

Lecture #5. 애니메이션

2D 게임 프로그래밍

이대현 교수

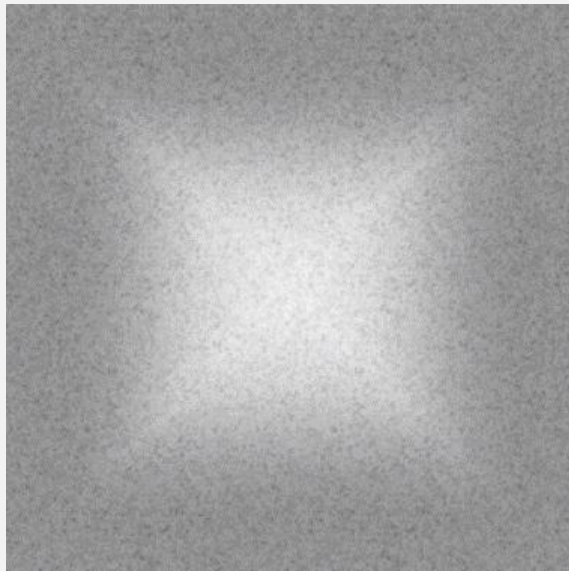


한국공학대학교
TECH UNIVERSITY OF KOREA

학습 내용

- 더블 버퍼링
- 플리핑
- 스프라이트 애니메이션

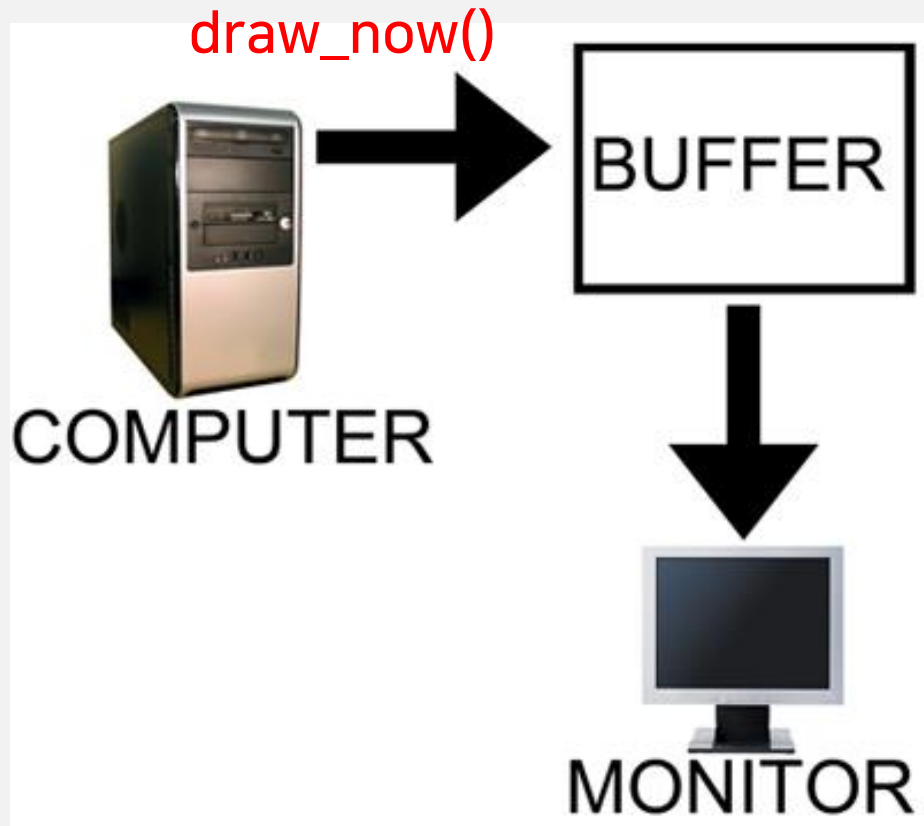
지난 번 실습의 문제점? - 화면 플리커링



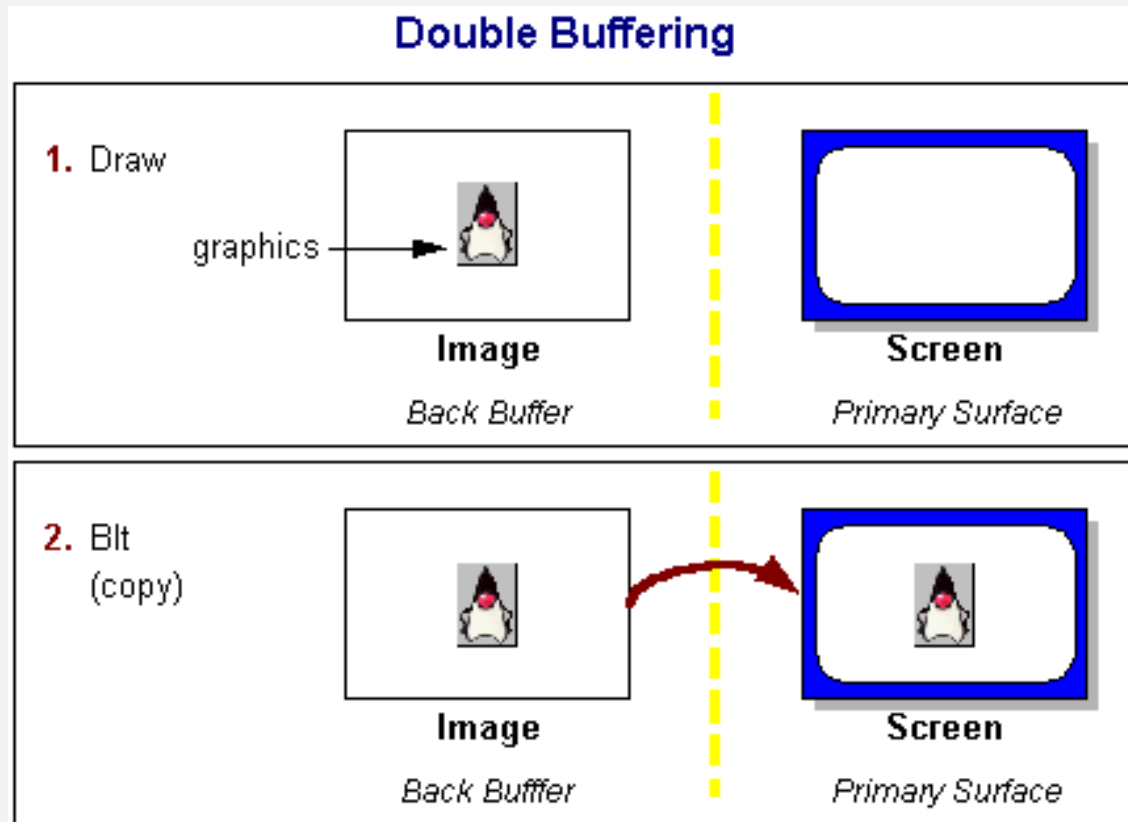
무대의 커튼은 왜 있을까?



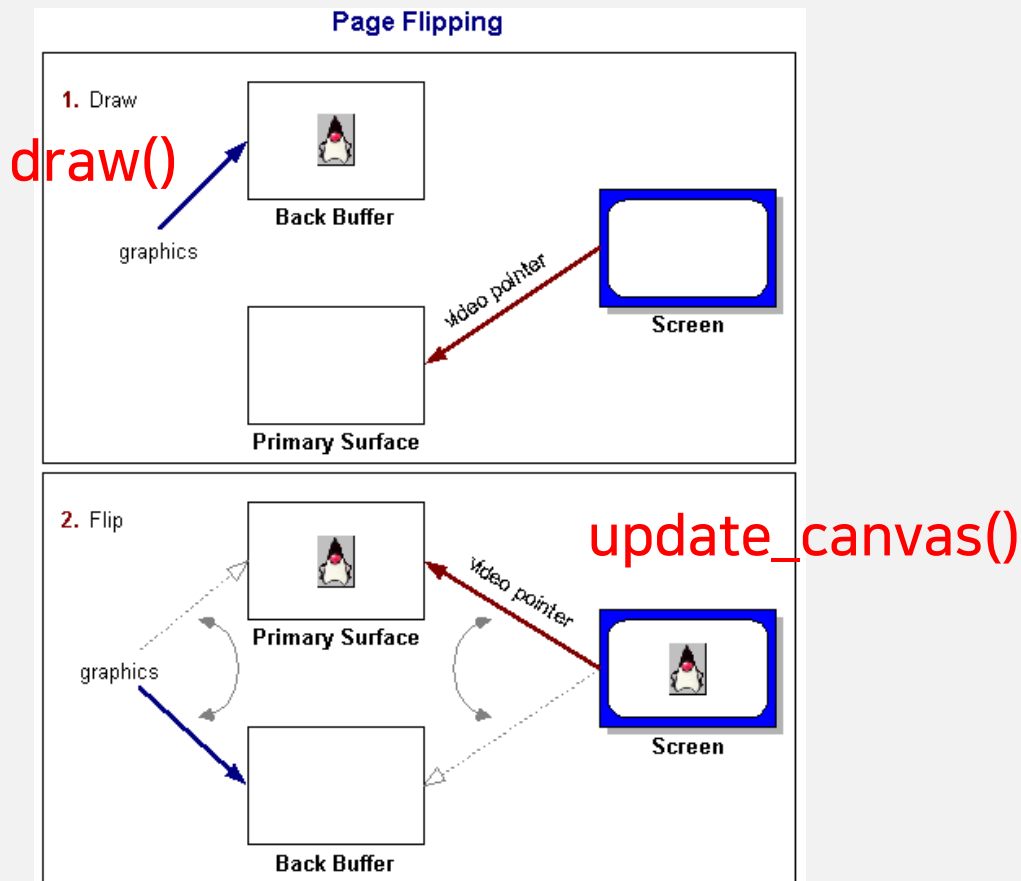
프레임 버퍼(Frame Buffer)



더블 버퍼링(Double Buffering)



페이지 플리핑(Page Flipping)



후면 버퍼(Back Buffer)에 그리기

```
>>> from pico2d import *  
>>> open_canvas()  
>>> character = load_image('character.png')  
>>> character.draw(100,100)  
>>> character.draw(200,200)
```



```
>>> update_canvas()
```

화면 지우기

```
>>> clear_canvas()  
>>> update_canvas()
```

Python IDE

- **PyCharm**

- 파이썬용으로 가장 많이 사용되는 IDE
- PC, 리눅스, 맥 등 다양한 환경에서 사용 가능

- **Visual Studio**

- C/C++/C# 이외에 파이썬 개발도 가능

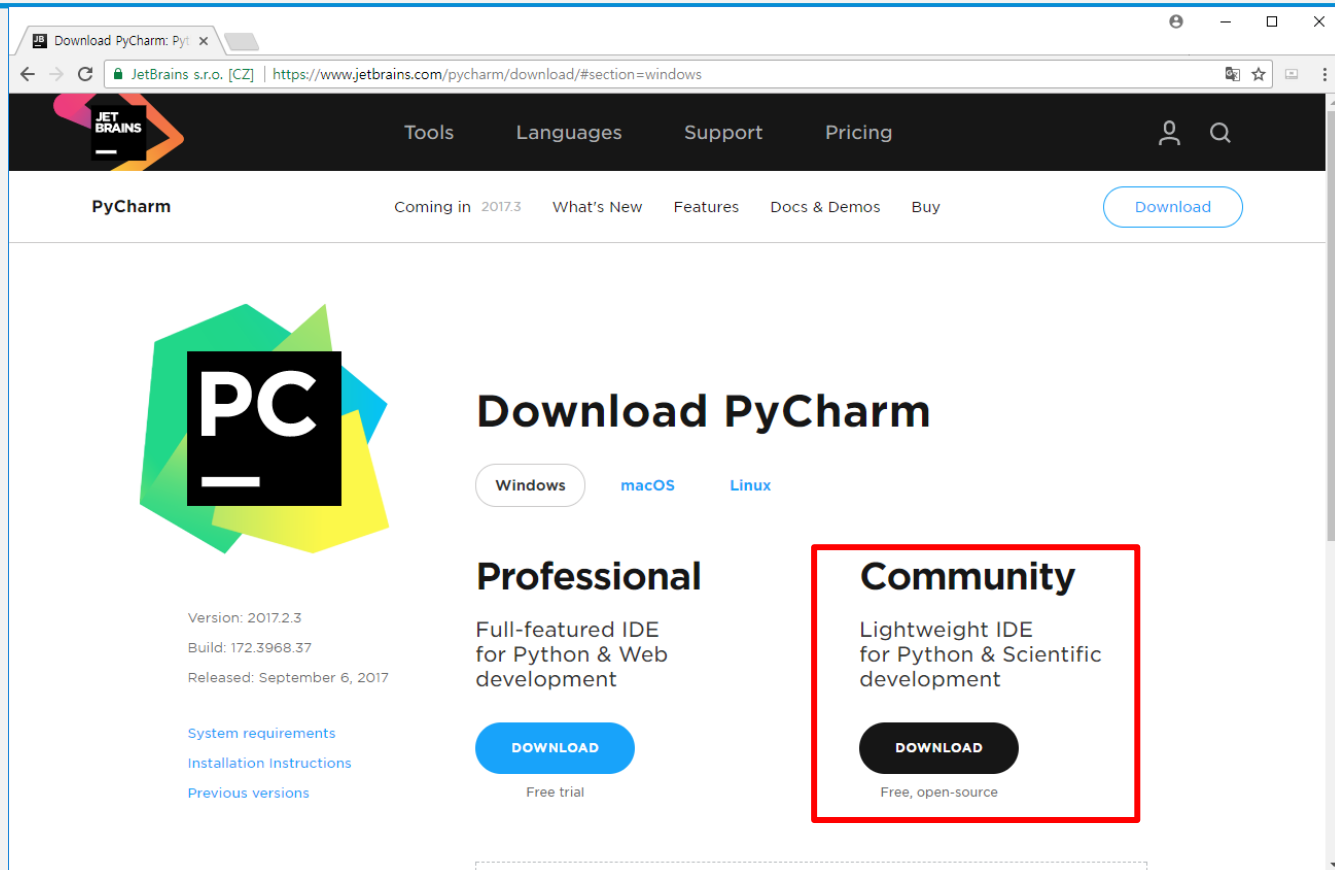
- **Visual Studio Code**

- 파이썬을 연계 사용 가능한 소스 코드 도구
- PC, Linux, 맥 등에서 공통적으로 사용 가능

PyCharm (<https://www.jetbrains.com/pycharm/>)



PyCharm 설치 – community version



The screenshot shows the JetBrains website's download page for PyCharm. The browser address bar displays the URL: <https://www.jetbrains.com/pycharm/download/#section=windows>. The page features a dark navigation bar with links for Tools, Languages, Support, and Pricing. Below this, a white banner contains the PyCharm logo, the text "Coming in 2017.3", and a "Download" button. The main content area is divided into two columns. The left column displays the PyCharm logo (a green hexagon with a black square containing "PC") and version details: Version: 2017.2.3, Build: 172.3968.37, Released: September 6, 2017. It also includes links for "System requirements", "Installation instructions", and "Previous versions". The right column is titled "Download PyCharm" and features three tabs: "Windows", "macOS", and "Linux". Below these tabs are two download options: "Professional" (Full-featured IDE for Python & Web development) and "Community" (Lightweight IDE for Python & Scientific development). The "Community" option is highlighted with a red box. It includes a "DOWNLOAD" button and the text "Free, open-source".

Download PyCharm: Pyi x

JetBrains s.r.o. [CZ] | <https://www.jetbrains.com/pycharm/download/#section=windows>

Tools Languages Support Pricing

PyCharm Coming in 2017.3 What's New Features Docs & Demos Buy [Download](#)

PC

Version: 2017.2.3
Build: 172.3968.37
Released: September 6, 2017

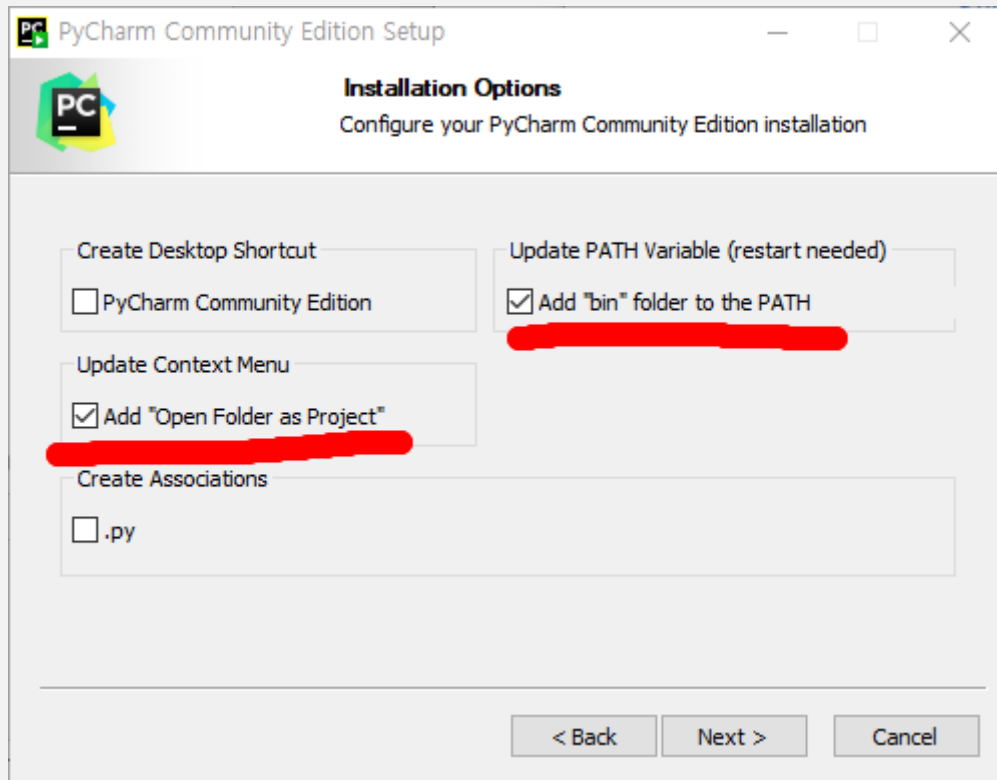
[System requirements](#)
[Installation instructions](#)
[Previous versions](#)

Download PyCharm

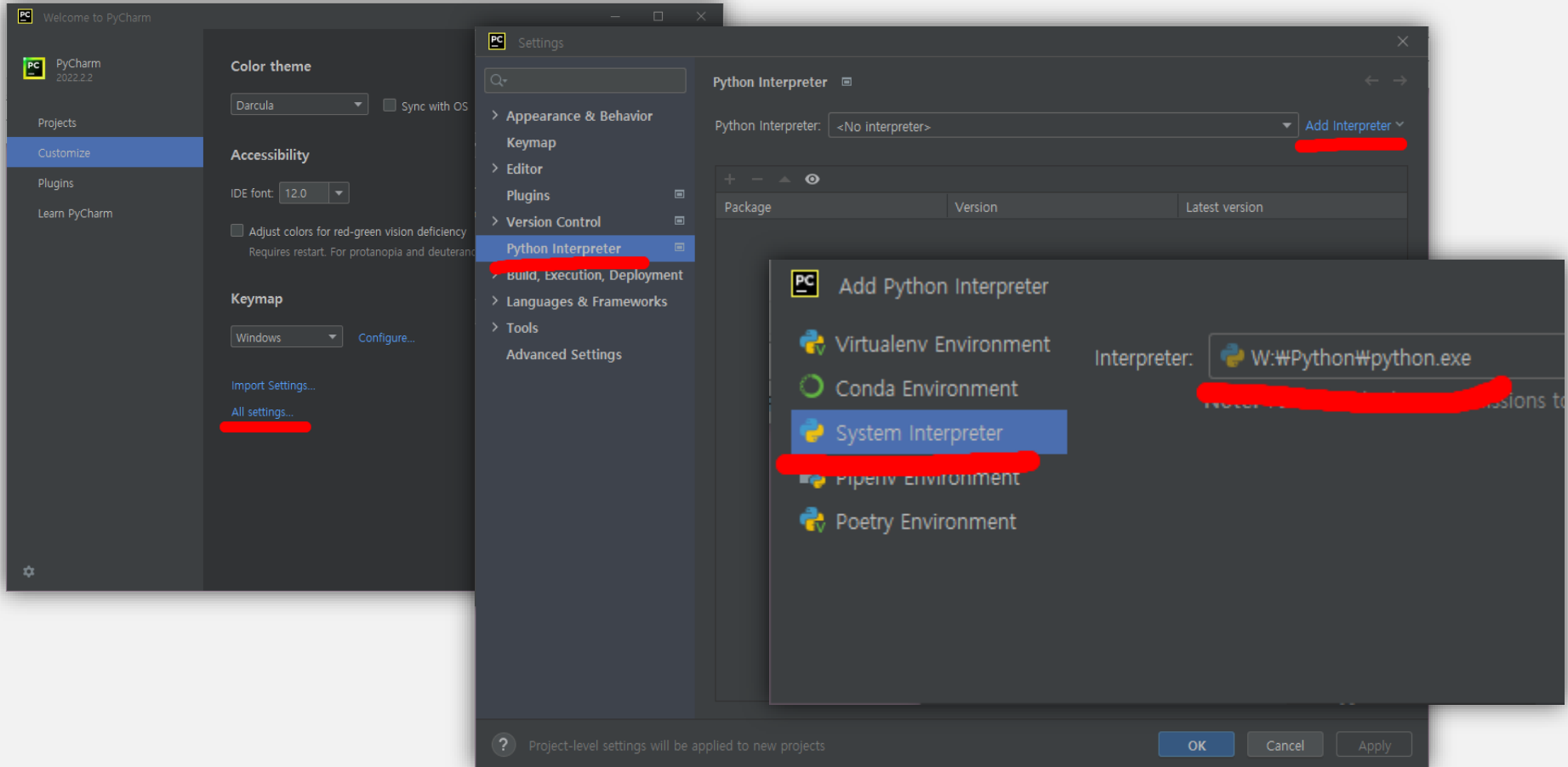
Windows macOS Linux

Professional
Full-featured IDE for Python & Web development
[DOWNLOAD](#)
Free trial

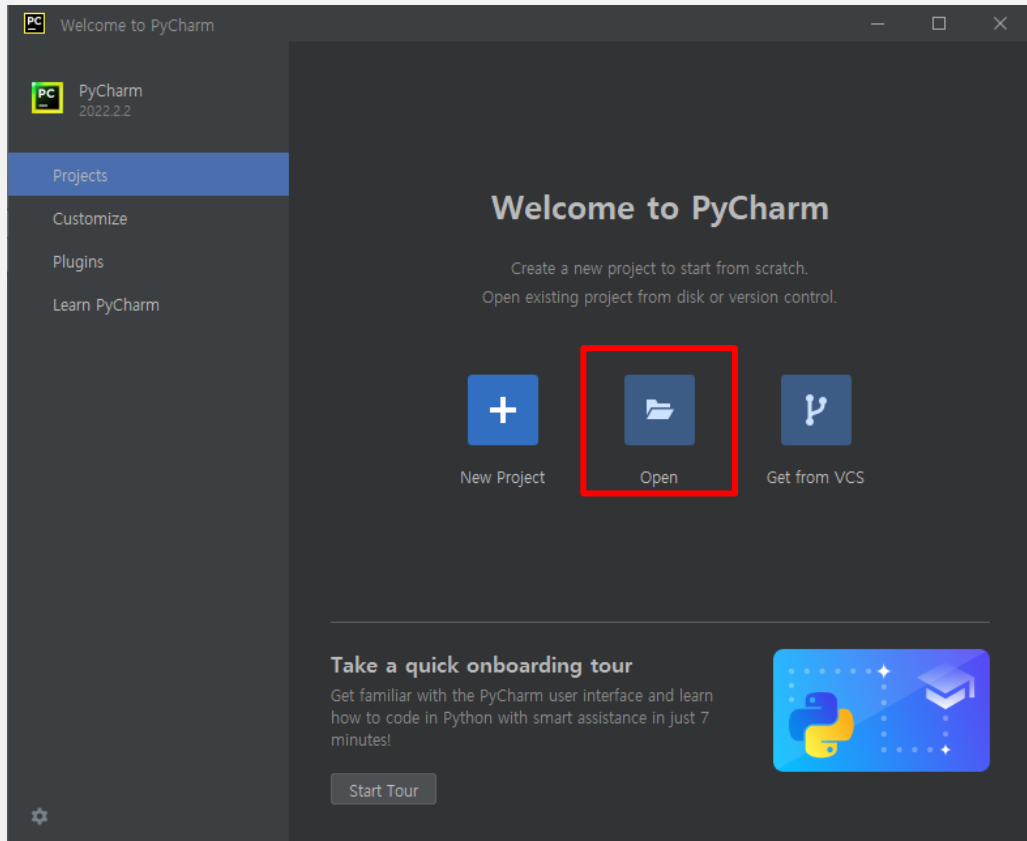
Community
Lightweight IDE for Python & Scientific development
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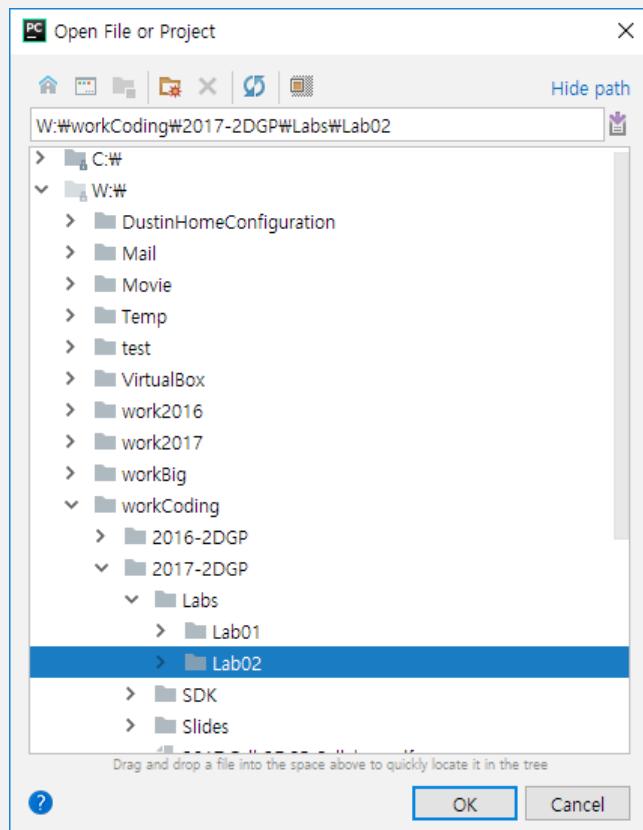
기본 설정 – System Interpreter



PyCharm의 실행



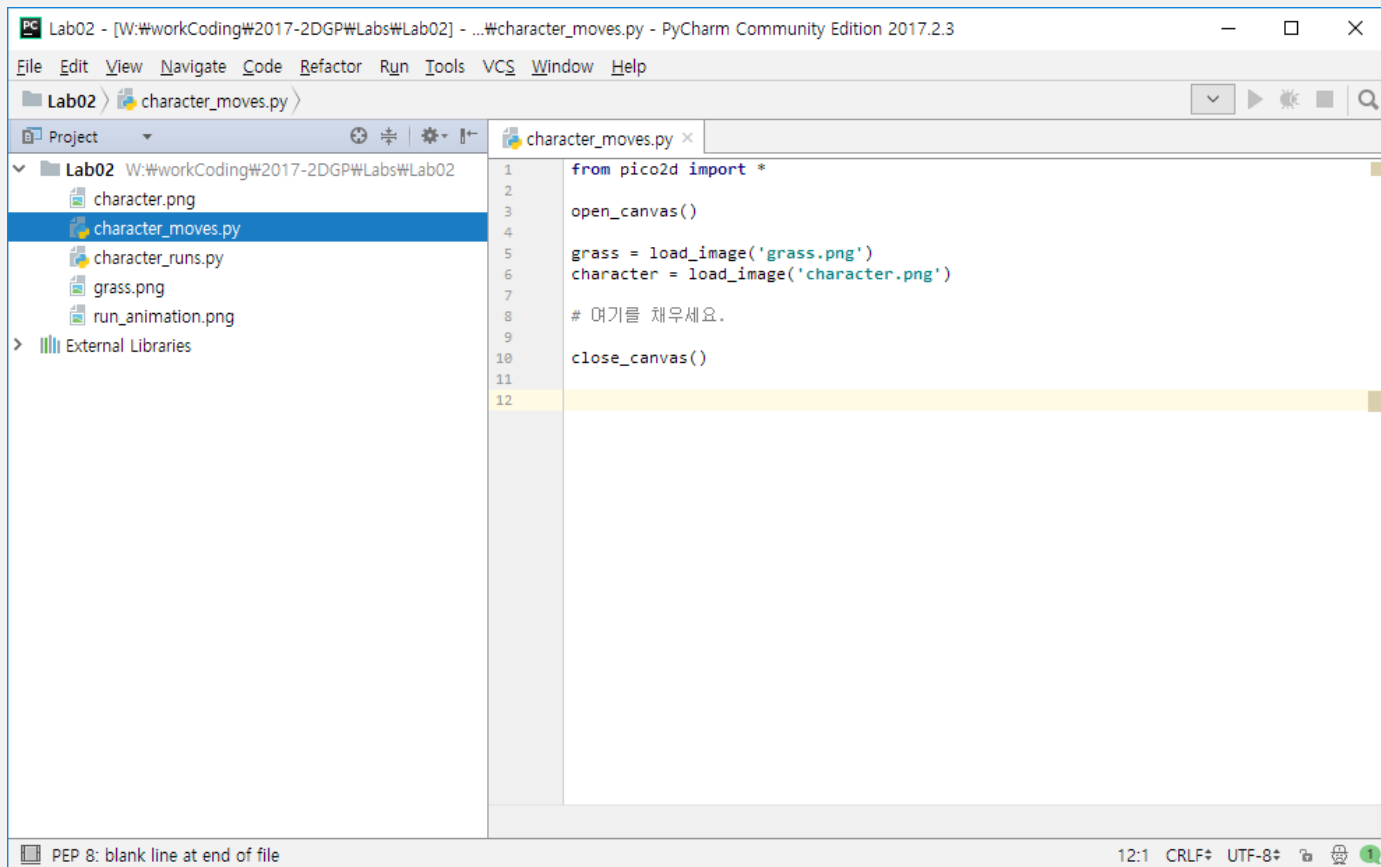
폴더 선택





부드러운 캐릭터 이동

character_moves.py 선택 및 코드 입력



character_moves.py



```
from pico2d import *

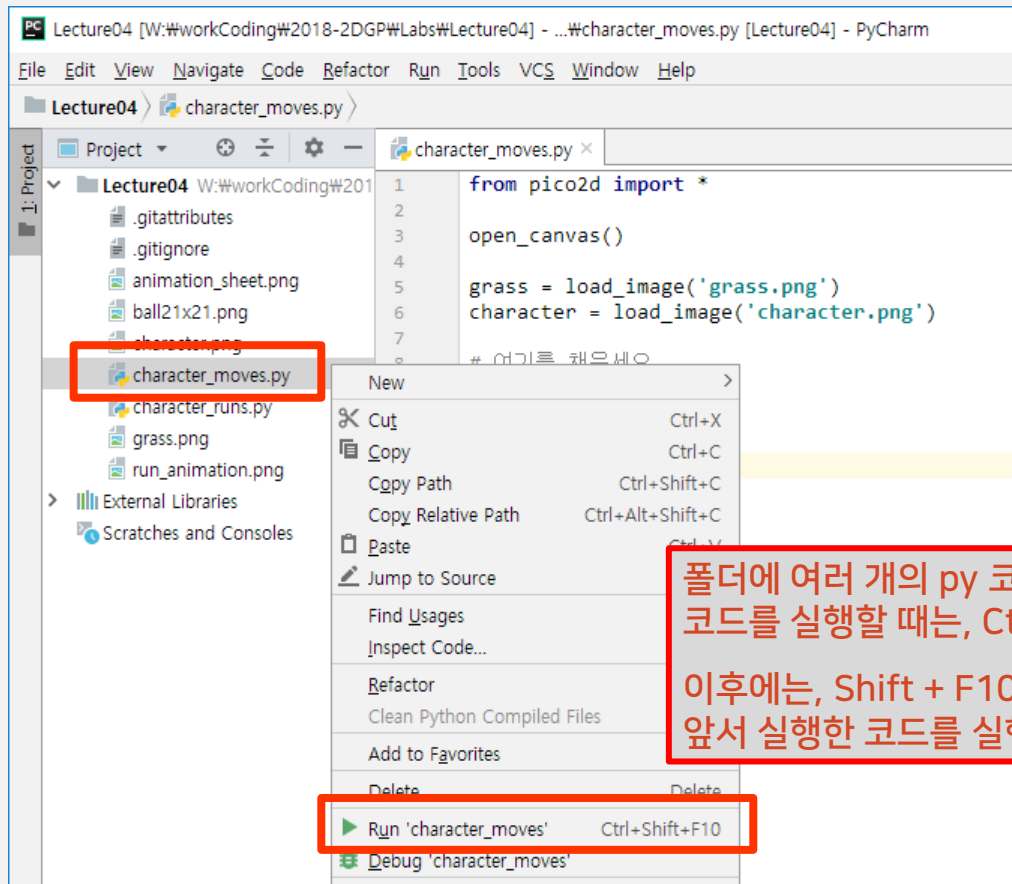
open_canvas()

grass = load_image('grass.png')
character = load_image('character.png')

for x in range(0, 800, 5):
    clear_canvas()
    grass.draw(400, 30)
    character.draw(x, 90)
    update_canvas()
    delay(0.01)

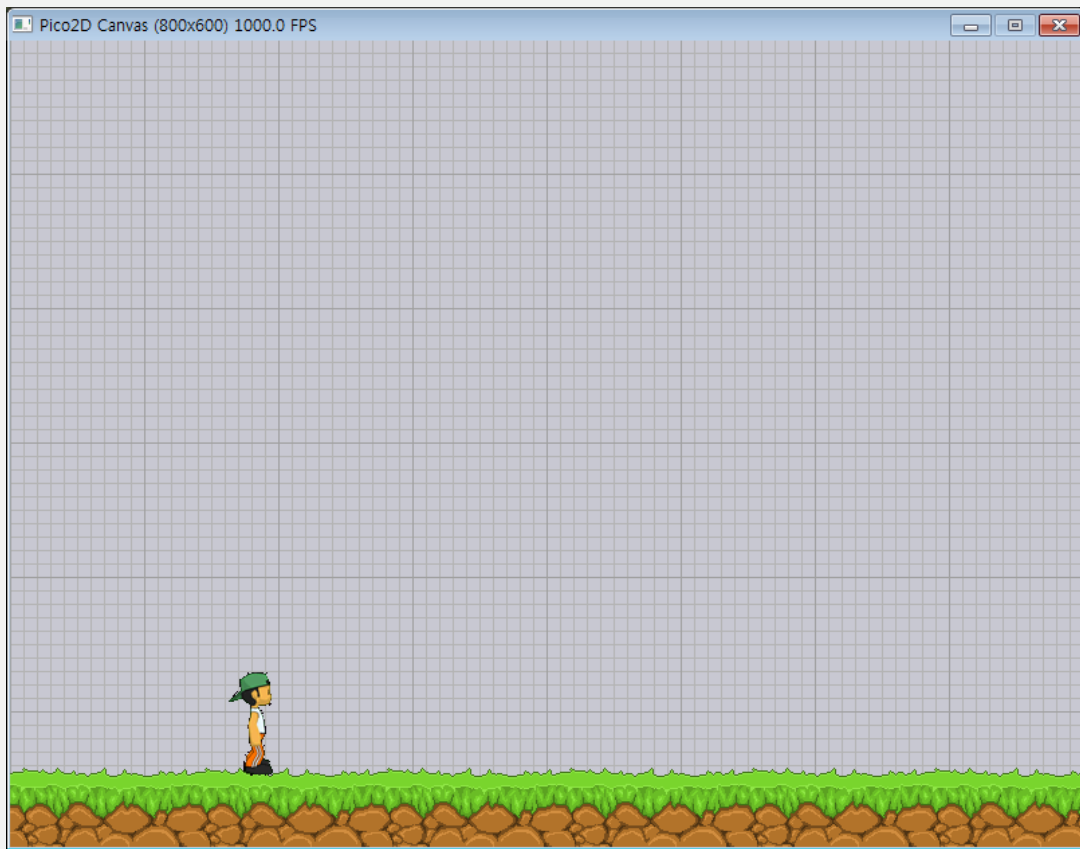
close_canvas()
```

선택한 코드의 실행(Ctrl + Shift + F10)



폴더에 여러 개의 py 코드가 있을 경우, 선택한 코드를 실행할 때는, Ctrl + Shift + F10
이후에는, Shift + F10 을 하면, 지속적으로 앞서 실행한 코드를 실행할 수 있음.

실행 결과



스프라이트(Sprite)

■ 스프라이트란?

- 게임 장면안에서 보여지는 이미지 또는 애니메이션되는 오브젝트
- 2D 게임에서는 게임의 모든 캐릭터들과 이동하는 물체들을 표현하는 데 사용됨.
- 3D 게임에서는 2D로 표현될 수 있는 각종 오브젝트에 사용됨.
 - 불, 연기, 작은 물체들, UI 표시 등등.

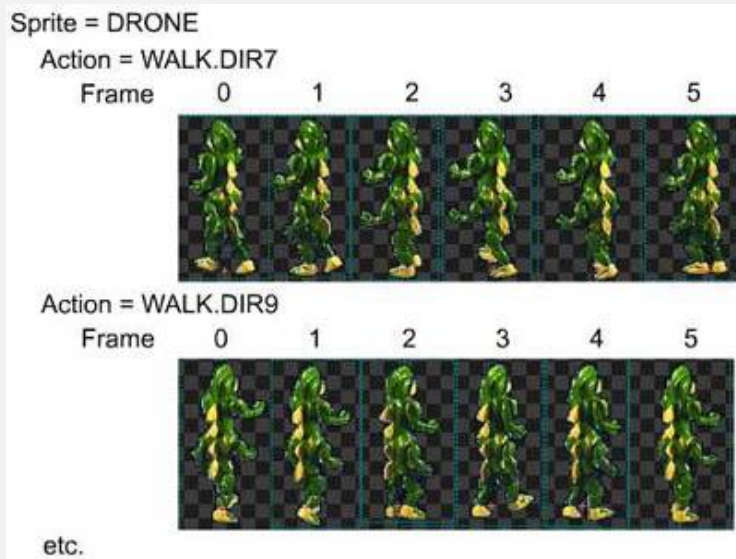


Metal Slug 3

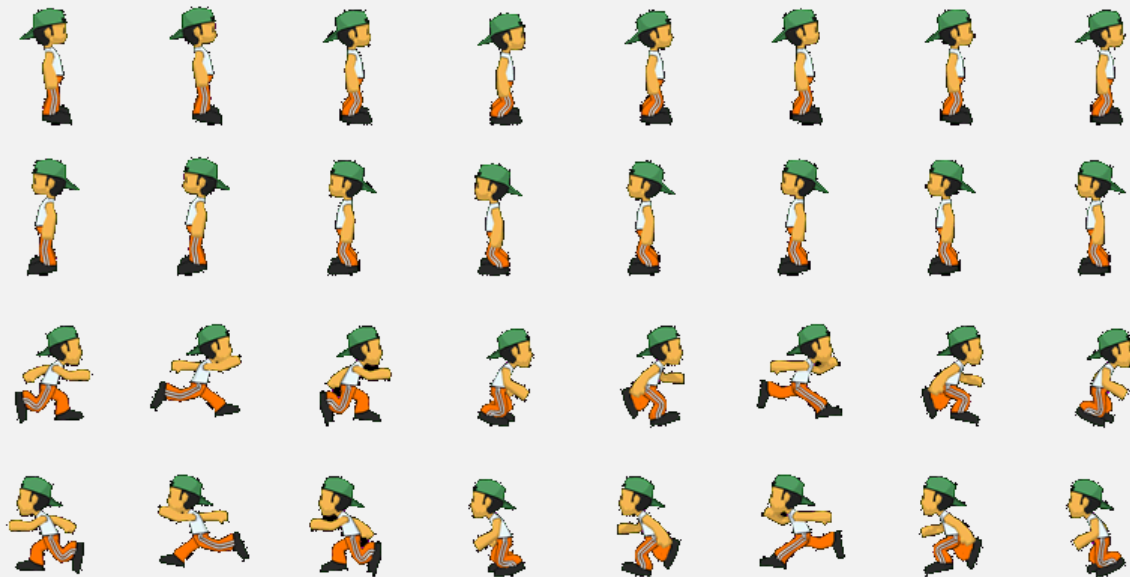
애니메이션(Animation)

■ 애니메이션이란?

- 여러 개의 이미지를 일정한 시간 간격을 통해서 화면에 뿌림으로써, 물체가 움직이는 효과를 주는 것.
- 스프라이트는 여러 개의 action으로 구성됨.
 - Action: 달리기, 걷기, 제자리 동작 등과 같이 캐릭터의 움직임을 나타냄.
 - Action은 여러 개의 Frame으로 구성됨.
 - Frame은 한 개의 이미지



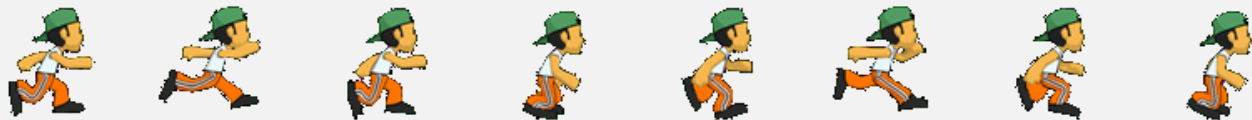
스프라이트 시트





캐릭터 애니메이션

run_animation.png



character_runs.py



```
from pico2d import *

open_canvas()

grass = load_image('grass.png')
character = load_image('run_animation.png')

frame = 0
for x in range(0, 800, 10):
    clear_canvas()
    grass.draw(400, 30)
    character.clip_draw(frame * 100, 0, 100, 100, x, 90)
    update_canvas()
    frame = (frame + 1) % 8
    delay(0.05)

close_canvas()
```

현재 Edit 중인 파일의 실행(Ctrl+Shift+F10)

The screenshot shows an IDE window titled '2023-2DGP - character_runs.py'. The file explorer on the left shows a project structure with folders like '2023-2DGP', 'Drills', 'Exams', 'Labs', and 'Lecture05_Animation'. The file 'character_runs.py' is selected in the 'Labs' folder. The code editor shows the following Python code:

```
1 from pico2d import *
2 open_canvas()
3 grass = load_image('grass.png')
4 character = load_image('run_animation.png')
5
6 def draw(frame * 100, 0, 100, 100, x, 90):
7     p_draw(frame * 100, 0, 100, 100, x, 130, 200, 200)
8     composite_draw(frame * 100, 0, 100, 100, 0, 'h', x, 130, 200, 200)
9
10 def main():
11     +
12
13 if __name__ == '__main__':
14     main()
```

A context menu is open over the code, showing various actions. The 'Run' option, which includes the keyboard shortcut 'Ctrl+Shift+F10', is highlighted with a red box. The 'Run' option is also visible in the bottom status bar.

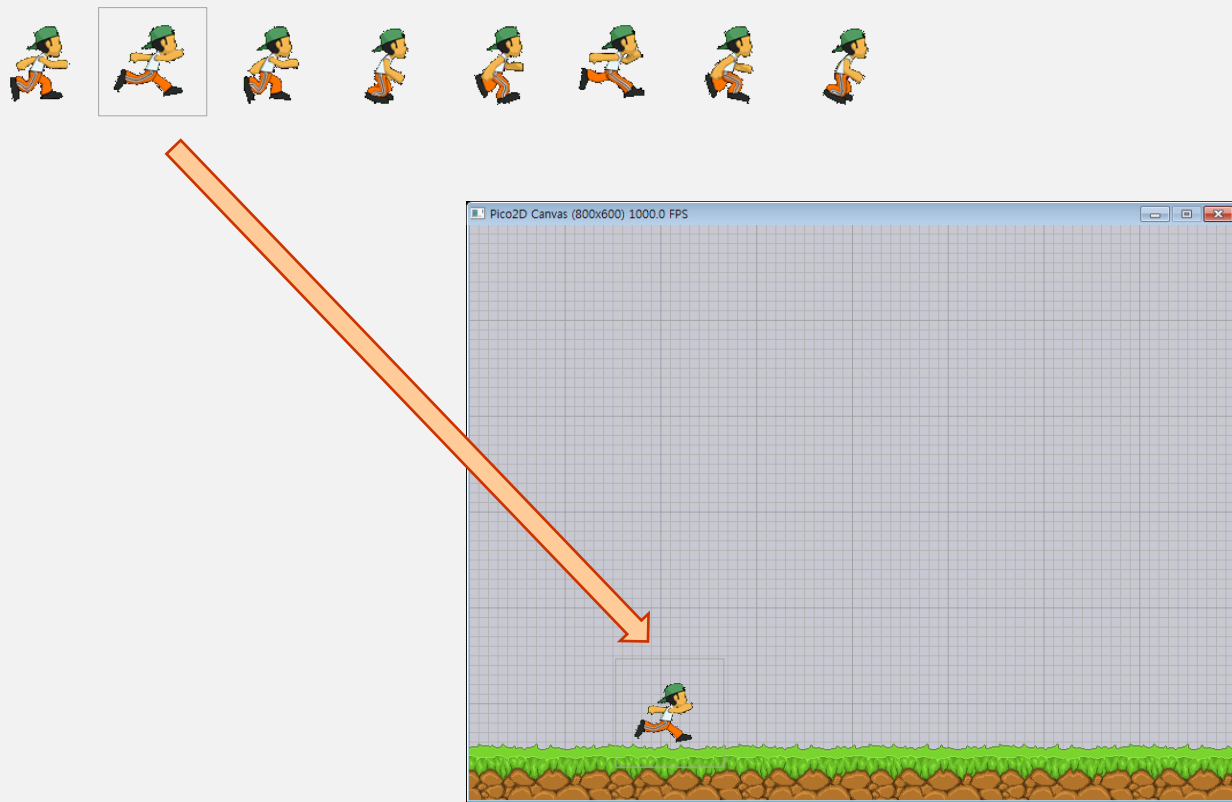
Ctrl + Shift + F10 으로 실행.
이후에는, Shift + F10 을 하면, 지속적으로
앞서 실행한 코드를 실행할 수 있음.

Run: character_runs x
C:\Python\python.exe W:\V...
Pico2d is prepared.
Process finished with exit...

28 files committed: LEC 05, 06 base source 추가 (3 mi)

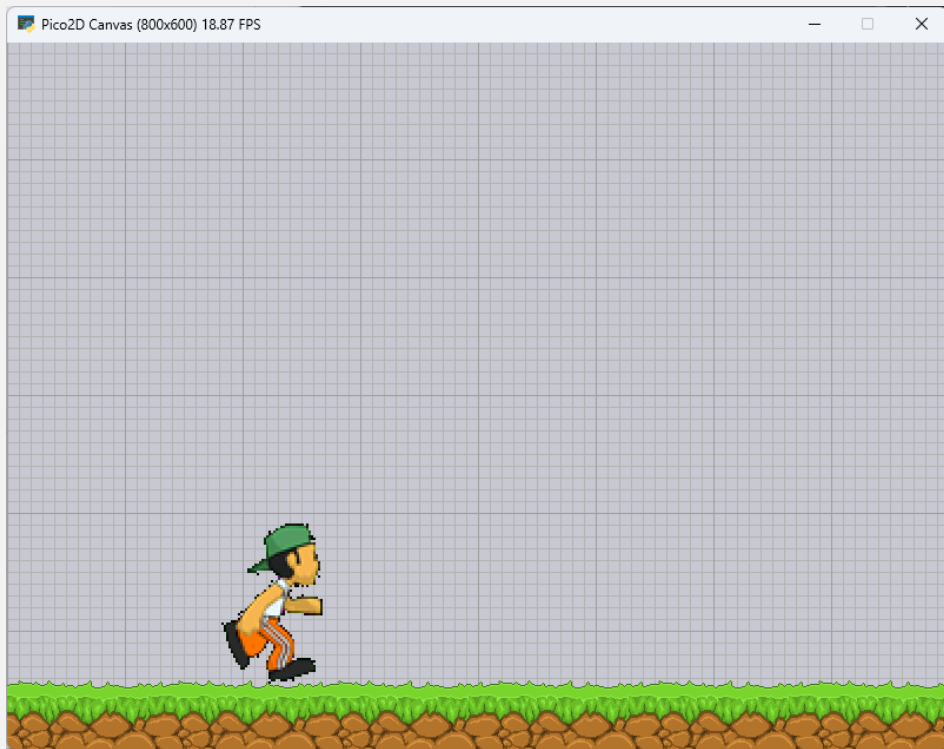
22:1 CRLF UTF-8 4 spaces Python 3.11 main

clip_draw(left, bottom, width, height, x, y)



확대

```
character.clip_draw(frame * 100, 0, 100, 100, x, 130, 200, 200)
```



좌우반전

```
# clip_composite_draw(self, left, bottom, width, height, rad, flip, x, y, w=None, h=None)
```

```
character.clip_composite_draw(frame * 100, 0, 100, 100, 0, 'h', x, 130, 200, 200)
```

