

# Lecture #4. 애니메이션

2D 게임 프로그래밍

이대현 교수

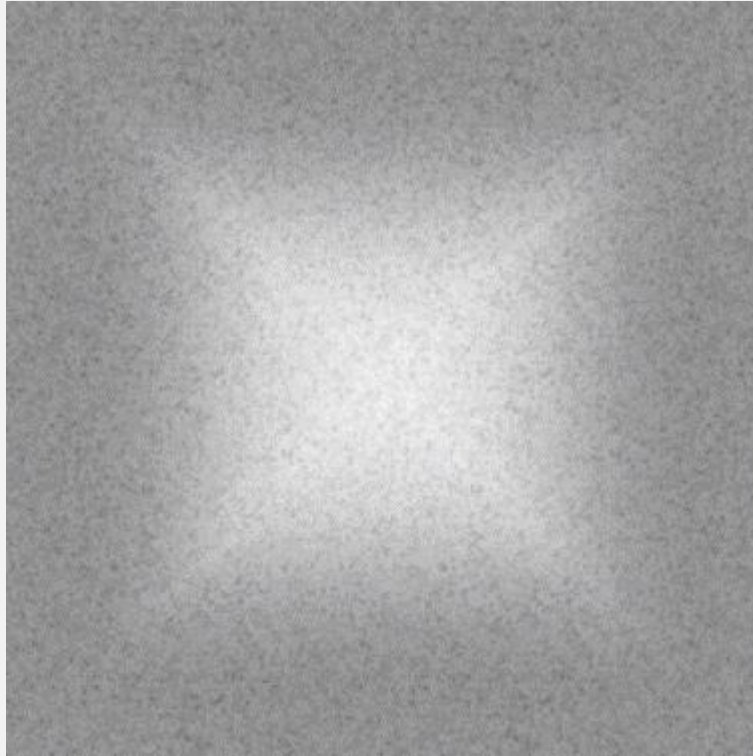
# 학습 내용

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- 더블 버퍼링
- 플리핑
- 스프라이트 애니메이션

# 지난 번 실습의 문제점? – 화면 플리커링

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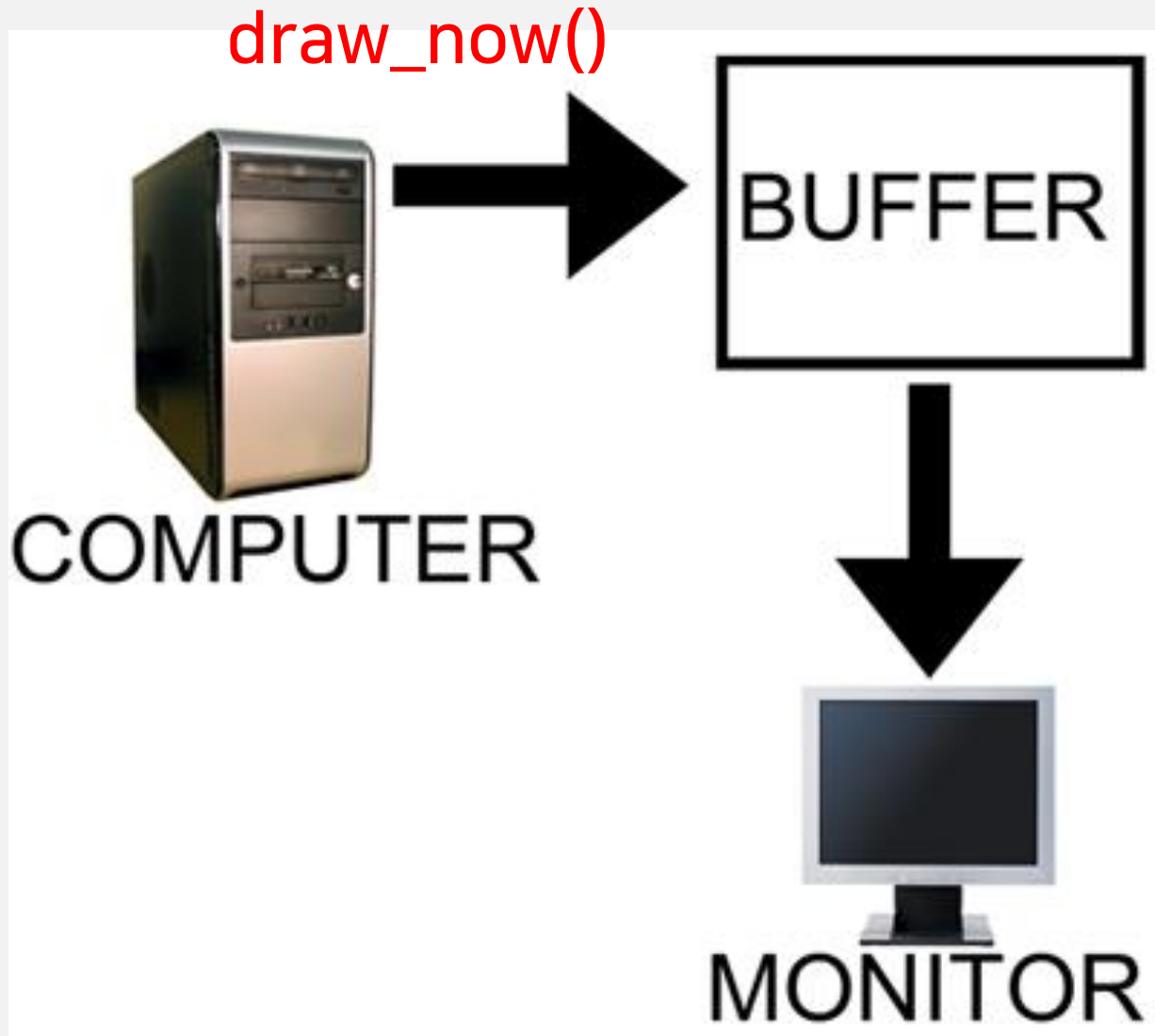
# 무대의 커튼은 왜 있을까?

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# 프레임 버퍼(Frame Buffer)

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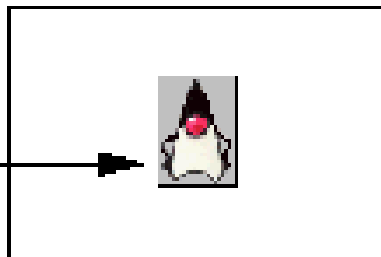


# 더블 버퍼링(Double Buffering)

## Double Buffering

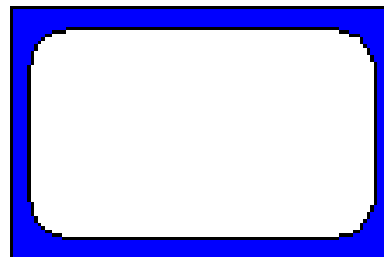
1. Draw

graphics



**Image**

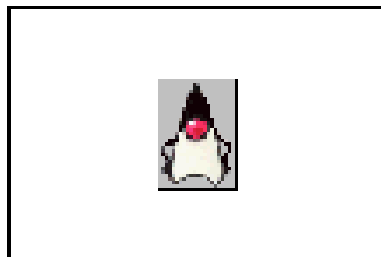
*Back Buffer*



**Screen**

*Primary Surface*

2. Blt  
(copy)



**Image**

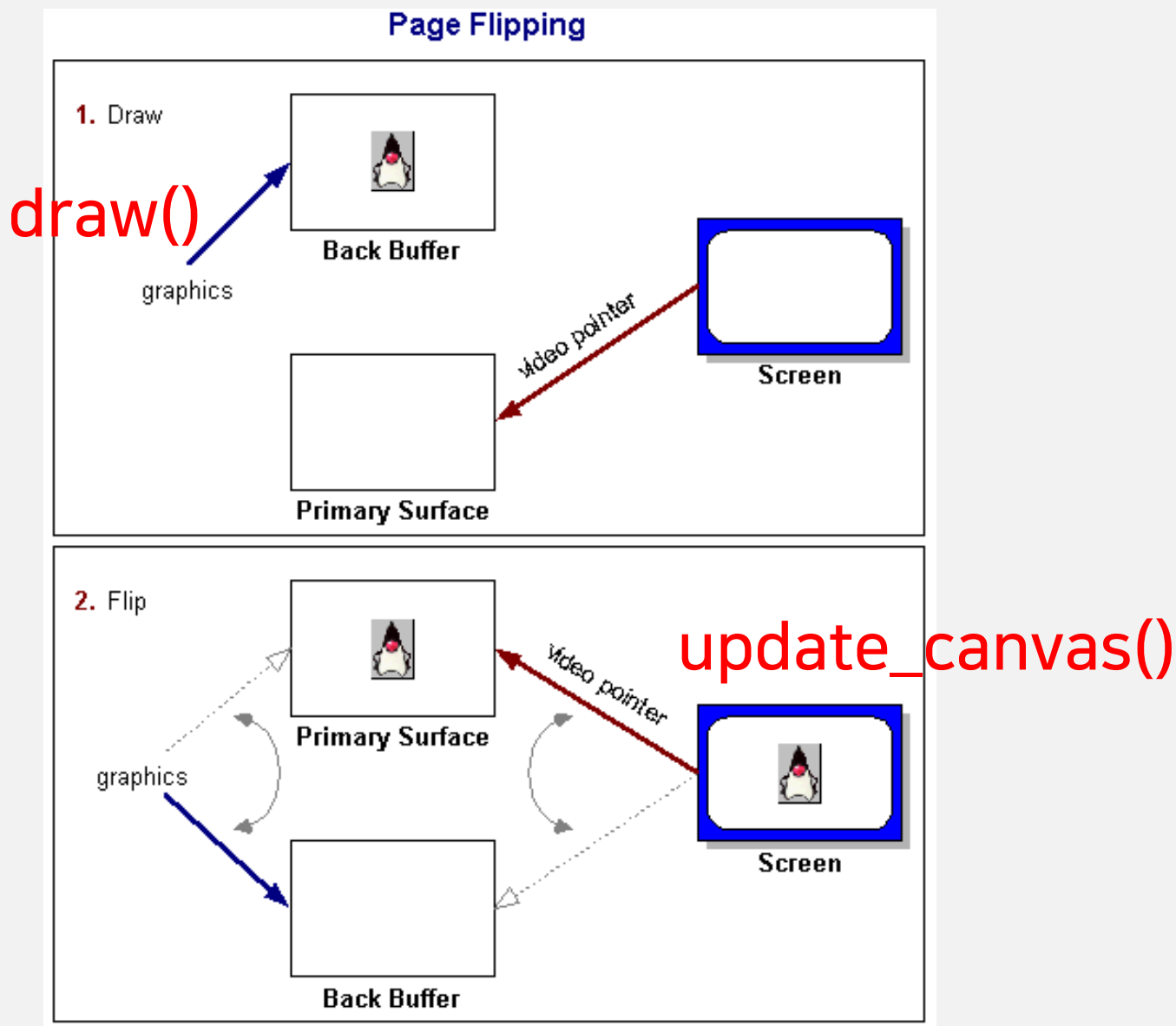
*Back Buffer*



**Screen**

*Primary Surface*

# 페이지 플리핑(Page Flipping)



## 후면 버퍼(Back Buffer)에 그리기

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

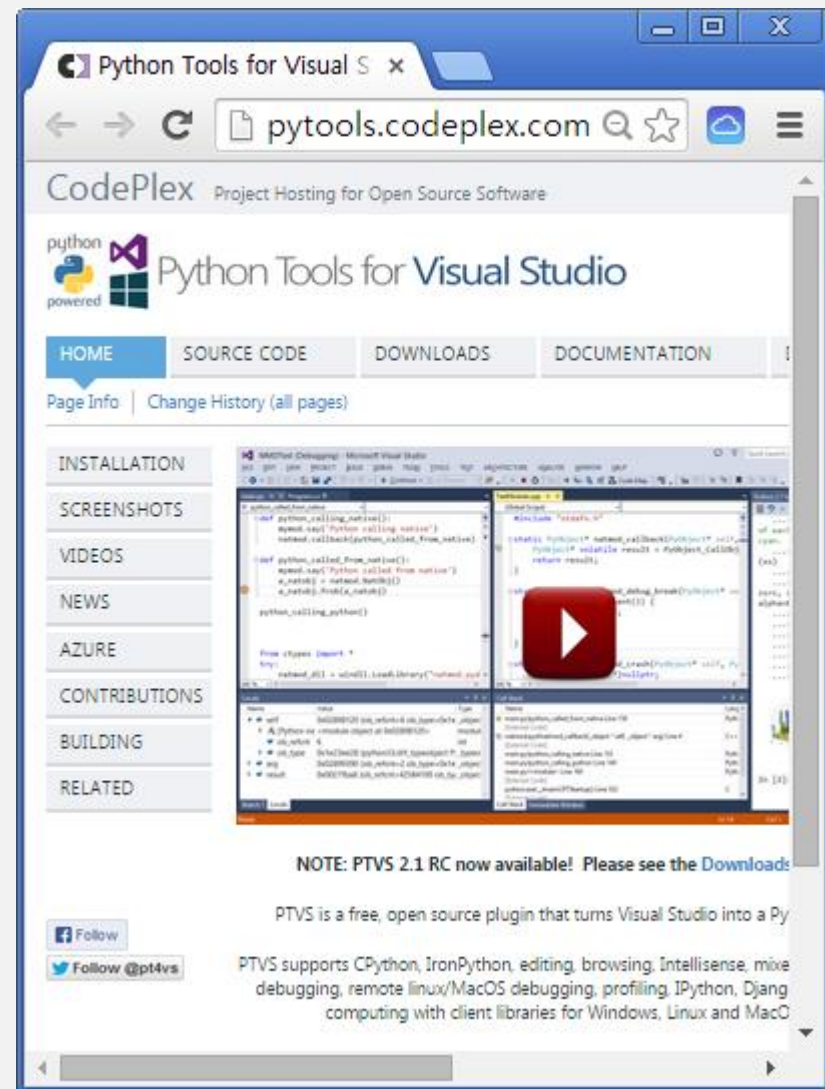
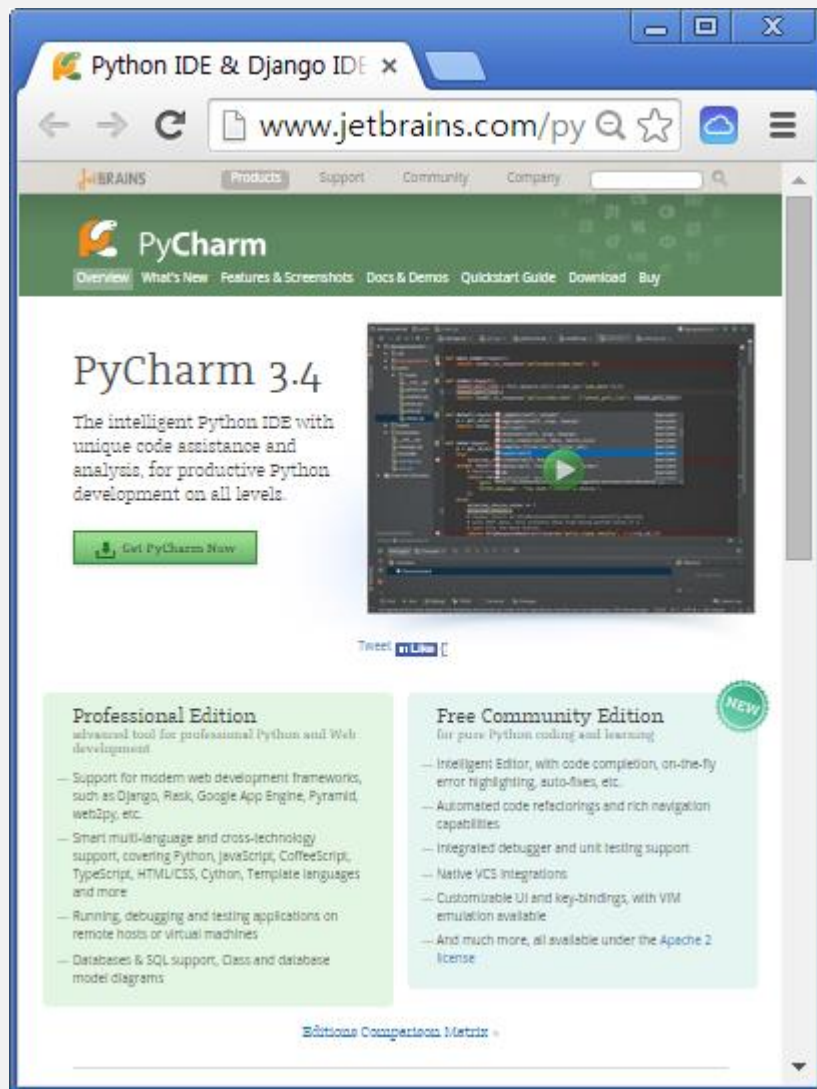


```
>>> update_canvas()
```

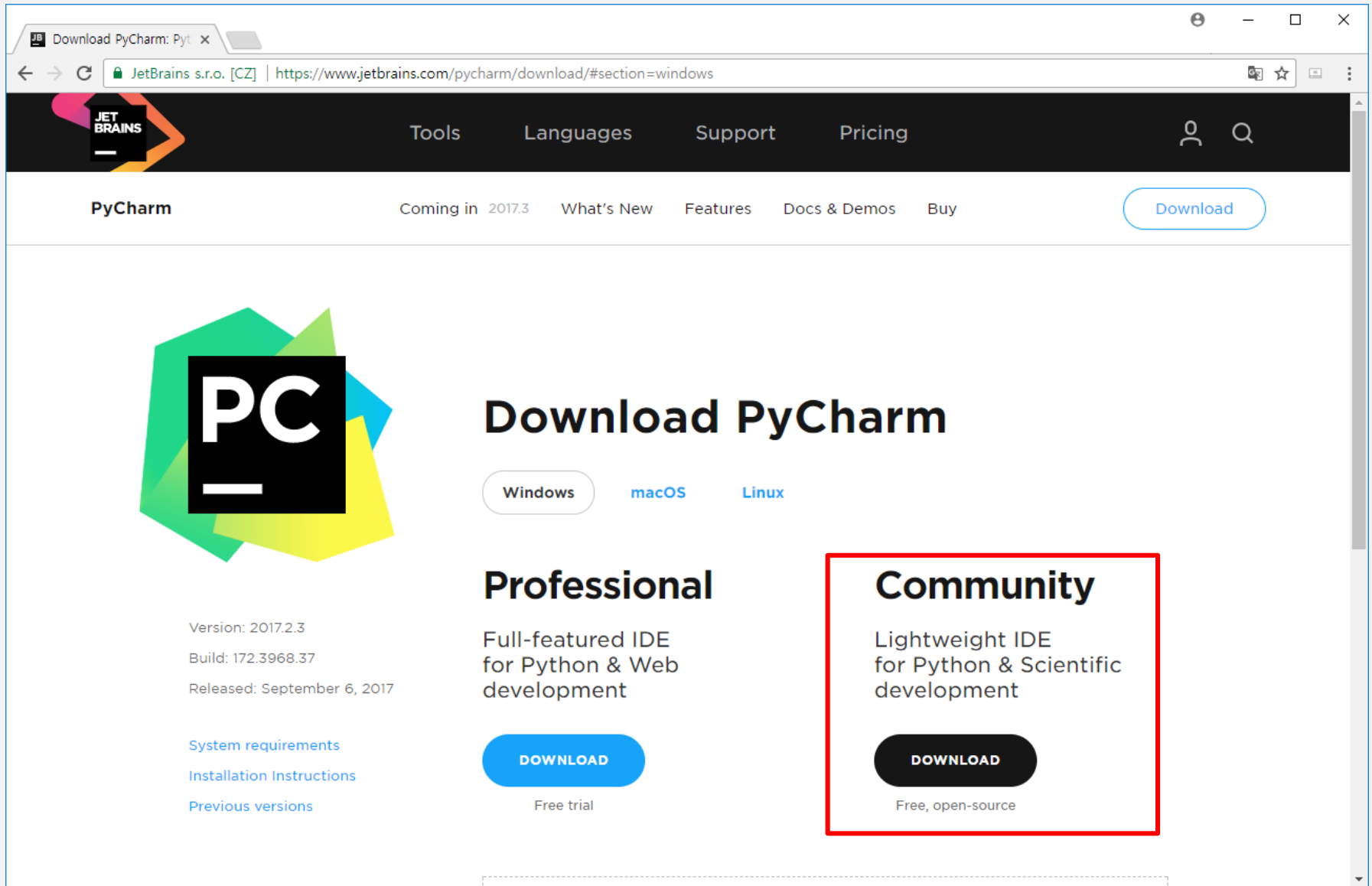
```
>>> clear_canvas()
```

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

# Python IDE



# PyCharm 설치 (Community Edition)



The screenshot shows the JetBrains PyCharm download page for Windows. The page features a dark header with the JetBrains logo and navigation links. Below the header, there's a section for PyCharm with a 'Download' button. The main content area displays the PyCharm logo and version information. Two download options are presented: Professional and Community. The Community Edition is highlighted with a red border. The Professional Edition is described as a 'Full-featured IDE for Python & Web development' with a 'Free trial' download button. The Community Edition is described as a 'Lightweight IDE for Python & Scientific development' with a 'Free, open-source' download button.

Download PyCharm: Pyt 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

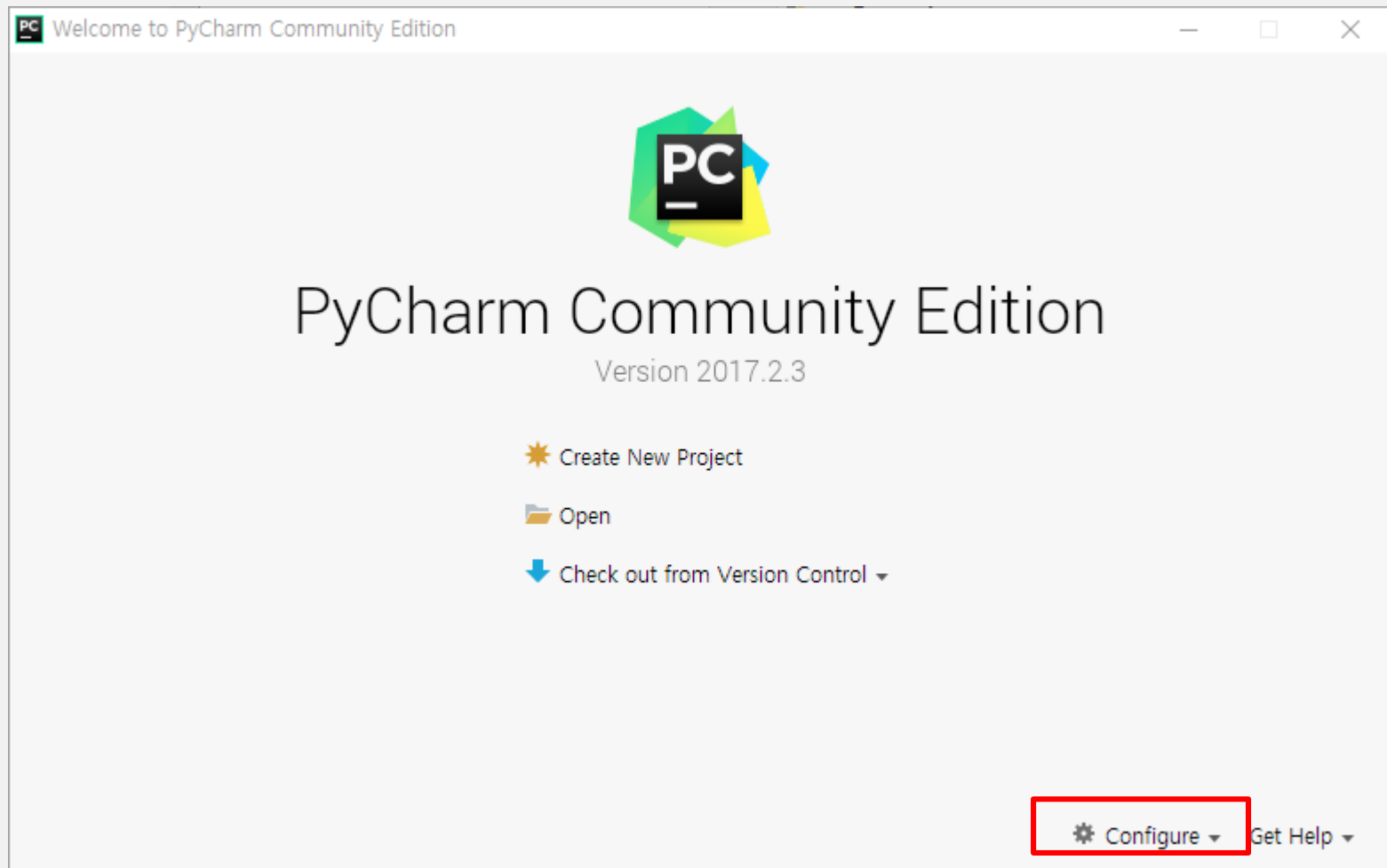
[System requirements](#)  
[Installation Instructions](#)  
[Previous versions](#)

**Download PyCharm**

Windows macOS Linux

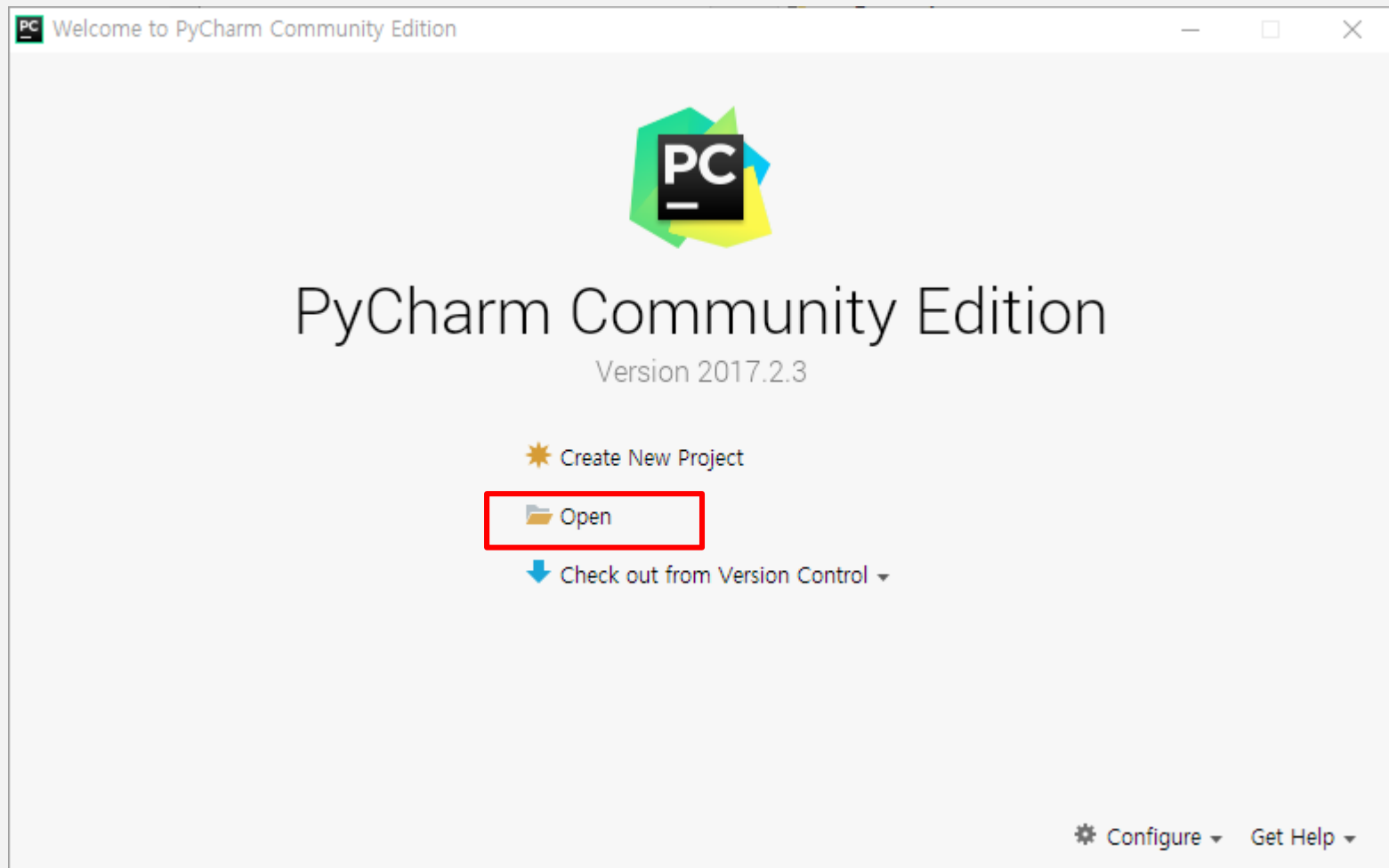
**Professional**  
Full-featured IDE for Python & Web development  
[DOWNLOAD](#)  
Free trial

**Community**  
Lightweight IDE for Python & Scientific development  
[DOWNLOAD](#)  
Free, open-source

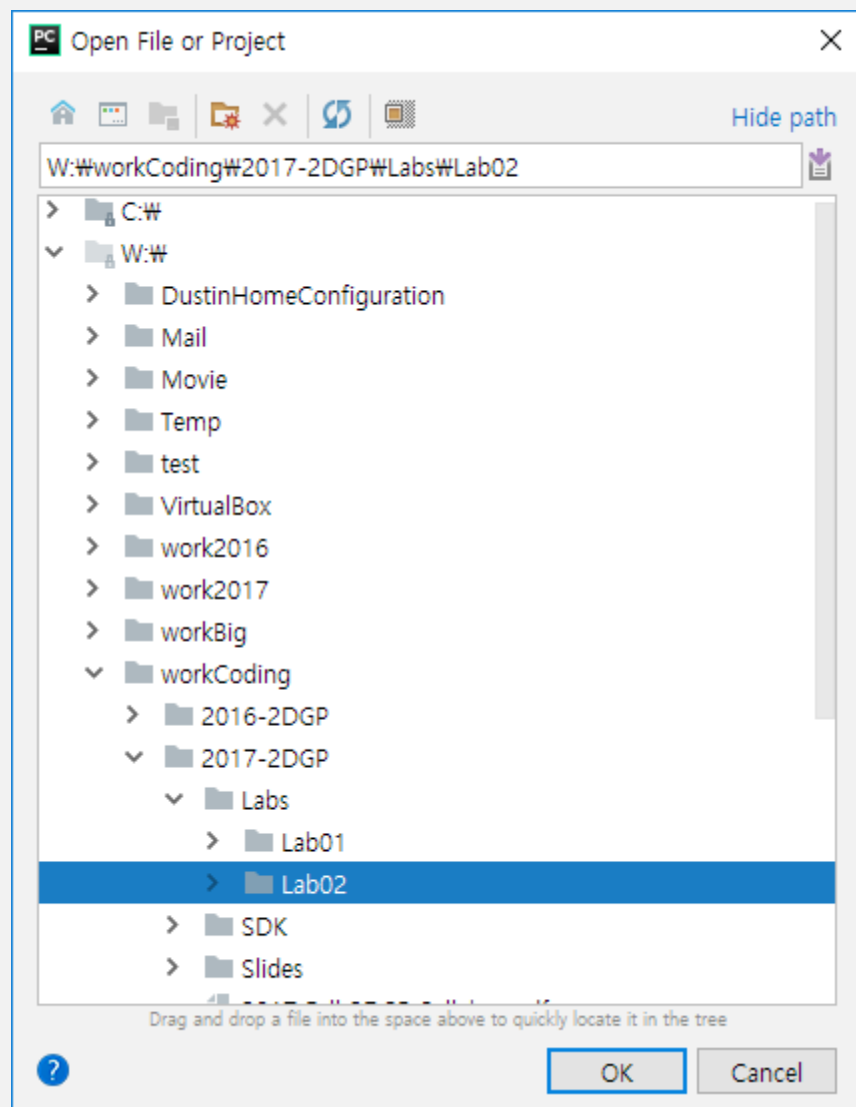


# PyCharm의 실행

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# 폴더 선택



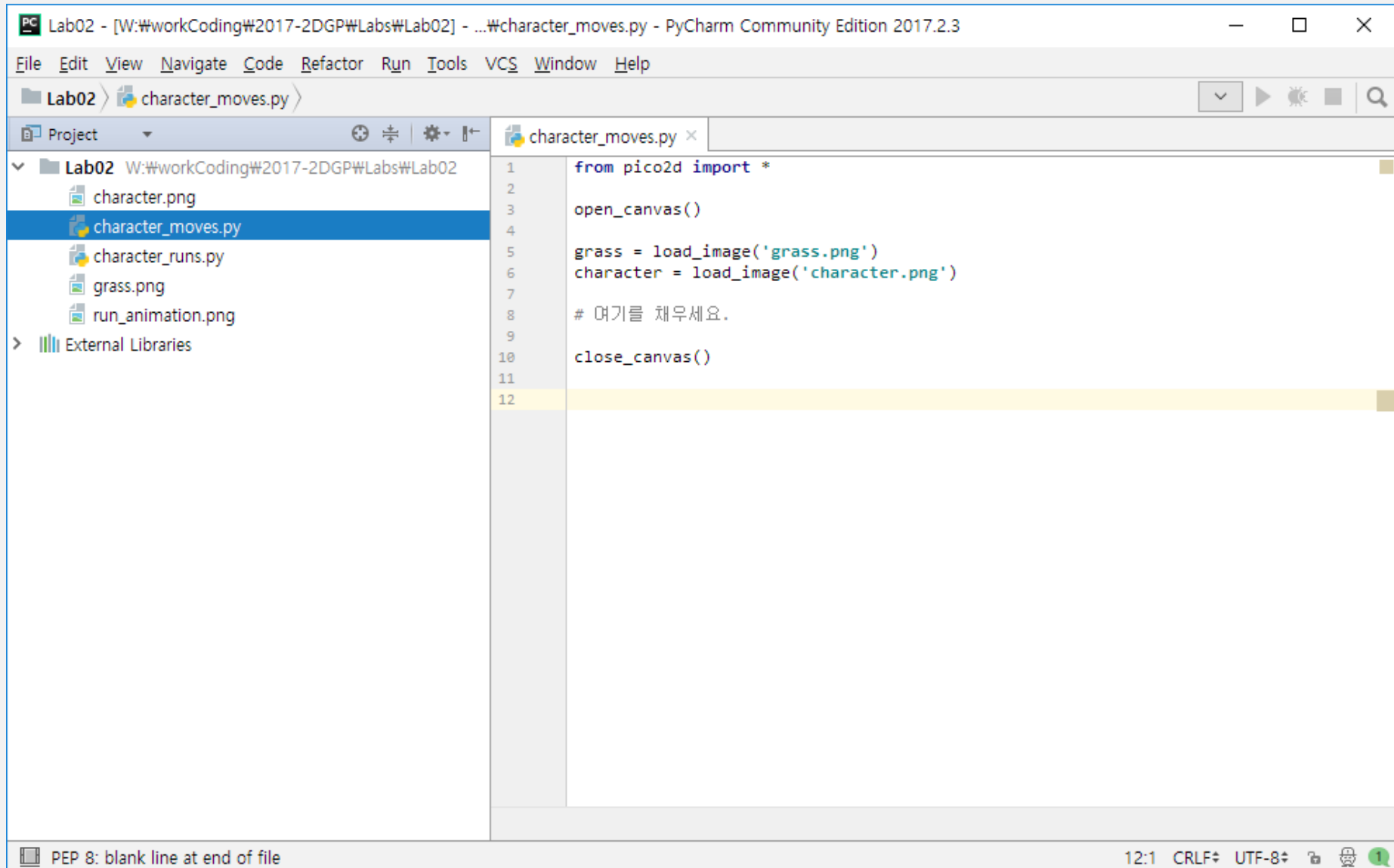
시스템



부드러운 캐릭터 이동



# character\_moves.py 선택 및 코드 입력



# character\_moves.py



```
from pico2d import *

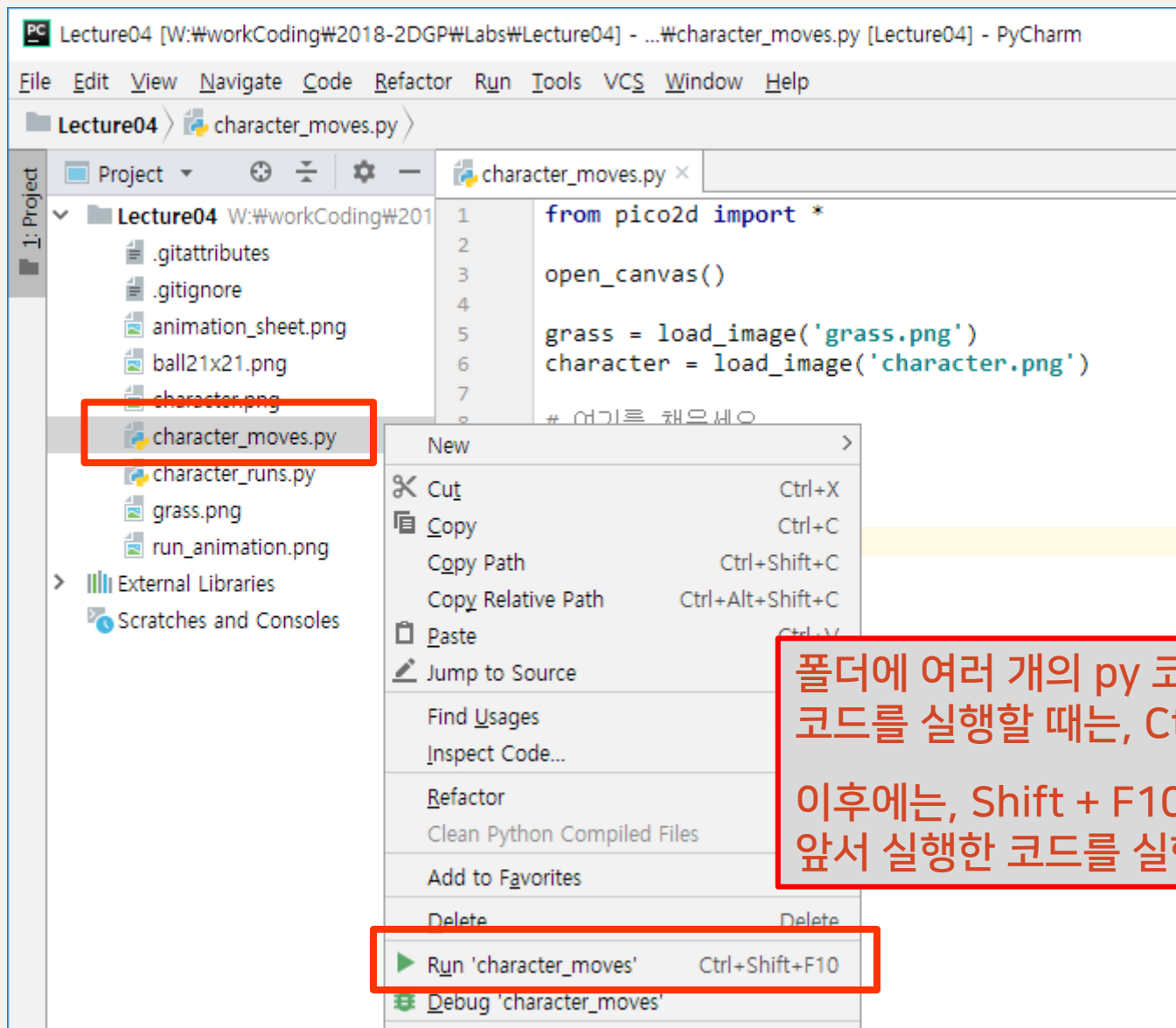
open_canvas()

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

x = 0
while (x < 800):
    clear_canvas()
    grass.draw(400, 30)
    character.draw(x, 90)
    x = x + 2
    update_canvas()
    delay(0.01)
    get_events()

close_canvas()
```

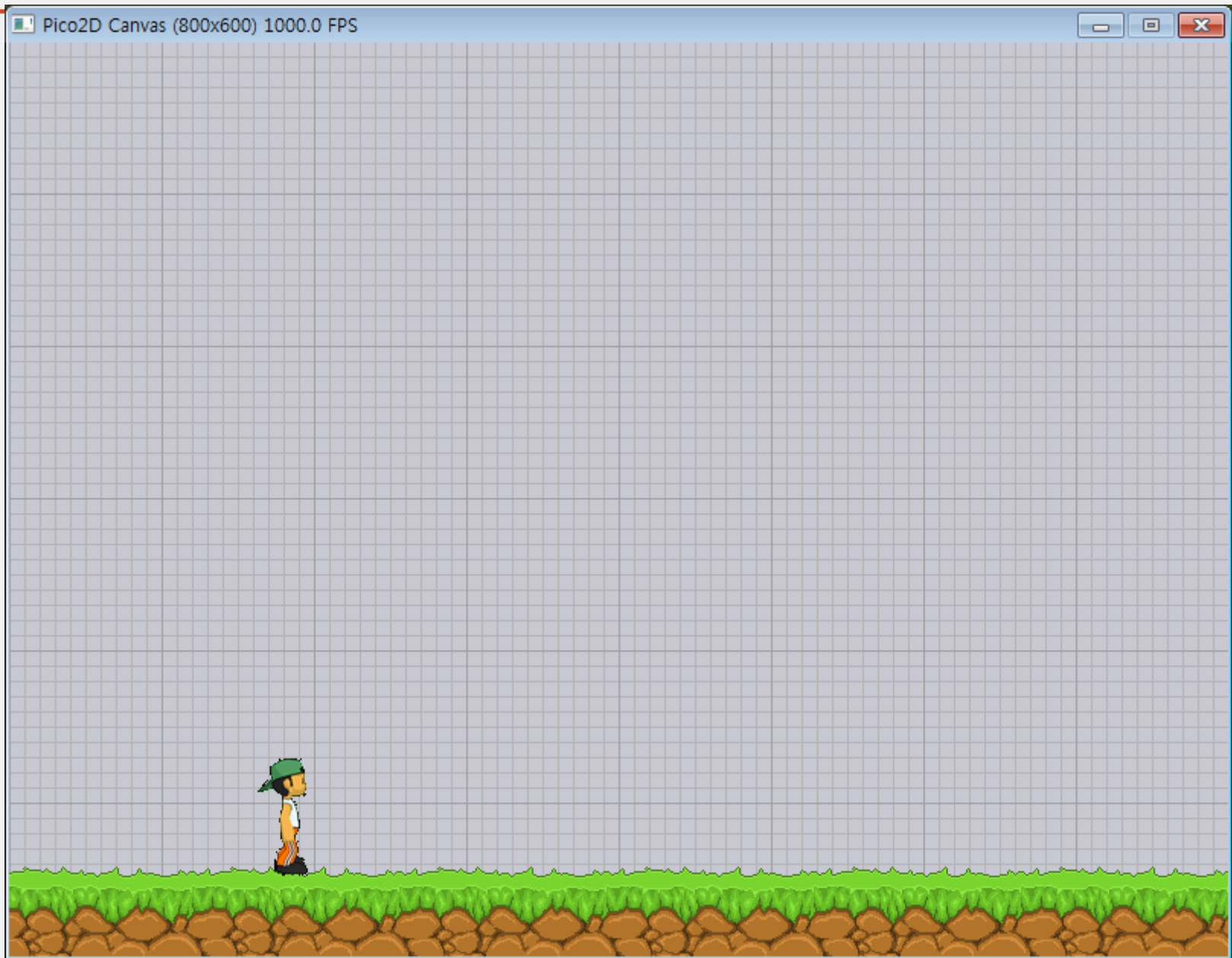
# 선택한 코드의 실행(Ctrl + Shift + F10)



폴더에 여러 개의 py 코드가 있을 경우,  
코드를 실행할 때는, Ctrl + Shift + F10

이후에는, Shift + F10 을 하면, 지속적  
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.

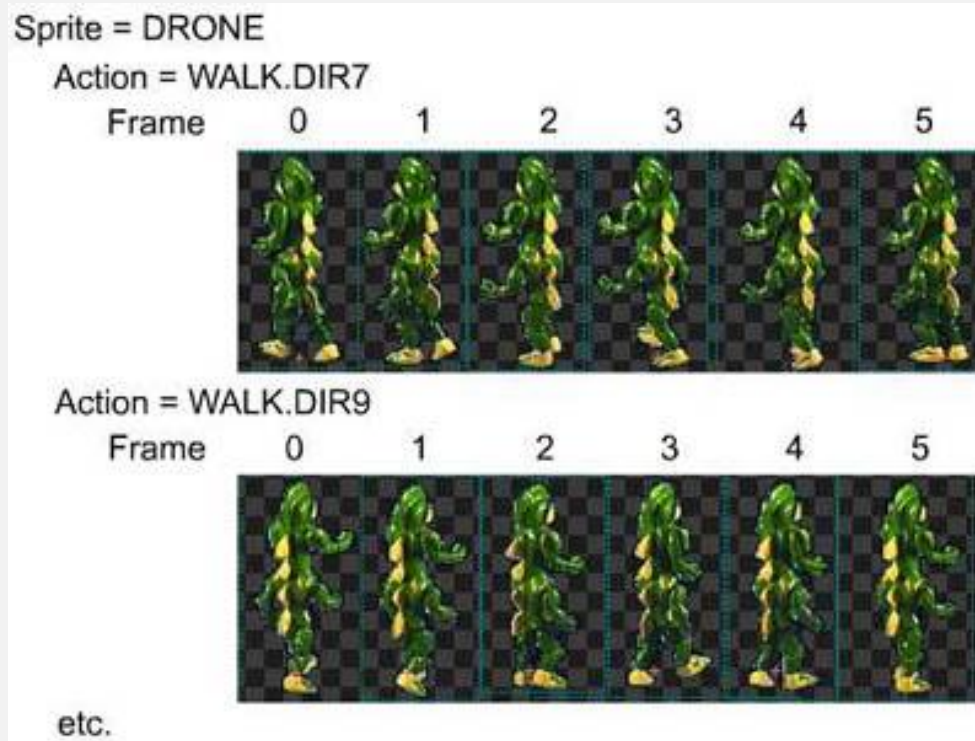


*Metal Slug 3*

# 애니메이션(Animation)

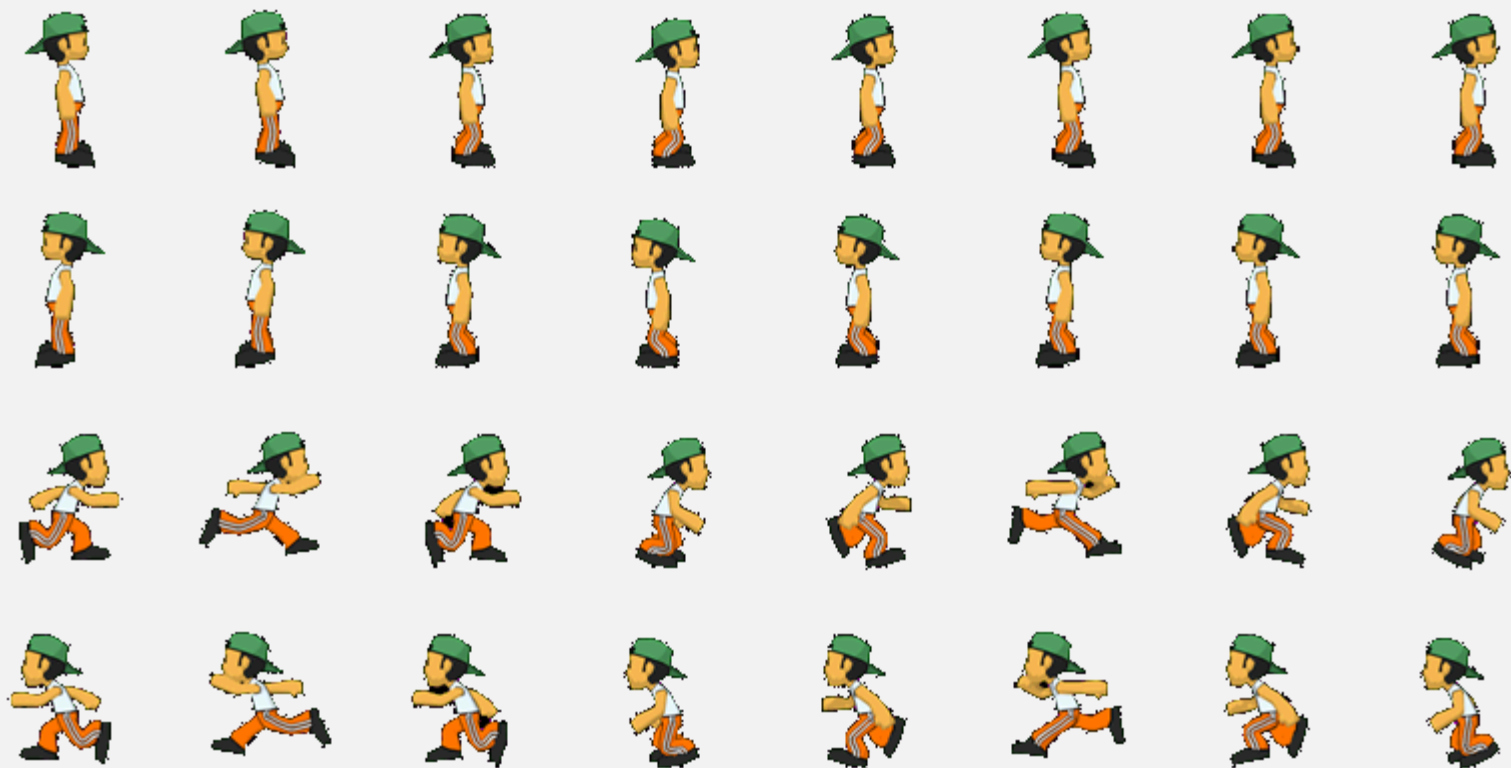
## ■ 애니메이션이란?

- 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

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시작



## 캐릭터 애니메이션



# run\_animation.png

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# character\_runs.py

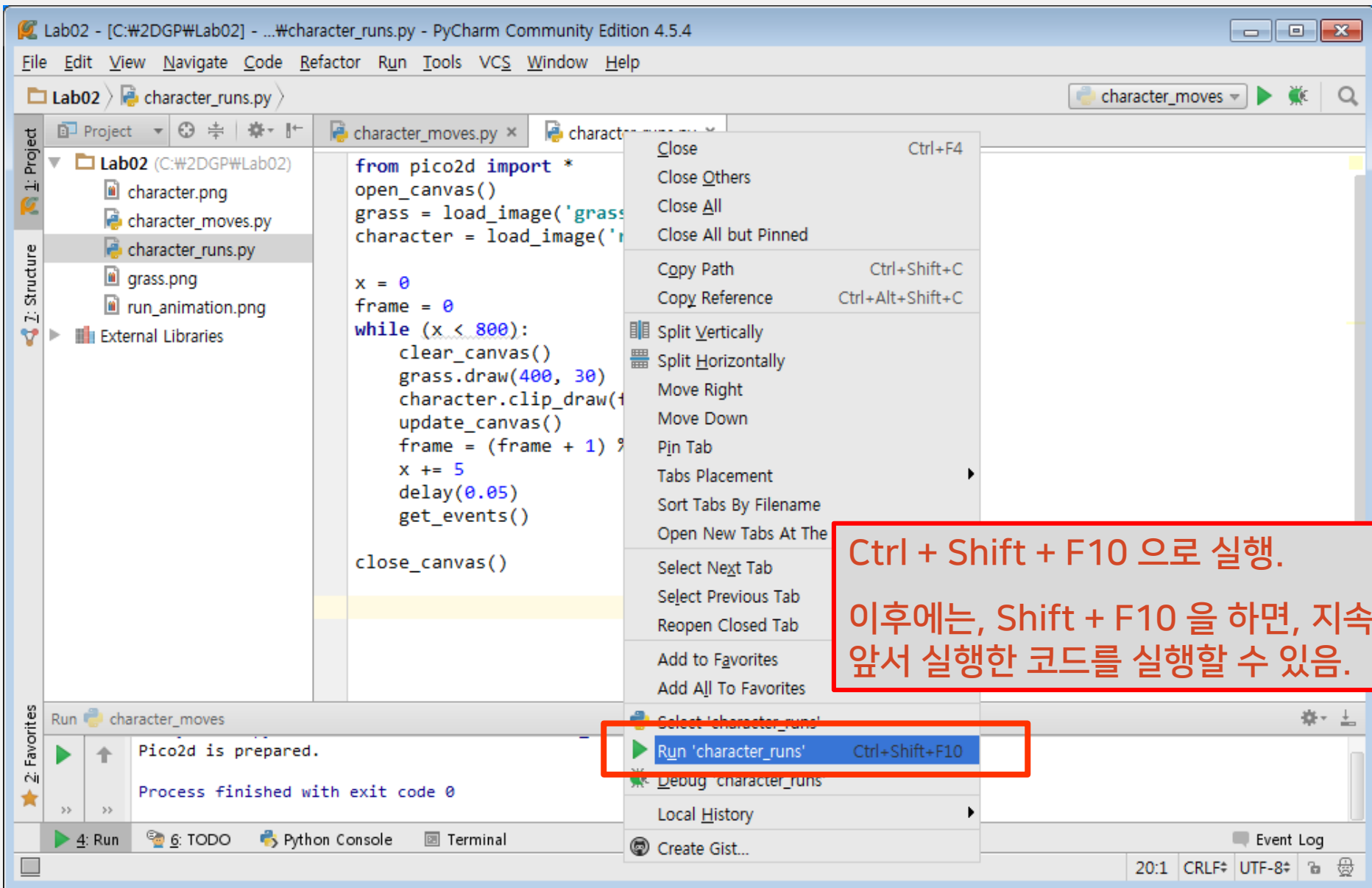


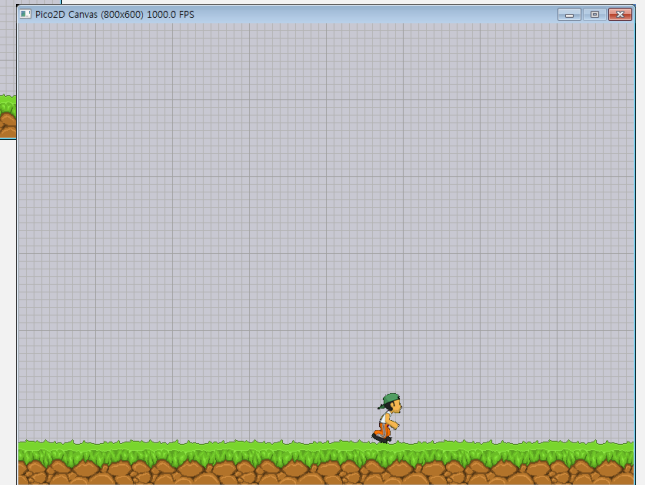
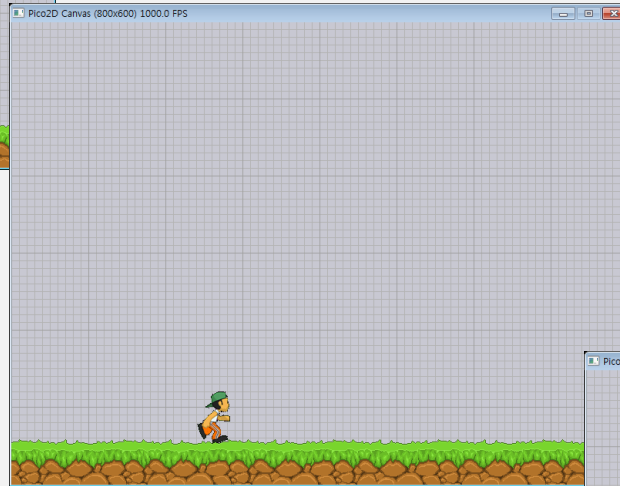
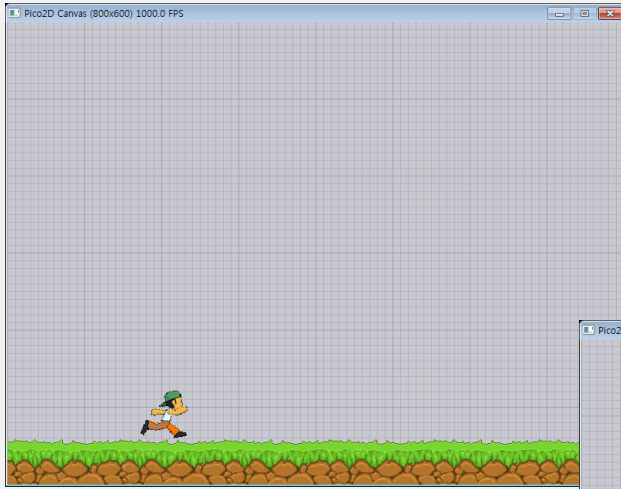
```
from pico2d import *
open_canvas()
grass = load_image('grass.png')
character = load_image('run_animation.png')

x = 0
frame = 0
while (x < 800):
    clear_canvas()
    grass.draw(400, 30)
    character.clip_draw(frame * 100, 0, 100, 100, x, 90)
    update_canvas()
    frame = (frame + 1) % 8
    x += 5
    delay(0.05)
    get_events()

close_canvas()
```

# 현재 Edit 중인 파일의 실행(Ctrl+Shift+F10)





# clip\_draw(left, bottom, width, height, x, y)

