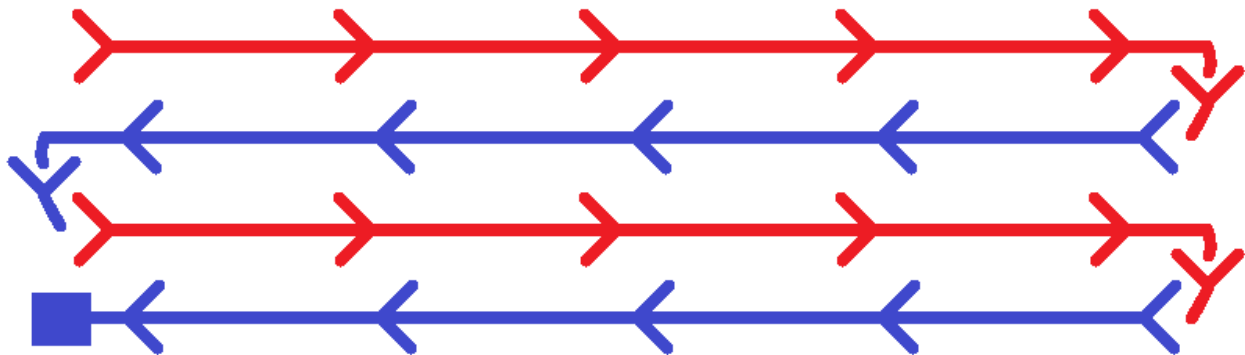


الگوریتم پیمایش محیط به صورت شخم‌گاو (boustrophedon) است و این روش برای این مسئله بهینه است چون که محیط مورد نظر مستطیلی شکل بوده و نقطه‌ی شروع جاروبرقی هم در لبه است. بنابراین مسیر طی‌شده توسط عامل و همچنین تعداد گام‌های آن همیشه در یک محیط یکسان، ثابت است؛ مثلاً تعداد گام‌های مورد نیاز برای پیمایش محیطی به اندازه‌ی $m=5$ و $n=8$ همیشه بدون توجه به کثیف یا تمیز بودن خانه‌ها (و در نظر نگرفتن مکش‌ها) ۴۰ خواهد بود.



یک نمونه از اجرای برنامه در صفحات بعد نشان داده شده است:

شروع:

e =

```

0 1 0 1 1 1 0 0
1 1 1 1 1 1 0 0
1 1 1 0 0 0 0 1
1 0 0 0 1 1 0 0
1 1 1 0 0 1 0 1

```

cnt = 1

percept =

1 1 0

action = r

e =

```

0 1 0 1 1 1 0 0
1 1 1 1 1 1 0 0
1 1 1 0 0 0 0 1
1 0 0 0 1 1 0 0
1 1 1 0 0 1 0 1

```

cnt = 2

percept =

1 2 1

action = s

e =

```

0 0 0 1 1 1 0 0
1 1 1 1 1 1 0 0
1 1 1 0 0 0 0 1
1 0 0 0 1 1 0 0
1 1 1 0 0 1 0 1

```

cnt = 3

percept =

1 2 0

action = r

e =

```

0 0 0 1 1 1 0 0
1 1 1 1 1 1 0 0
1 1 1 0 0 0 0 1
1 0 0 0 1 1 0 0
1 1 1 0 0 1 0 1

```

cnt = 4

percept =

1 3 0

action = r

e =

```

0 0 0 1 1 1 0 0

```

```

1 1 1 1 1 1 0 0
1 1 1 0 0 0 0 1
1 0 0 0 1 1 0 0
1 1 1 0 0 1 0 1

```

```

cnt = 5
percept =

```

```

1 4 1

```

```

action = s
e =

```

```

0 0 0 0 1 1 0 0
1 1 1 1 1 1 0 0
1 1 1 0 0 0 0 1
1 0 0 0 1 1 0 0
1 1 1 0 0 1 0 1

```

```

cnt = 6
percept =

```

```

1 4 0

```

```

action = r
e =

```

```

0 0 0 0 1 1 0 0
1 1 1 1 1 1 0 0

```

```

1 1 1 0 0 0 0 1
1 0 0 0 1 1 0 0
1 1 1 0 0 1 0 1

```

```

cnt = 7
percept =

```

```

1 5 1

```

```

action = s
e =

```

```

0 0 0 0 0 1 0 0
1 1 1 1 1 1 0 0
1 1 1 0 0 0 0 1
1 0 0 0 1 1 0 0
1 1 1 0 0 1 0 1

```

```

cnt = 8
percept =

```

```

1 5 0

```

```

action = r
e =

```

```

0 0 0 0 0 1 0 0
1 1 1 1 1 1 0 0
1 1 1 0 0 0 0 1

```

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 9

percept =

1 6 1

action = s

e =

0 0 0 0 0 0 0 0

1 1 1 1 1 1 0 0

1 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 10

percept =

1 6 0

action = r

e =

0 0 0 0 0 0 0 0

1 1 1 1 1 1 0 0

1 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 11

percept =

1 7 0

action = r

e =

0 0 0 0 0 0 0 0

1 1 1 1 1 1 0 0

1 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 12

percept =

1 8 0

action = d

e =

0 0 0 0 0 0 0 0

1 1 1 1 1 1 0 0

1 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 13

percept =

2 8 0

action = l

e =

0 0 0 0 0 0 0 0

1 1 1 1 1 1 0 0

1 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 14

percept =

2 7 0

action = l

e =

0 0 0 0 0 0 0 0

1 1 1 1 1 1 0 0

1 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 15

percept =

2 6 1

action = s

e =

0 0 0 0 0 0 0 0

1 1 1 1 1 0 0 0

1 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 16

percept =

2 6 0

action = l

e =

0 0 0 0 0 0 0 0

1 1 1 1 1 0 0 0

1 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 17

percept =

2 5 1

action = s

e =

0 0 0 0 0 0 0 0

1 1 1 1 0 0 0 0

1 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 18

percept =

2 5 0

action = l

e =

0 0 0 0 0 0 0 0

1 1 1 1 0 0 0 0

1 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 19

percept =

2 4 1

action = s

e =

0 0 0 0 0 0 0 0

1 1 1 0 0 0 0 0

1 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 20

percept =

2 4 0

action = l

e =

0 0 0 0 0 0 0 0

1 1 1 0 0 0 0 0

1 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 21

percept =

2 3 1

action = s

e =

0 0 0 0 0 0 0 0

1 1 0 0 0 0 0 0

1 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 22

percept =

2 3 0

action = l

e =

0 0 0 0 0 0 0 0

1 1 0 0 0 0 0 0

1 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 23

percept =

2 2 1

action = s

e =

0 0 0 0 0 0 0 0

1 0 0 0 0 0 0 0

1 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 24

percept =

2 2 0

action = l

e =

0 0 0 0 0 0 0 0

1 0 0 0 0 0 0 0

1 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 25

percept =

2 1 1

action = s

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

1 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 26

percept =

2 1 0

action = d

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

1 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 27

percept =

3 1 1

action = s

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 28

percept =

3 1 0

action = r

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 1 1 0 0 0 0 1

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 29

percept =

3 2 1

action = s

e =


```

0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 1 0 0 0 0 1
1 0 0 0 1 1 0 0
1 1 1 0 0 1 0 1

```

```

cnt = 30
percept =

```

```

3 2 0

```

```

action = r
e =

```

```

0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 1 0 0 0 0 1
1 0 0 0 1 1 0 0
1 1 1 0 0 1 0 1

```

```

cnt = 31
percept =

```

```

3 3 1

```

```

action = s
e =

```

```

0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 1
1 0 0 0 1 1 0 0
1 1 1 0 0 1 0 1

```

```

cnt = 32
percept =

```

```

3 3 0

```

```

action = r
e =

```

```

0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 1
1 0 0 0 1 1 0 0
1 1 1 0 0 1 0 1

```

```

cnt = 33
percept =

```

```

3 4 0

```

```

action = r
e =

```

```

0 0 0 0 0 0 0 0

```

```

0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 1
1 0 0 0 1 1 0 0
1 1 1 0 0 1 0 1

```

cnt = 34

percept =

3 5 0

action = r

e =

```

0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 1
1 0 0 0 1 1 0 0
1 1 1 0 0 1 0 1

```

cnt = 35

percept =

3 6 0

action = r

e =

```

0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0

```

```

0 0 0 0 0 0 0 1
1 0 0 0 1 1 0 0
1 1 1 0 0 1 0 1

```

cnt = 36

percept =

3 7 0

action = r

e =

```

0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 1
1 0 0 0 1 1 0 0
1 1 1 0 0 1 0 1

```

cnt = 37

percept =

3 8 1

action = s

e =

```

0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0

```

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 38

percept =

3 8 0

action = d

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 39

percept =

4 8 0

action = l

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 40

percept =

4 7 0

action = l

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

1 0 0 0 1 1 0 0

1 1 1 0 0 1 0 1

cnt = 41

percept =

4 6 1

action = s

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

1 0 0 0 1 0 0 0

1 1 1 0 0 1 0 1

cnt = 42

percept =

4 6 0

action = l

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

1 0 0 0 1 0 0 0

1 1 1 0 0 1 0 1

cnt = 43

percept =

4 5 1

action = s

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

1 0 0 0 0 0 0 0

1 1 1 0 0 1 0 1

cnt = 44

percept =

4 5 0

action = l

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

1 0 0 0 0 0 0 0

1 1 1 0 0 1 0 1

cnt = 45

percept =

4 4 0

action = l

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

1 0 0 0 0 0 0 0

1 1 1 0 0 1 0 1

cnt = 46

percept =

4 3 0

action = l

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

1 0 0 0 0 0 0 0

1 1 1 0 0 1 0 1

cnt = 47

percept =

4 2 0

action = l

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

1 0 0 0 0 0 0 0

1 1 1 0 0 1 0 1

cnt = 48

percept =

4 1 1

action = s

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

1 1 1 0 0 1 0 1

cnt = 49

percept =

4 1 0

action = d

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

1 1 1 0 0 1 0 1

cnt = 50

percept =

5 1 1

action = s

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 1 1 0 0 1 0 1

cnt = 51

percept =

5 1 0

action = r

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 1 1 0 0 1 0 1

cnt = 52

percept =

5 2 1

action = s

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 1 0 0 1 0 1

cnt = 53

percept =

5 2 0

action = r

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 1 0 0 1 0 1

cnt = 54

percept =

5 3 1

action = s

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 1 0 1

cnt = 55

percept =

5 3 0

action = r

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 1 0 1

cnt = 56

percept =

5 4 0

action = r

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 1 0 1

cnt = 57

percept =

5 5 0

action = r

e =

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

0 0 0 0 0 1 0 1

cnt = 58

percept =

5 6 1

action = s

e =

```
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 1
```

```
cnt = 59
percept =
```

```
5 6 0
```

```
action = r
e =
```

```
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 1
```

```
cnt = 60
percept =
```

```
5 7 0
```

```
action = r
e =
```

```
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 1
```

```
cnt = 61
percept =
```

```
5 8 1
```

```
action = s
e =
```

```
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
0 0 0 0 0 0 0 0
```

```
cnt = 62
percept =
```

```
5 8 0
```

```
action = n
```