

PROGRAMMING

Lecture 02

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How to Install Python

0. <https://open.kakao.com/o/gMZ21ubh> Join Open Chat
1. Download Python and install it Join Code: 250120
2. Download Pycharm and install it
3. Make Github account
4. Follow the instructions.
5. Install Python by typing in the following command in the Pycharm
python setup.py install
6. Test your Python interpreter with the following code in the Pycharm

```
>>>from cs1robots import *  
>>>create_world()  
>>>hubo = Robot()
```

Installing Python

The screenshot shows the Python.org homepage. The top navigation bar includes links for Python, PSF, Docs, PyPI, Jobs, and Community. The main header features the Python logo, a 'Donate' button, a search bar, and a 'Socialize' button. Below the header is a secondary navigation bar with links for About, Downloads, Documentation, Community, Success Stories, News, and Events. The 'Downloads' menu is open, displaying a list of options: All releases, Source code, Windows, macOS, Other Platforms, License, and Alternative Implementations. The 'Windows' option is selected, leading to a 'Download for Windows' section. This section highlights 'Python 3.13.1' and includes a note that Python 3.9+ cannot be used on Windows 7 or earlier. It also provides a link to view the full list of downloads. At the bottom of the page, a message states: 'Python is a programming language that lets you work quickly and integrate systems more effectively. >>> [Learn More](#)'.

Python

PSF

Docs

PyPI

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Python 3: Fib

>>> def fib(n):

>>> a, b = 0, 1

>>> while a < n:

>>> print(a, end=' ')

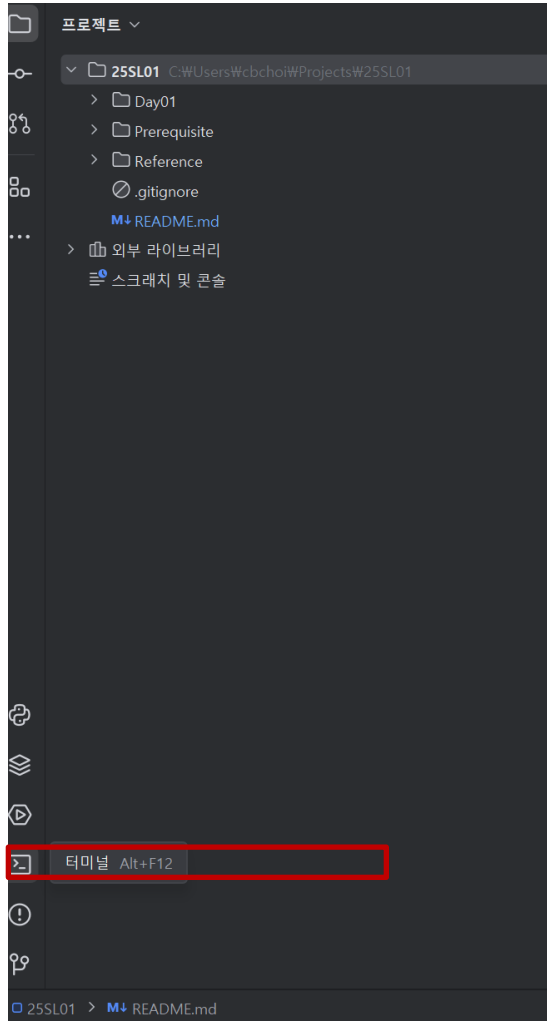
>>> a, b = b, a+b

>>> print()

>>> fib(1000)

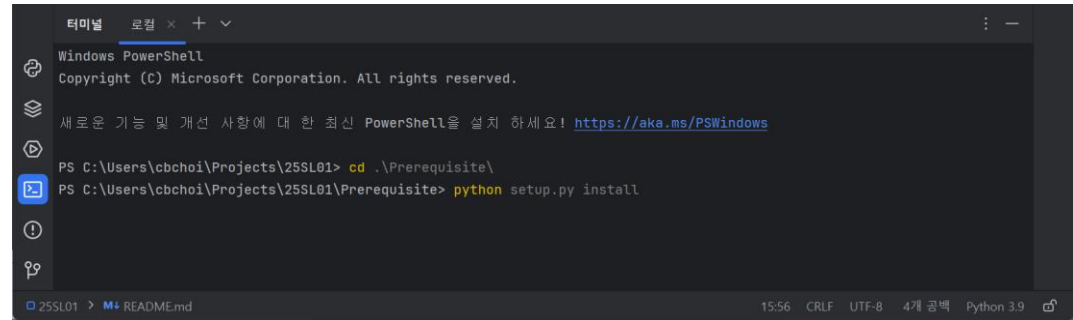
0 1 1 2 3 5 8 13 21 34 55 89 144 233 377 610 987 1597 2584 4181 6765 10946 17711 28657 46368 75025 121393 196418 317811 514229 832040 1346269 2178309 3524558 5702887 9227465 14930352 24157811 39088369 63245986 102334155 166555456 268931961 435487077 704418963 1139905039 1844326900 2984313680 4823218719 7807625318 12631536037 20436637756 33068173795 53504710832 86571762547 139073696439 225645408986 364719065425 590364474411 955083540397 1545407614816 2500690769217 4046098384033 6546706053250 10597401822467 17143597875717 27741000000000 44888401875717 72629499725717 117517500000000 190146901875717 307664401875717 49781130375717 80547620563250 13032875075717 21087537130375 3412040220563 5520803923571 8932557637571 1445336156103 2338416548460 3783752712163 6122168660625 9905921372788 16028090033413 25933991406198 41962081440611 67990072473800 110022063880011 177011936353811 287033999233822 464055963113833 751067909352644 1215123872466477 1966190781579321 3181314653945800 5147438525525177 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570739215990880001717717177 922758465378221771717717177 1493487681270800001717717177 2415606907169021771717717177 3908836900439821771717717177 6324598618608800001717717177 10233415519580821771717717177 16655545638189041771717717177 27741000000000000001717717177 448884018757171771717717177 726294997257171771717717177 11751750000000000001717717177 1901469018757171771717717177 3076644018757171771717717177 497811303757171771717717177 805476205632500001717717177 130328750757171771717717177 2108753713037500001717717177 3412040220563171771717717177 552080392357171771717717177 893255763757171771717717177 1445336156103171771717717177 2338416548460171771717717177 3783752712163171771717717177 6122168660625171771717717177 9905921372788171771717717177 16028090033413171771717717177 25933991406198171771717717177 41962081440611171771717717177 67990072473800171771717717177 110022063880011171771717717177 177011936353811171771717717177 287033999233822171771717717177 464055963113833171771717717177 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144533615610317177171771717717177 233841654846017177171771717717177 378375271216317177171771717717177 612216866062517177171771717717177 990592137278817177171771717717177 1602809003341317177171771717717177 2593399140619817177171771717717177 4196208144061117177171771717717177 6799007247380017177171771717717177 11002206388001117177171771717717177 17701193635381117177171771717717177 28703399923382217177171771717717177 46405596311383317177171771717717177 75106790935264417177171771717717177 121512387246647717177171771717717177 196619078157932117177171771717717177 318131465394580017177171771717717177 514743852552517717177171771717717177 832875320710450017177171771717717177 1347017173162967717177171771717717177 2180192493873417717177171771717717177 3527209666035377717177171771717717177 5707392159908800017177171771717717177 9227584653782217717177171771717717177 14934876812708000017177171771717717177 24156069071690217717177171771717717177 39088369004398217717177171771717717177 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6799007247380017177171771717717177171771717717177 11002206388001117177171771717717177171771717717177 17701193635381117177171771717717177171771717717177 28703399923382217177171771717717177171771717717177 46405596311383317177171771717717177171771717717177 75106790935264417177171771717717177171771717717177 121512387246647717177171771717717177171771717717177 196619078157932117177171771717717177171771717717177 318131465394580017177171771717717177171771717717177 514743852552517717177171771717717177171771717717177 832875320710450017177171771717717177171771717717177 1347017173162967717177171771717717177171771717717177 2180192493873417717177171771717717177171771717717177 3527209666035377717177171771717717177171771717717177 5707392159908800017177171771717717177171771717717177 9227584653782217717177171771717717177171771717717177 14934876812708000017177171771717717177171771717717177 24156069071690217717177171771717717177171771717717177 39088369004398217717177171771717717177171771717717177 6

Installing prerequisite (1/2)



1. Launch
Terminal

2. Execute following commands
`cd Prerequisite`
`python setup.py install`



Installing prerequisite (2/2)

```
프로젝트 > 25SL01 C:\Users\cbchoi\Projects\25SL01
├── Day01
├── Prerequisite
├── Reference
├── .gitignore
├── README.md
└── 외부 라이브러리
    └── 스크래치 및 콘솔

터미널 로컬 x
Processing dependencies for sit22001==0.2.3
Searching for pillow>=3.4.2
Reading https://pypi.org/simple/pillow/
C:\Users\cbchoi\AppData\Local\Programs\Python\Python39\lib\site-packages\pkg_resources\__init__.py:123: PkgResourcesDeprecationWarning: is an invalid version and will not be supported in a future release
  warnings.warn(
C:\Users\cbchoi\AppData\Local\Programs\Python\Python39\lib\site-packages\pkg_resources\__init__.py:123: PkgResourcesDeprecationWarning: rc1 is an invalid version and will not be supported in a future release
  warnings.warn(
Downloading https://files.pythonhosted.org/packages/21/a6/f51d47675940b5c63b08ff0575b3518428b4acb891f88526fa4ee1edab6f/pillow-11.1.0-cp39-cp39-win_amd64.whl#sha256=3362c6ca227e65c54bf71a5f88b3d4565ff1bcb63ae72c34b07bbb1cc59a43f
Best match: pillow 11.1.0
Processing pillow-11.1.0-cp39-cp39-win_amd64.whl
Installing pillow-11.1.0-cp39-cp39-win_amd64.whl to c:\users\cbchoi\appdata\local\programs\python\python39\lib\site-packages
Adding pillow 11.1.0 to easy-install.pth file

Installed c:\users\cbchoi\appdata\local\programs\python\python39\lib\site-packages\pillow-11.1.0-py3.9-win-amd64.egg
Finished processing dependencies for sit22001==0.2.3
PS C:\Users\cbchoi\Projects\25SL01\Prerequisite>
```

Note) The path may different!

2D ROBOT CONTROL

Read Sections 5~9 to do following tasks:

Zigzag1

Hurdles1

Newspaper delivery

Harvest1

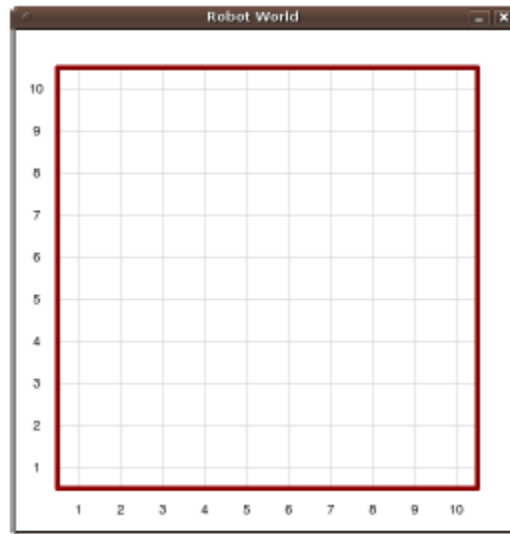
Hurdles2

Harvest2

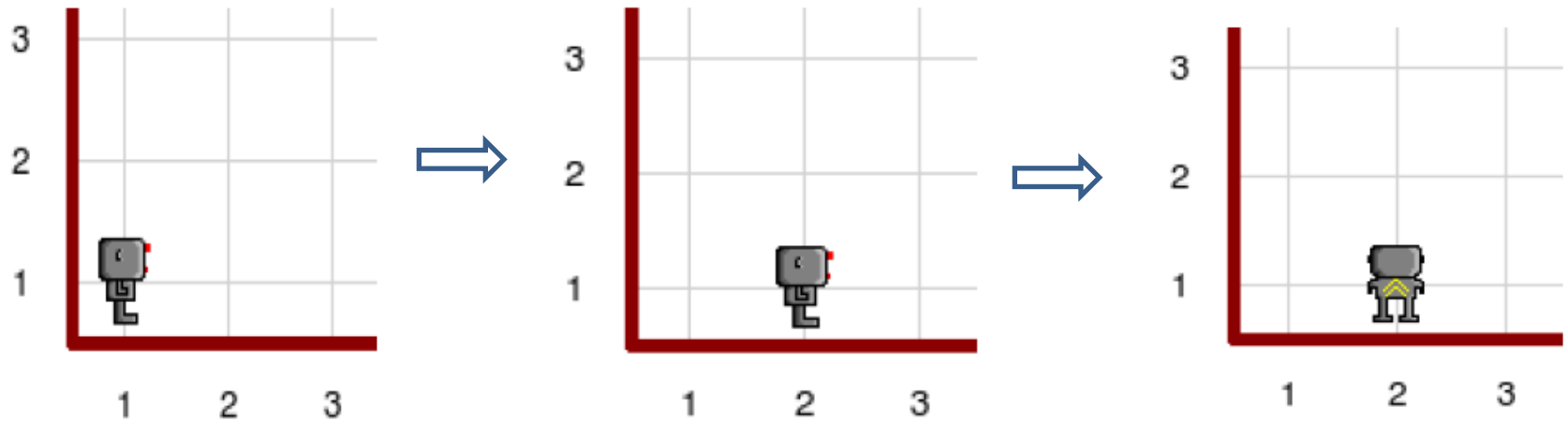
Harvest3

INTERACTIVE MODE (1/2)

```
>>>from cs1robots import *  
>>>create_world()
```



INTERACTIVE MODE (2/2)



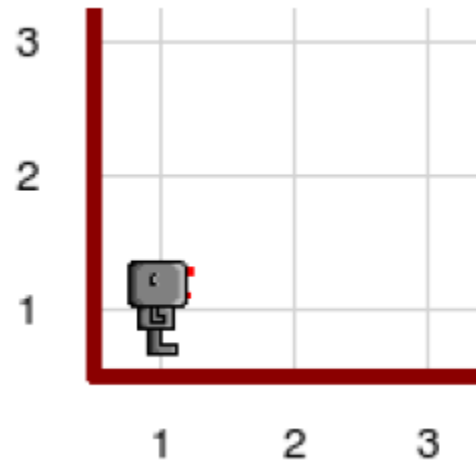
```
>>>hubo = Robot()
```

```
>>>hubo.move()
```

```
>>>hubo.turn_left
```


SCRIPT MODE

```
from cs1robots import *  
create_world()  
hubo = Robot()  
hubo.move()  
hubo.turn_left()  
hubo.move()  
hubo.turn_left()  
hubo.move()  
hubo.turn_left()  
hubo.move()  
hubo.turn_left()
```



Why ?

TRACE & PAUSE

```
from cs1robots import *  
create_world()  
hubo = Robot()
```

```
hubo.set_trace("blue")
```

```
hubo.set_pause(2)
```

```
hubo.move()
```

```
hubo.turn_left()
```

```
hubo.move()
```

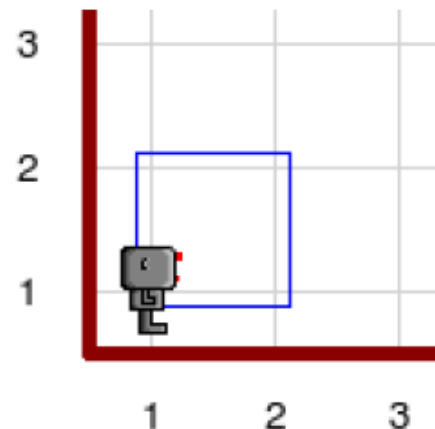
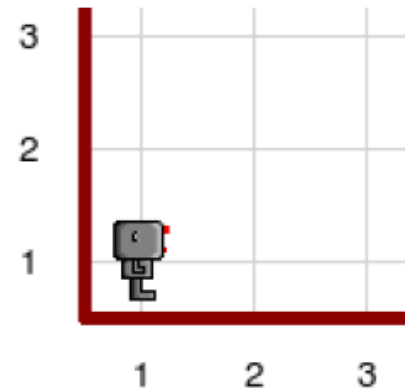
```
hubo.turn_left()
```

```
hubo.move()
```

```
hubo.turn_left()
```

```
hubo.move()
```

```
hubo.turn_left()
```



BUGS

Hubo.mMove() **Syntax error !**

```
from cs1robots import *
```

```
create_world()
```

```
hubo = Robot()
```

```
hubo.move()
```

```
hubo.turn_left()
```

```
hubo.turn_left()
```

```
hubo.turn_left()
```

```
hubo.move()
```

Runtime error !

What's wrong ?

COMMENTS

Used for other humans inside a program

- To embed programmer-readable annotations.
- To make the source code easier to understand.

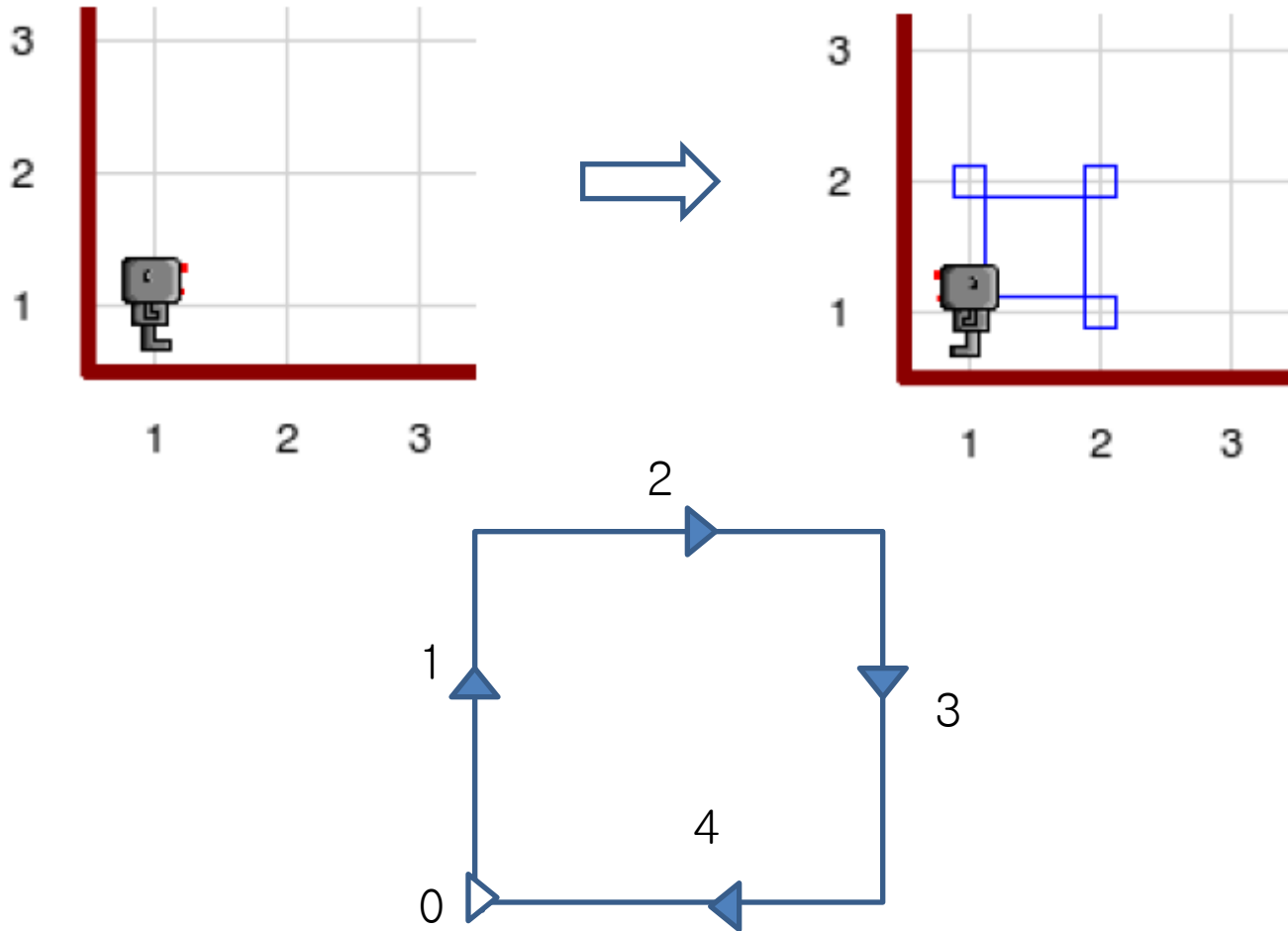
Starting with #

Ignored by the Python interpreter:

```
# My first program
from cs1robots import *
create_world()

# This line should be ignored!
```

TURNING RIGHT (1/3)



TURNING RIGHT (2/3)

```
# initialize the world
```

```
from cs1robots import *  
create_world()  
hubo = Robot()
```

```
# turn left
```

```
hubo.turn_left()
```

Why?

```
# move and turn right  
hubo.move()
```

```
hubo.turn_left()  
hubo.turn_left()  
hubo.turn_left()
```

turn right

```
# move and turn right  
hubo.move()
```

```
hubo.turn_left()  
hubo.turn_left()  
hubo.turn_left()
```

turn right

```
# move and turn right  
hubo.move()
```

```
hubo.turn_left()  
hubo.turn_left()  
hubo.turn_left()
```

turn right

```
hubo.move()
```

TURNING RIGHT (3/3)

```
from cs1robots import *  
create_world()  
hubo = Robot()
```

```
def turn_right():  
    hubo.turn_left()  
    hubo.turn_left()  
    hubo.turn_left()
```

```
hubo.turn_left()  
  
# turn right and move  
hubo.move()  
turn_right()
```

```
# turn right and move  
hubo.move()  
turn_right()
```

```
# turn left and move  
hubo.move()  
turn_right()
```

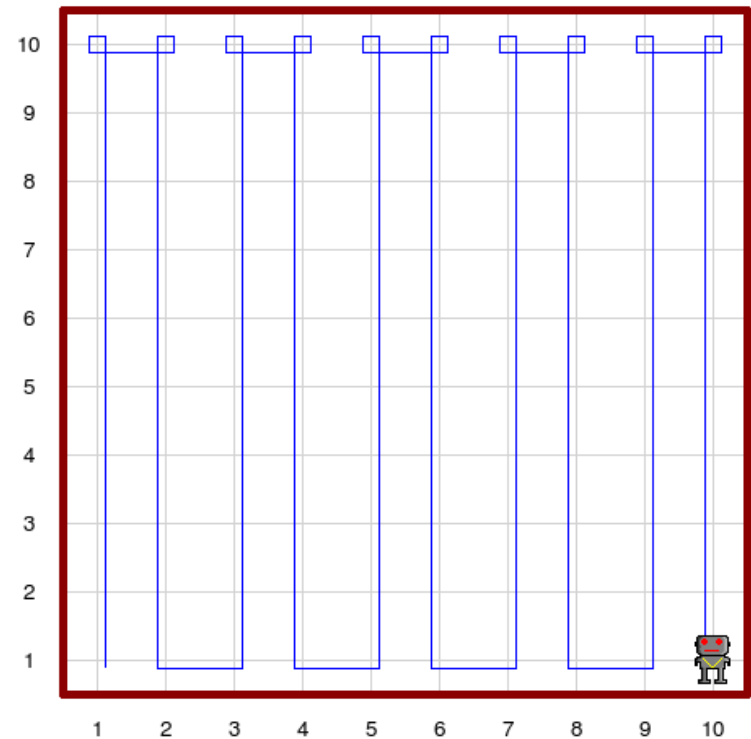
```
hubo.move()
```

PRACTICE USING FUNCTIONS 1

PROBLEM 1: ZIGZAG1

Write a program *zigzag.py* that makes your robot visit the entire world in a zigzag fashion.

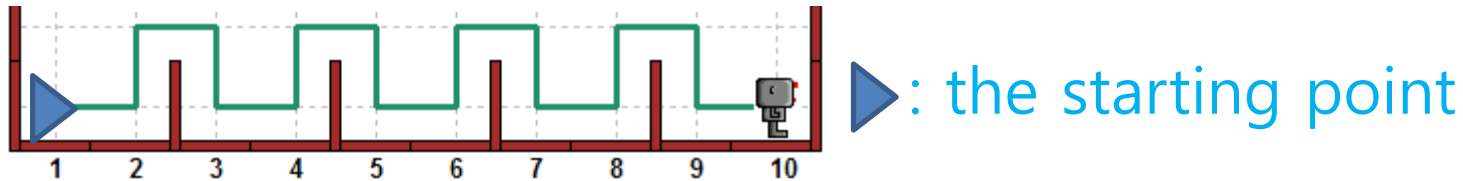
Analyze the zigzag path and use the functions to make your program as compact as possible.



PRACTICE USING FUNCTIONS 2

PROBLEM2: HURDLES1


Hubo has entered a hurdles race with obstacles as in the world file *hurdles1*. Write a program that makes Hubo follow the path indicated below in his way to picking up a beeper, which is at grid(10,1).



Again, make your program as compact as possible using functions.

HOW TO LOAD HURDLES1

```
from cs1robots import *  
load_world("worlds/hurdles1.wld") #but not create_world()  
hubo = Robot()
```

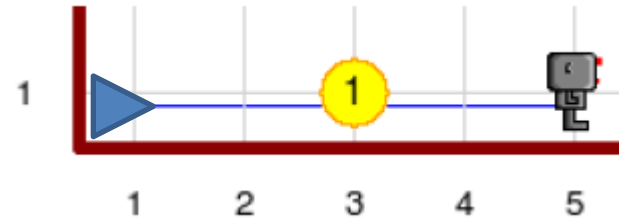


directory hurdle1 file

Create a directory worlds and download all world files.

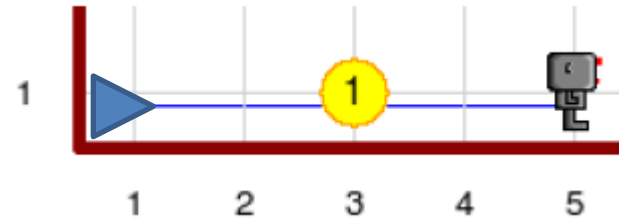
DROPPING A BEEPER

```
from cs1robots import *  
load_world("worlds/hurdles1.wld")  
hubo = Robot beepers = 1  
hubo.set_trace("blue")  
hubo.move()  
hubo.move()  
hubo.drop_beeper()  
hubo.move()  
hubo.move()
```



PICKING A BEEPER

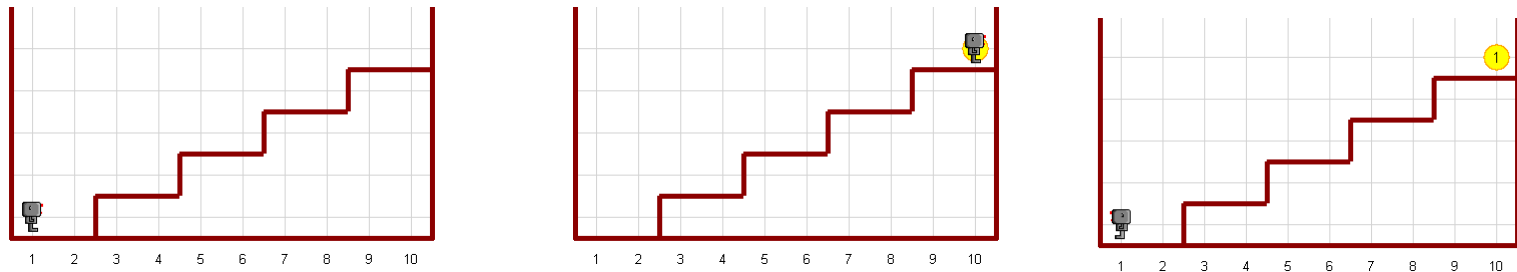
```
from cs1robots import *  
load_world("worlds/hurdles1.wld")  
hubo = Robot beepers = 1  
hubo.set_trace("blue")  
hubo.move()  
hubo.move()  
hubo.pick_beeper()  
hubo.move()  
hubo.move()
```



PRACTICE USING FUNCTIONS 3

PROBLEM 3: NEWSPAPER DELIVERY

Hubo delivers newspapers in his local neighborhood. Make him climb the stairs to the front door of a house, drop the newspaper (represented by a beeper) on the top step, and return to his starting point as illustrated below. The world file is newspaper.wld.



Use top-down design: As already explained in the previous lecture, decompose the problem into sub-problems and then focus on each sub-problem one by one.

PRACTICE USING FUNCTIONS 4

PROBLEM 4: HARVEST1

It's harvest time! Make the robot pick up all the carrots (represented by beepers) in this garden. The world file is harvest1.wld. Employ top-down design. Use for-loops.

