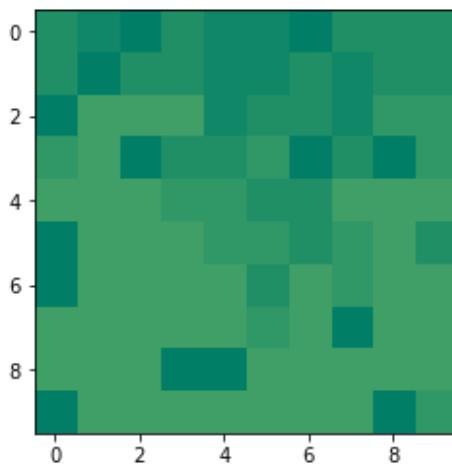
Updated direction: [ 0 1]



Step: 513

Updated position: [9 2]

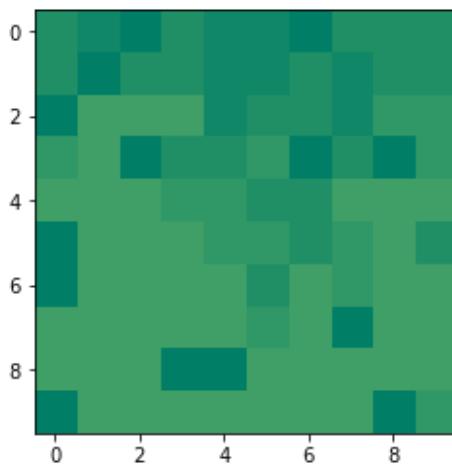
Updated direction: [ 0 -1]



Step: 514

Updated position: [9 1]

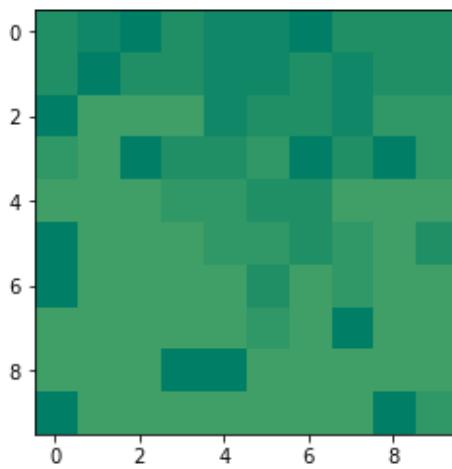
Updated direction: [0 1]



Step: 515

Updated position: [9 2]

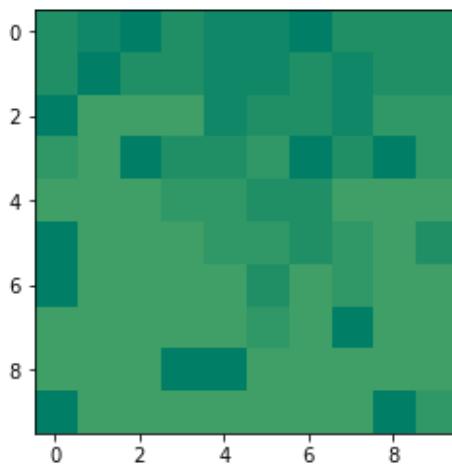
Updated direction: [-1 0]



Step: 516

Updated position: [8 2]

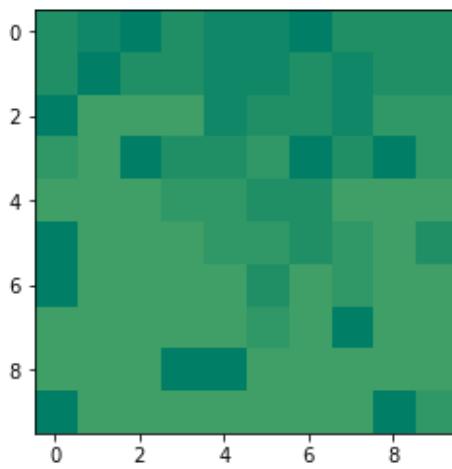
Updated direction: [1 0]



Step: 517

Updated position: [9 2]

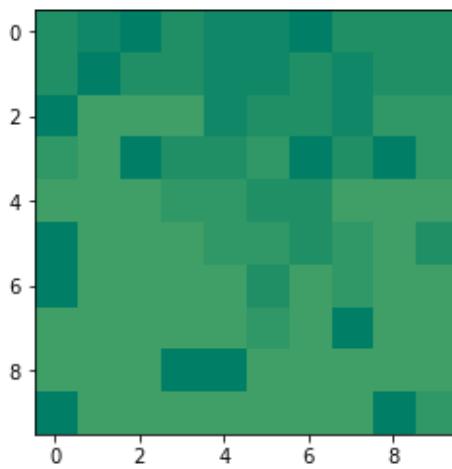
Updated direction: [ 0 -1 ]



Step: 518

Updated position: [9 1]

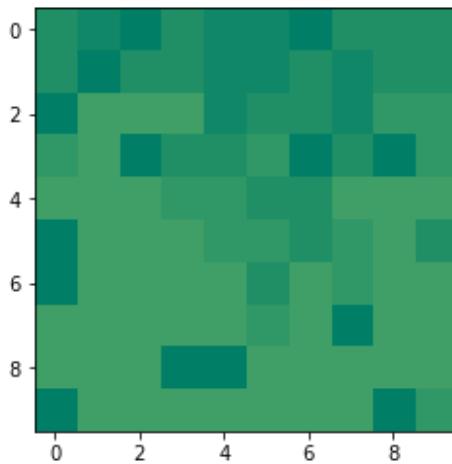
Updated direction: [-1 0 ]



Step: 519

Updated position: [8 1]

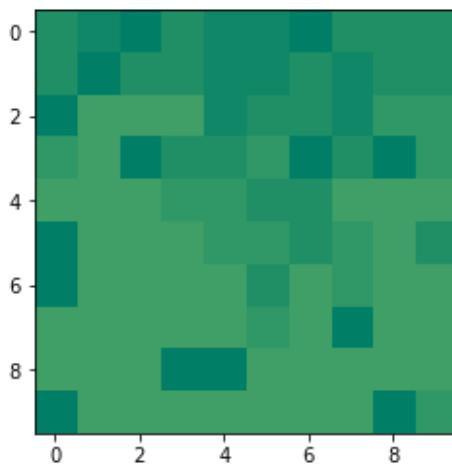
Updated direction: [-1 0 ]



Step: 520

Updated position: [ 7 1 ]

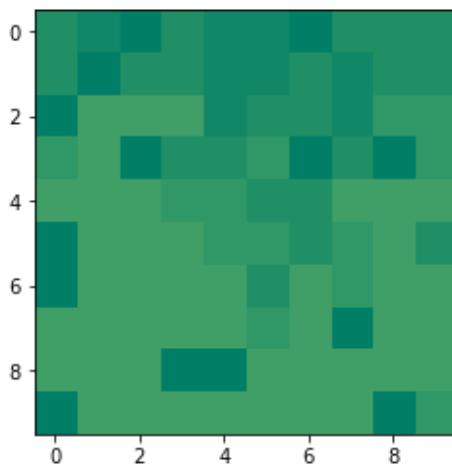
Updated direction: [ 0 -1 ]



Step: 521

Updated position: [ 7 0 ]

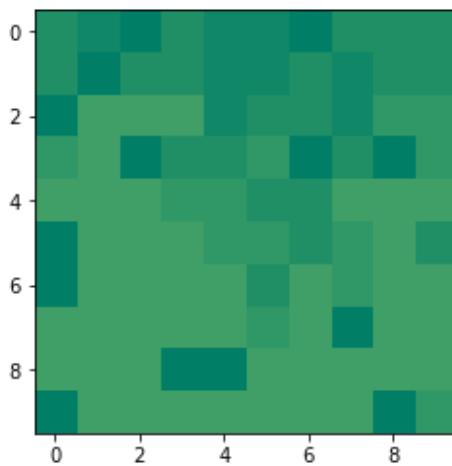
Updated direction: [ 1 0 ]



Step: 522

Updated position: [ 8 0 ]

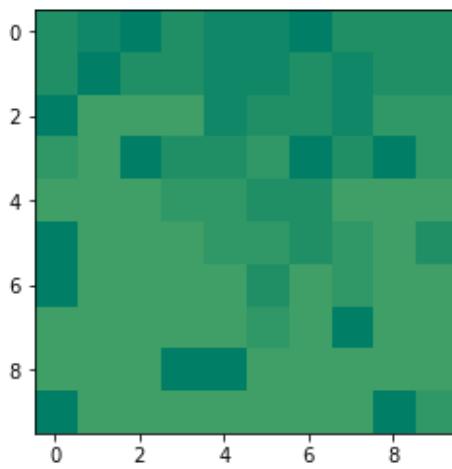
Updated direction: [ 0 1 ]



Step: 523

Updated position: [ 8 1 ]

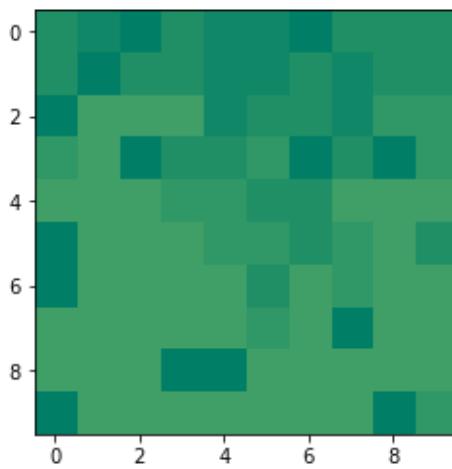
Updated direction: [ 1 0 ]



Step: 524

Updated position: [ 9 1 ]

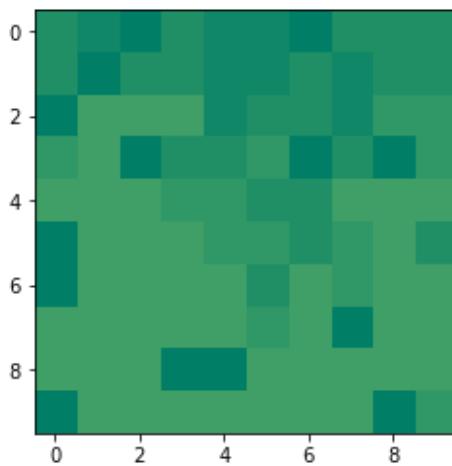
Updated direction: [ 0 1 ]



Step: 525

Updated position: [ 9 2 ]

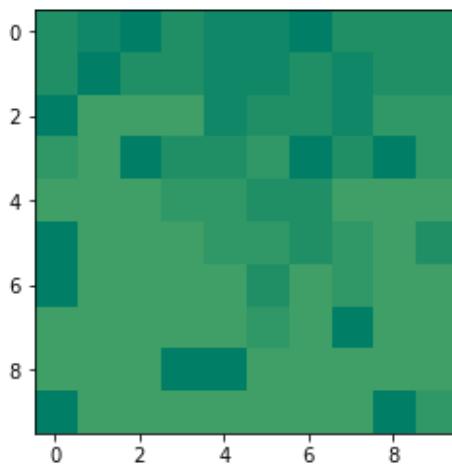
Updated direction: [ 0 -1 ]



Step: 526

Updated position: [9 1]

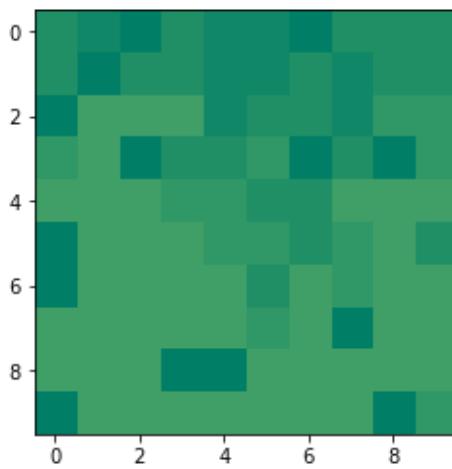
Updated direction: [0 1]



Step: 527

Updated position: [9 2]

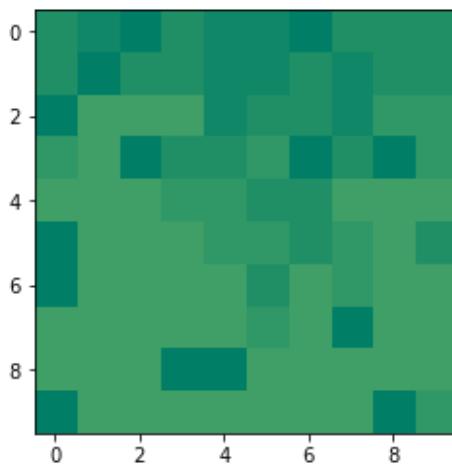
Updated direction: [0 1]



Step: 528

Updated position: [9 3]

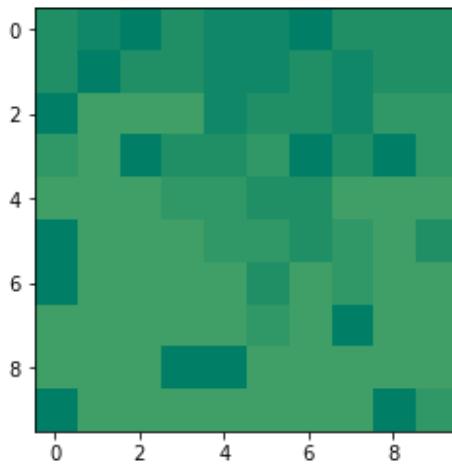
Updated direction: [0 1]



Step: 529

Updated position: [9 4]

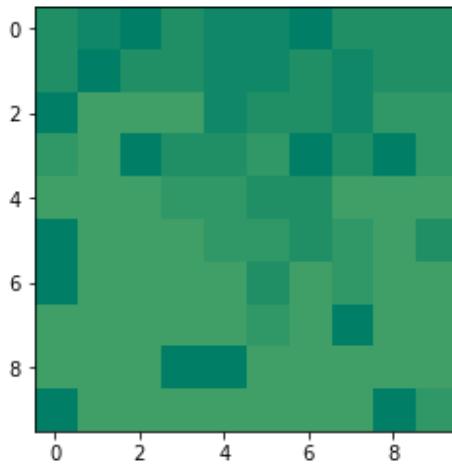
Updated direction: [ 0 -1]



Step: 530

Updated position: [9 3]

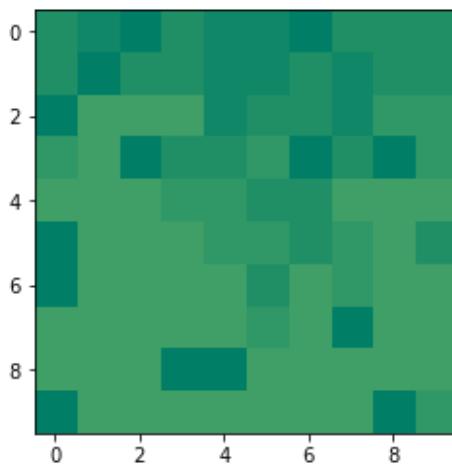
Updated direction: [ 0 -1]



Step: 531

Updated position: [9 2]

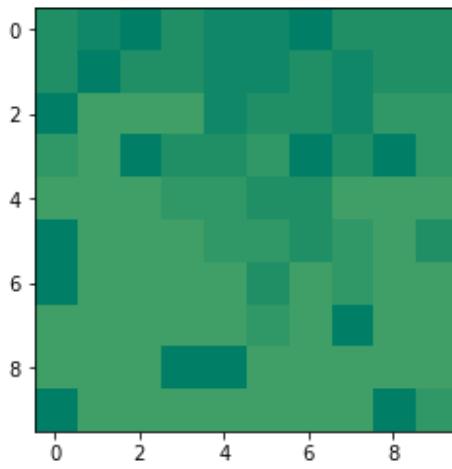
Updated direction: [ 0 -1]



Step: 532

Updated position: [ 9 1 ]

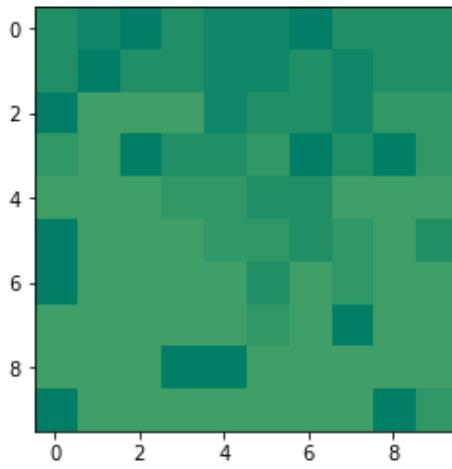
Updated direction: [ 0 1 ]



Step: 533

Updated position: [ 9 2 ]

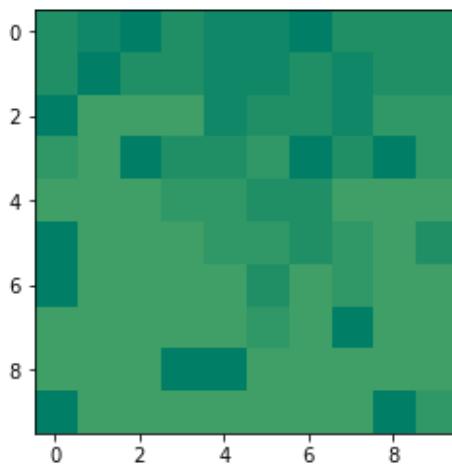
Updated direction: [ 0 -1 ]



Step: 534

Updated position: [ 9 1 ]

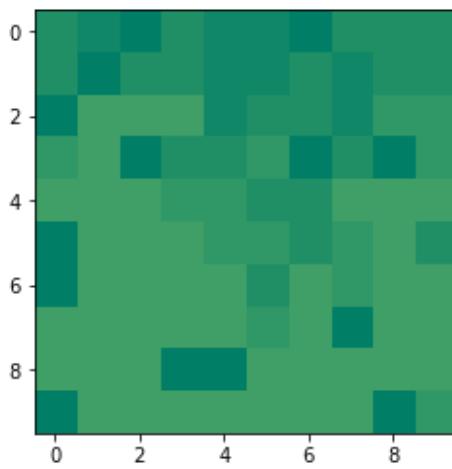
Updated direction: [-1 0 ]



Step: 535

Updated position: [ 8 1 ]

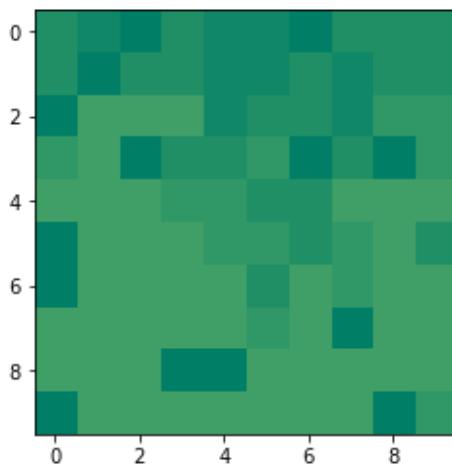
Updated direction: [ 1 0 ]



Step: 536

Updated position: [ 9 1 ]

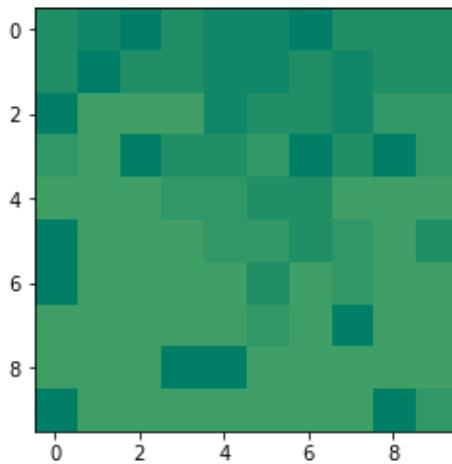
Updated direction: [ 0 1 ]



Step: 537

Updated position: [ 9 2 ]

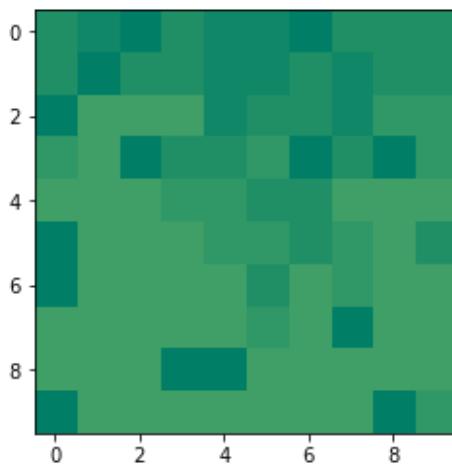
Updated direction: [ 0 -1 ]



Step: 538

Updated position: [ 9 1 ]

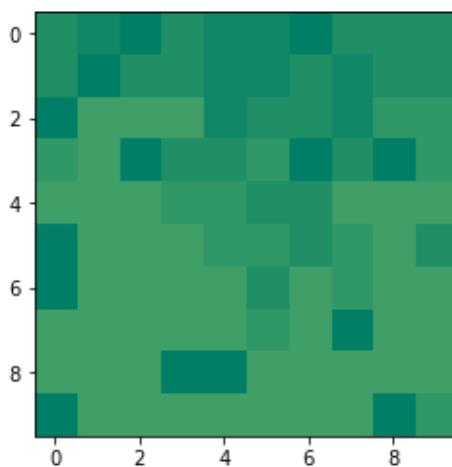
Updated direction: [ -1 0 ]



Step: 539

Updated position: [ 8 1 ]

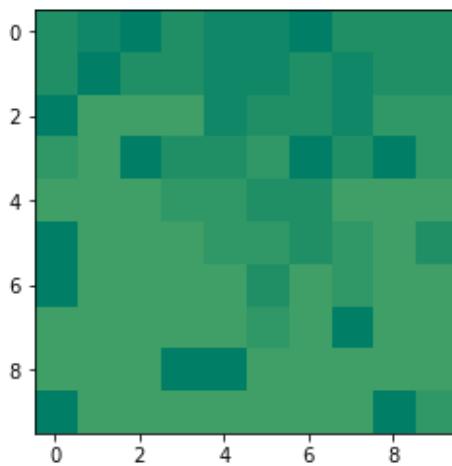
Updated direction: [ 0 1 ]



Step: 540

Updated position: [ 8 2 ]

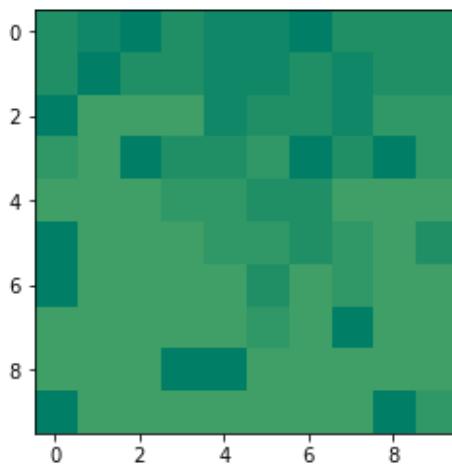
Updated direction: [ 1 0 ]



Step: 541

Updated position: [9 2]

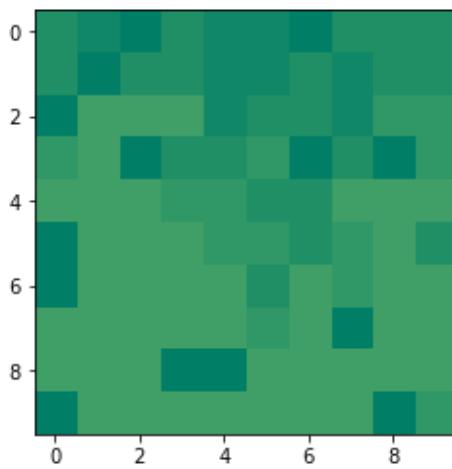
Updated direction: [ 0 -1 ]



Step: 542

Updated position: [9 1]

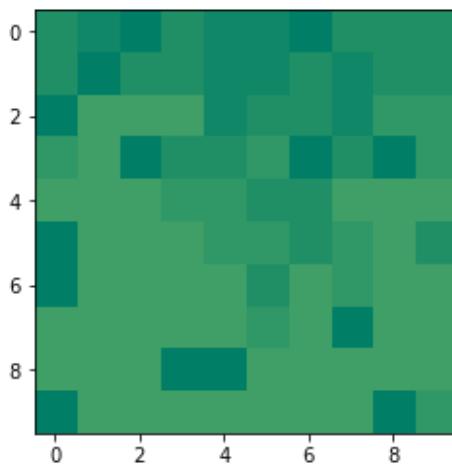
Updated direction: [-1 0 ]



Step: 543

Updated position: [8 1]

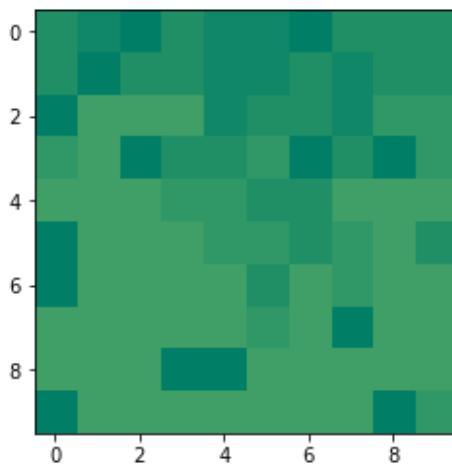
Updated direction: [1 0 ]



Step: 544

Updated position: [ 9 1 ]

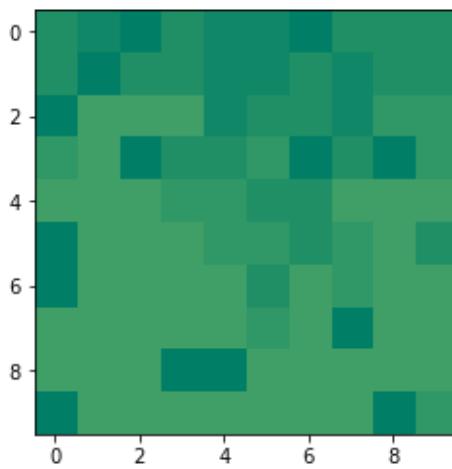
Updated direction: [ -1 0 ]



Step: 545

Updated position: [ 8 1 ]

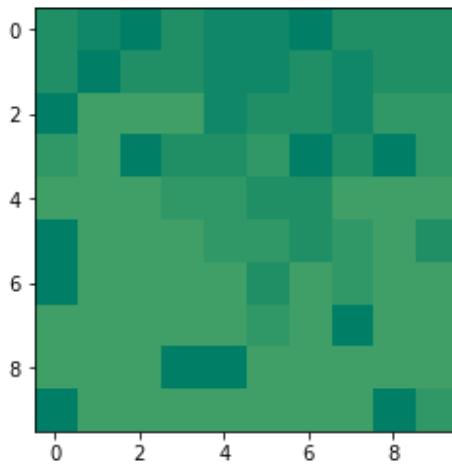
Updated direction: [ 0 1 ]



Step: 546

Updated position: [ 8 2 ]

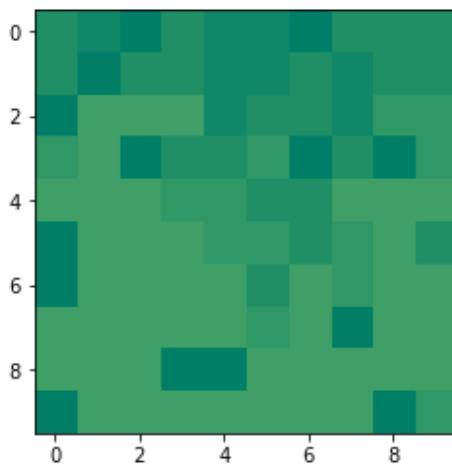
Updated direction: [ 1 0 ]



Step: 547

Updated position: [9 2]

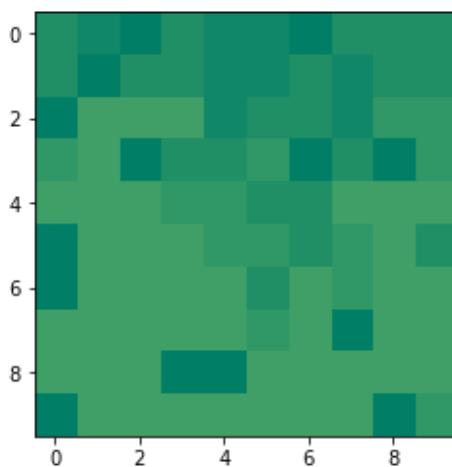
Updated direction: [ 0 -1]



Step: 548

Updated position: [9 1]

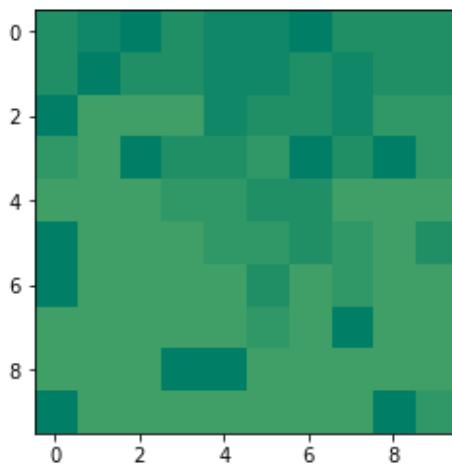
Updated direction: [ 0 1]



Step: 549

Updated position: [9 2]

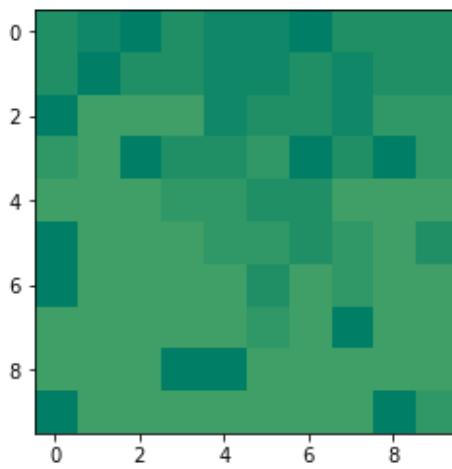
Updated direction: [ 0 -1]



Step: 550

Updated position: [ 9 1 ]

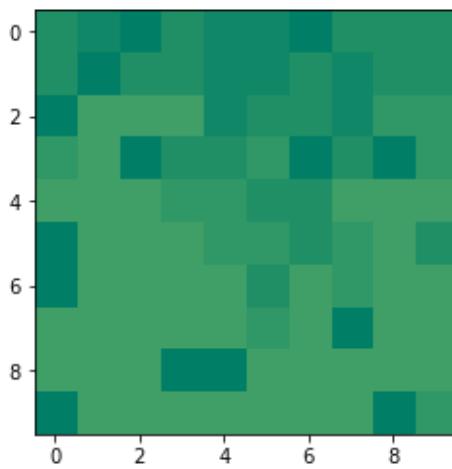
Updated direction: [ 0 1 ]



Step: 551

Updated position: [ 9 2 ]

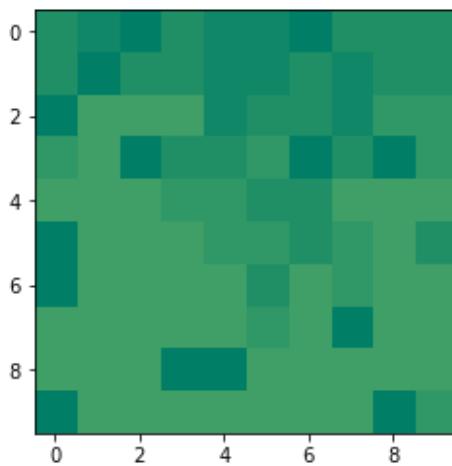
Updated direction: [ 0 1 ]



Step: 552

Updated position: [ 9 3 ]

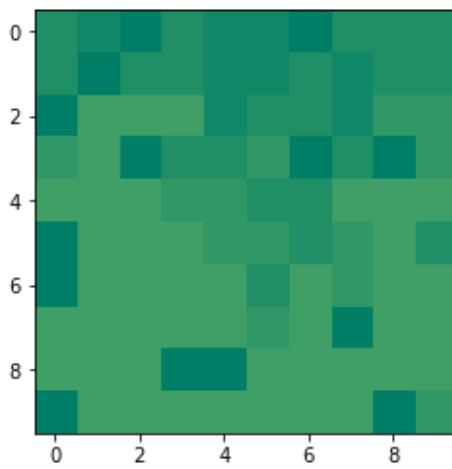
Updated direction: [ 0 -1 ]



Step: 553

Updated position: [9 2]

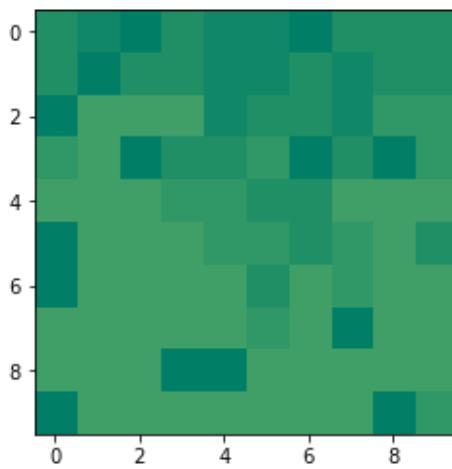
Updated direction: [ 0 -1 ]



Step: 554

Updated position: [9 1]

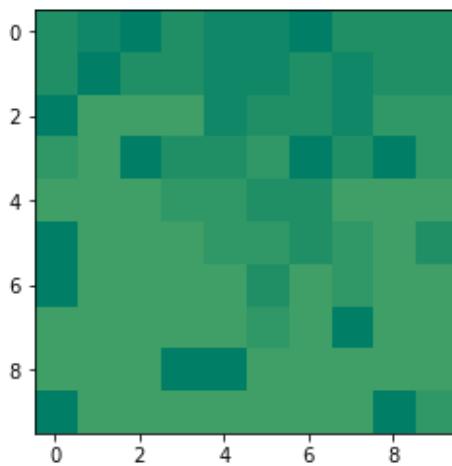
Updated direction: [-1 0 ]



Step: 555

Updated position: [8 1]

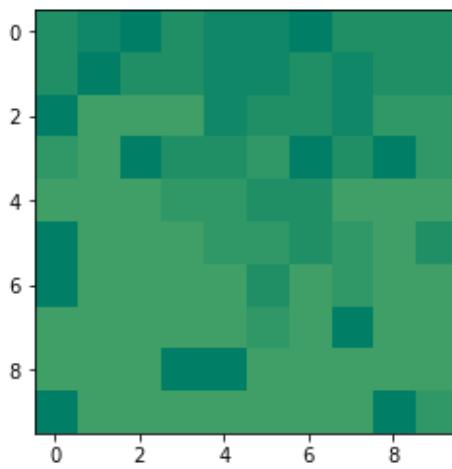
Updated direction: [1 0 ]



Step: 556

Updated position: [9 1]

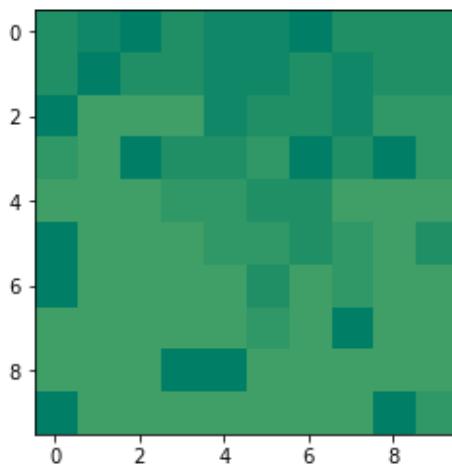
Updated direction: [0 1]



Step: 557

Updated position: [9 2]

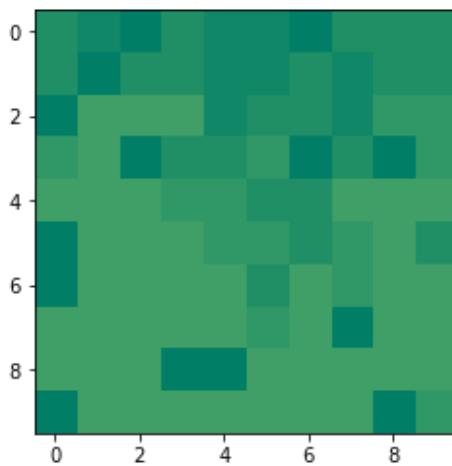
Updated direction: [0 -1]



Step: 558

Updated position: [9 1]

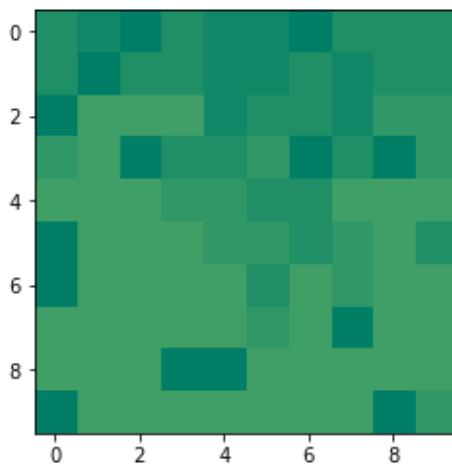
Updated direction: [0 1]



Step: 559

Updated position: [ 9 2 ]

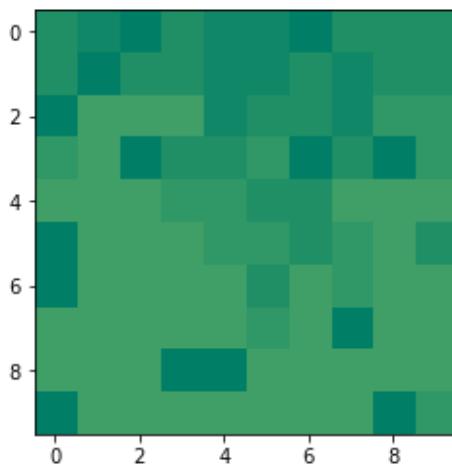
Updated direction: [ 0 1 ]



Step: 560

Updated position: [ 9 3 ]

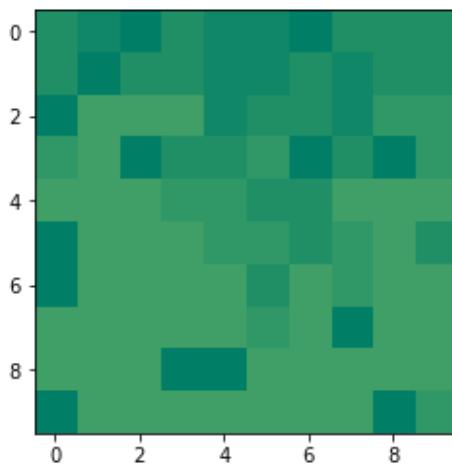
Updated direction: [ 0 -1 ]



Step: 561

Updated position: [ 9 2 ]

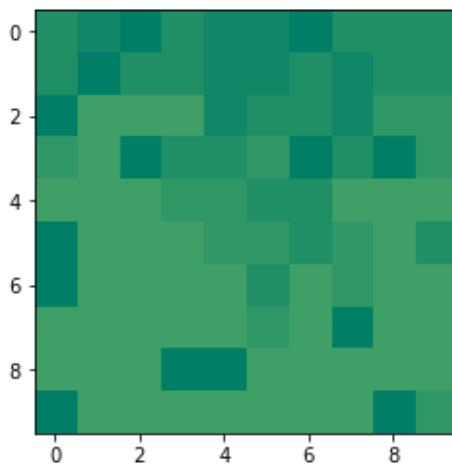
Updated direction: [ 0 1 ]



Step: 562

Updated position: [9 3]

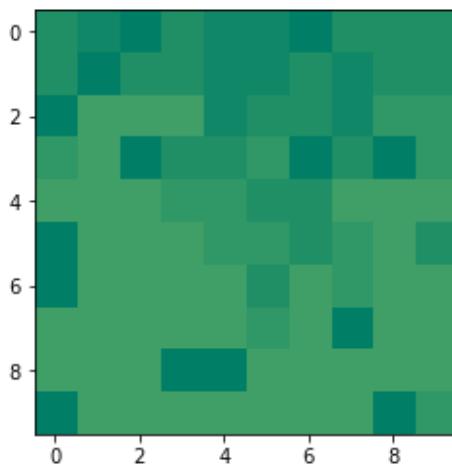
Updated direction: [ 0 -1 ]



Step: 563

Updated position: [9 2]

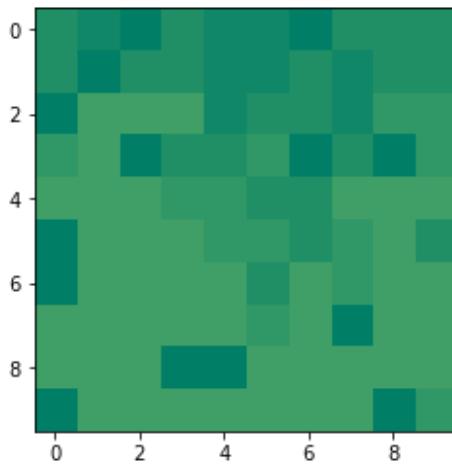
Updated direction: [ 0 -1 ]



Step: 564

Updated position: [9 1]

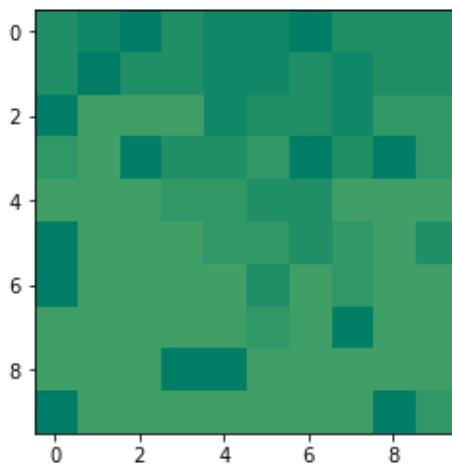
Updated direction: [ 0 1 ]



Step: 565

Updated position: [9 2]

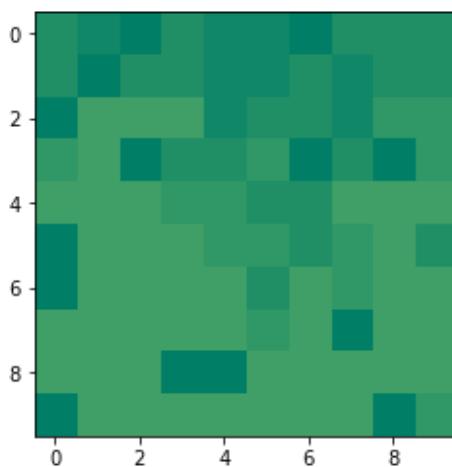
Updated direction: [ 0 -1]



Step: 566

Updated position: [9 1]

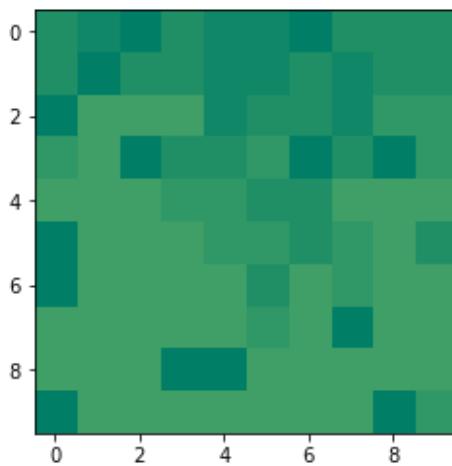
Updated direction: [ 0 1]



Step: 567

Updated position: [9 2]

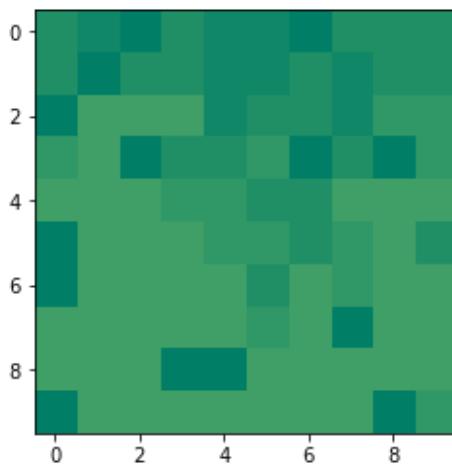
Updated direction: [ 0 1]



Step: 568

Updated position: [9 3]

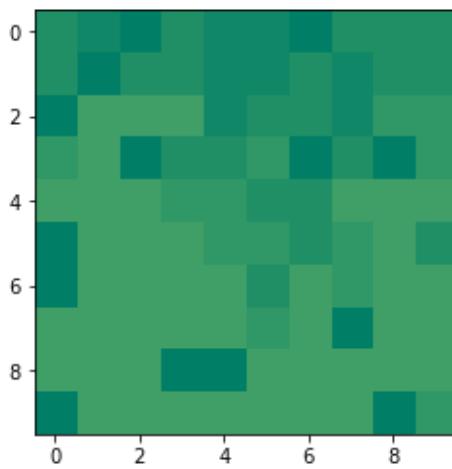
Updated direction: [ 0 -1 ]



Step: 569

Updated position: [9 2]

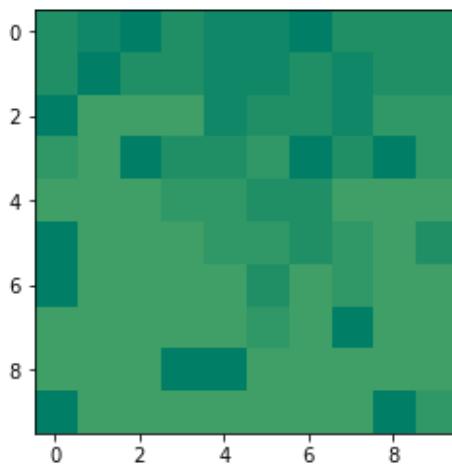
Updated direction: [ 0 -1 ]



Step: 570

Updated position: [9 1]

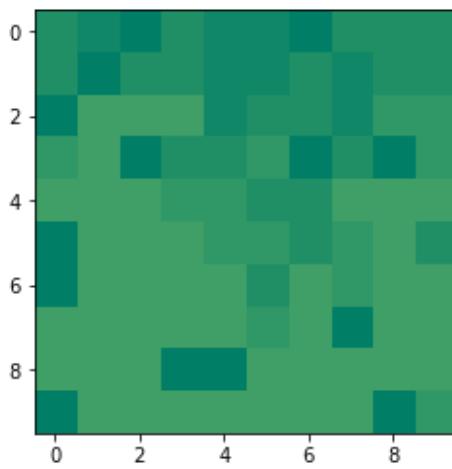
Updated direction: [ 0 1 ]



Step: 571

Updated position: [9 2]

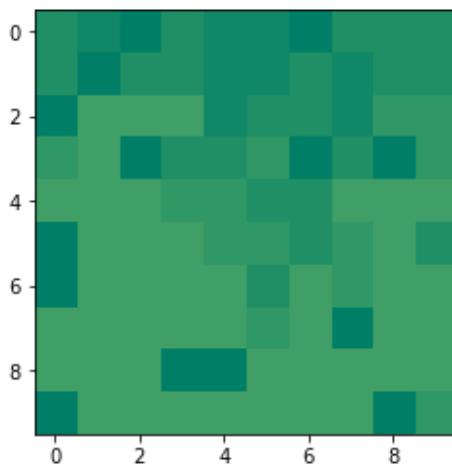
Updated direction: [ 0 -1]



Step: 572

Updated position: [9 1]

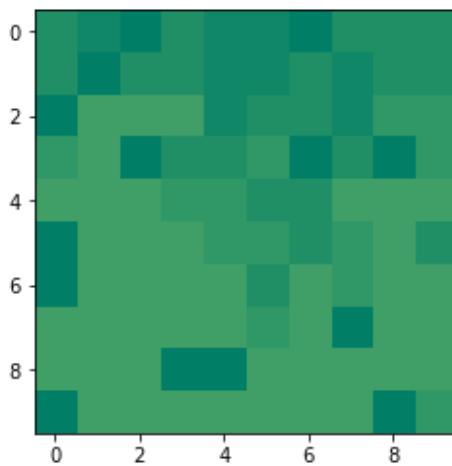
Updated direction: [ 0 1]



Step: 573

Updated position: [9 2]

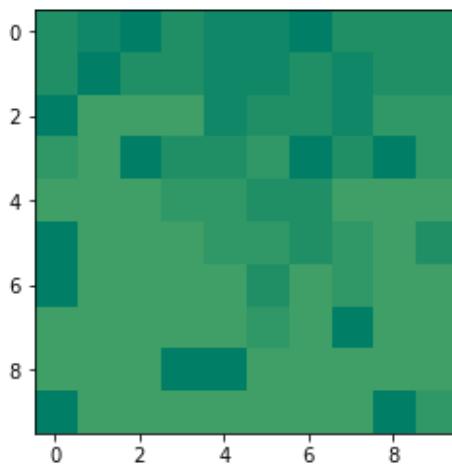
Updated direction: [ 0 -1]



Step: 574

Updated position: [9 1]

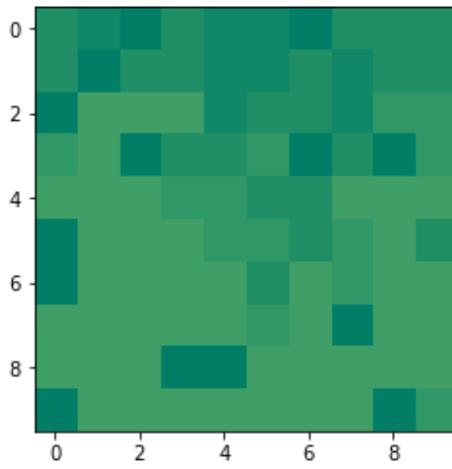
Updated direction: [ 0 1 ]



Step: 575

Updated position: [9 2]

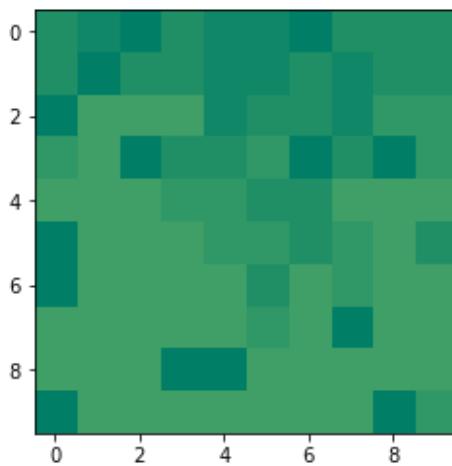
Updated direction: [ 0 -1 ]



Step: 576

Updated position: [9 1]

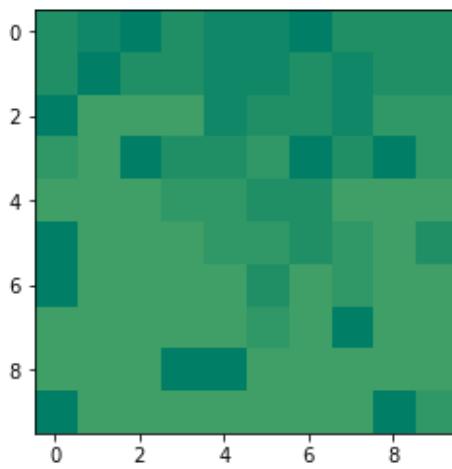
Updated direction: [ 0 1 ]



Step: 577

Updated position: [9 2]

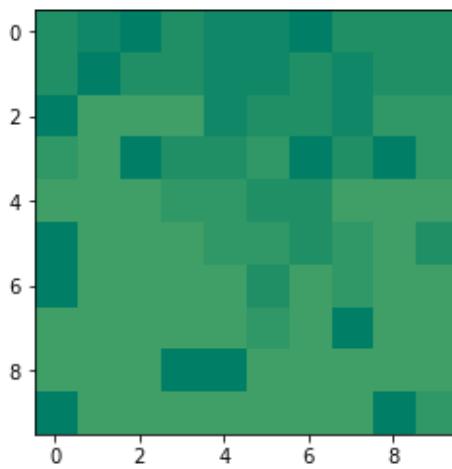
Updated direction: [ 0 -1]



Step: 578

Updated position: [9 1]

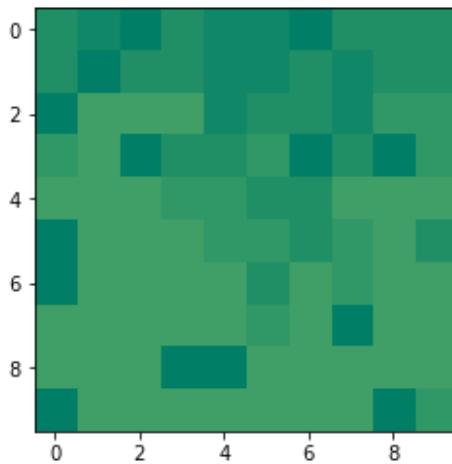
Updated direction: [ 0 1]



Step: 579

Updated position: [9 2]

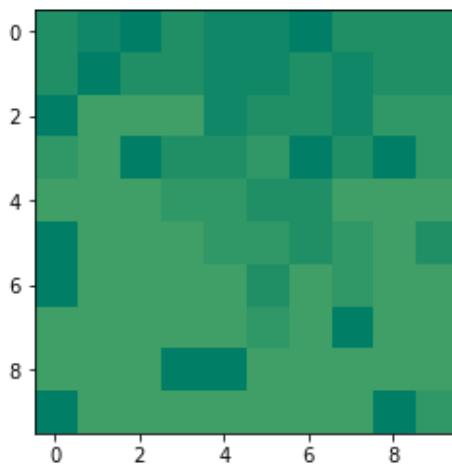
Updated direction: [ 0 -1]



Step: 580

Updated position: [9 1]

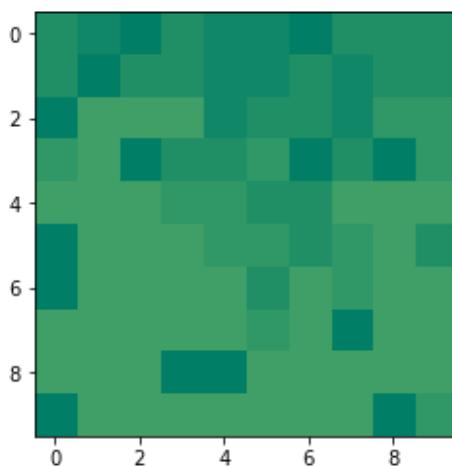
Updated direction: [0 1]



Step: 581

Updated position: [9 2]

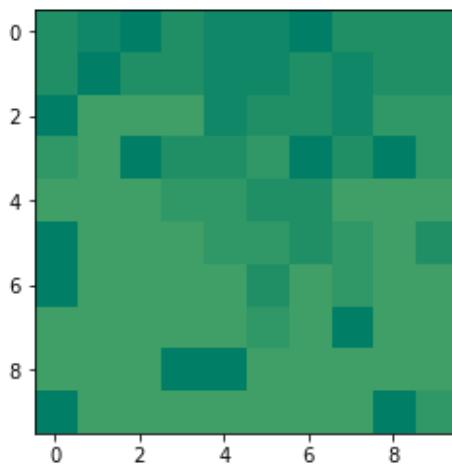
Updated direction: [0 -1]



Step: 582

Updated position: [9 1]

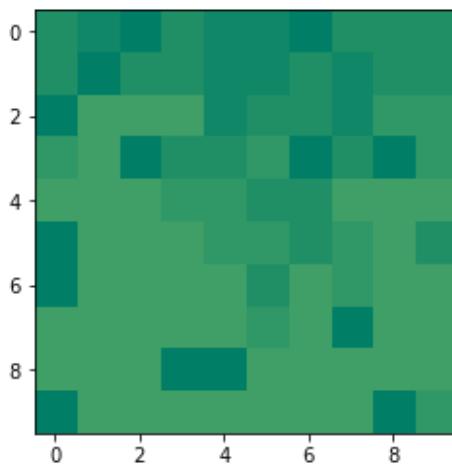
Updated direction: [0 1]



Step: 583

Updated position: [9 2]

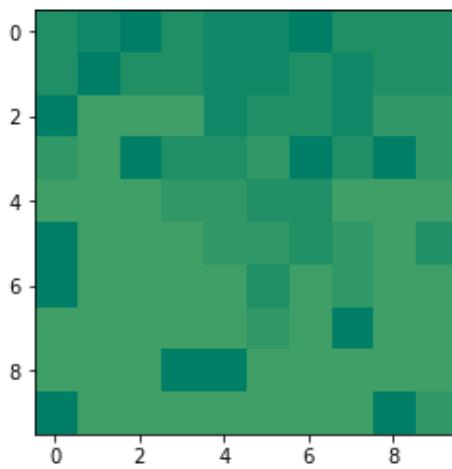
Updated direction: [ 0 -1 ]



Step: 584

Updated position: [9 1]

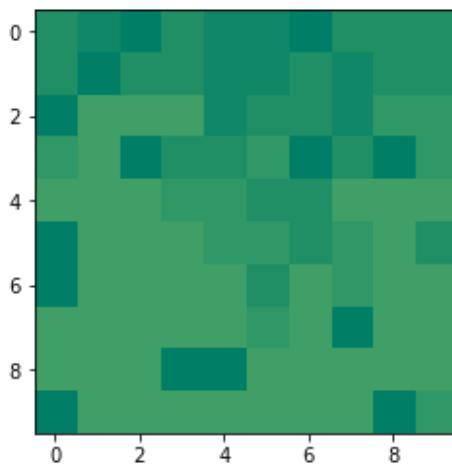
Updated direction: [-1 0 ]



Step: 585

Updated position: [8 1]

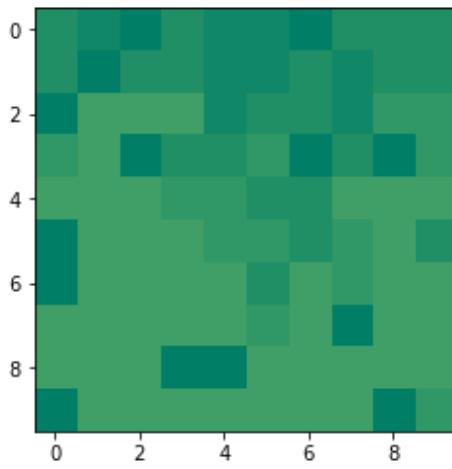
Updated direction: [1 0 ]



Step: 586

Updated position: [ 9 1 ]

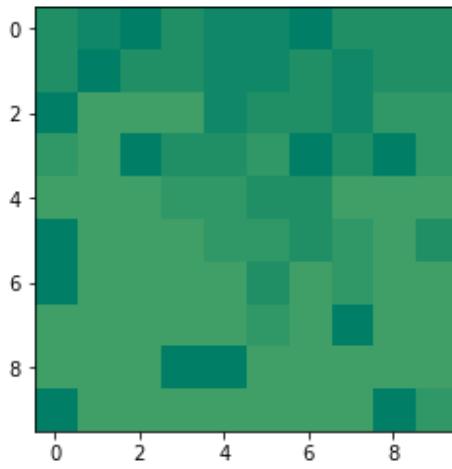
Updated direction: [ -1 0 ]



Step: 587

Updated position: [ 8 1 ]

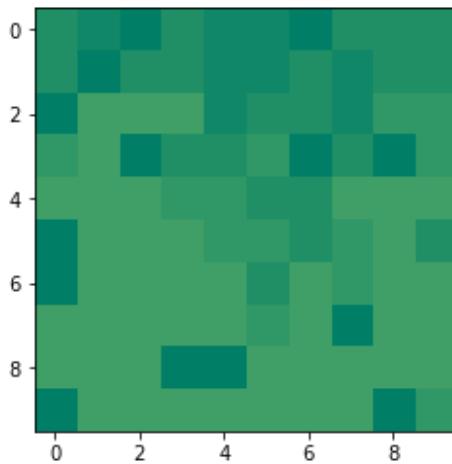
Updated direction: [ 0 -1 ]



Step: 588

Updated position: [ 8 0 ]

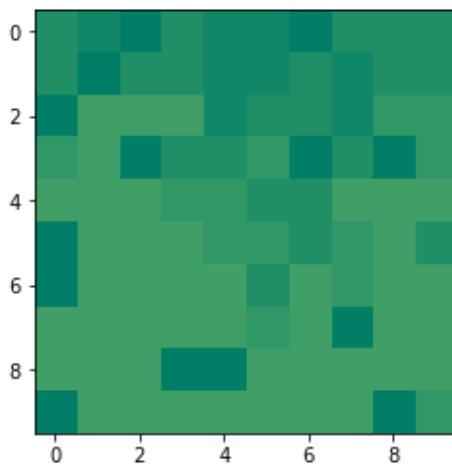
Updated direction: [ -1 0 ]



Step: 589

Updated position: [ 7 0 ]

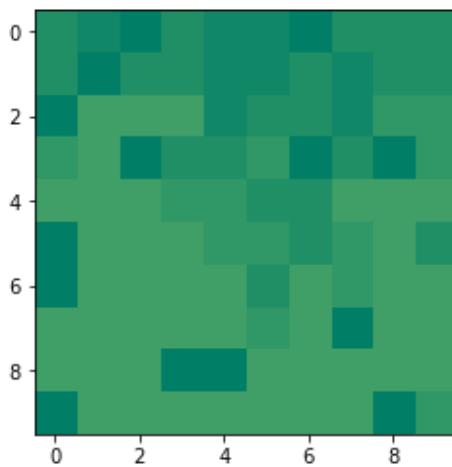
Updated direction: [ 1 0 ]



Step: 590

Updated position: [ 8 0 ]

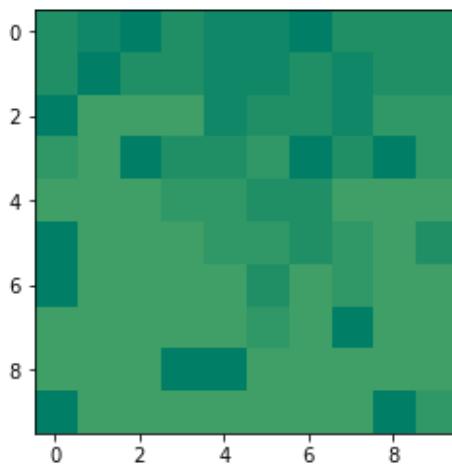
Updated direction: [ -1 0 ]



Step: 591

Updated position: [ 7 0 ]

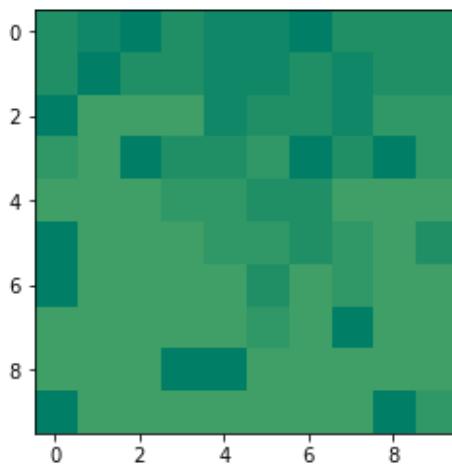
Updated direction: [ 1 0 ]



Step: 592

Updated position: [8 0]

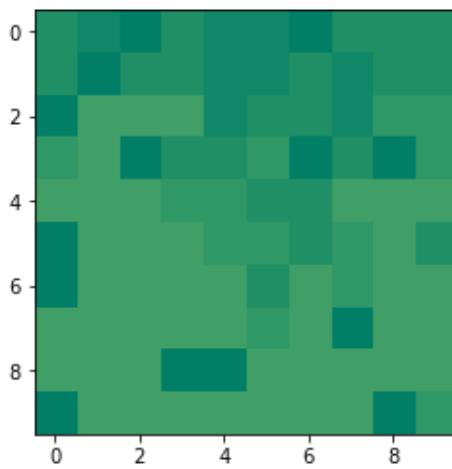
Updated direction: [0 1]



Step: 593

Updated position: [8 1]

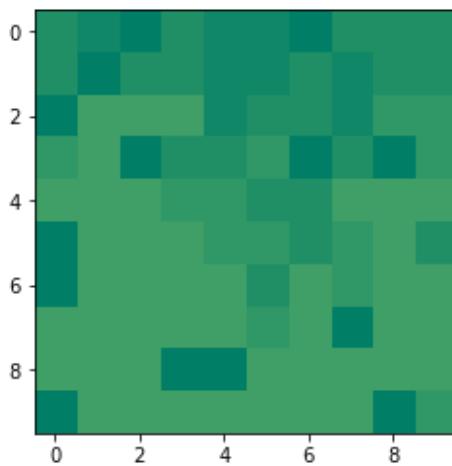
Updated direction: [1 0]



Step: 594

Updated position: [9 1]

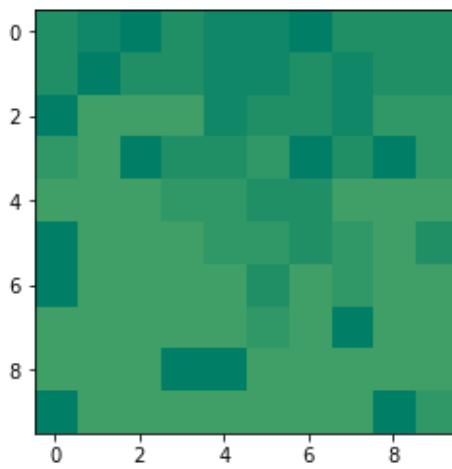
Updated direction: [0 1]



Step: 595

Updated position: [9 2]

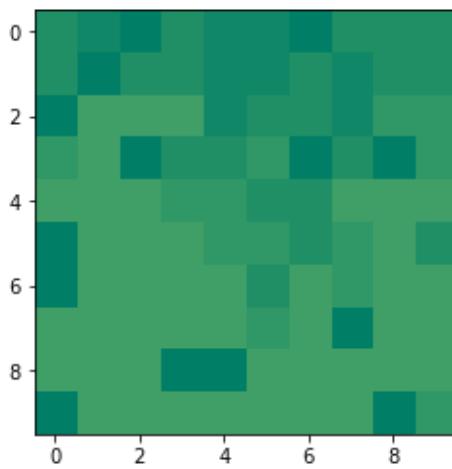
Updated direction: [ 0 -1]



Step: 596

Updated position: [9 1]

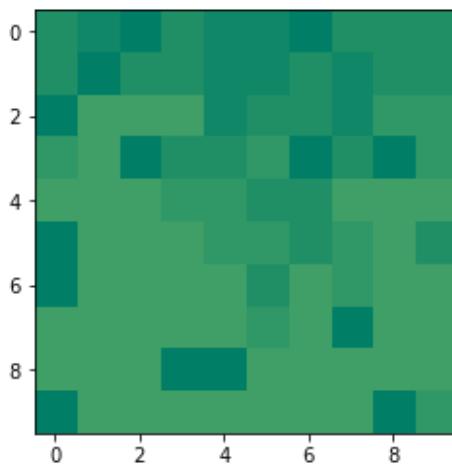
Updated direction: [ 0 1]



Step: 597

Updated position: [9 2]

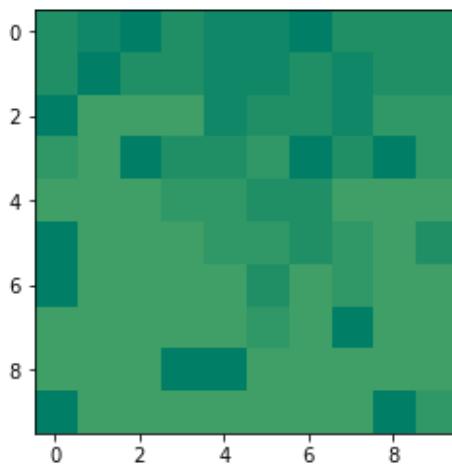
Updated direction: [ 0 -1]



Step: 598

Updated position: [9 1]

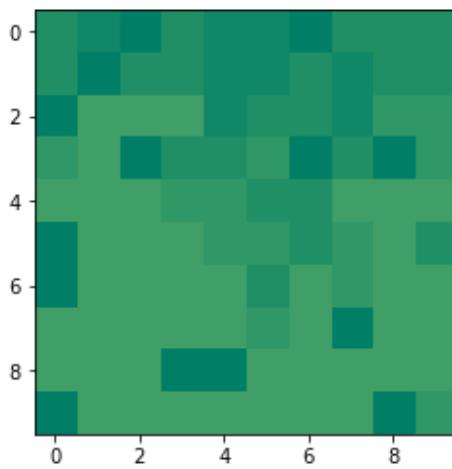
Updated direction: [-1 0]



Step: 599

Updated position: [8 1]

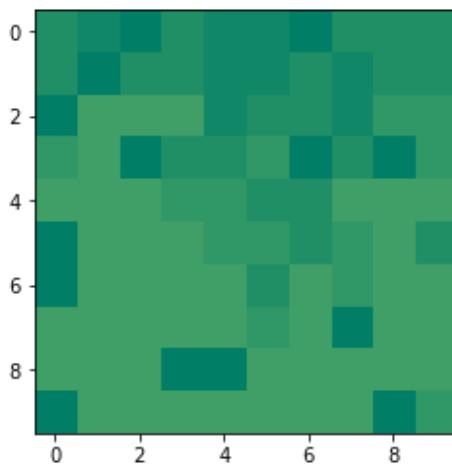
Updated direction: [-1 0]



Step: 600

Updated position: [7 1]

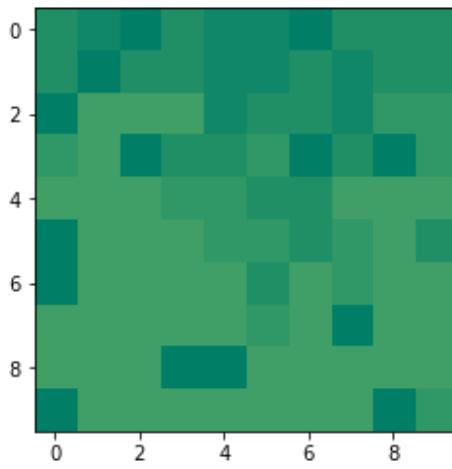
Updated direction: [1 0]



Step: 601

Updated position: [ 8 1 ]

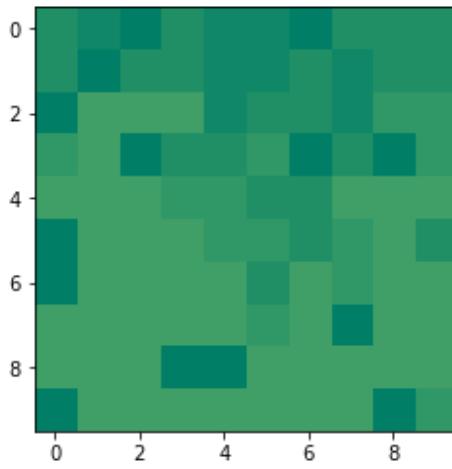
Updated direction: [ 1 0 ]



Step: 602

Updated position: [ 9 1 ]

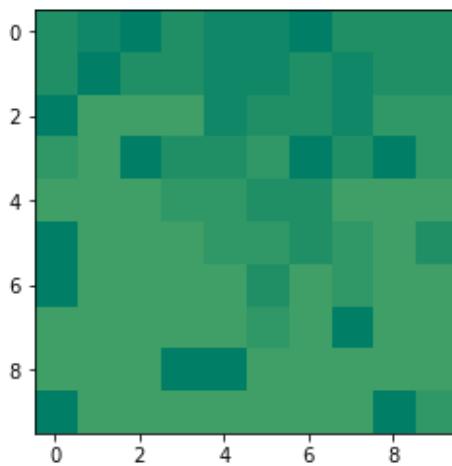
Updated direction: [ -1 0 ]



Step: 603

Updated position: [ 8 1 ]

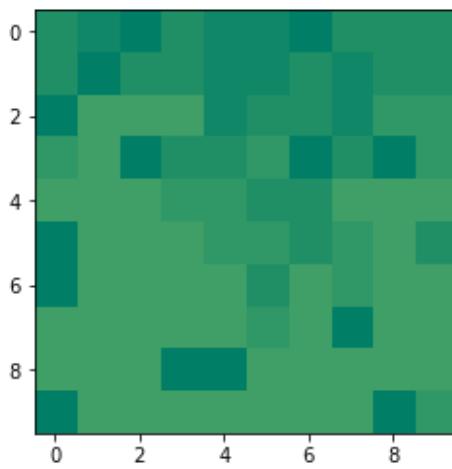
Updated direction: [ 1 0 ]



Step: 604

Updated position: [9 1]

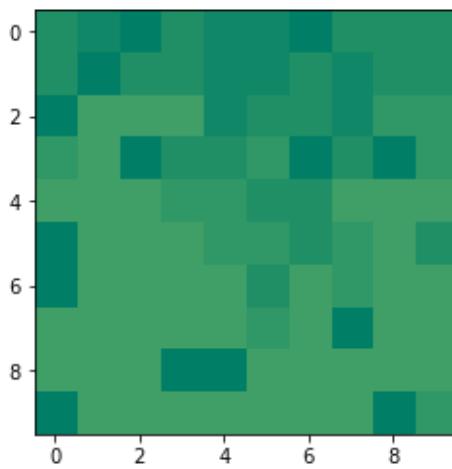
Updated direction: [ 0 1 ]



Step: 605

Updated position: [9 2]

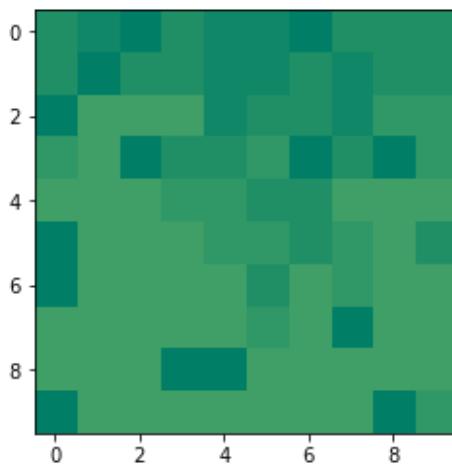
Updated direction: [ 0 -1 ]



Step: 606

Updated position: [9 1]

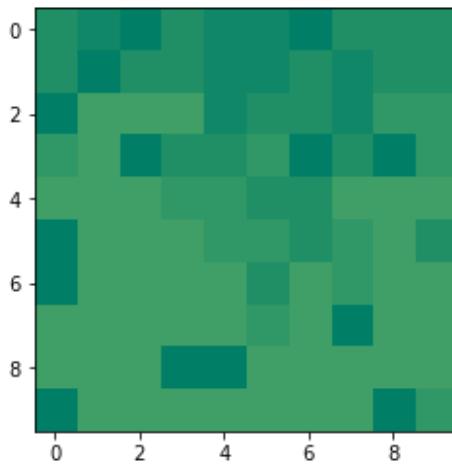
Updated direction: [ 0 1 ]



Step: 607

Updated position: [9 2]

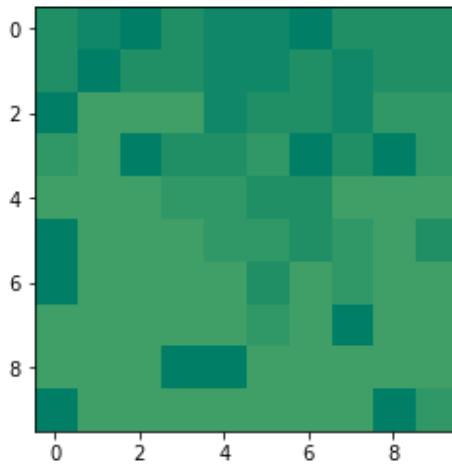
Updated direction: [ 0 -1 ]



Step: 608

Updated position: [9 1]

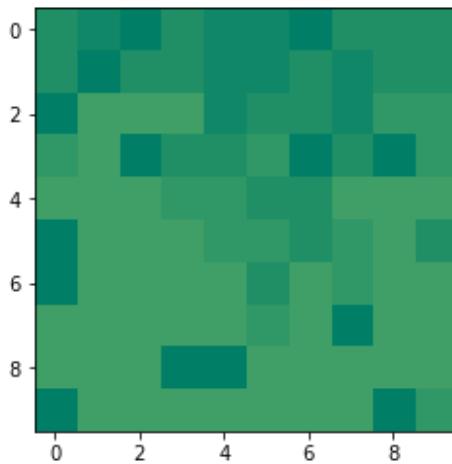
Updated direction: [-1 0 ]



Step: 609

Updated position: [8 1]

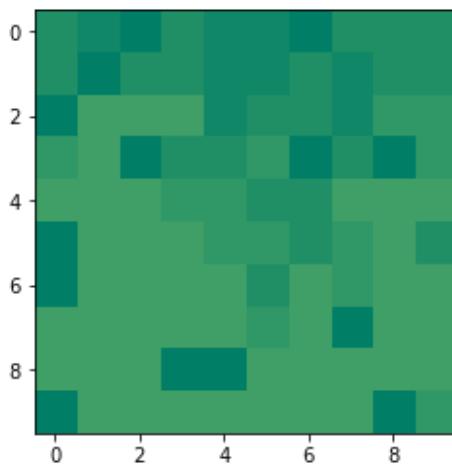
Updated direction: [-1 0 ]



Step: 610

Updated position: [ 7 1 ]

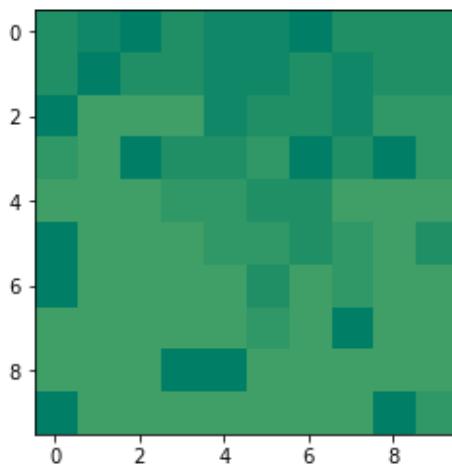
Updated direction: [ 1 0 ]



Step: 611

Updated position: [ 8 1 ]

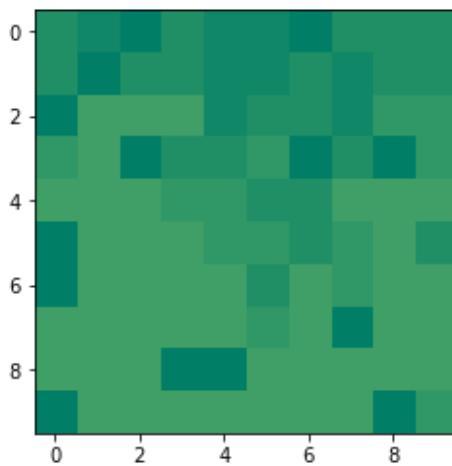
Updated direction: [ 1 0 ]



Step: 612

Updated position: [ 9 1 ]

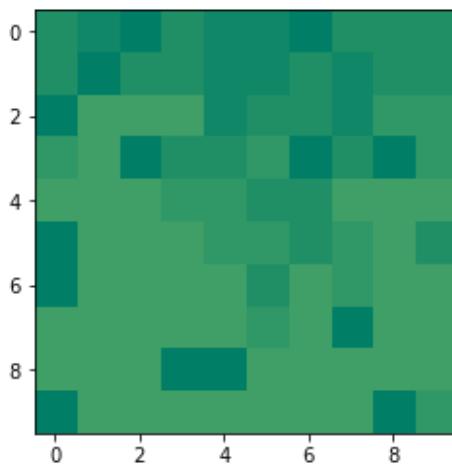
Updated direction: [ -1 0 ]



Step: 613

Updated position: [ 8 1 ]

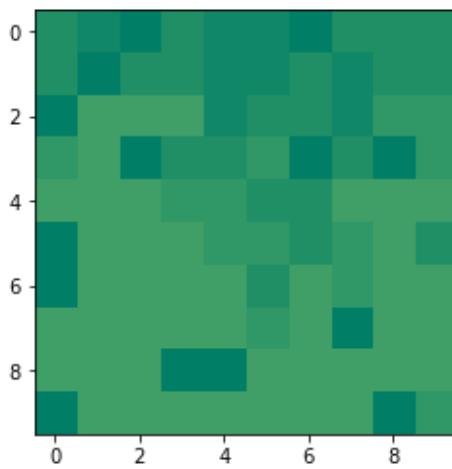
Updated direction: [ 1 0 ]



Step: 614

Updated position: [ 9 1 ]

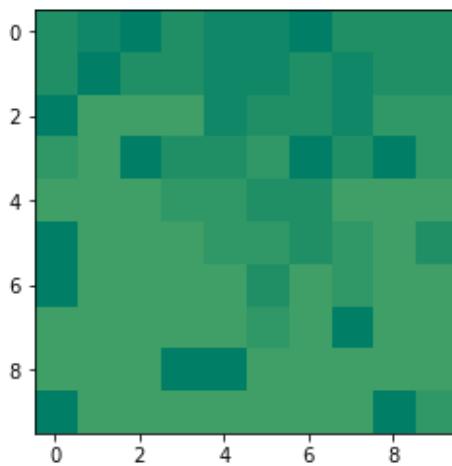
Updated direction: [ 0 1 ]



Step: 615

Updated position: [ 9 2 ]

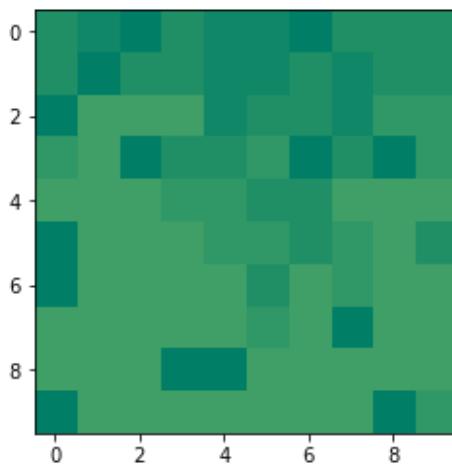
Updated direction: [ 0 -1 ]



Step: 616

Updated position: [ 9 1 ]

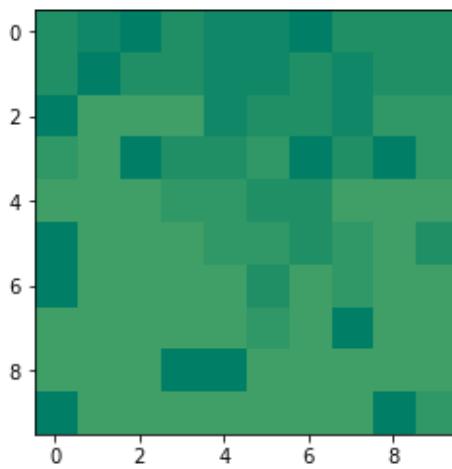
Updated direction: [ 0 1 ]



Step: 617

Updated position: [ 9 2 ]

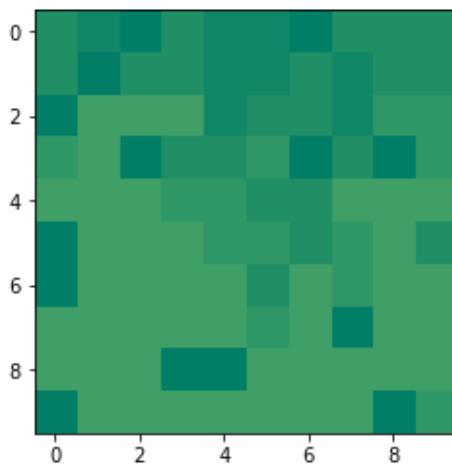
Updated direction: [ 0 -1 ]



Step: 618

Updated position: [ 9 1 ]

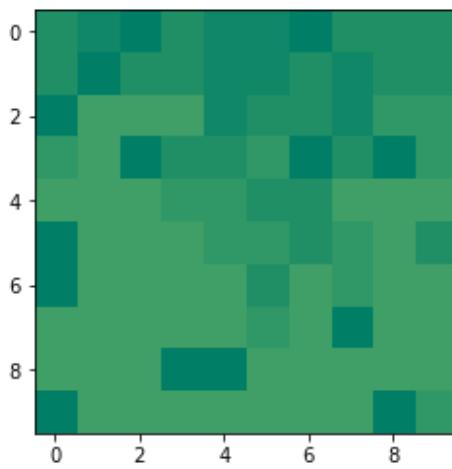
Updated direction: [-1 0 ]



Step: 619

Updated position: [8 1]

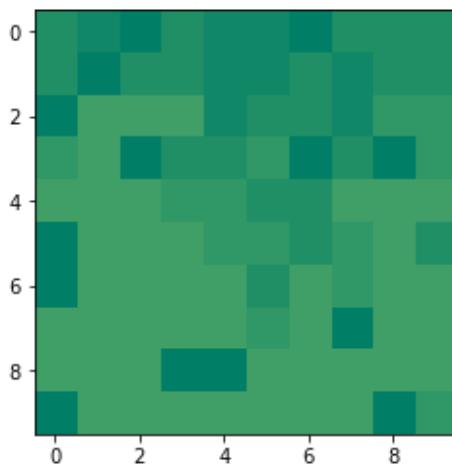
Updated direction: [0 1]



Step: 620

Updated position: [8 2]

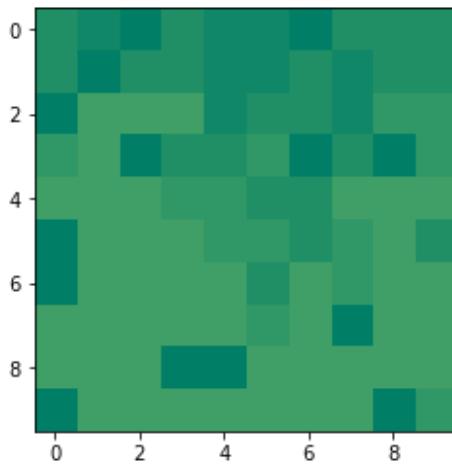
Updated direction: [1 0]



Step: 621

Updated position: [9 2]

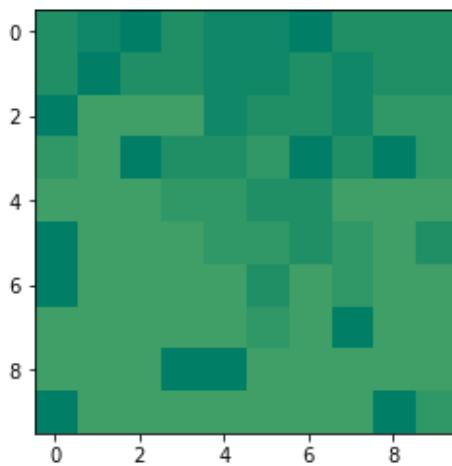
Updated direction: [0 -1]



Step: 622

Updated position: [ 9 1 ]

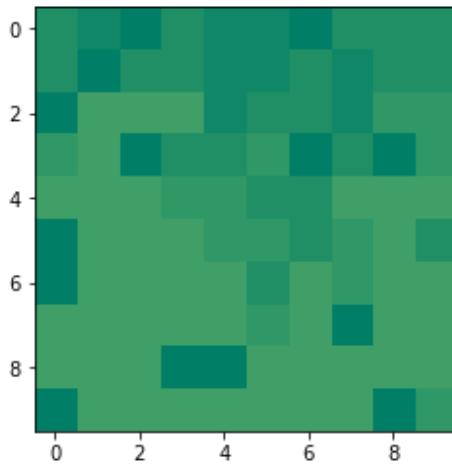
Updated direction: [ 0 1 ]



Step: 623

Updated position: [ 9 2 ]

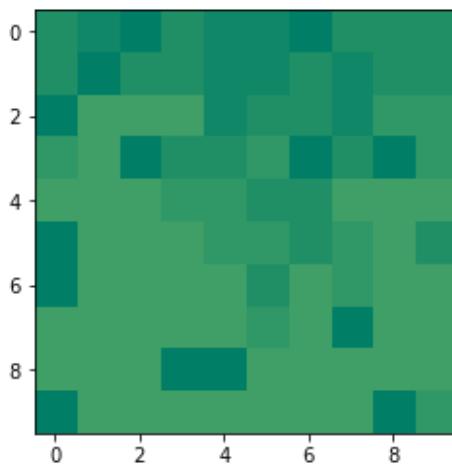
Updated direction: [ 0 -1 ]



Step: 624

Updated position: [ 9 1 ]

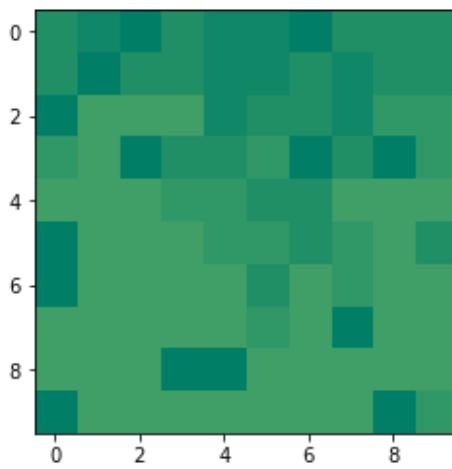
Updated direction: [-1 0 ]



Step: 625

Updated position: [8 1]

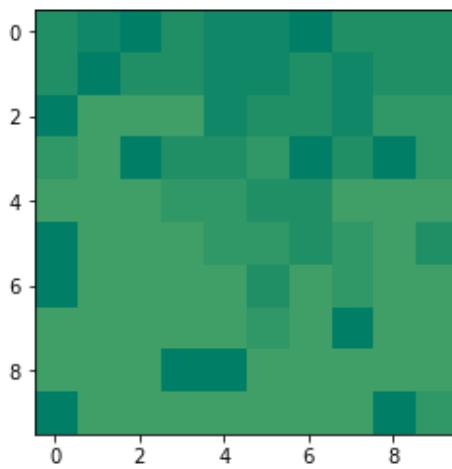
Updated direction: [0 1]



Step: 626

Updated position: [8 2]

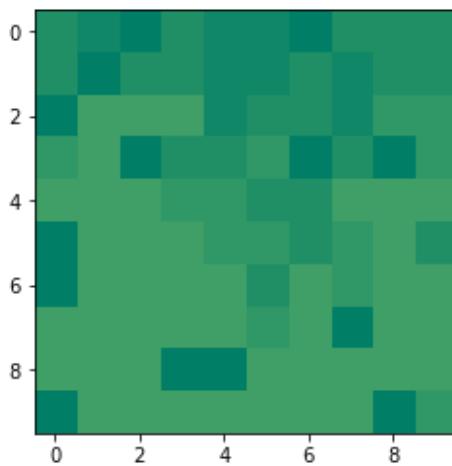
Updated direction: [1 0]



Step: 627

Updated position: [9 2]

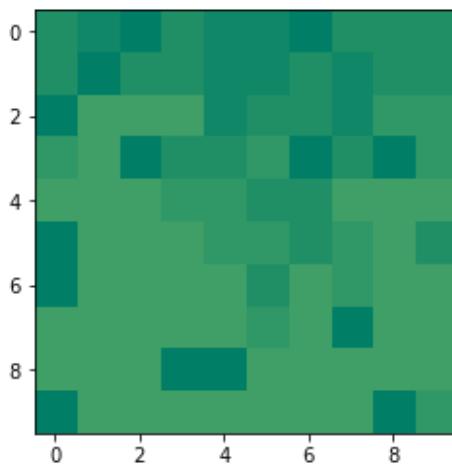
Updated direction: [-1 0]



Step: 628

Updated position: [ 8 2 ]

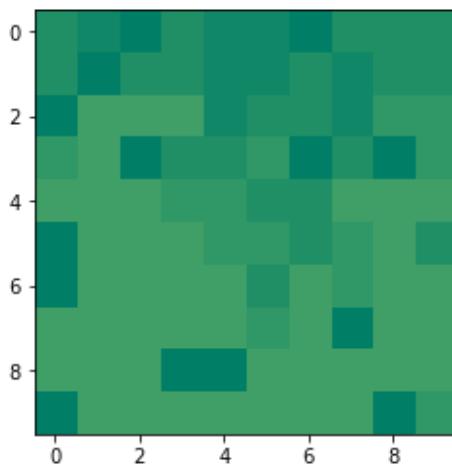
Updated direction: [ 1 0 ]



Step: 629

Updated position: [ 9 2 ]

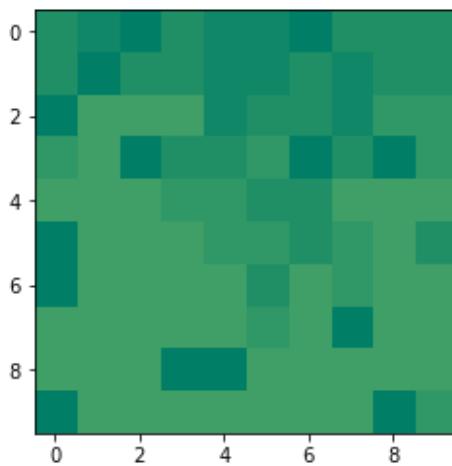
Updated direction: [ 0 -1 ]



Step: 630

Updated position: [ 9 1 ]

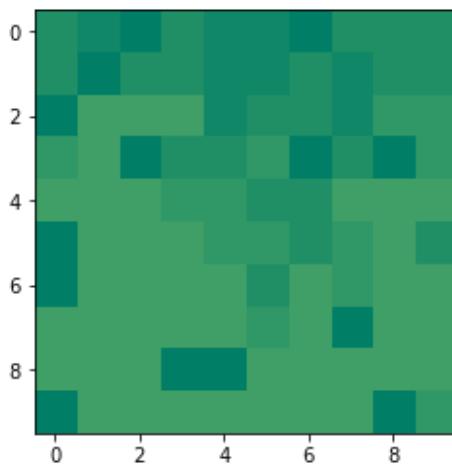
Updated direction: [ 0 1 ]



Step: 631

Updated position: [9 2]

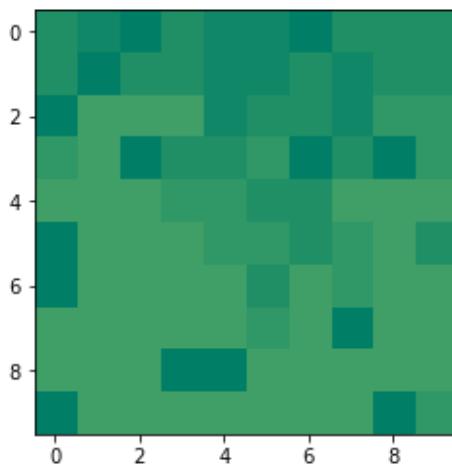
Updated direction: [ 0 -1 ]



Step: 632

Updated position: [9 1]

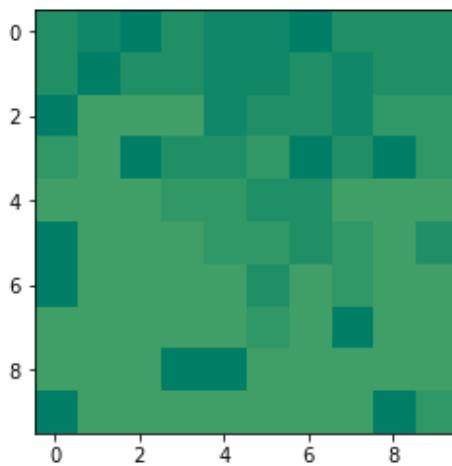
Updated direction: [0 1]



Step: 633

Updated position: [9 2]

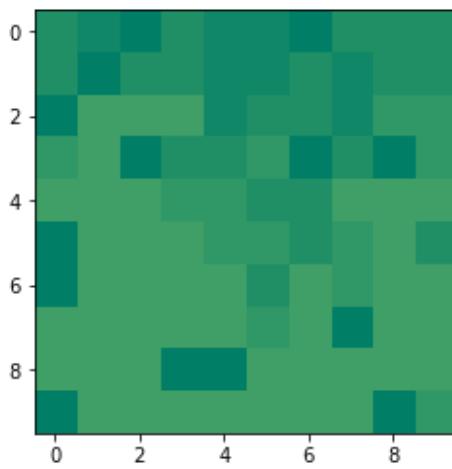
Updated direction: [-1 0]



Step: 634

Updated position: [8 2]

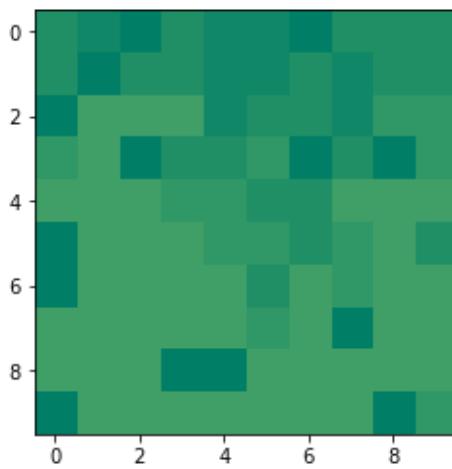
Updated direction: [ 0 -1 ]



Step: 635

Updated position: [8 1]

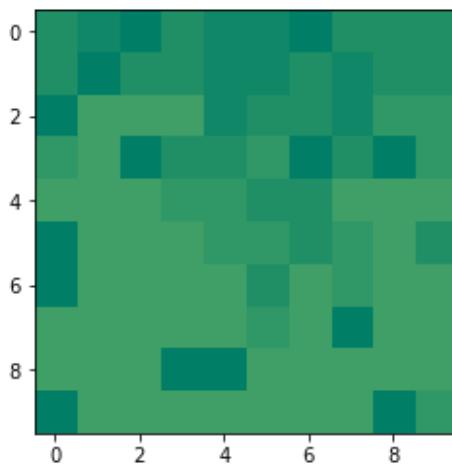
Updated direction: [1 0]



Step: 636

Updated position: [9 1]

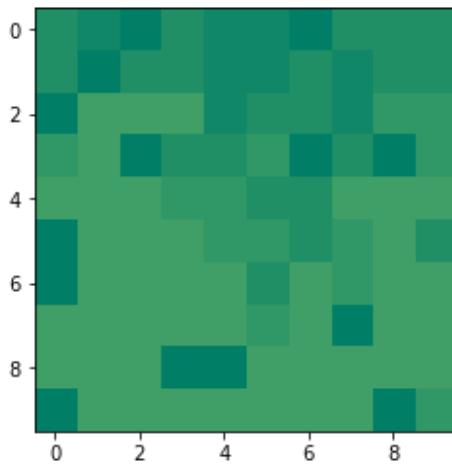
Updated direction: [0 1]



Step: 637

Updated position: [9 2]

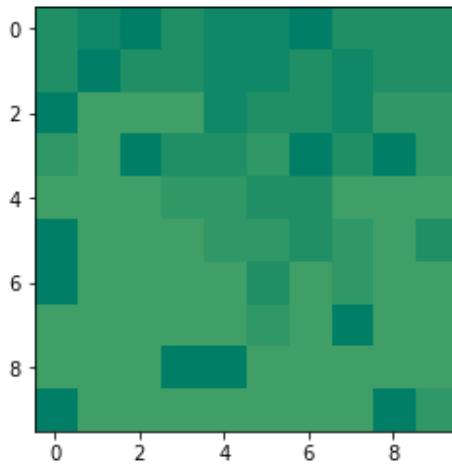
Updated direction: [ 0 -1 ]



Step: 638

Updated position: [9 1]

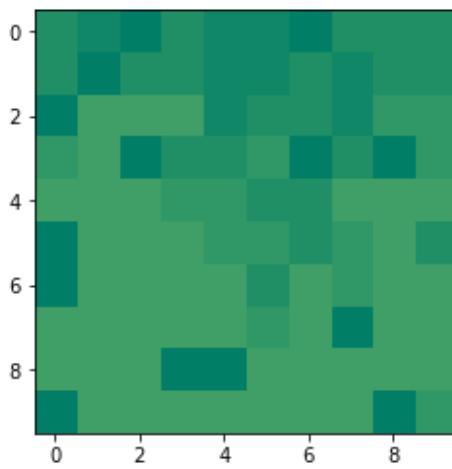
Updated direction: [ 0 1 ]



Step: 639

Updated position: [9 2]

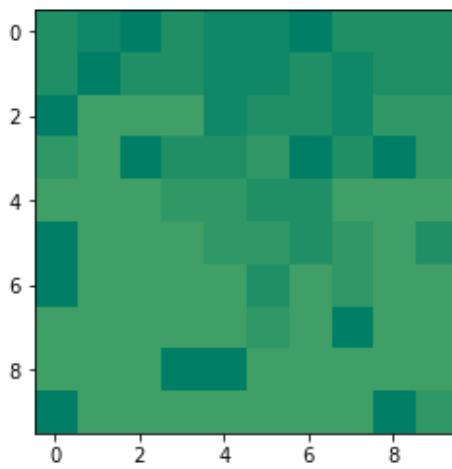
Updated direction: [-1 0 ]



Step: 640

Updated position: [8 2]

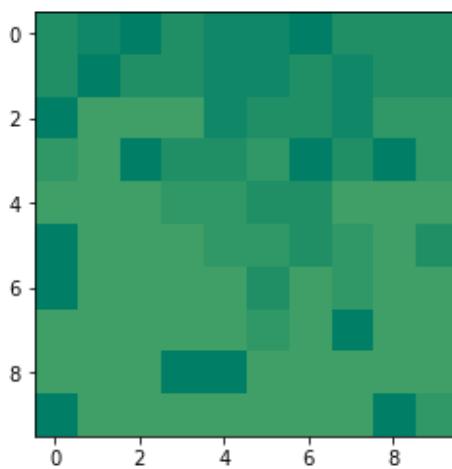
Updated direction: [1 0]



Step: 641

Updated position: [9 2]

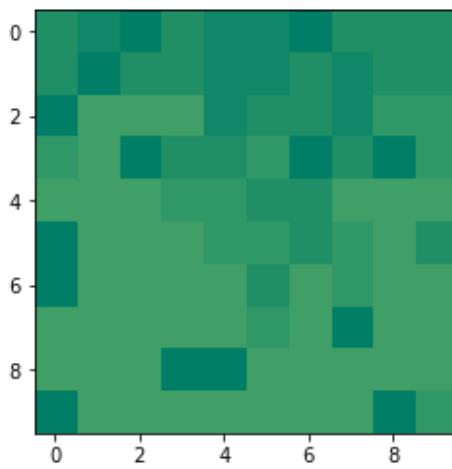
Updated direction: [0 -1]



Step: 642

Updated position: [9 1]

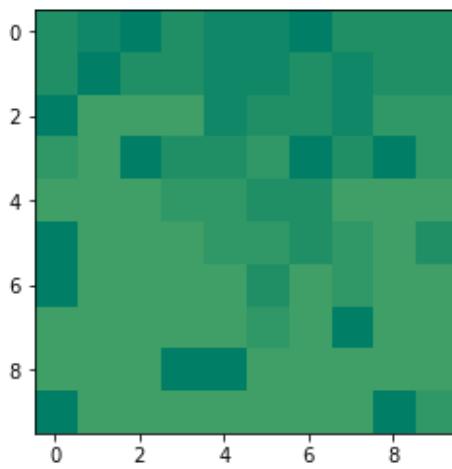
Updated direction: [0 1]



Step: 643

Updated position: [9 2]

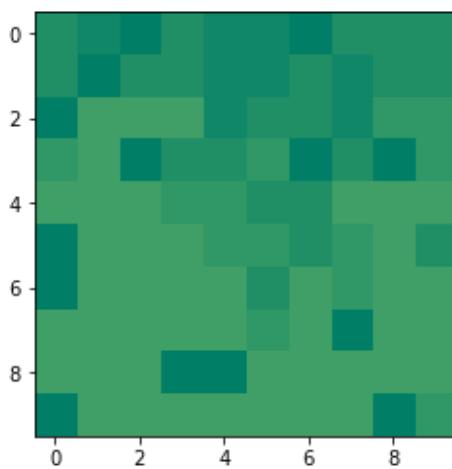
Updated direction: [ 0 -1]



Step: 644

Updated position: [9 1]

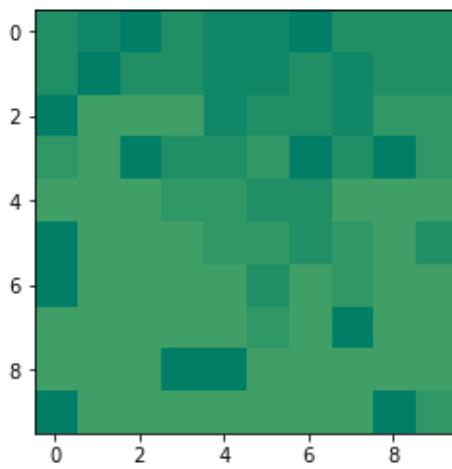
Updated direction: [ 0 1]



Step: 645

Updated position: [9 2]

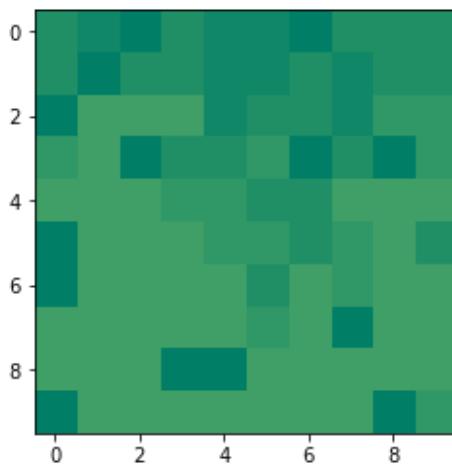
Updated direction: [ 0 -1]



Step: 646

Updated position: [9 1]

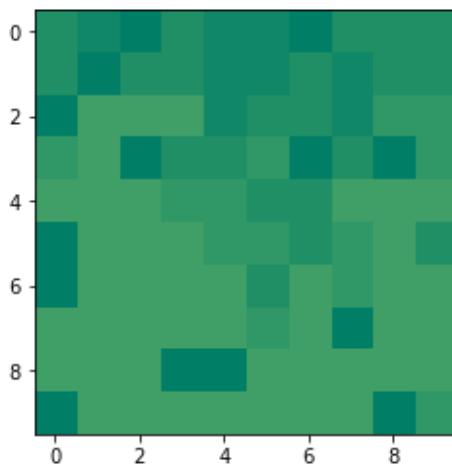
Updated direction: [ 0 1 ]



Step: 647

Updated position: [9 2]

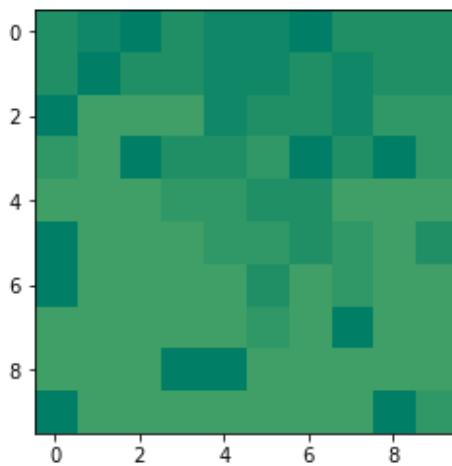
Updated direction: [ 0 -1 ]



Step: 648

Updated position: [9 1]

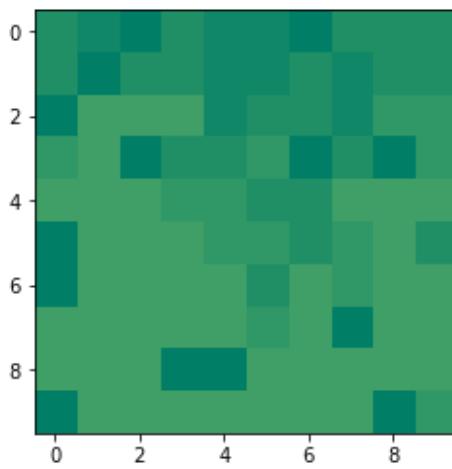
Updated direction: [ 0 1 ]



Step: 649

Updated position: [9 2]

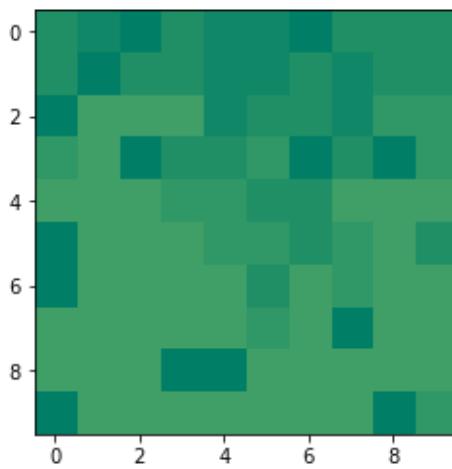
Updated direction: [ 0 -1 ]



Step: 650

Updated position: [9 1]

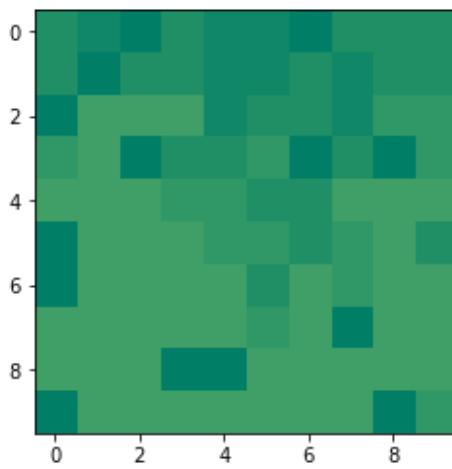
Updated direction: [ 0 1 ]



Step: 651

Updated position: [9 2]

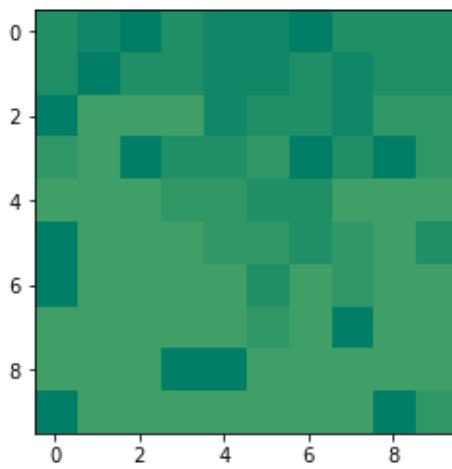
Updated direction: [ 0 1 ]



Step: 652

Updated position: [9 3]

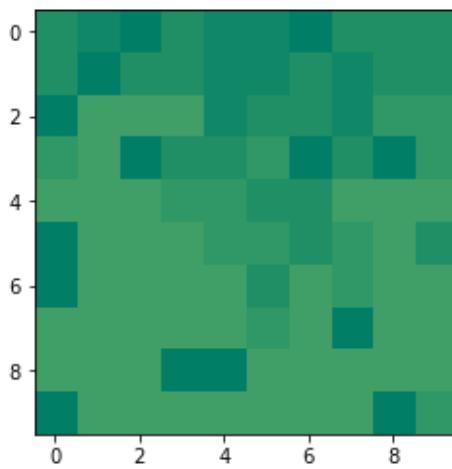
Updated direction: [ 0 -1]



Step: 653

Updated position: [9 2]

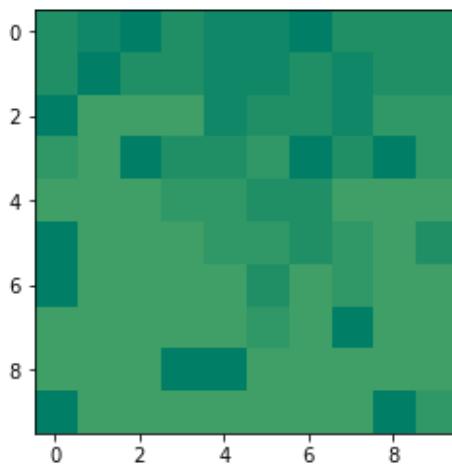
Updated direction: [ 0 -1]



Step: 654

Updated position: [9 1]

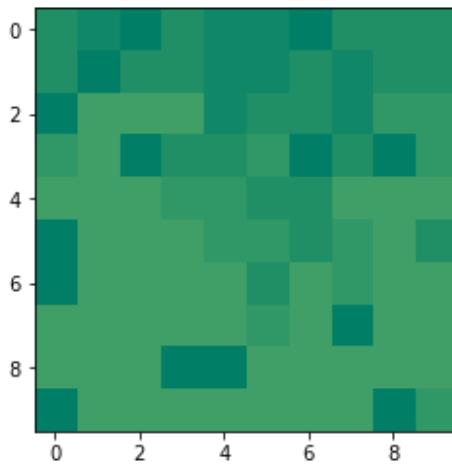
Updated direction: [-1 0]



Step: 655

Updated position: [ 8 1 ]

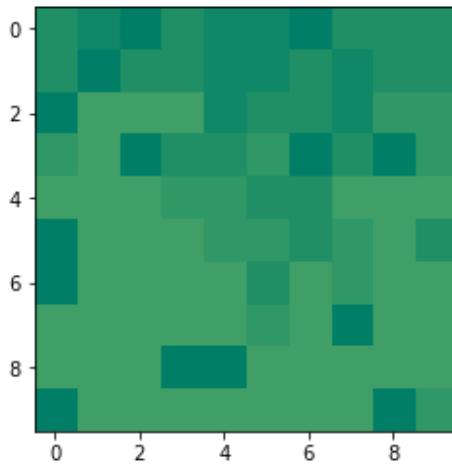
Updated direction: [ 1 0 ]



Step: 656

Updated position: [ 9 1 ]

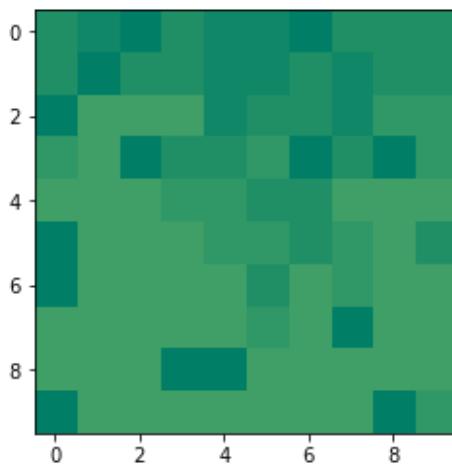
Updated direction: [ 0 1 ]



Step: 657

Updated position: [ 9 2 ]

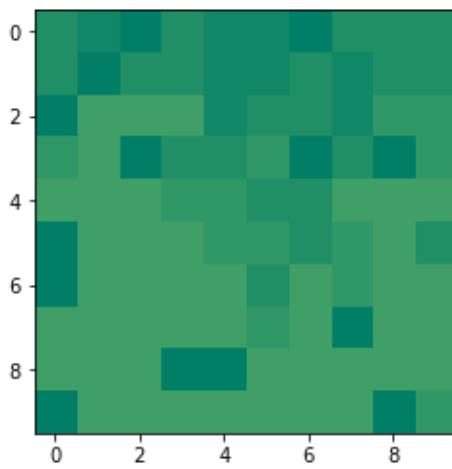
Updated direction: [ 0 -1 ]



Step: 658

Updated position: [9 1]

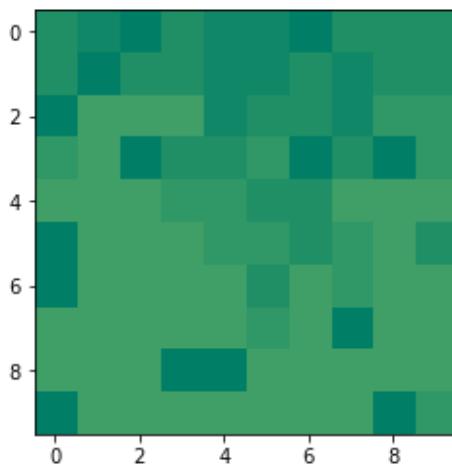
Updated direction: [ 0 1 ]



Step: 659

Updated position: [9 2]

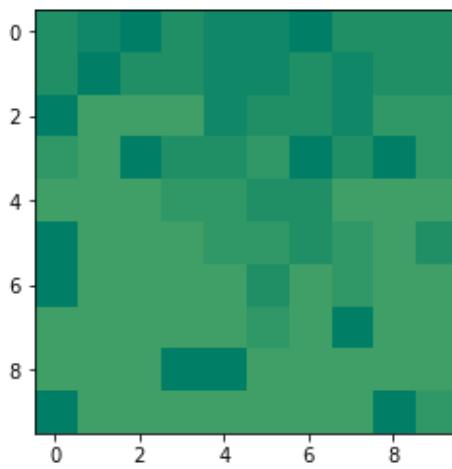
Updated direction: [ 0 -1 ]



Step: 660

Updated position: [9 1]

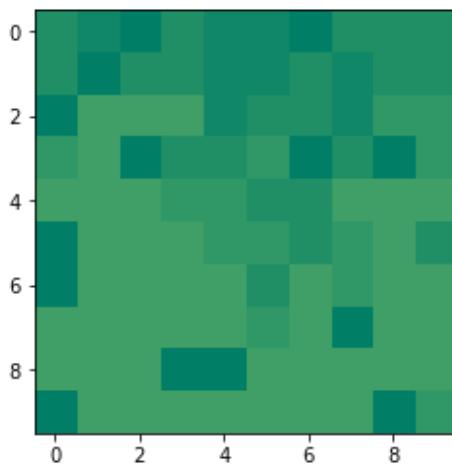
Updated direction: [ 0 1 ]



Step: 661

Updated position: [9 2]

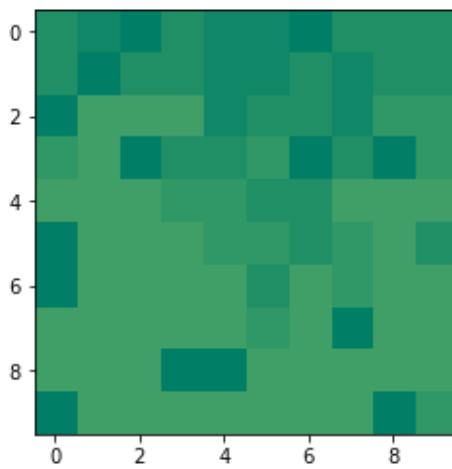
Updated direction: [ 0 -1 ]



Step: 662

Updated position: [9 1]

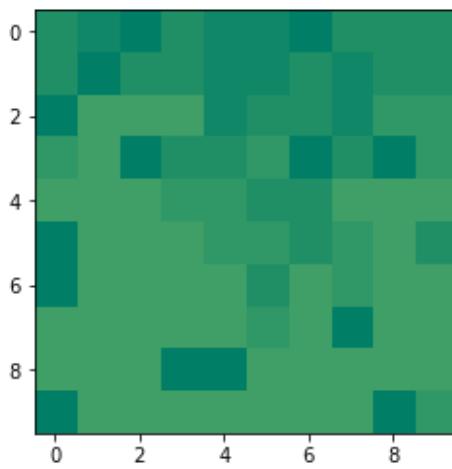
Updated direction: [-1 0 ]



Step: 663

Updated position: [8 1]

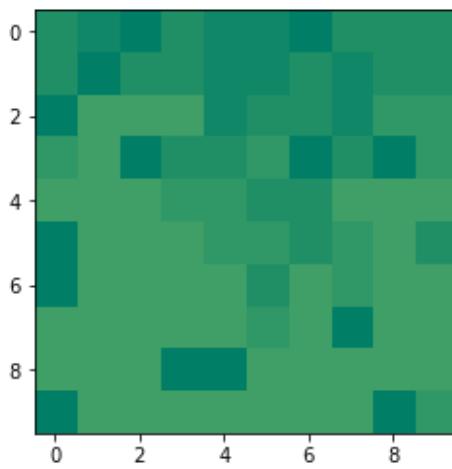
Updated direction: [ 0 -1 ]



Step: 664

Updated position: [ 8 0 ]

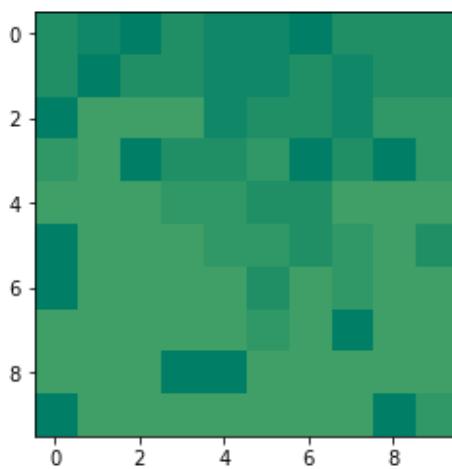
Updated direction: [ -1 0 ]



Step: 665

Updated position: [ 7 0 ]

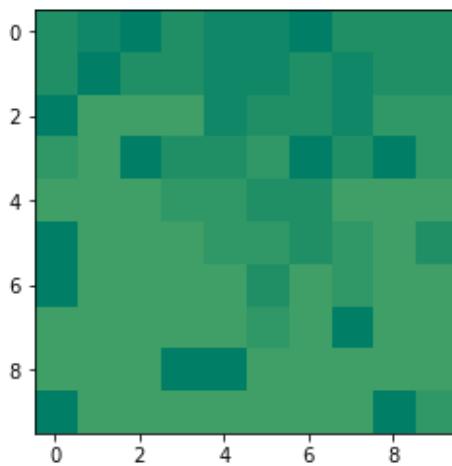
Updated direction: [ 1 0 ]



Step: 666

Updated position: [ 8 0 ]

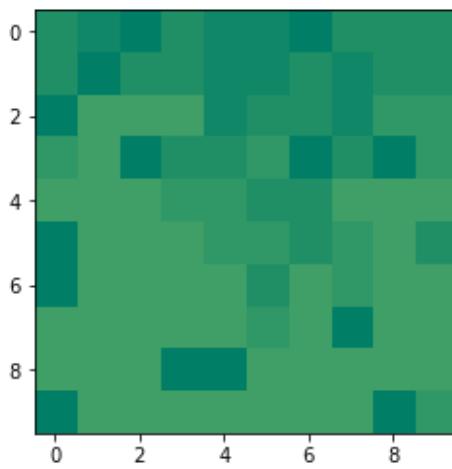
Updated direction: [ 0 1 ]



Step: 667

Updated position: [ 8 1 ]

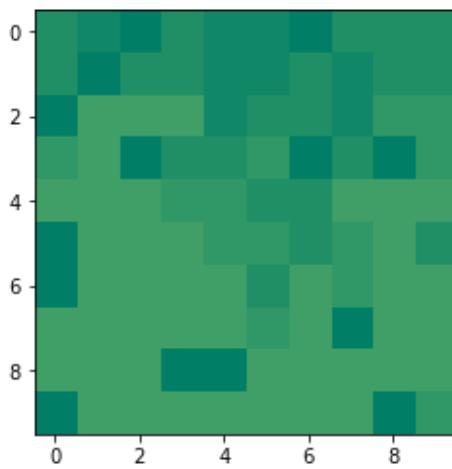
Updated direction: [ 0 -1 ]



Step: 668

Updated position: [ 8 0 ]

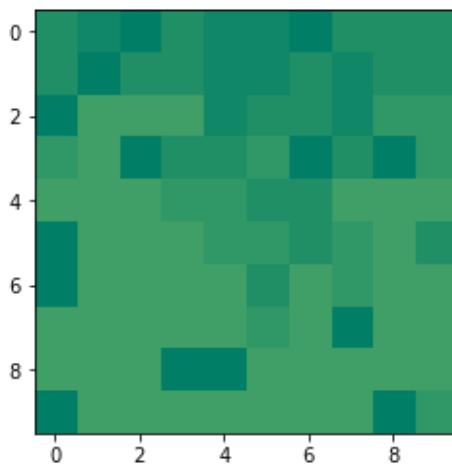
Updated direction: [ 0 1 ]



Step: 669

Updated position: [ 8 1 ]

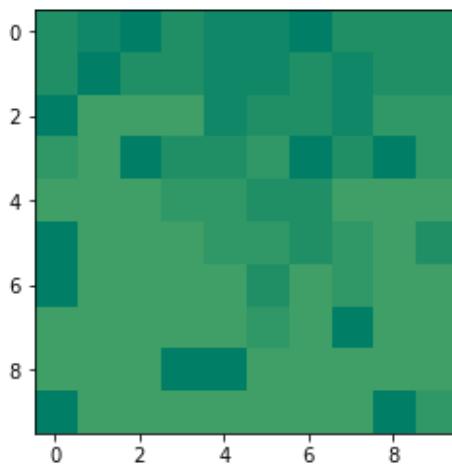
Updated direction: [ 1 0 ]



Step: 670

Updated position: [ 9 1 ]

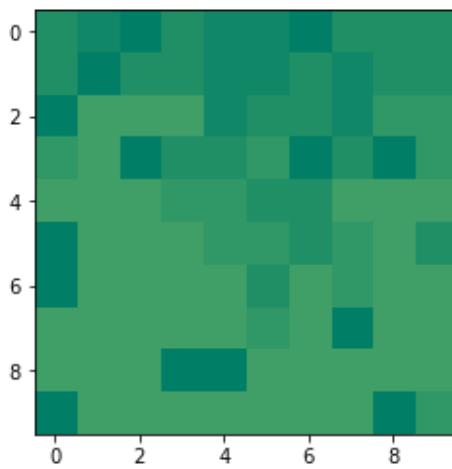
Updated direction: [ -1 0 ]



Step: 671

Updated position: [ 8 1 ]

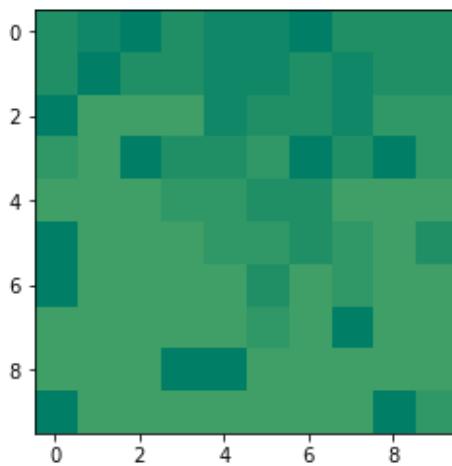
Updated direction: [ 0 1 ]



Step: 672

Updated position: [ 8 2 ]

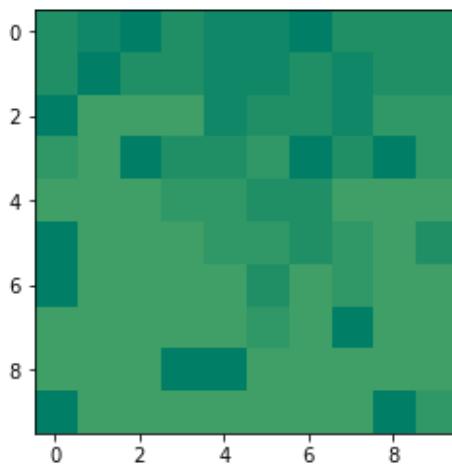
Updated direction: [ 0 -1 ]



Step: 673

Updated position: [ 8 1 ]

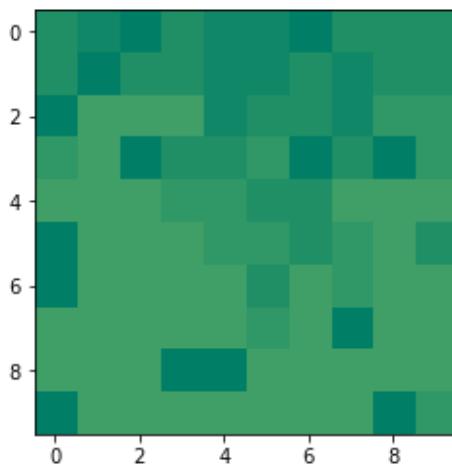
Updated direction: [ 0 1 ]



Step: 674

Updated position: [ 8 2 ]

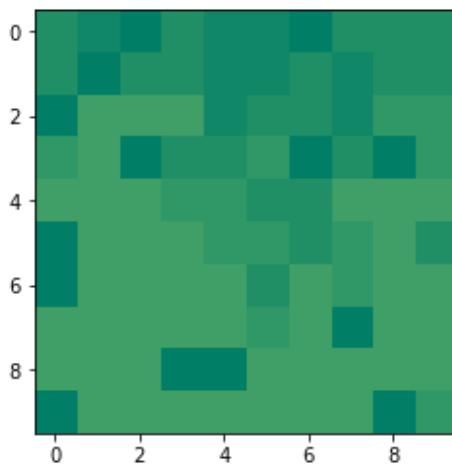
Updated direction: [ 1 0 ]



Step: 675

Updated position: [ 9 2 ]

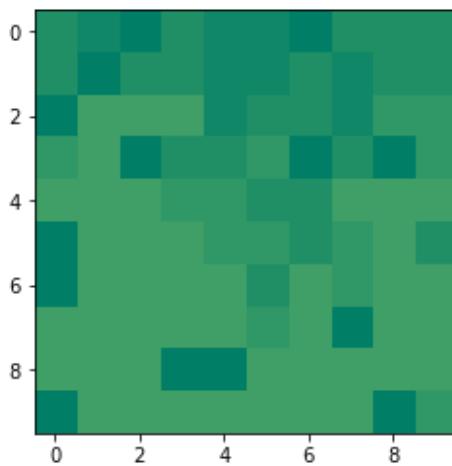
Updated direction: [ 0 -1 ]



Step: 676

Updated position: [ 9 1 ]

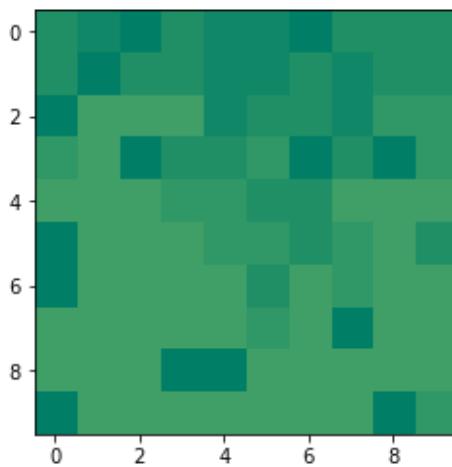
Updated direction: [-1 0 ]



Step: 677

Updated position: [ 8 1 ]

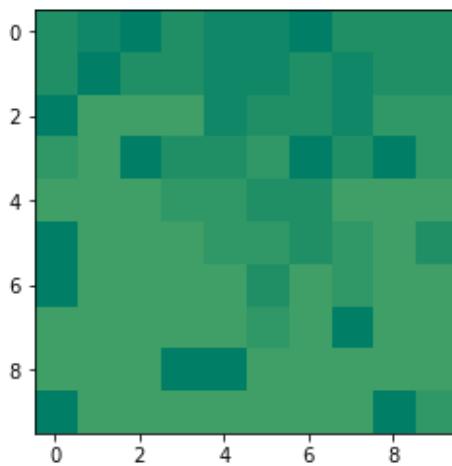
Updated direction: [-1 0 ]



Step: 678

Updated position: [ 7 1 ]

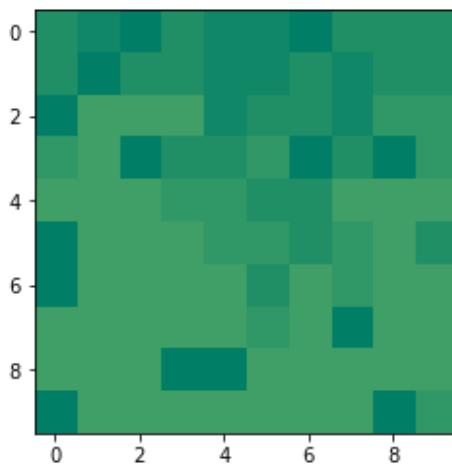
Updated direction: [ 1 0 ]



Step: 679

Updated position: [ 8 1 ]

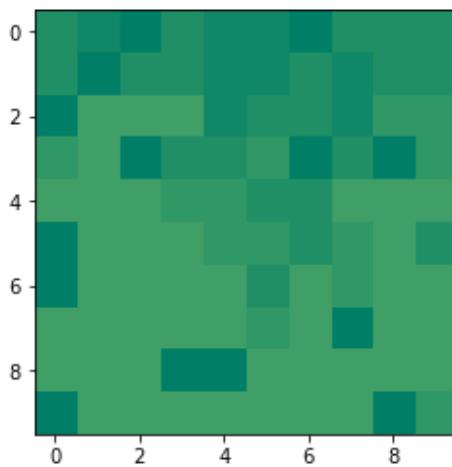
Updated direction: [ 0 1 ]



Step: 680

Updated position: [ 8 2 ]

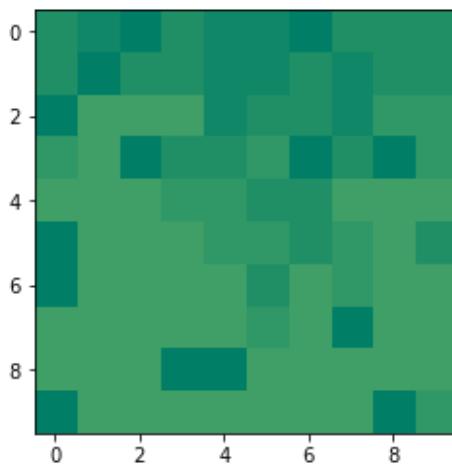
Updated direction: [ 1 0 ]



Step: 681

Updated position: [ 9 2 ]

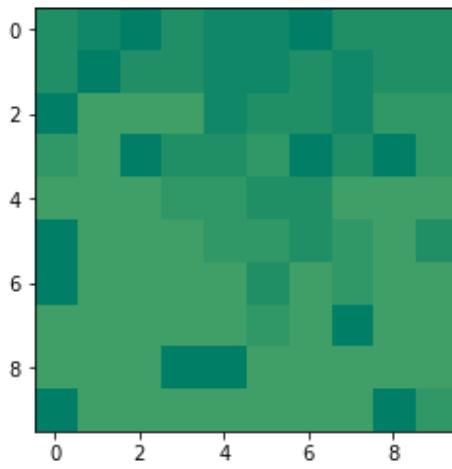
Updated direction: [ 0 -1 ]



Step: 682

Updated position: [ 9 1 ]

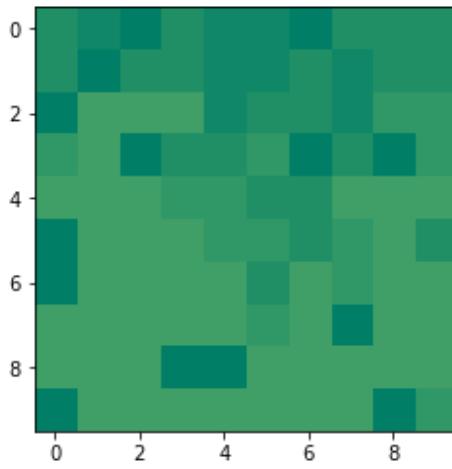
Updated direction: [ 0 1 ]



Step: 683

Updated position: [ 9 2 ]

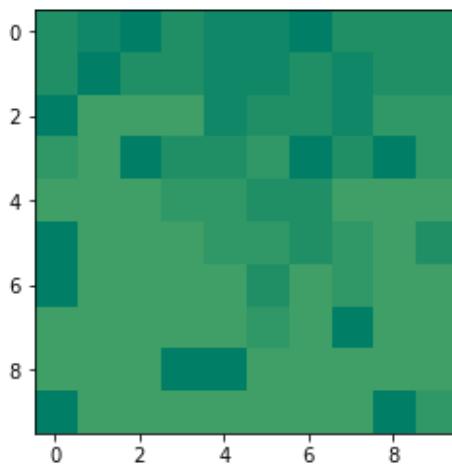
Updated direction: [ -1 0 ]



Step: 684

Updated position: [ 8 2 ]

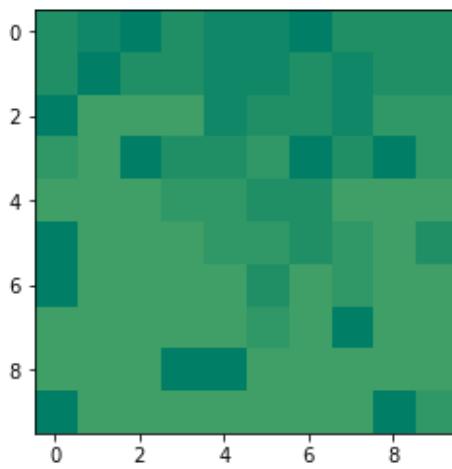
Updated direction: [ 1 0 ]



Step: 685

Updated position: [9 2]

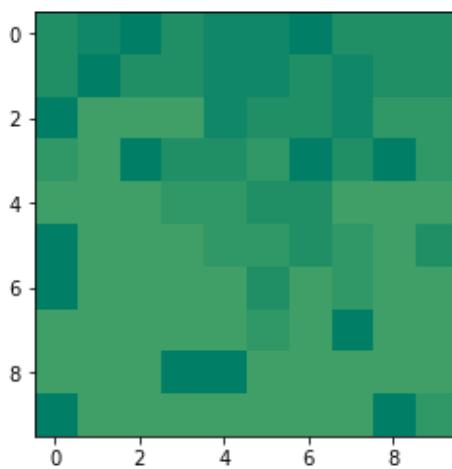
Updated direction: [ 0 -1]



Step: 686

Updated position: [9 1]

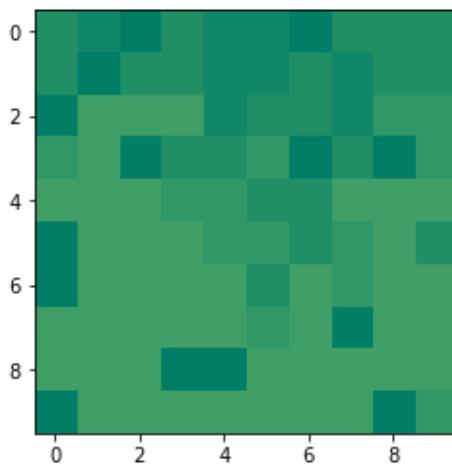
Updated direction: [ 0 1]



Step: 687

Updated position: [9 2]

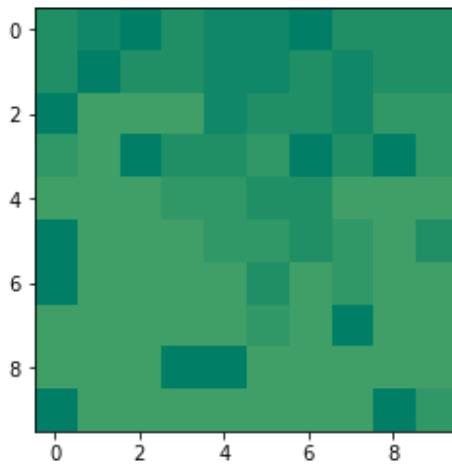
Updated direction: [ 0 -1]



Step: 688

Updated position: [9 1]

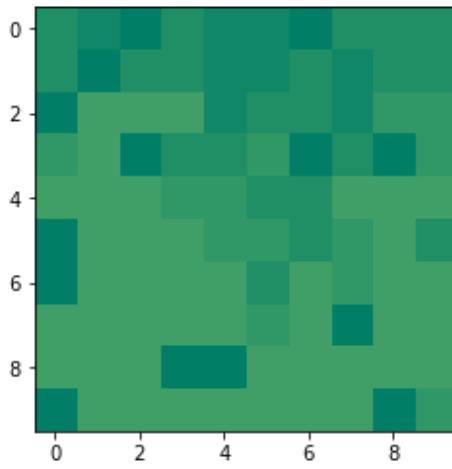
Updated direction: [ 0 1 ]



Step: 689

Updated position: [9 2]

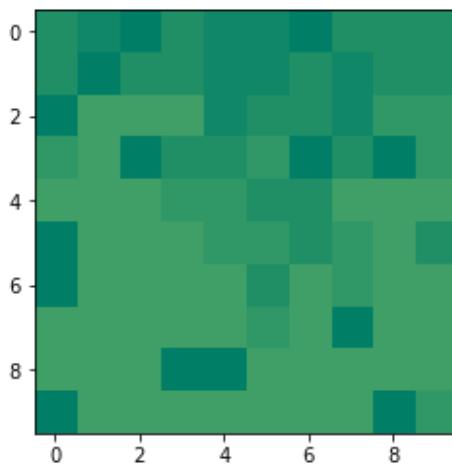
Updated direction: [ 0 -1 ]



Step: 690

Updated position: [9 1]

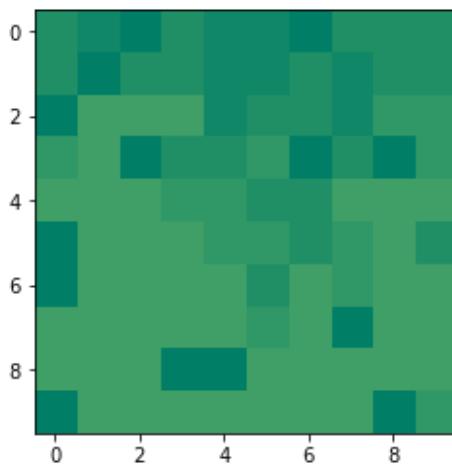
Updated direction: [ 0 1 ]



Step: 691

Updated position: [9 2]

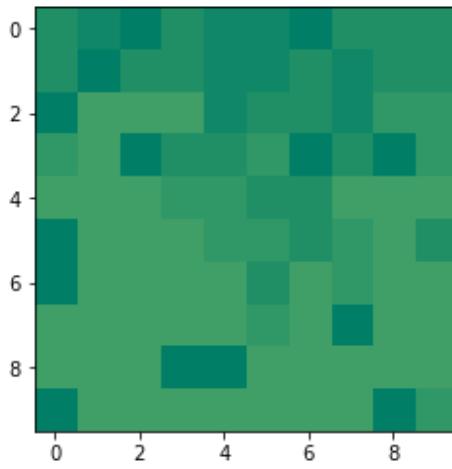
Updated direction: [ 0 -1 ]



Step: 692

Updated position: [9 1]

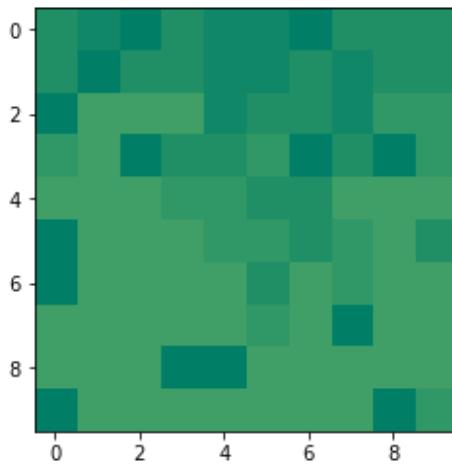
Updated direction: [-1 0]



Step: 693

Updated position: [8 1]

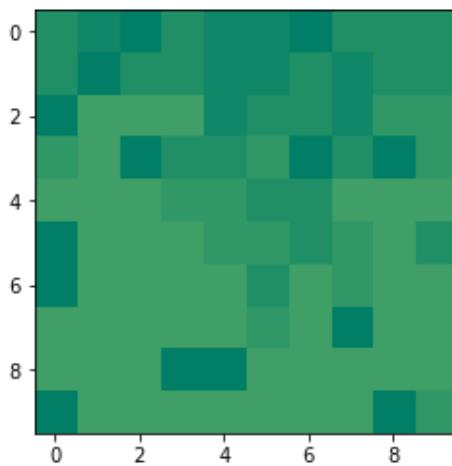
Updated direction: [ 0 1 ]



Step: 694

Updated position: [ 8 2 ]

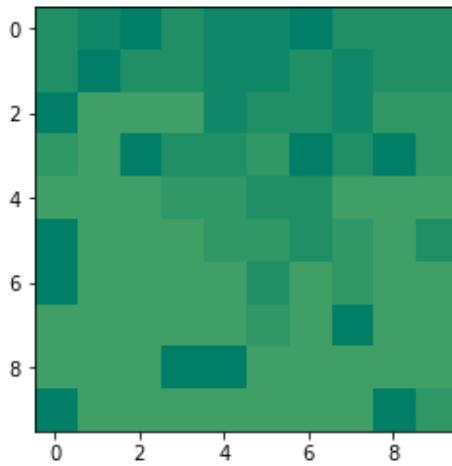
Updated direction: [ 1 0 ]



Step: 695

Updated position: [ 9 2 ]

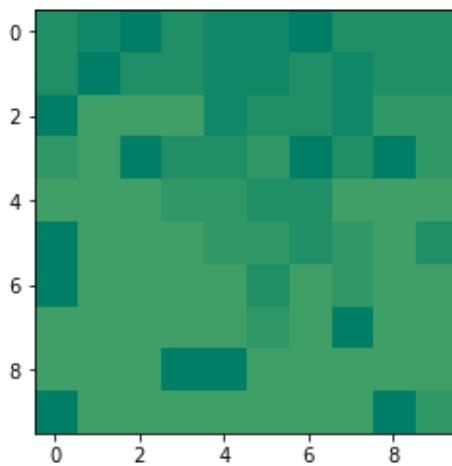
Updated direction: [ 0 -1 ]



Step: 696

Updated position: [ 9 1 ]

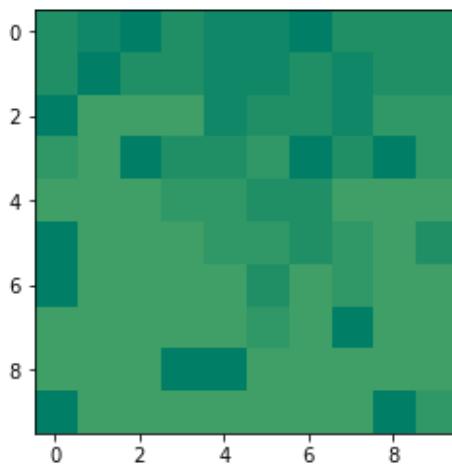
Updated direction: [-1 0 ]



Step: 697

Updated position: [8 1]

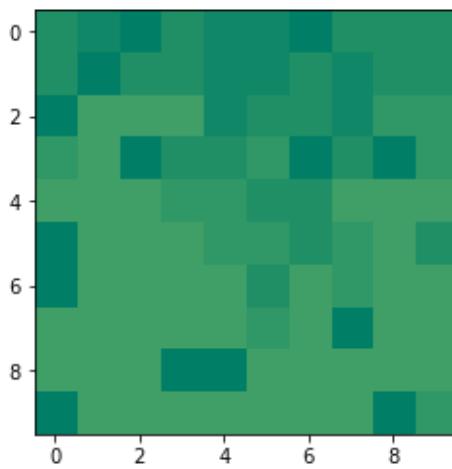
Updated direction: [0 1]



Step: 698

Updated position: [8 2]

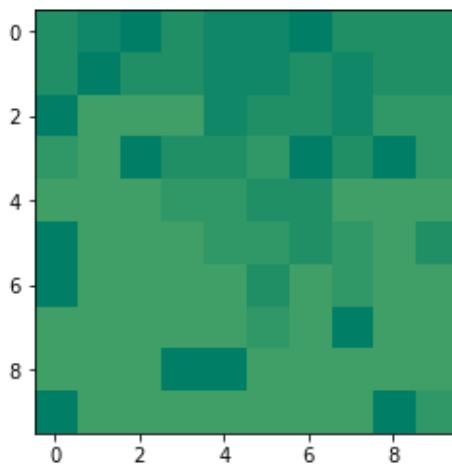
Updated direction: [1 0]



Step: 699

Updated position: [9 2]

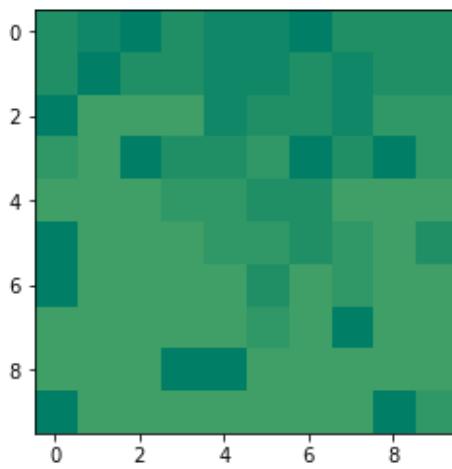
Updated direction: [0 1]



Step: 700

Updated position: [9 3]

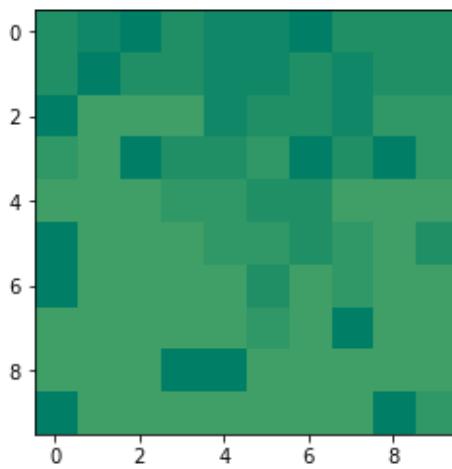
Updated direction: [0 1]



Step: 701

Updated position: [9 4]

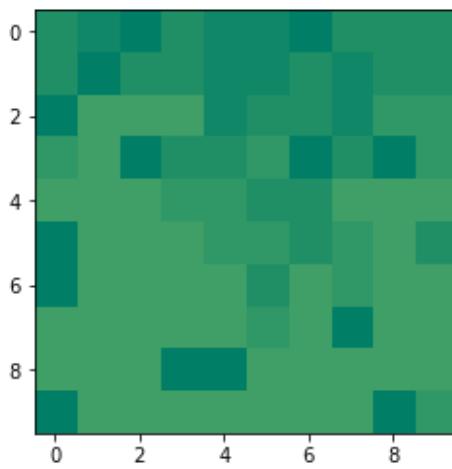
Updated direction: [0 -1]



Step: 702

Updated position: [9 3]

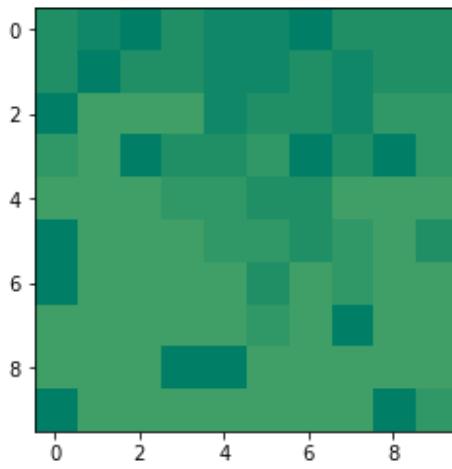
Updated direction: [0 1]



Step: 703

Updated position: [9 4]

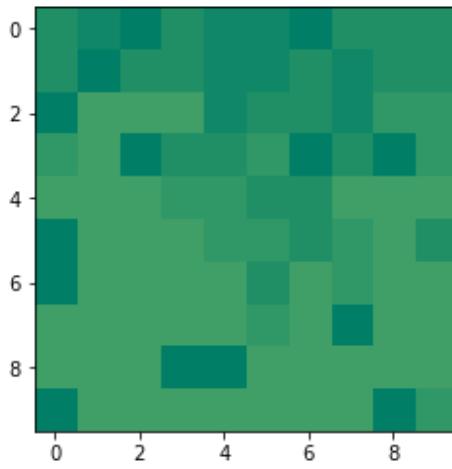
Updated direction: [ 0 -1]



Step: 704

Updated position: [9 3]

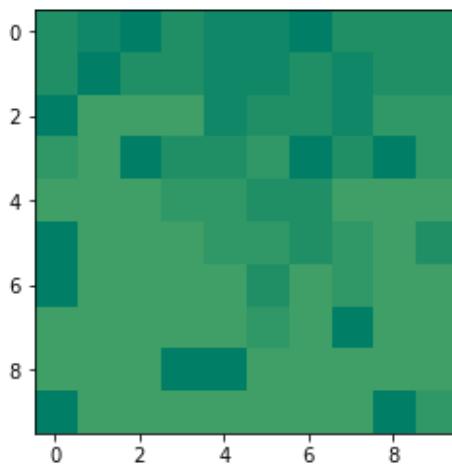
Updated direction: [ 0 1]



Step: 705

Updated position: [9 4]

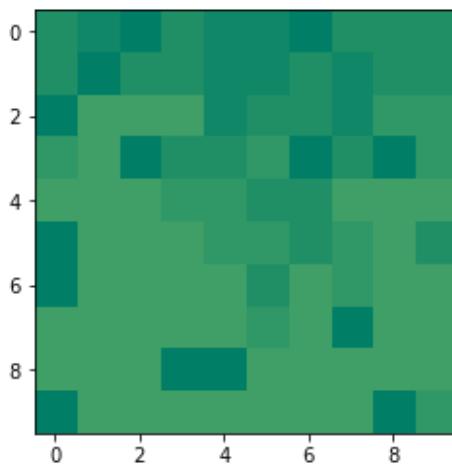
Updated direction: [ 0 -1]



Step: 706

Updated position: [9 3]

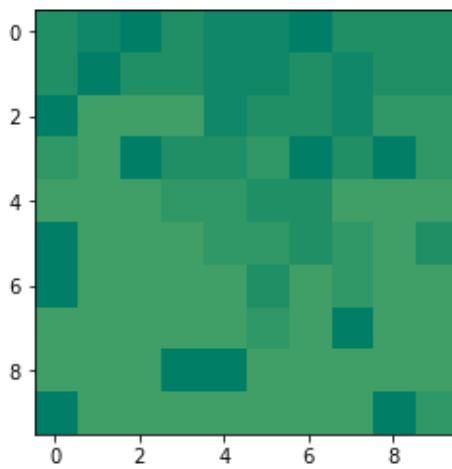
Updated direction: [ 0 -1]



Step: 707

Updated position: [9 2]

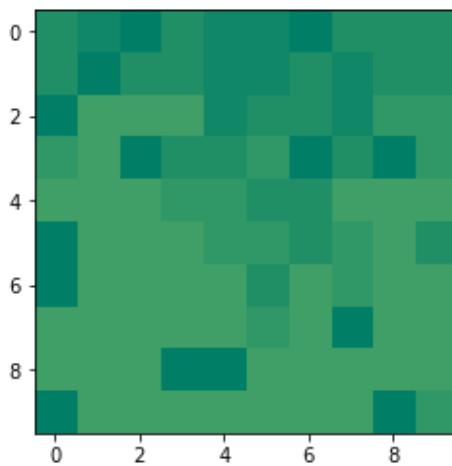
Updated direction: [ 0 1]



Step: 708

Updated position: [9 3]

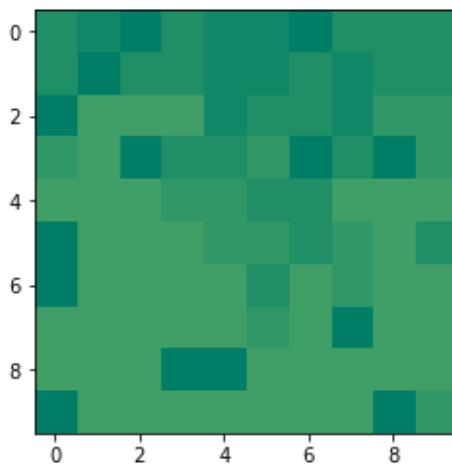
Updated direction: [ 0 -1]



Step: 709

Updated position: [9 2]

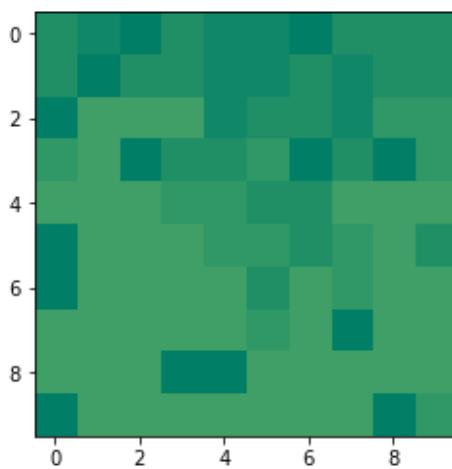
Updated direction: [ 0 -1]



Step: 710

Updated position: [9 1]

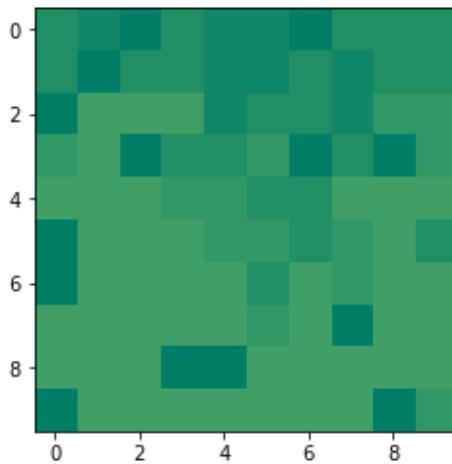
Updated direction: [ 0 1]



Step: 711

Updated position: [9 2]

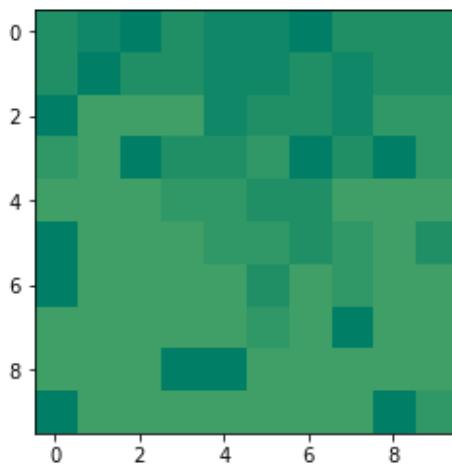
Updated direction: [ 0 -1]



Step: 712

Updated position: [9 1]

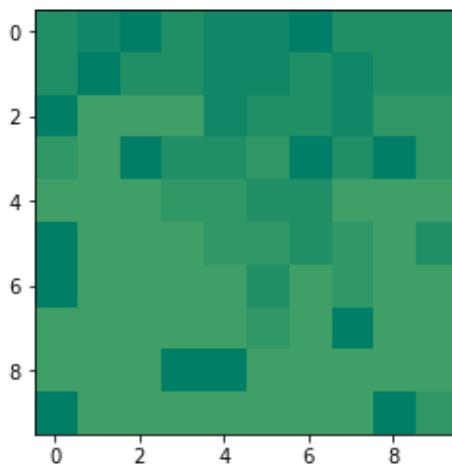
Updated direction: [ 0 1 ]



Step: 713

Updated position: [9 2]

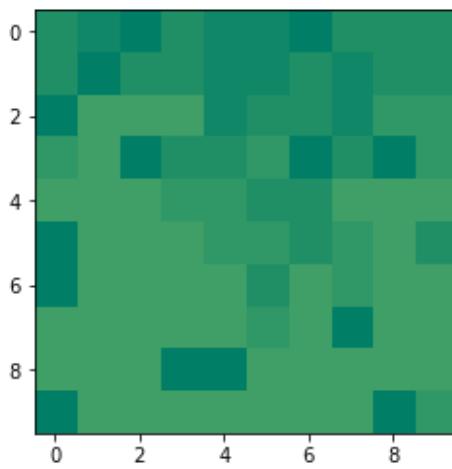
Updated direction: [ 0 -1 ]



Step: 714

Updated position: [9 1]

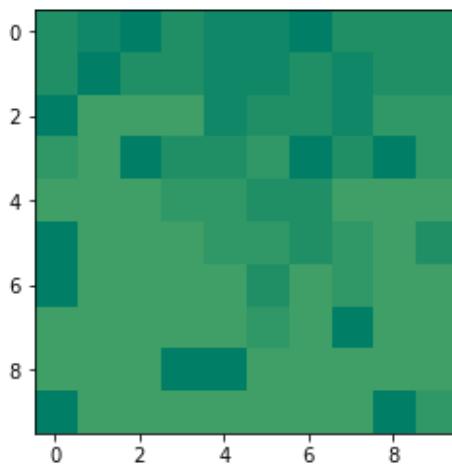
Updated direction: [ 0 1 ]



Step: 715

Updated position: [9 2]

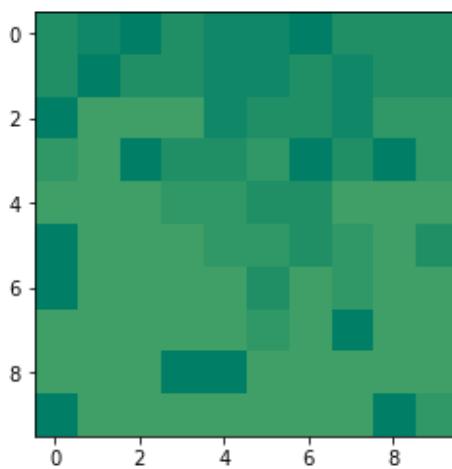
Updated direction: [-1 0]



Step: 716

Updated position: [8 2]

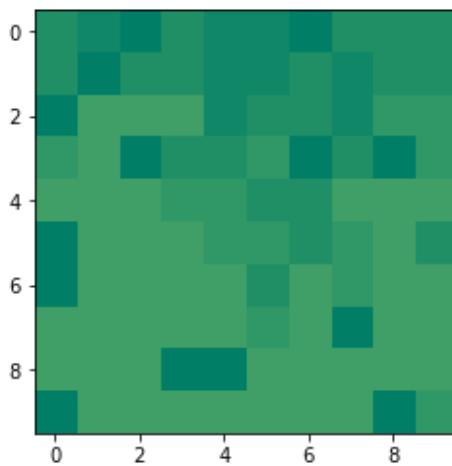
Updated direction: [1 0]



Step: 717

Updated position: [9 2]

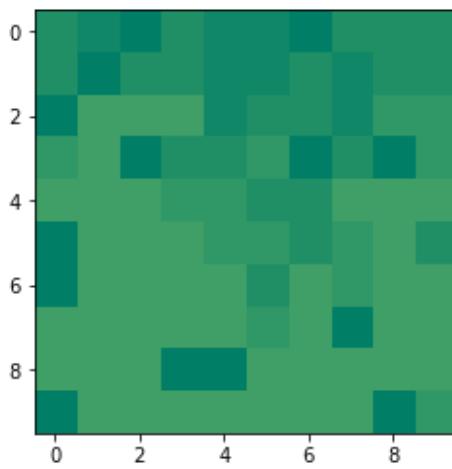
Updated direction: [-1 0]



Step: 718

Updated position: [8 2]

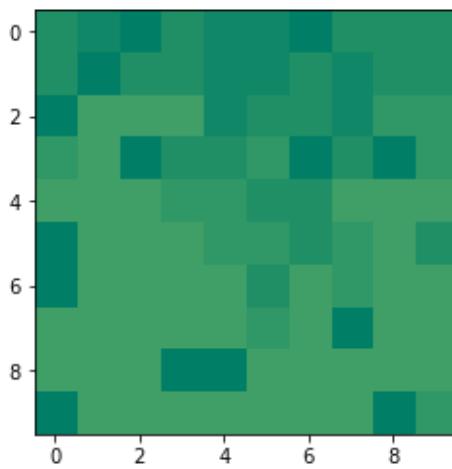
Updated direction: [1 0]



Step: 719

Updated position: [9 2]

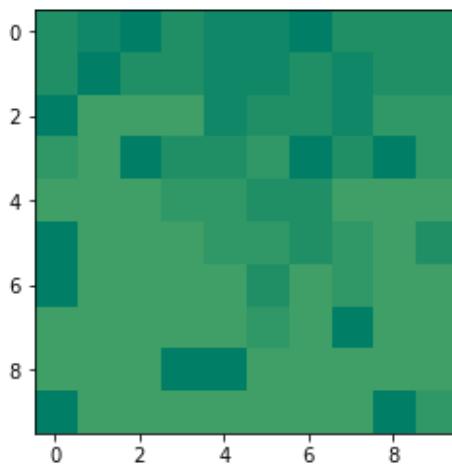
Updated direction: [0 1]



Step: 720

Updated position: [9 3]

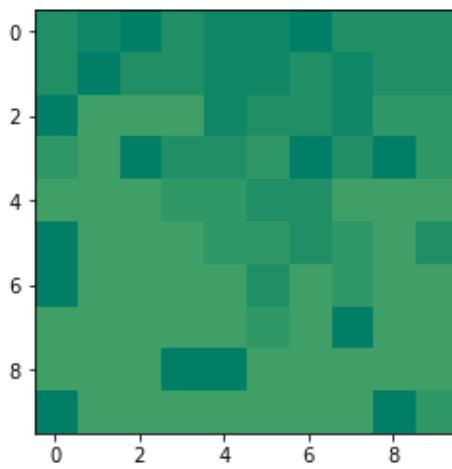
Updated direction: [0 1]



Step: 721

Updated position: [9 4]

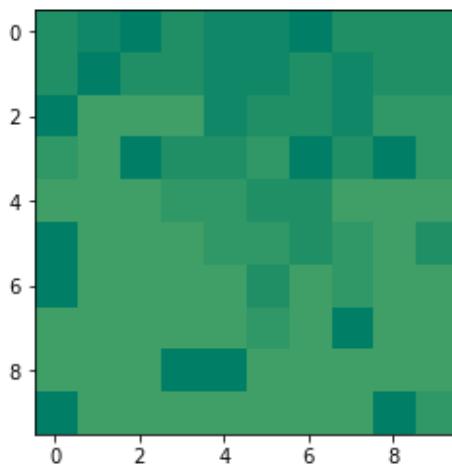
Updated direction: [0 1]



Step: 722

Updated position: [9 5]

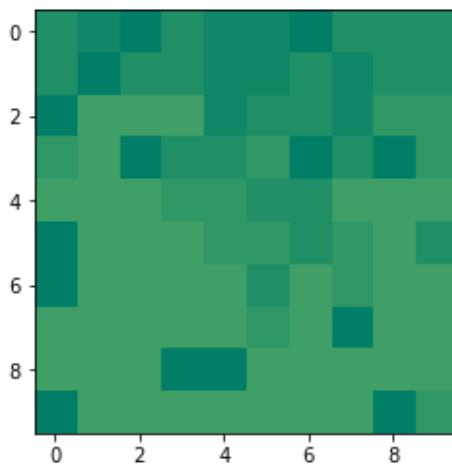
Updated direction: [-1 0]



Step: 723

Updated position: [8 5]

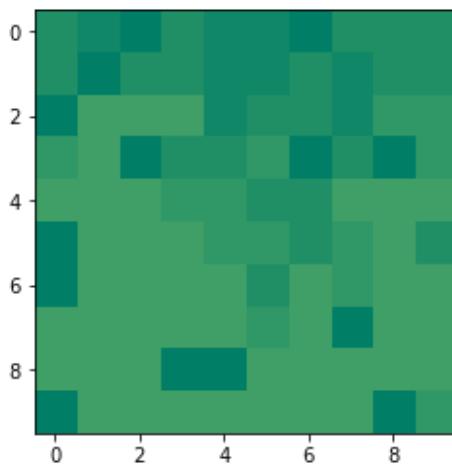
Updated direction: [0 1]



Step: 724

Updated position: [ 8 6 ]

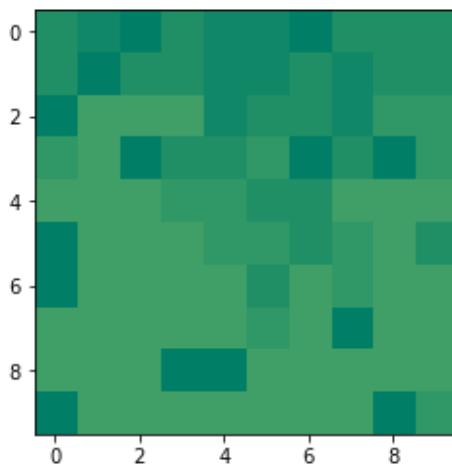
Updated direction: [ 1 0 ]



Step: 725

Updated position: [ 9 6 ]

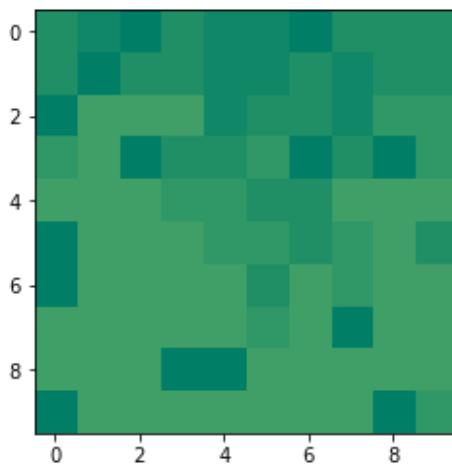
Updated direction: [ 0 1 ]



Step: 726

Updated position: [ 9 7 ]

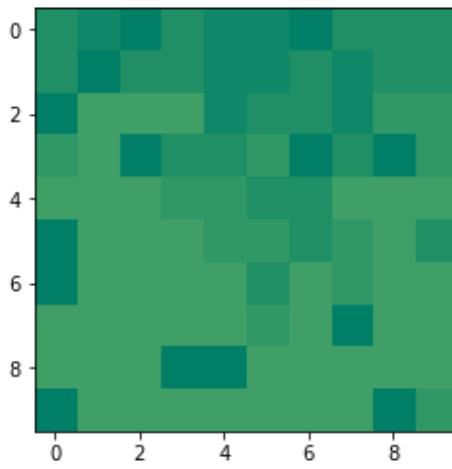
Updated direction: [ 0 -1 ]



Step: 727

Updated position: [9 6]

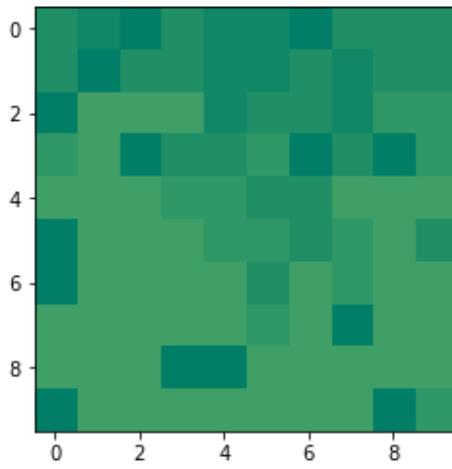
Updated direction: [ 0 -1 ]



Step: 728

Updated position: [9 5]

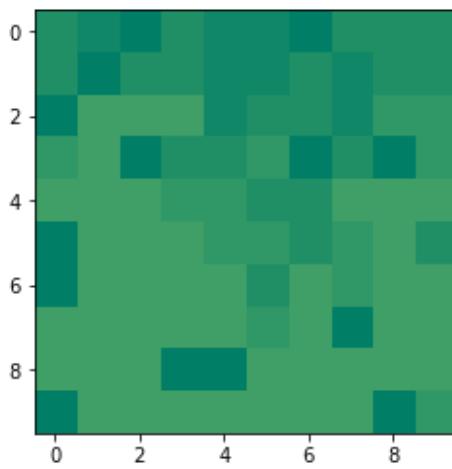
Updated direction: [-1 0 ]



Step: 729

Updated position: [8 5]

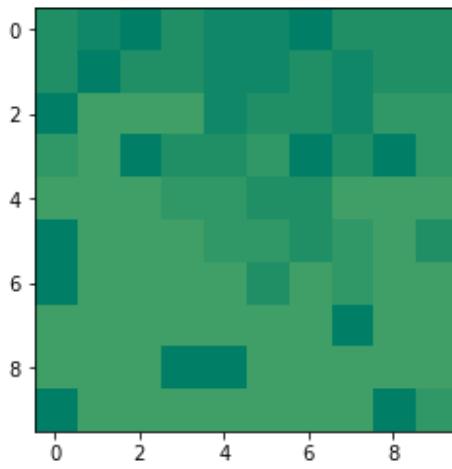
Updated direction: [-1 0 ]



Step: 730

Updated position: [ 7 5 ]

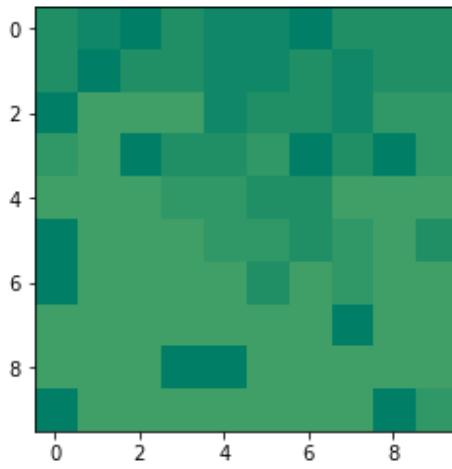
Updated direction: [ 0 -1 ]



Step: 731

Updated position: [ 7 4 ]

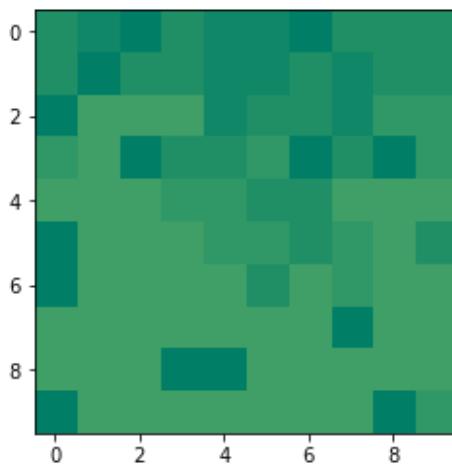
Updated direction: [-1 0 ]



Step: 732

Updated position: [ 6 4 ]

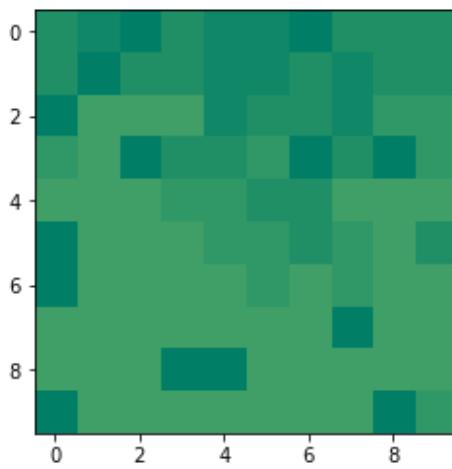
Updated direction: [ 0 1 ]



Step: 733

Updated position: [ 6 5 ]

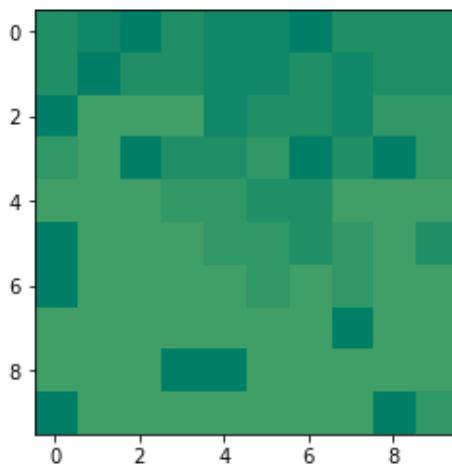
Updated direction: [ 0 1 ]



Step: 734

Updated position: [ 6 6 ]

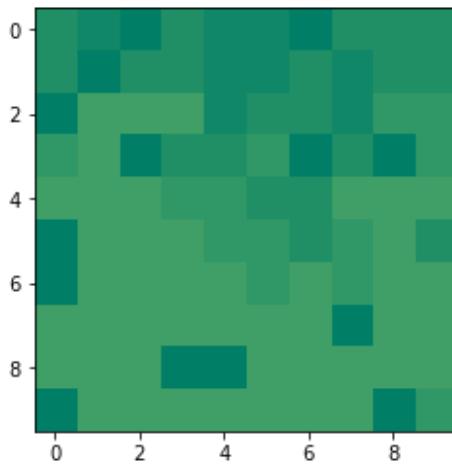
Updated direction: [ -1 0 ]



Step: 735

Updated position: [ 5 6 ]

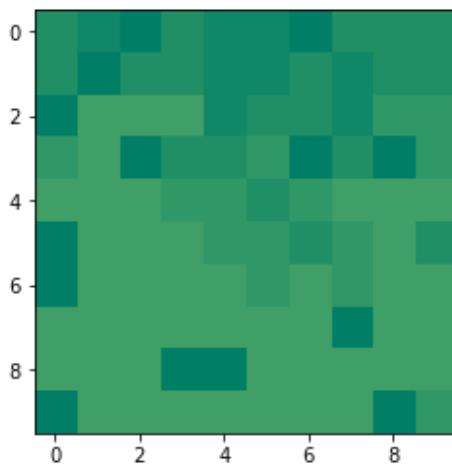
Updated direction: [ -1 0 ]



Step: 736

Updated position: [ 4 6 ]

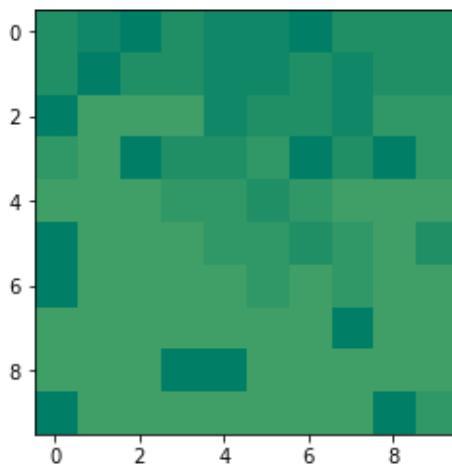
Updated direction: [ 1 0 ]



Step: 737

Updated position: [ 5 6 ]

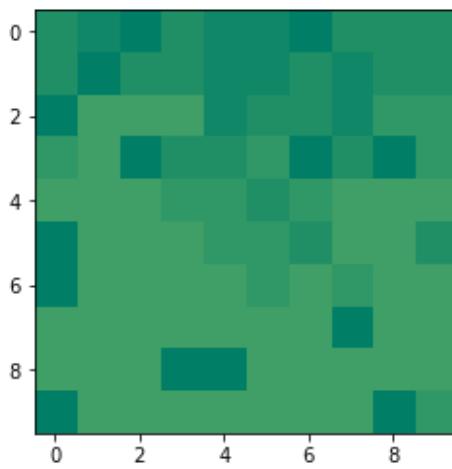
Updated direction: [ 0 1 ]



Step: 738

Updated position: [ 5 7 ]

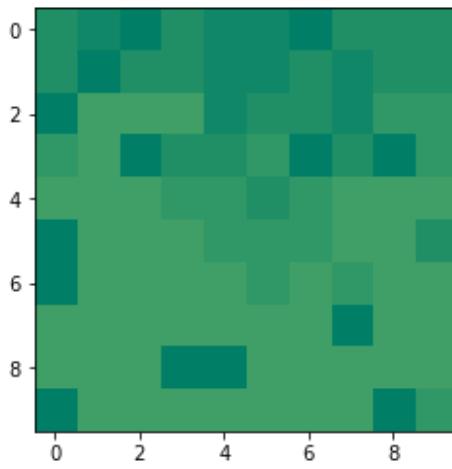
Updated direction: [ 0 -1 ]



Step: 739

Updated position: [ 5 6 ]

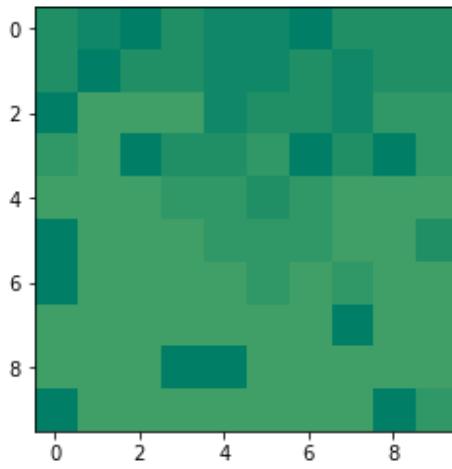
Updated direction: [ 1 0 ]



Step: 740

Updated position: [ 6 6 ]

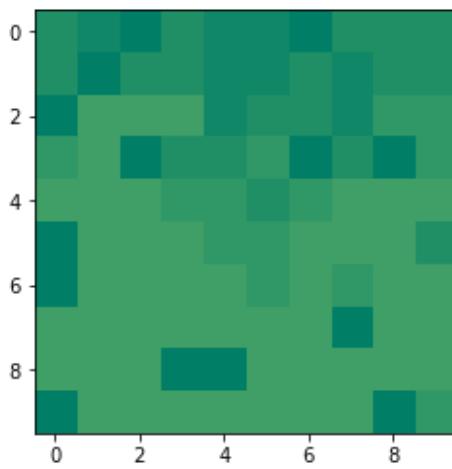
Updated direction: [ -1 0 ]



Step: 741

Updated position: [ 5 6 ]

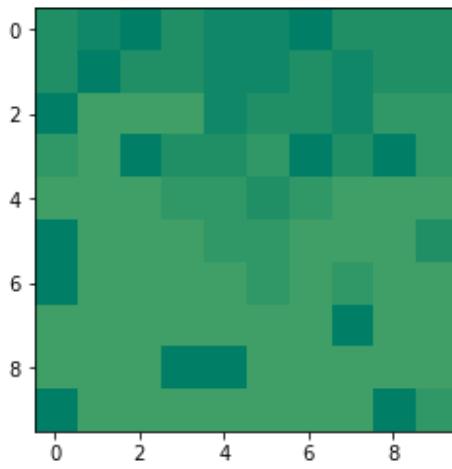
Updated direction: [ -1 0 ]



Step: 742

Updated position: [ 4 6 ]

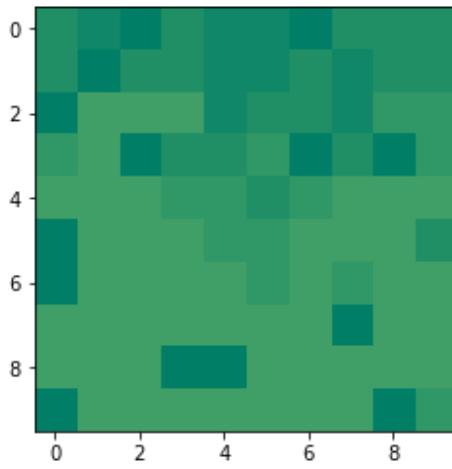
Updated direction: [ 0 1 ]



Step: 743

Updated position: [ 4 7 ]

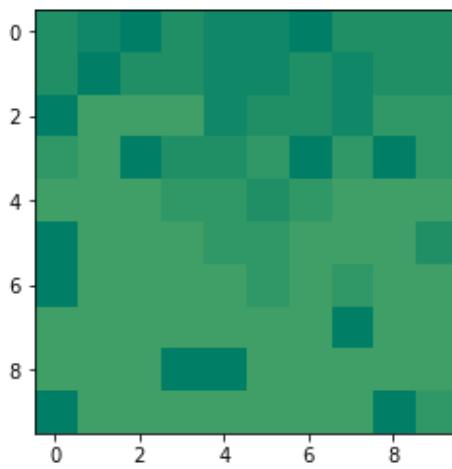
Updated direction: [ -1 0 ]



Step: 744

Updated position: [ 3 7 ]

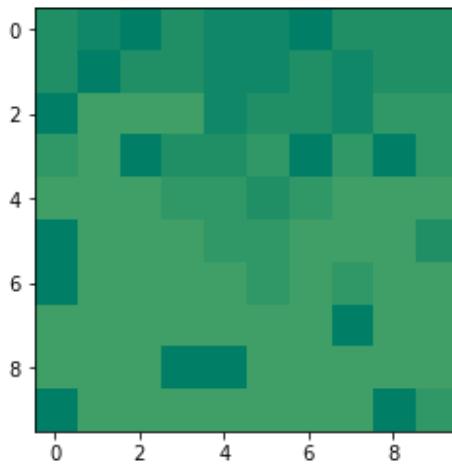
Updated direction: [ 1 0 ]



Step: 745

Updated position: [ 4 7 ]

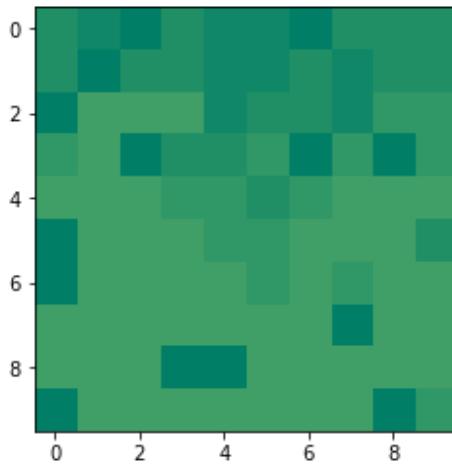
Updated direction: [-1 0 ]



Step: 746

Updated position: [ 3 7 ]

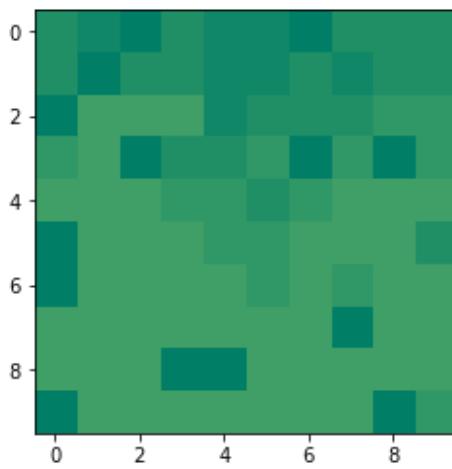
Updated direction: [-1 0 ]



Step: 747

Updated position: [ 2 7 ]

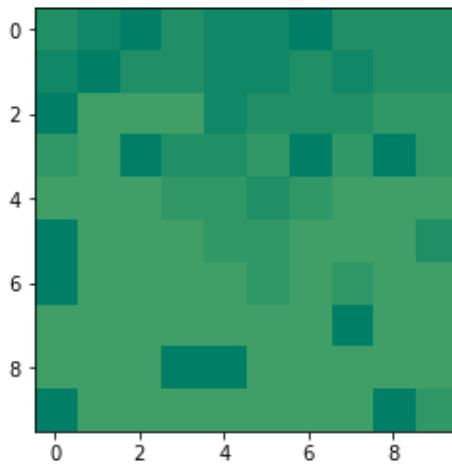
Updated direction: [-1 0 ]



Step: 748

Updated position: [1 7]

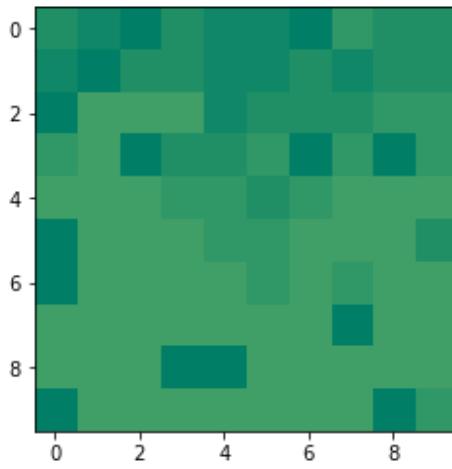
Updated direction: [-1 0]



Step: 749

Updated position: [0 7]

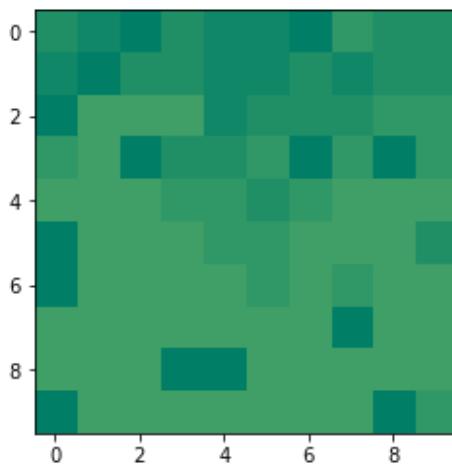
Updated direction: [1 0]



Step: 750

Updated position: [1 7]

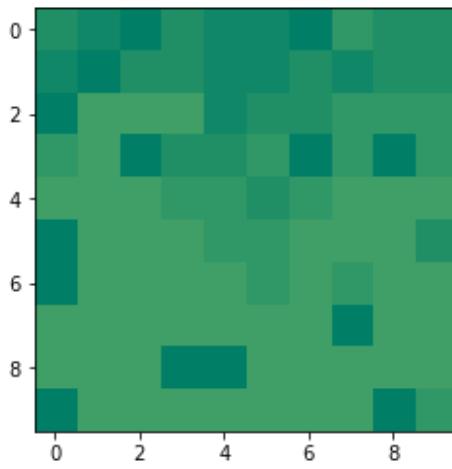
Updated direction: [1 0]



Step: 751

Updated position: [ 2 7 ]

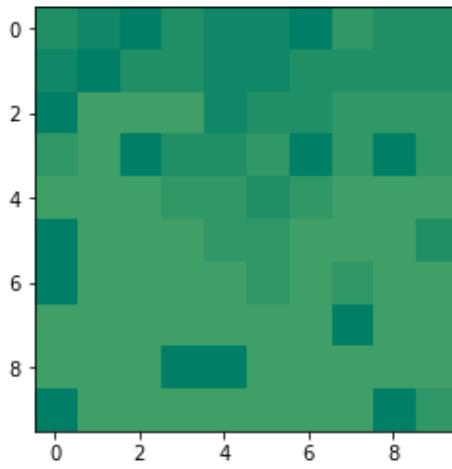
Updated direction: [ -1 0 ]



Step: 752

Updated position: [ 1 7 ]

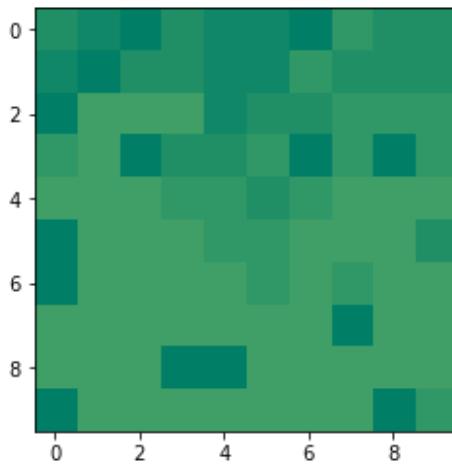
Updated direction: [ 0 -1 ]



Step: 753

Updated position: [ 1 6 ]

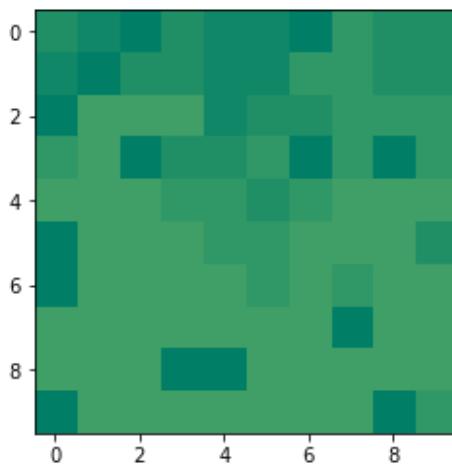
Updated direction: [ 0 1 ]



Step: 754

Updated position: [ 1 7 ]

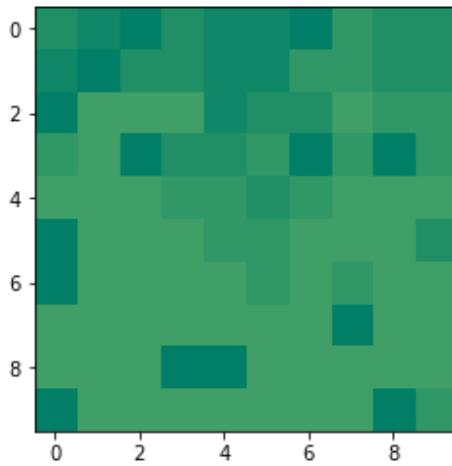
Updated direction: [ 1 0 ]



Step: 755

Updated position: [ 2 7 ]

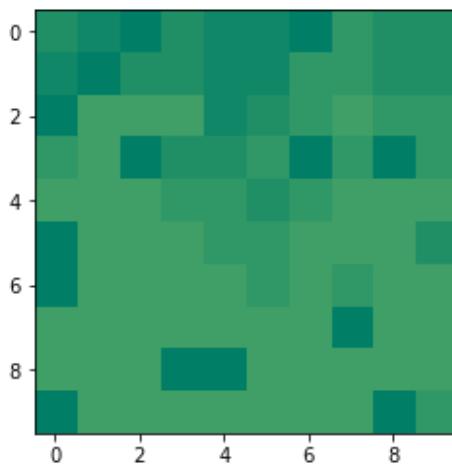
Updated direction: [ 0 -1 ]



Step: 756

Updated position: [ 2 6 ]

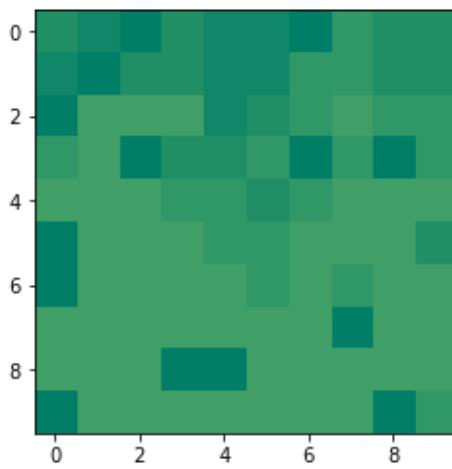
Updated direction: [ 0 -1 ]



Step: 757

Updated position: [ 2 5 ]

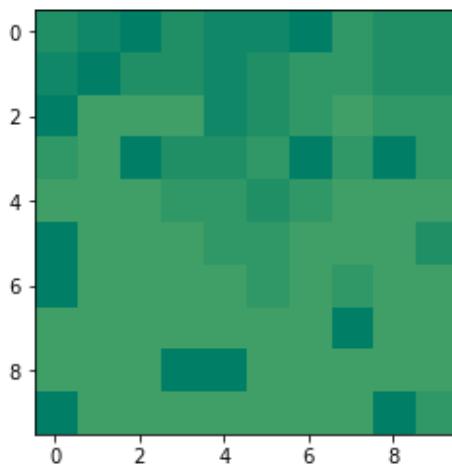
Updated direction: [-1 0 ]



Step: 758

Updated position: [ 1 5 ]

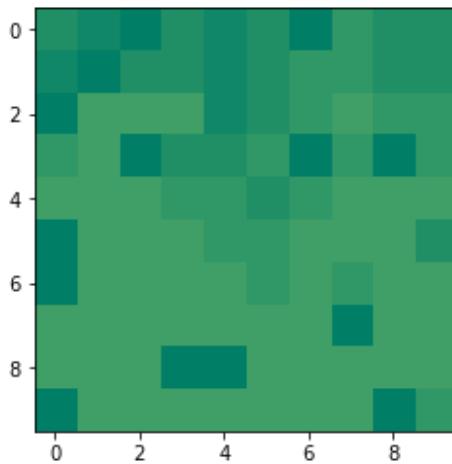
Updated direction: [-1 0 ]



Step: 759

Updated position: [ 0 5 ]

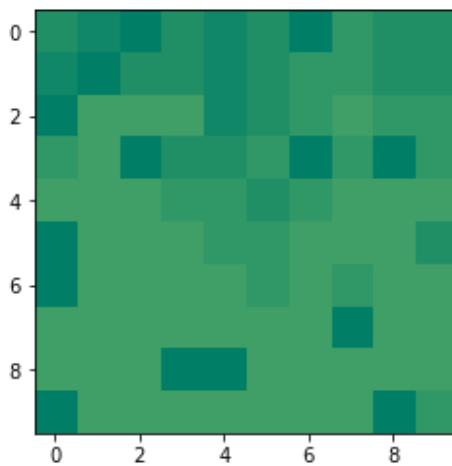
Updated direction: [ 1 0 ]



Step: 760

Updated position: [1 5]

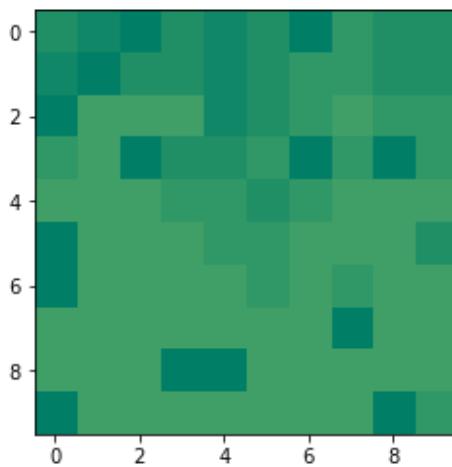
Updated direction: [ 0 -1 ]



Step: 761

Updated position: [1 4]

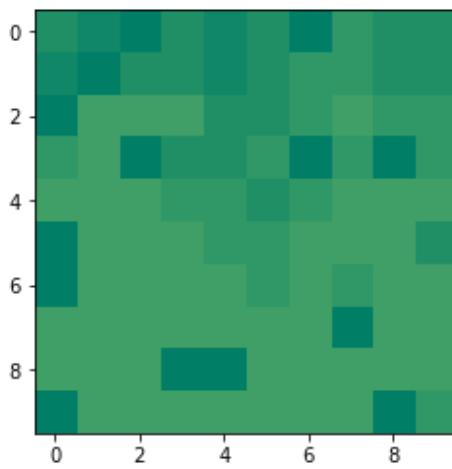
Updated direction: [1 0]



Step: 762

Updated position: [2 4]

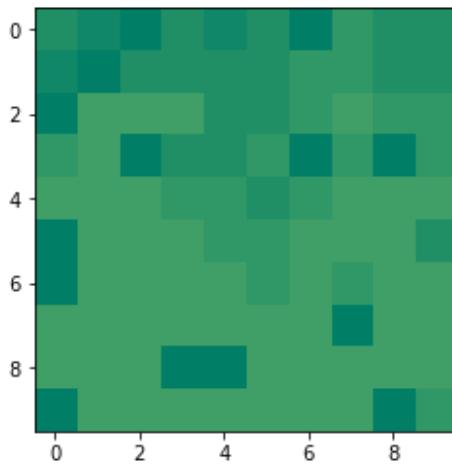
Updated direction: [-1 0 ]



Step: 763

Updated position: [ 1 4 ]

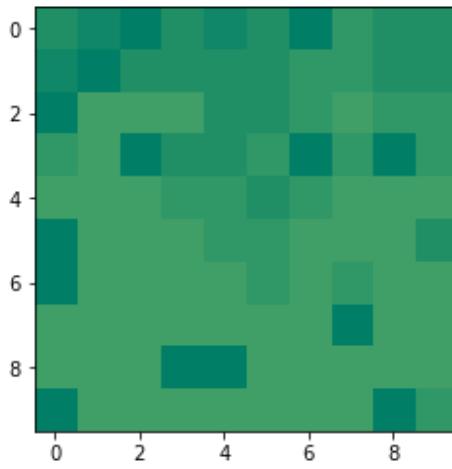
Updated direction: [ 1 0 ]



Step: 764

Updated position: [ 2 4 ]

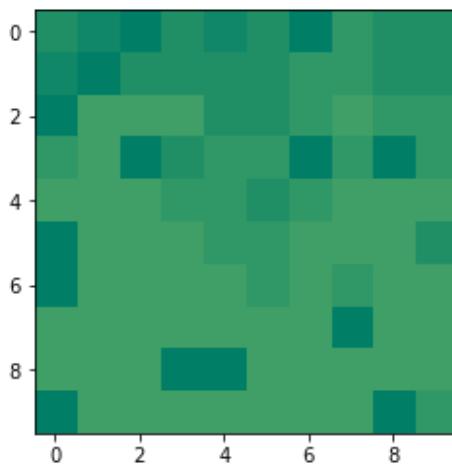
Updated direction: [ 1 0 ]



Step: 765

Updated position: [ 3 4 ]

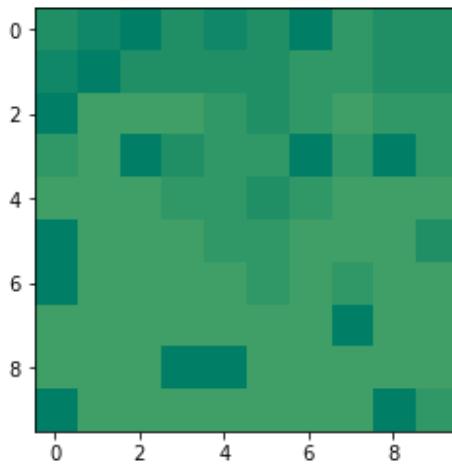
Updated direction: [ -1 0 ]



Step: 766

Updated position: [ 2 4 ]

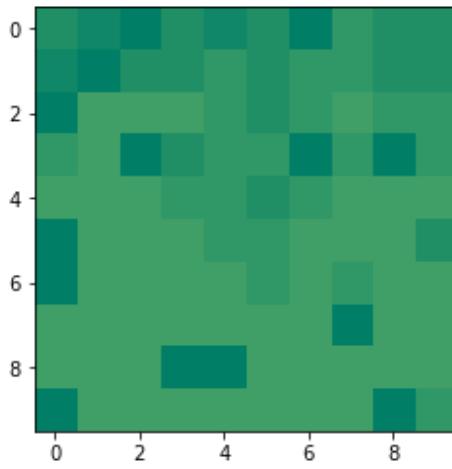
Updated direction: [-1 0 ]



Step: 767

Updated position: [ 1 4 ]

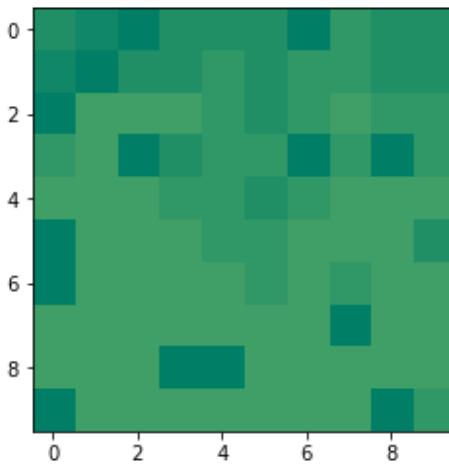
Updated direction: [-1 0 ]



Step: 768

Updated position: [ 0 4 ]

Updated direction: [ 0 1 ]



Total amount of time: 3452

```
In [168]: # 95% confidence interval
# amount of time
print("95% CI for time, roomba 1: " + str([np.percentile(np.array(time_list1), 2.5),
                                              np.percentile(np.array(time_list1), 97.5)]))
print("95% CI for time, roomba 2: " + str([np.percentile(np.array(time_list2), 2.5),
                                              np.percentile(np.array(time_list2), 97.5)]))
print("95% CI for time, roomba 3: " + str([np.percentile(np.array(time_list3), 2.5),
                                              np.percentile(np.array(time_list3), 97.5)]))

95% CI for time, roomba 1: [1661.325, 4341.9]
95% CI for time, roomba 2: [1443.875, 3313.7000000000003]
95% CI for time, roomba 3: [1660.975000000001, 4315.0]
```

```
In [169]: # 95% confidence interval
# number of steps
print("95% CI for time, roomba 1: " + str([np.percentile(np.array(steps_list1), 2.5),
                                              np.percentile(np.array(steps_list1), 97.5)]))
print("95% CI for time, roomba 2: " + str([np.percentile(np.array(steps_list2), 2.5),
                                              np.percentile(np.array(steps_list2), 97.5)]))
print("95% CI for time, roomba 3: " + str([np.percentile(np.array(steps_list3), 2.5),
                                              np.percentile(np.array(steps_list3), 97.5)]))

95% CI for time, roomba 1: [233.9, 617.300000000001]
95% CI for time, roomba 2: [203.0, 471.400000000001]
95% CI for time, roomba 3: [241.875, 1000.0]
```

```
In [171]: # 95% confidence interval
# averaged cleanliness
print("95% CI for time, roomba 1: " + str([np.percentile(np.array(ave_cleaned_list1), 2.5),
                                              np.percentile(np.array(ave_cleaned_list1), 97.5)]))
print("95% CI for time, roomba 2: " + str([np.percentile(np.array(ave_cleaned_list2), 2.5),
                                              np.percentile(np.array(ave_cleaned_list2), 97.5)]))
print("95% CI for time, roomba 3: " + str([np.percentile(np.array(ave_cleaned_list3), 2.5),
                                              np.percentile(np.array(ave_cleaned_list3), 97.5)]))
```

```
95% CI for time, roomba 1: [1.79925, 4.43125]
95% CI for time, roomba 2: [1.489, 3.4617500000000003]
95% CI for time, roomba 3: [0.99, 2.241]
```

```
In [172]: # 95% confidence interval
# cleanliness distribution
print("95% CI for time, roomba 1: " + str([np.percentile(np.array(cleanliness_1), 2.5),
                                              np.percentile(np.array(cleanliness_1), 97.5)]))
print("95% CI for time, roomba 2: " + str([np.percentile(np.array(cleanliness_2), 2.5),
                                              np.percentile(np.array(cleanliness_2), 97.5)]))
print("95% CI for time, roomba 3: " + str([np.percentile(np.array(cleanliness_3), 2.5),
                                              np.percentile(np.array(cleanliness_3), 97.5)]))
```

```
95% CI for time, roomba 1: [-1.0, 7.0]
95% CI for time, roomba 2: [-1.0, 6.0]
95% CI for time, roomba 3: [-1.0, 3.0]
```

```
In [ ]:
```