



ASTU

CSE 1061 **Introduction to Computing**

Lecture 6

Fall 2015



Department of Computing
The School of EE & Computing
Adama Science & Technology University

OUTLINE

More practice through 2D robot control

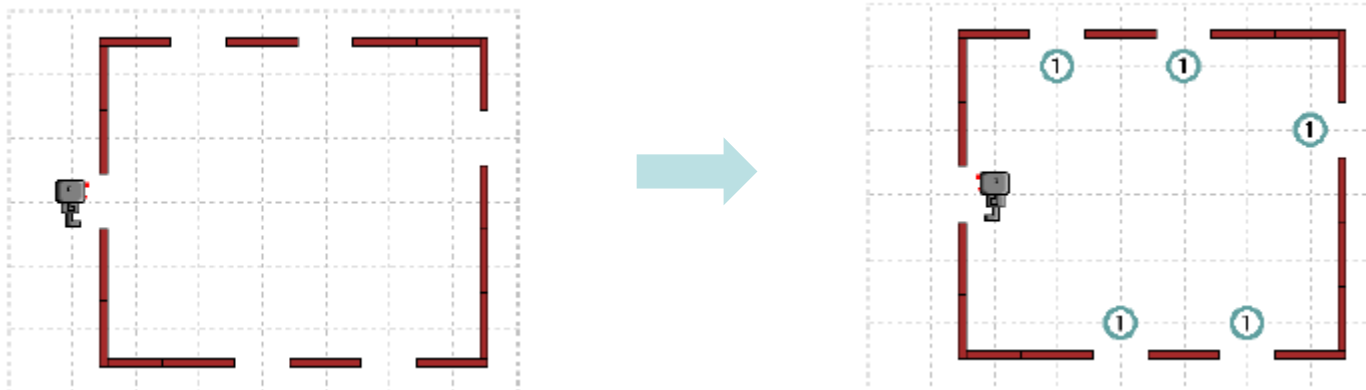
Conditional + while-loop

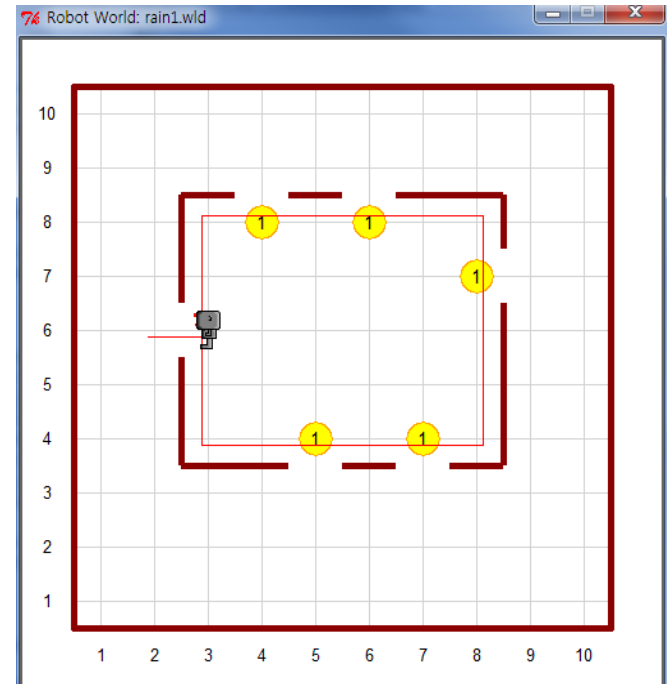
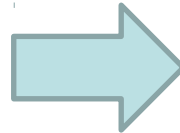
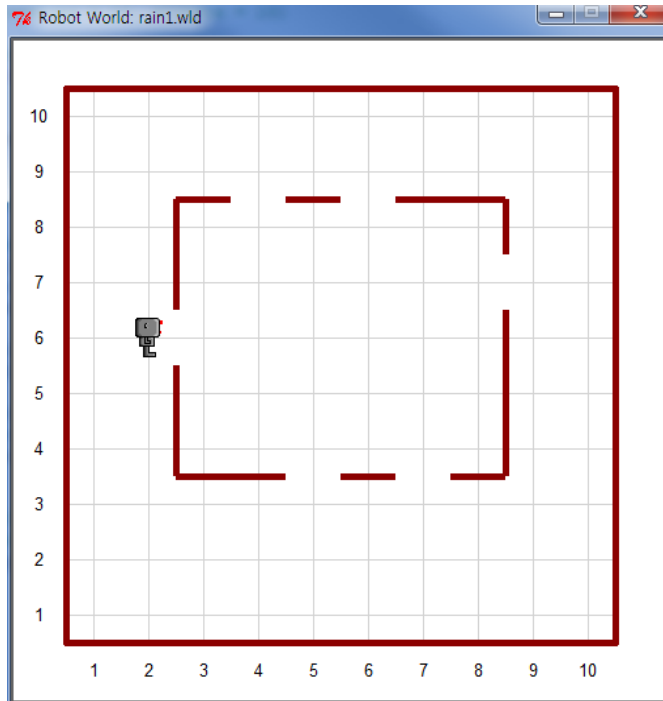
Color conversion

~~MORE PRACTICE~~(through 2D robot control)

PROBLEM 14-1: RAIN1*

It was a beautifully sunny day. Hubo is playing outside with friends. Suddenly, **it started to rain**. He remembered that the windows in his house were all open. So he went back to the house and stopped in front of the door. Help Hubo close the windows of the house. **A closed window has a beeper in front of it.**





Starting at position (2,6) and facing east.

Dropping a beeper in order to close a window

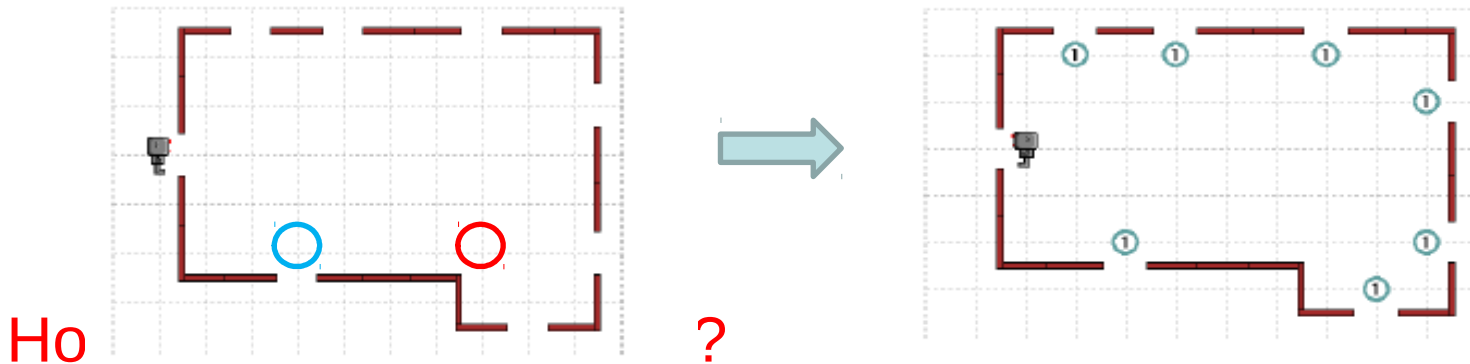
Use rain1.wld as the world file.

Pseudo code

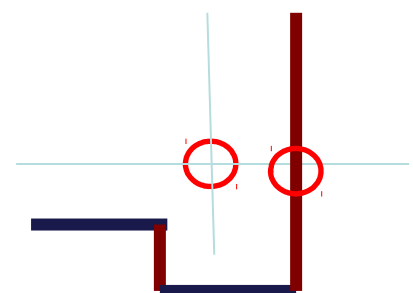
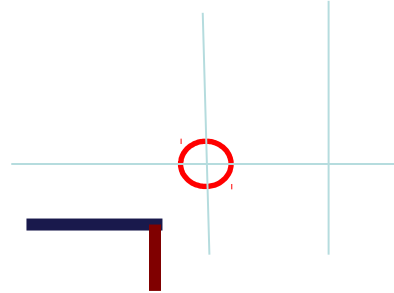
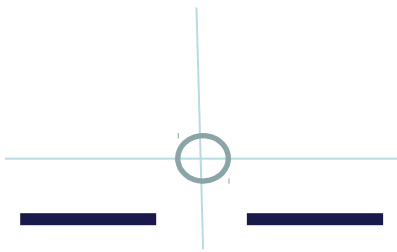
1. Mark the starting point.
2. Move forward to the east.
2. While not returning to the starting point:
 - If there is a **window**, **close** it. **How?**
 - If the front is clear, move forward.
 - Otherwise turn ~~right~~ **left**.
3. Unmark the starting point and turn to the east

PROBLEM 14-2: RAIN2*

Ami, Hubo's friend, lives in a bigger house. Ami was playing outside with Hubo when it started raining. Help Ami close the windows in her house.



How to find a window



if right is clear:

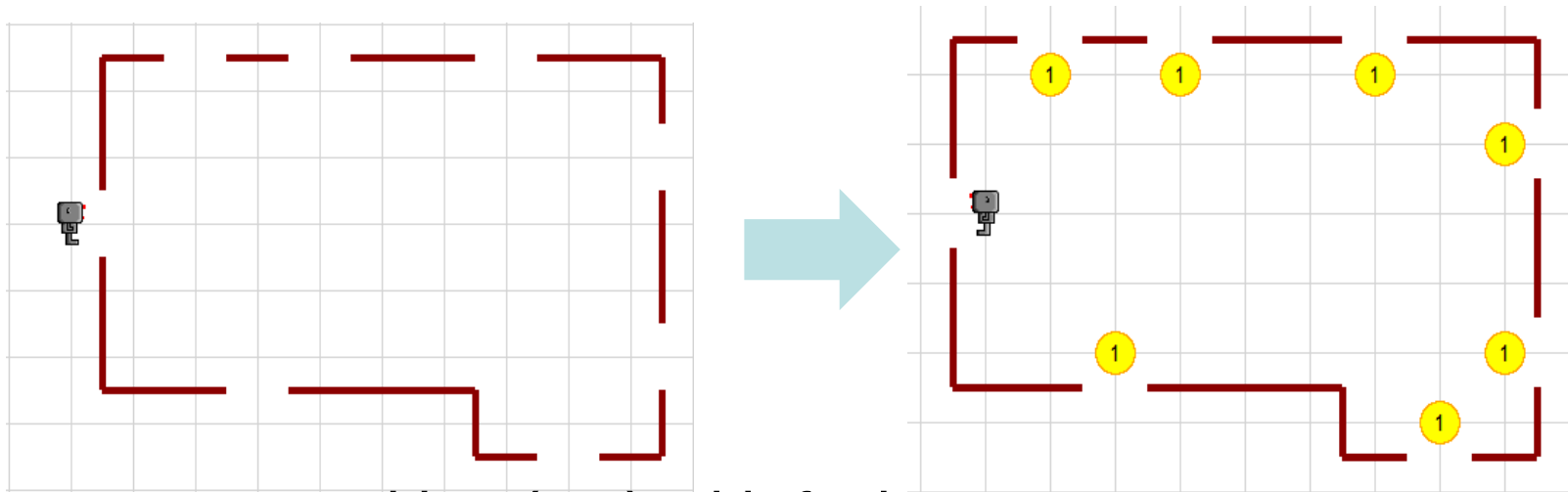
if front is clear,

then move forward.

if right is blocked, then :

Move backward.

close a window.



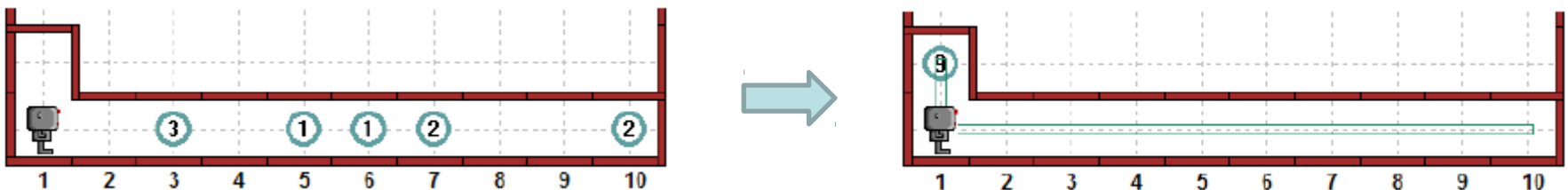
Start at position (2,6) with facing east.

Use rain2.wld as the world file.

Your program must work for both rain1.wld and rain2.wld

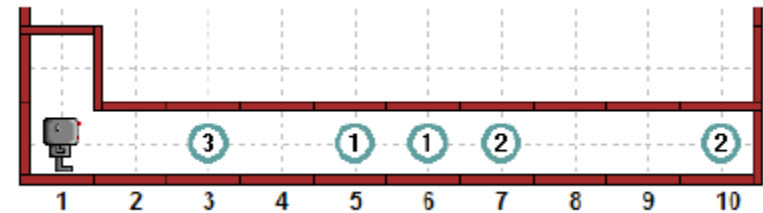
PROBLEM 15: TRASH1*

The wind blew really hard last night. There is litter everywhere outside Hubo's house. His parents asked him to go and clean up the driveway, as well as the path leading to the curb. They both are in a straight line, with garbage at random places as illustrated below(left). Hubo should collect all the litter, and put it in the garbage can, situated north of his starting point. The final situation should look like the following(right):



Pseudo code

1. While front is clear:
Move forward.
collect **all litter**. **How?**
2. Turn around.
3. Move back to the starting point.
4. Go to the north and **put all litter** in the garbage can.
- 5 Move back to the starting point.



← **How?**

How to put all litter in the trash can

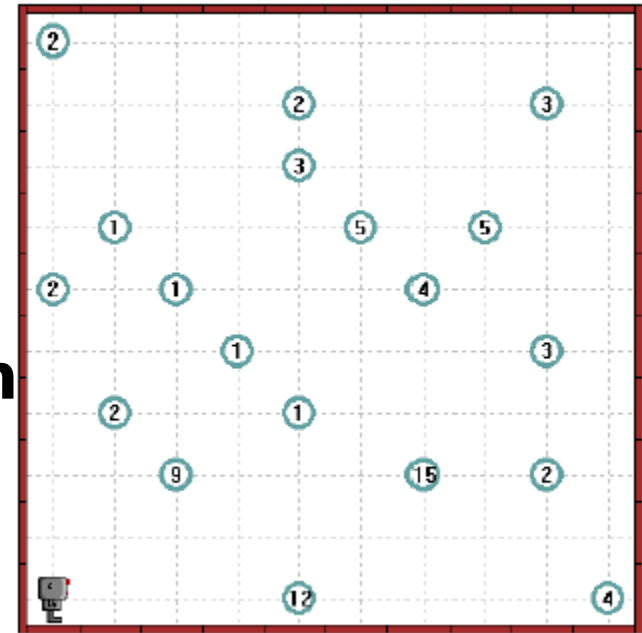
```
while hubo.carries_beeper():  
    hubo.dorp_beeper()
```

To collect all litter at a position, please refer to your program for solving **Harvest5**.

Use trash1.wld as the world.

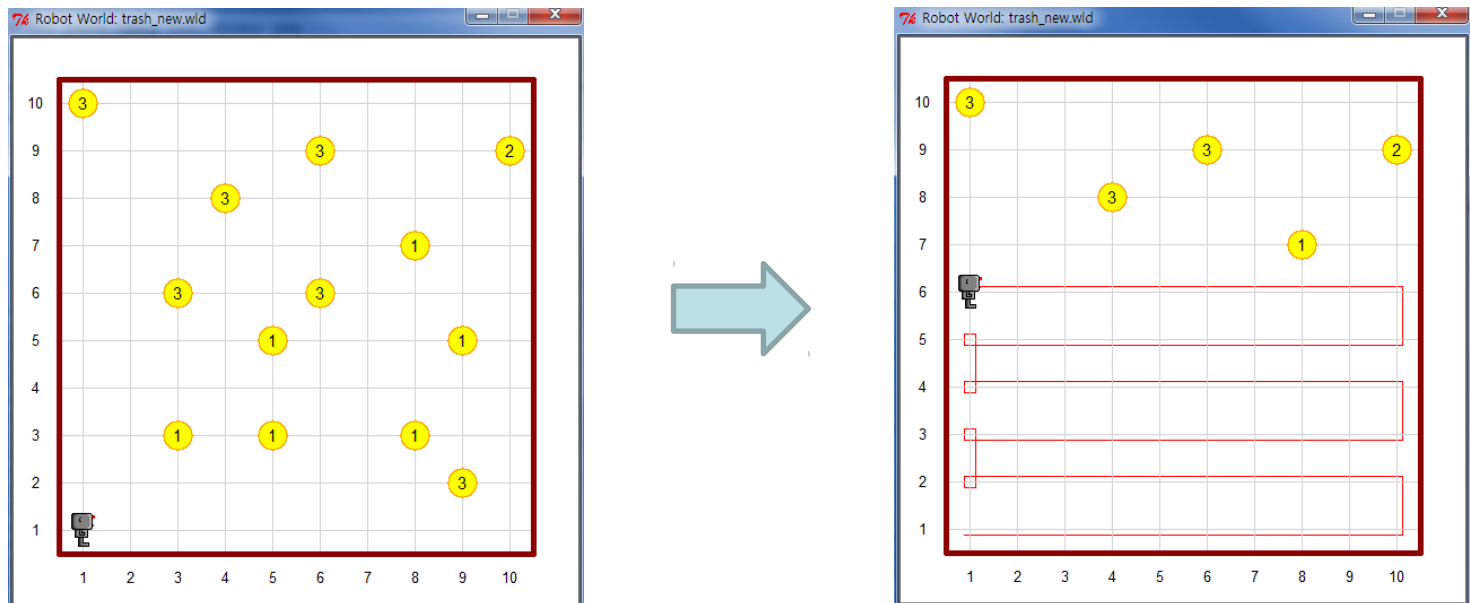
PROBLEM 16: TRASH2

Hubo's parents are so proud of his work that they ask him to pick up all the garbage that got blown away in their backyard during the windstorm. Have him pick up all the garbage and bring it back with him to his starting position. Create your own world file, corresponding to a situation like the one



illustrated in the left figure. Notice that the location of any beeper is not given in advance. The size of the backyard is not given, either.

HOW TO CLEAN THE BACKYARD

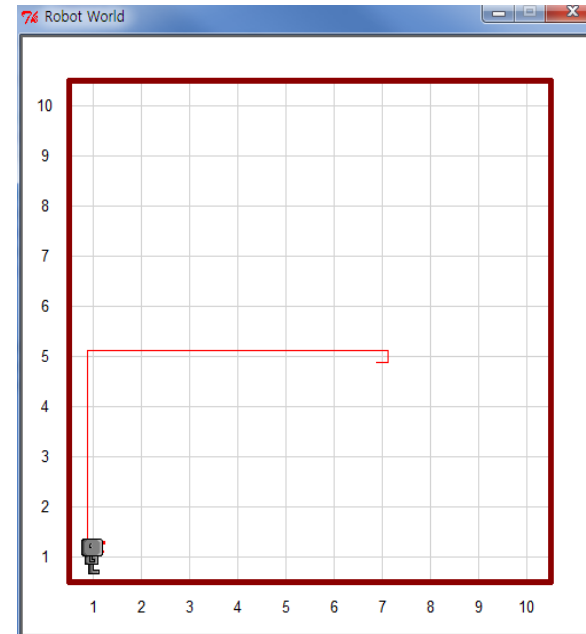
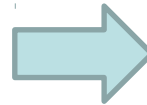
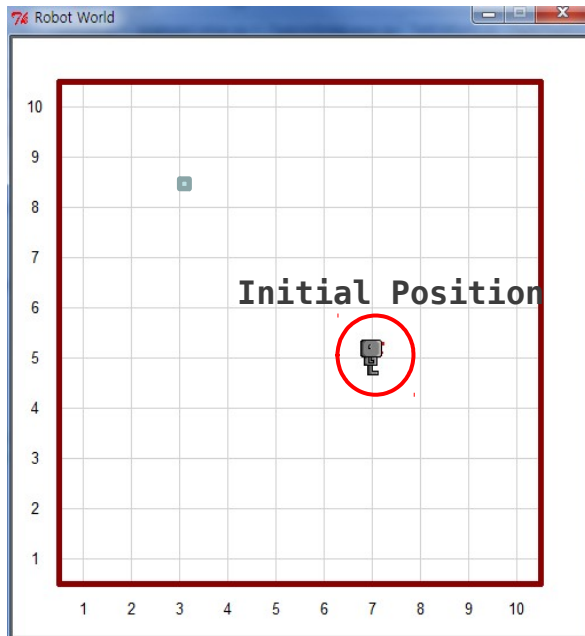


To create a backyard with litter, use `edit_world` in Section 7.

PROBLEM 17: Return

Write a program that will allow Hubo to return to his **usual starting position and orientation** (avenue 1, street 1, facing east), starting from **any position and orientation** in an empty world. You can create a robot with a given position and orientation like this:

```
hubo = Robot(orientation = "E", avenue = 7, street = 5)  
           ["E", "W", "S", "N"]
```



(orientation, avenue, street) (orientation, avenue, street)

“E”

7

5

“E”

1

1

COLOR COVERSION



PROBLEM 18: THREE_COLOR POSTER*

In the previous lecture, you learned a program that convert a color image to a black-and-white image. Modify that program to convert a color image to a three-color poster.

Use [yuna.jpg](#) as the color image.

How to convert pixels

bright pixels	yellow
dark pixels	blue
neither dark nor dark	green.

color photo



Three-color
poster



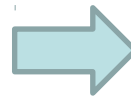
```
from cs1media import *
threshold = 100  Modify here
white = (255, 255, 255)
black = (0, 0, 0)
img = load_picture("./images/yuna.jpg")
w, h = img.size()
for y in range(h):
    for x in range(w):
        r, g, b = img.get(x, y)
        v = (r + g + b) / 3.0
        if v > threshold:
            img.set(x, y, white)
        else:
            img.set(x, y, black)
img.show()
```

Modify here.

Result with [kara.jpg](#)



Result with 2PM.jpg



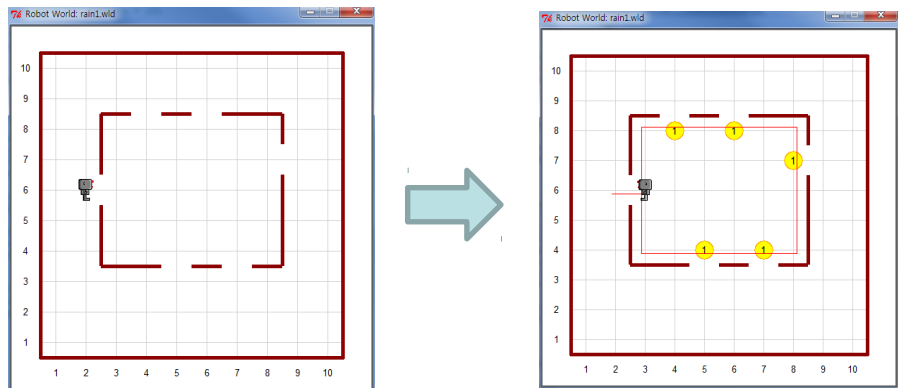
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Starting at position (2,6) and facing east.

Dropping a beeper in order to close a window

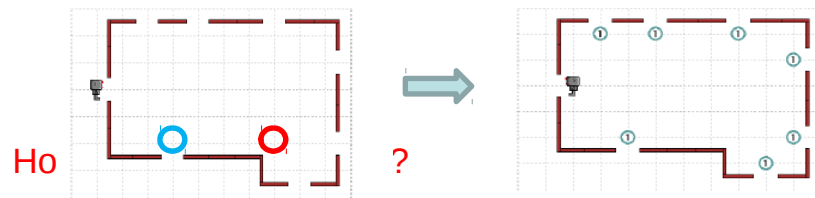
Use rain1.wld as the world file.

Pseudo code

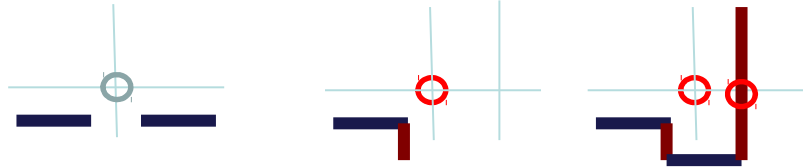
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PROBLEM 14-2: RAIN2*

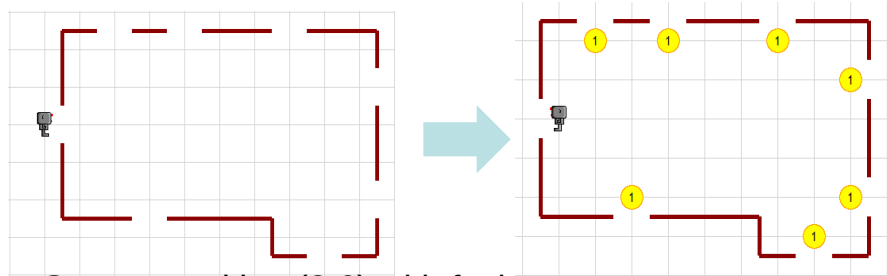
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How to find a window



if right is clear:
if front is clear,
then move forward.
if right is blocked, then :
Move backward.
close a window.



Start at position (2,6) with facing east.

Use rain2.wld as the world file.

Your program must work for both rain1.wld and rain2.wld

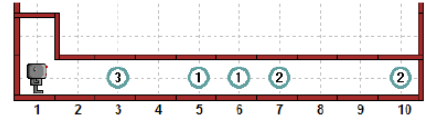
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← **How?**

How to put all litter in the trash can

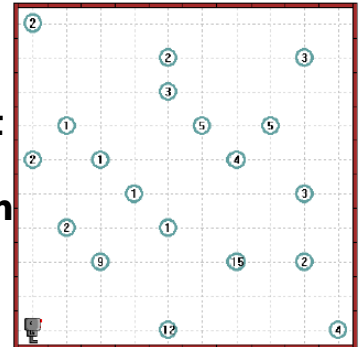
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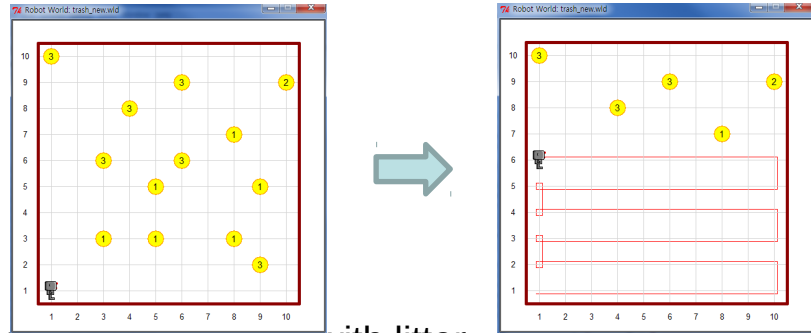
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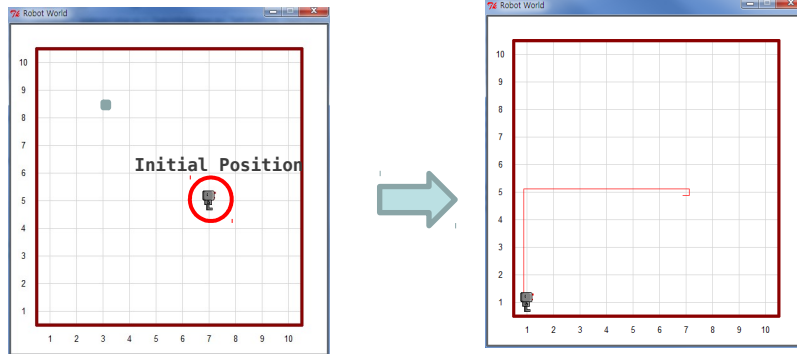


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(orientation, avenue, street) (orientation, avenue, street)

“E” 7 5 “E” 1 1

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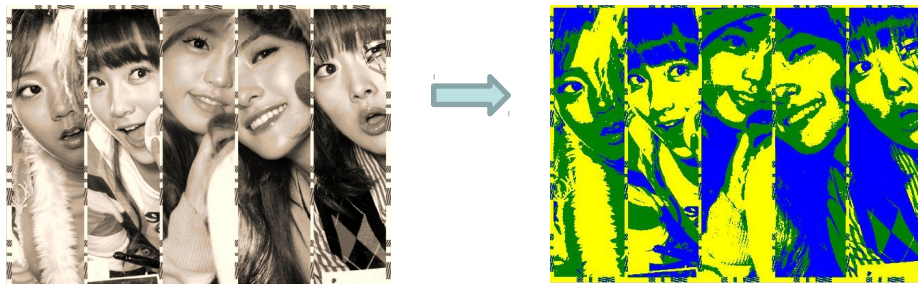
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w, h = img.size()
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    for x in range(w):
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        v = (r + g + b) / 3.0
        if v > threshold:
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        else:
            img.set(x, y, black)
img.show()
```

Result with [kara.jpg](#)



Result with 2PM.jpg

