

# Lecture #5. 애니메이션

2D 게임 프로그래밍

이대현 교수

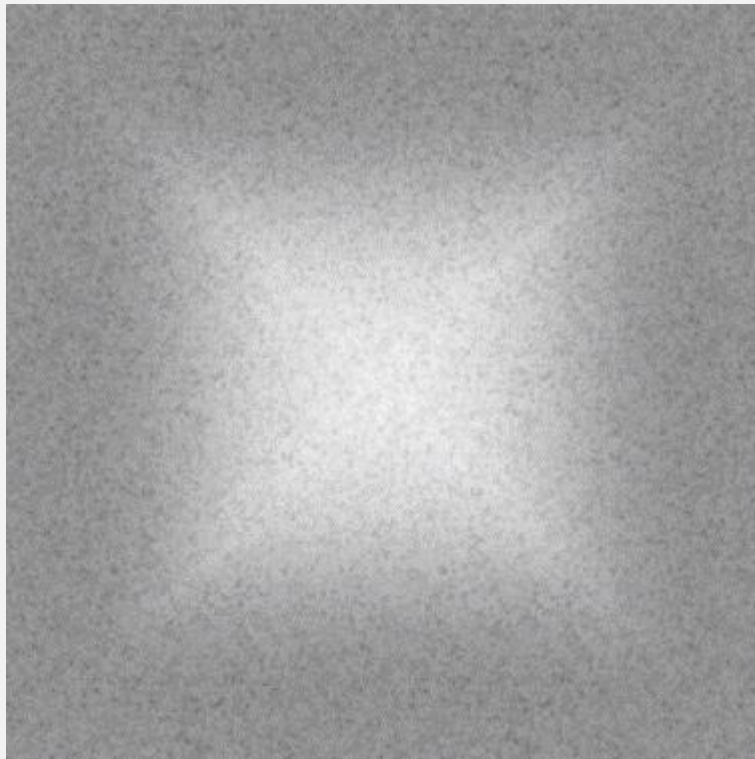
# 학습 내용

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- 더블 버퍼링
- 플리핑
- 스프라이트 애니메이션

## 지난 번 실습의 문제점? - 화면 플리커링

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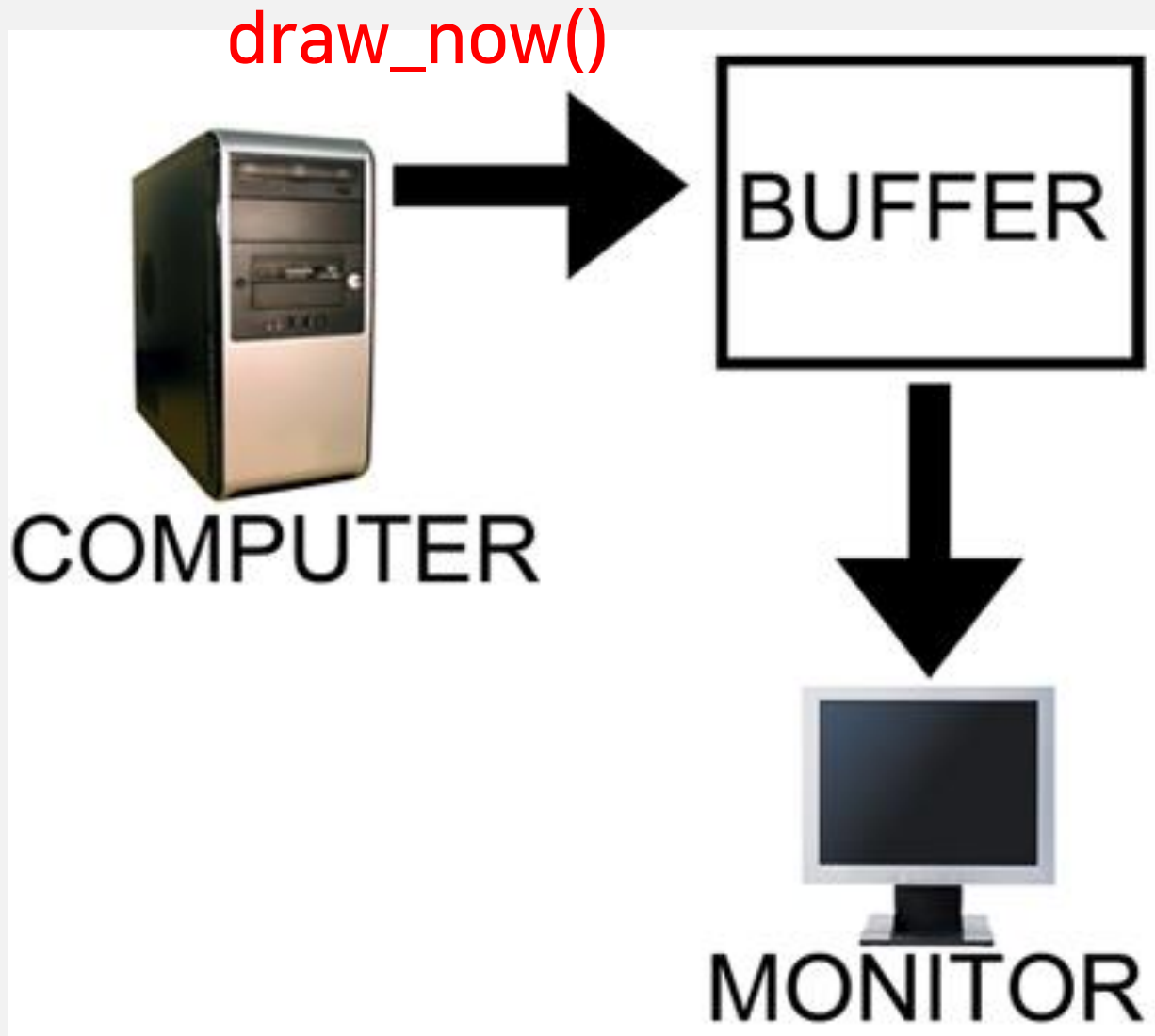
# 무대의 커튼은 왜 있을까?

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# 프레임 버퍼(Frame Buffer)

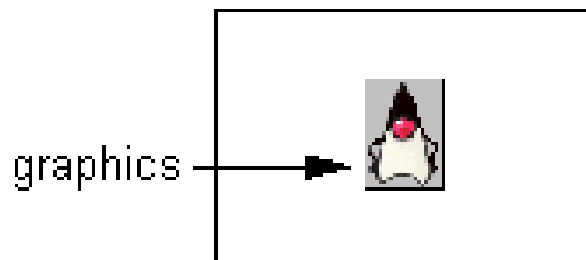
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# 더블 버퍼링(Double Buffering)

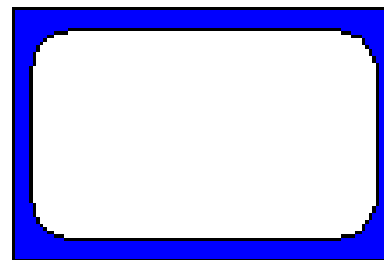
## Double Buffering

1. Draw



**Image**

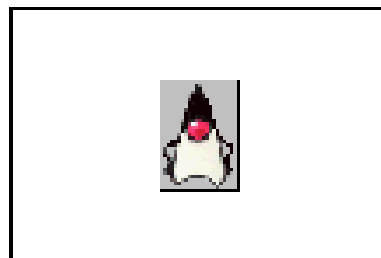
*Back Buffer*



**Screen**

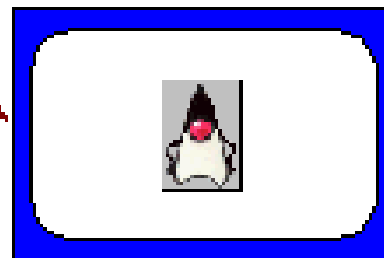
*Primary Surface*

2. Blt  
(copy)



**Image**

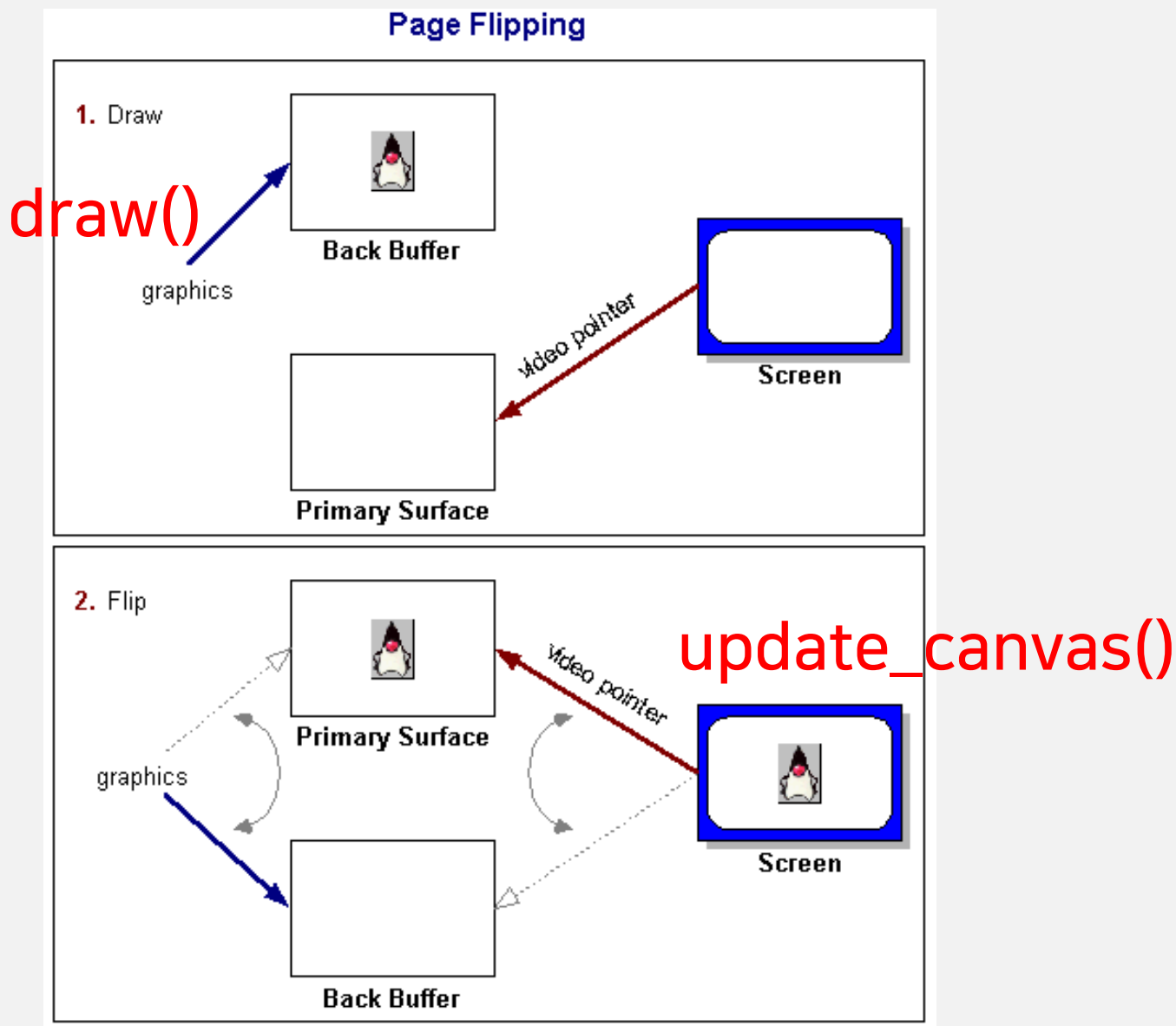
*Back Buffer*



**Screen**

*Primary Surface*

# 페이지 플리핑(Page Flipping)



## 후면 버퍼(Back Buffer)에 그리기

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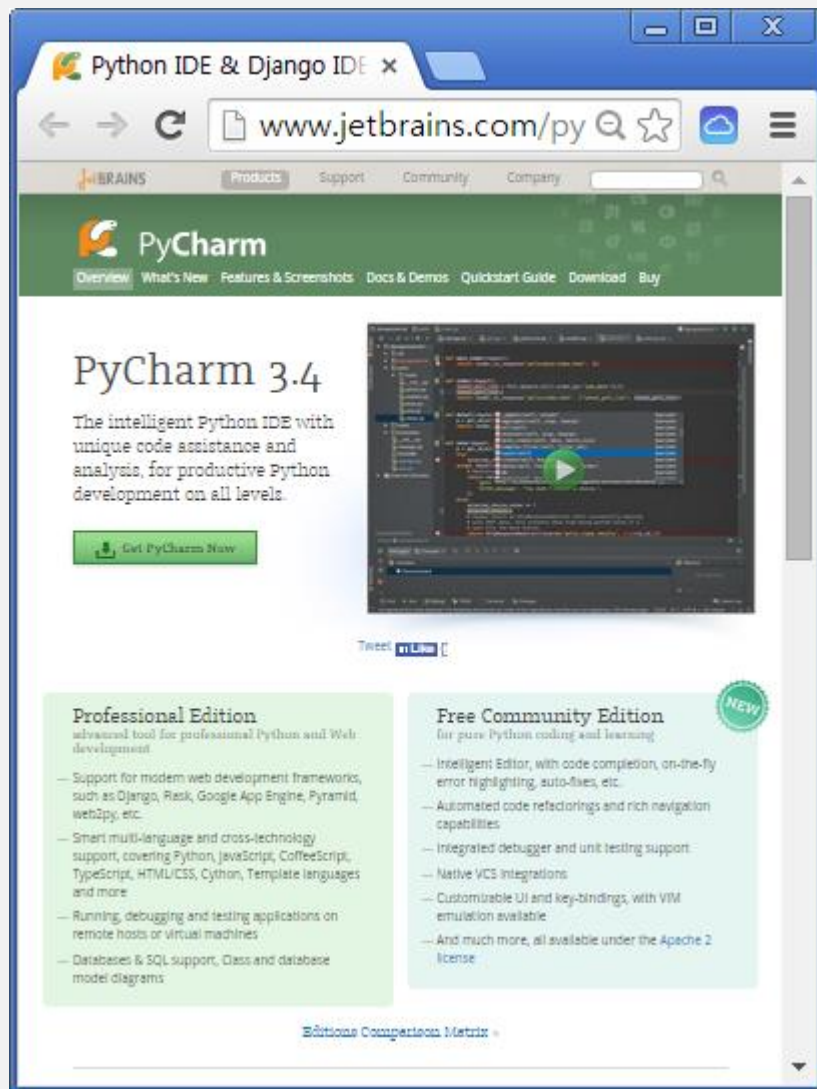
```
>>> from pico2d import *  
>>> open_canvas()  
>>> character = load_image('character.png')  
>>> character.draw(100,100)  
>>> character.draw(200,200)
```



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

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

# Python IDE



The screenshot shows the JetBrains website for PyCharm 3.4. The page features the JetBrains logo, navigation links (Products, Support, Community, Company), and a search bar. The main heading is "PyCharm 3.4" with the tagline "The intelligent Python IDE with unique code assistance and analysis, for productive Python development on all levels." Below this is a "Get PyCharm Now" button. A video player shows a PyCharm interface. The page is divided into two columns: "Professional Edition" and "Free Community Edition".

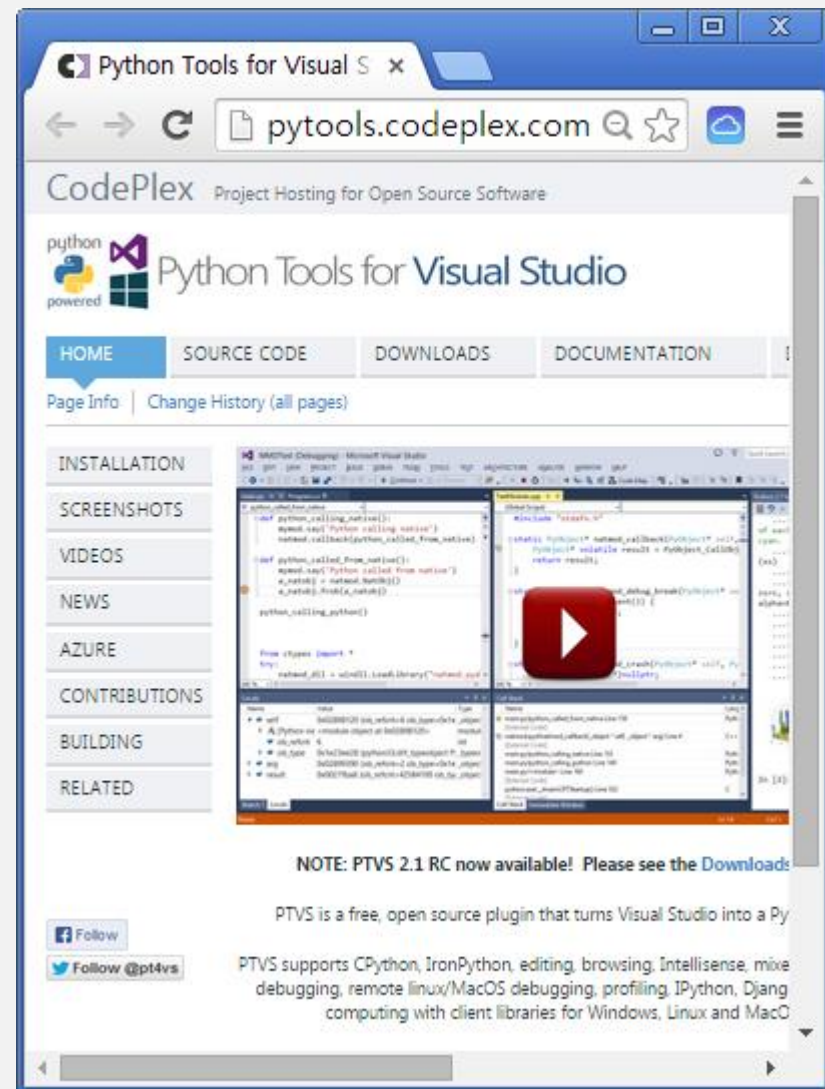
**Professional Edition**  
Advanced tool for professional Python and Web development

- Support for modern web development frameworks, such as Django, Flask, Google App Engine, Pyramid, web2py, etc.
- Smart multi-language and cross-technology support, covering Python, JavaScript, CoffeeScript, TypeScript, HTML/CSS, Cython, Template languages and more
- Running, debugging and testing applications on remote hosts or virtual machines
- Databases & SQL support, Class and database model diagrams

**Free Community Edition**  
for pure Python coding and learning

- Intelligent Editor, with code completion, on-the-fly error highlighting, auto-fixes, etc.
- Automated code refactorings and rich navigation capabilities
- Integrated debugger and unit testing support
- Native VCS integrations
- Customizable UI and key-bindings, with VIM emulation available
- And much more, all available under the Apache 2 license

[Editions Comparison Matrix](#)



The screenshot shows the Python Tools for Visual Studio (PTVS) website. The page features the CodePlex logo, navigation links (HOME, SOURCE CODE, DOWNLOADS, DOCUMENTATION), and a search bar. The main heading is "Python Tools for Visual Studio". Below this is a "Page Info" section and a "Change History (all pages)" link. The page is divided into two columns: "INSTALLATION" and "SCREENSHOTS".

**INSTALLATION**

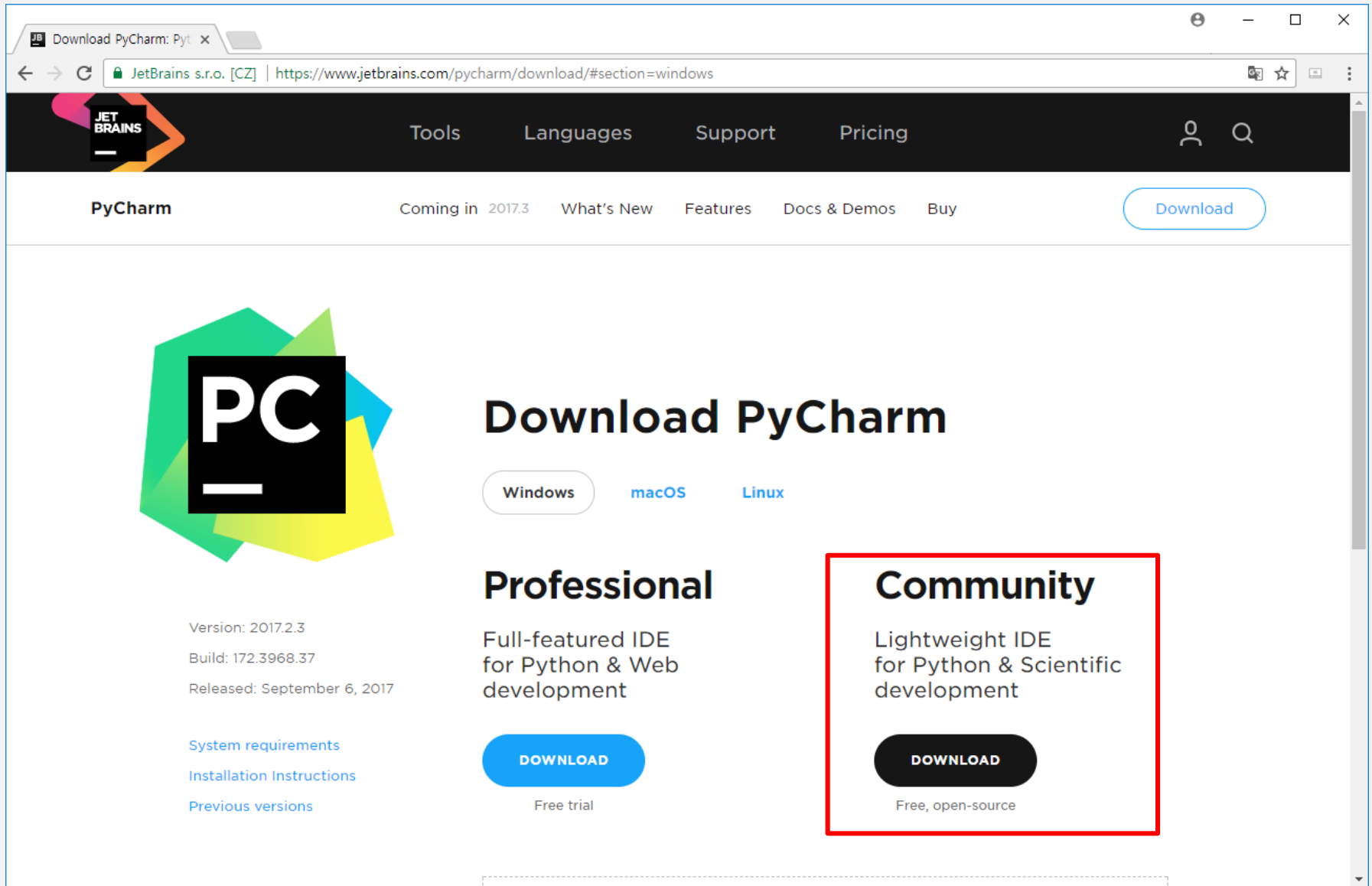
- SCREENSHOTS
- VIDEOS
- NEWS
- AZURE
- CONTRIBUTIONS
- BUILDING
- RELATED

**NOTE: PTVS 2.1 RC now available! Please see the Downloads**

PTVS is a free, open source plugin that turns Visual Studio into a Python IDE.

PTVS supports CPython, IronPython, editing, browsing, Intellisense, mixed debugging, remote linux/MacOS debugging, profiling, IPython, Django computing with client libraries for Windows, Linux and Mac

# PyCharm 설치 (Community Edition)



The screenshot shows the JetBrains PyCharm download page for Windows. The page features the PyCharm logo, version information (2017.2.3), and two main download options: 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. The page also includes a 'Download' button in the top right corner and a 'System requirements' link.

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

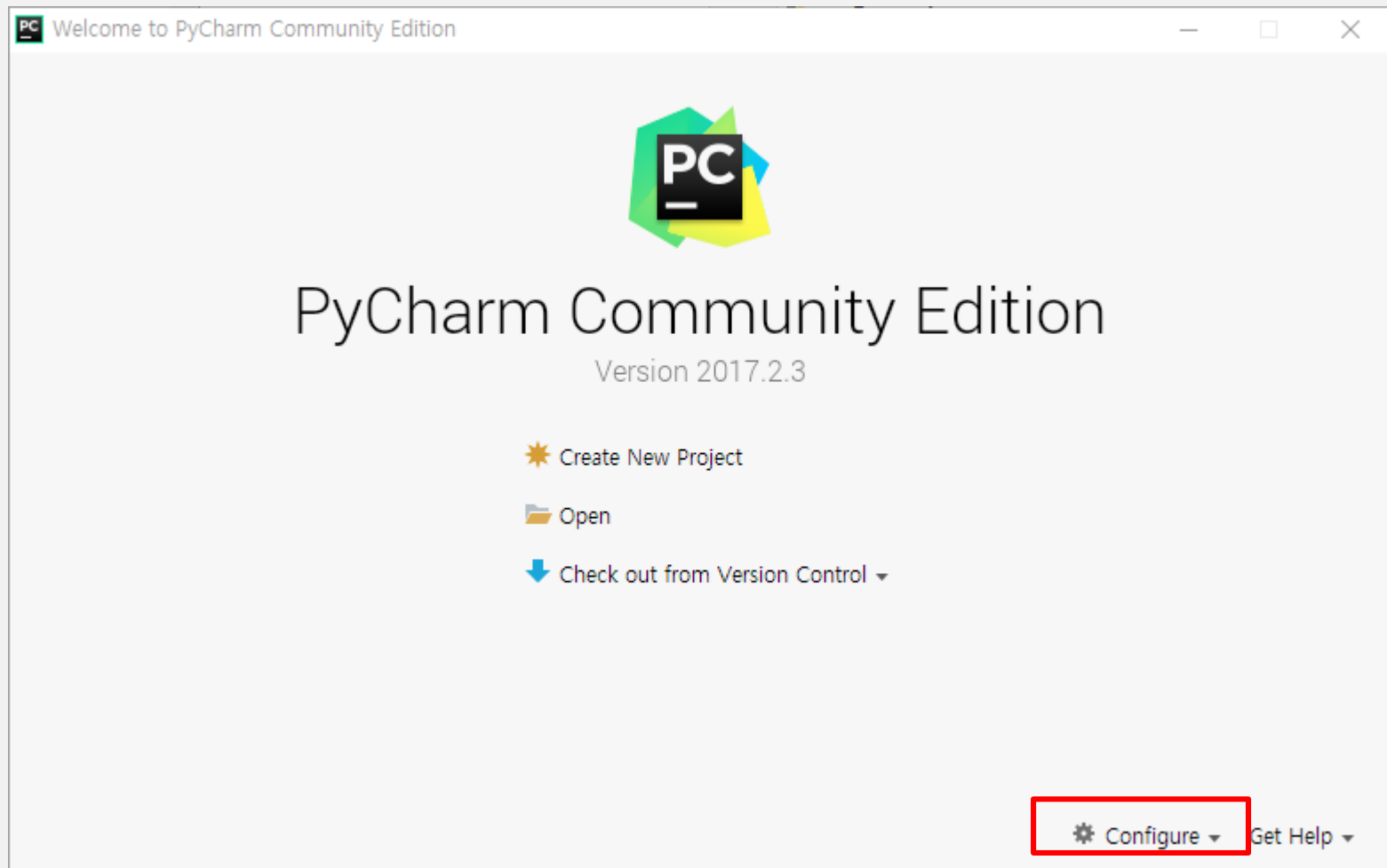
[System requirements](#)  
[Installation Instructions](#)  
[Previous versions](#)

**Download PyCharm**

Windows macOS Linux

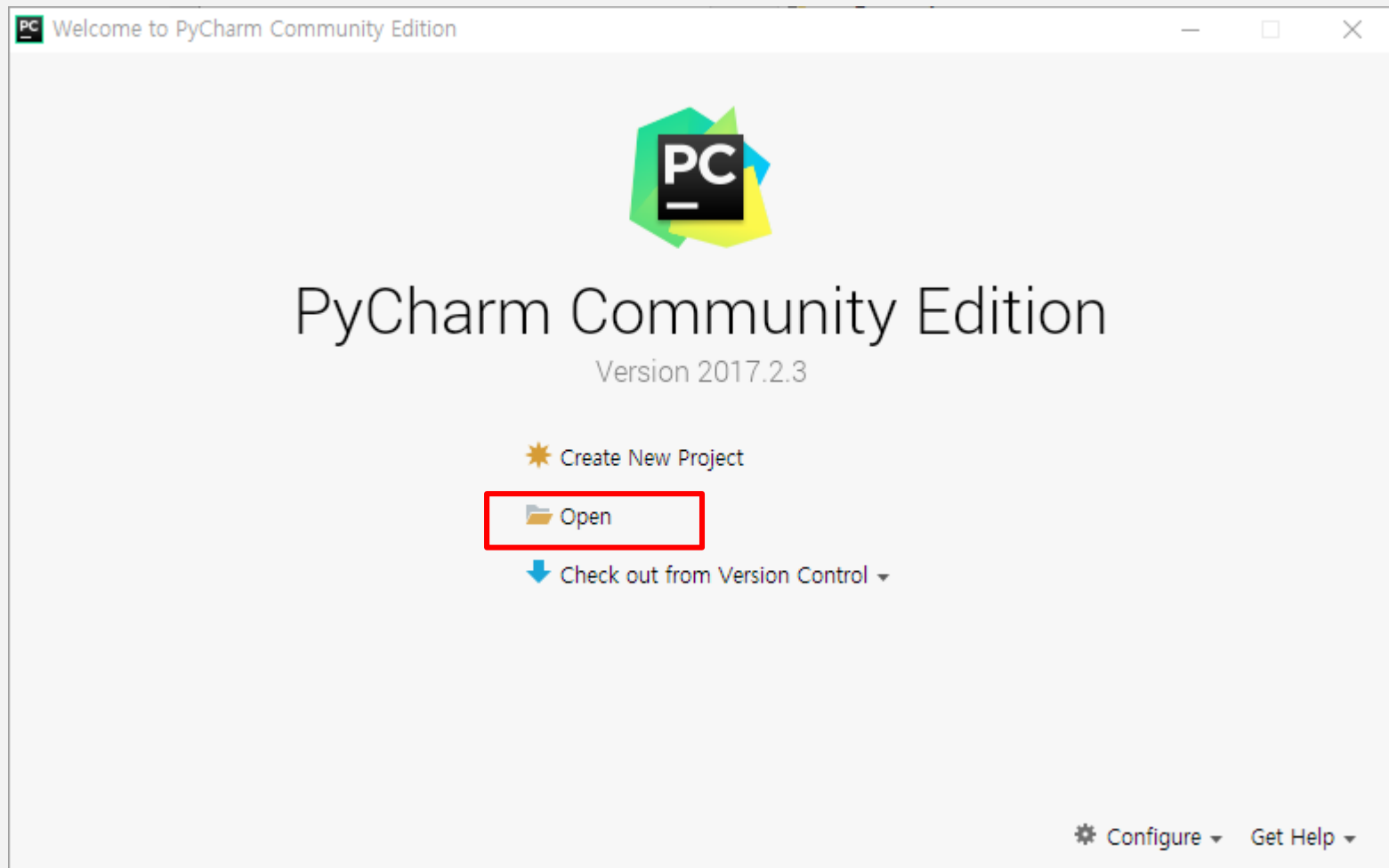
**Professional**  
Full-featured IDE for Python & Web development  
[DOWNLOAD](#)  
Free trial

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

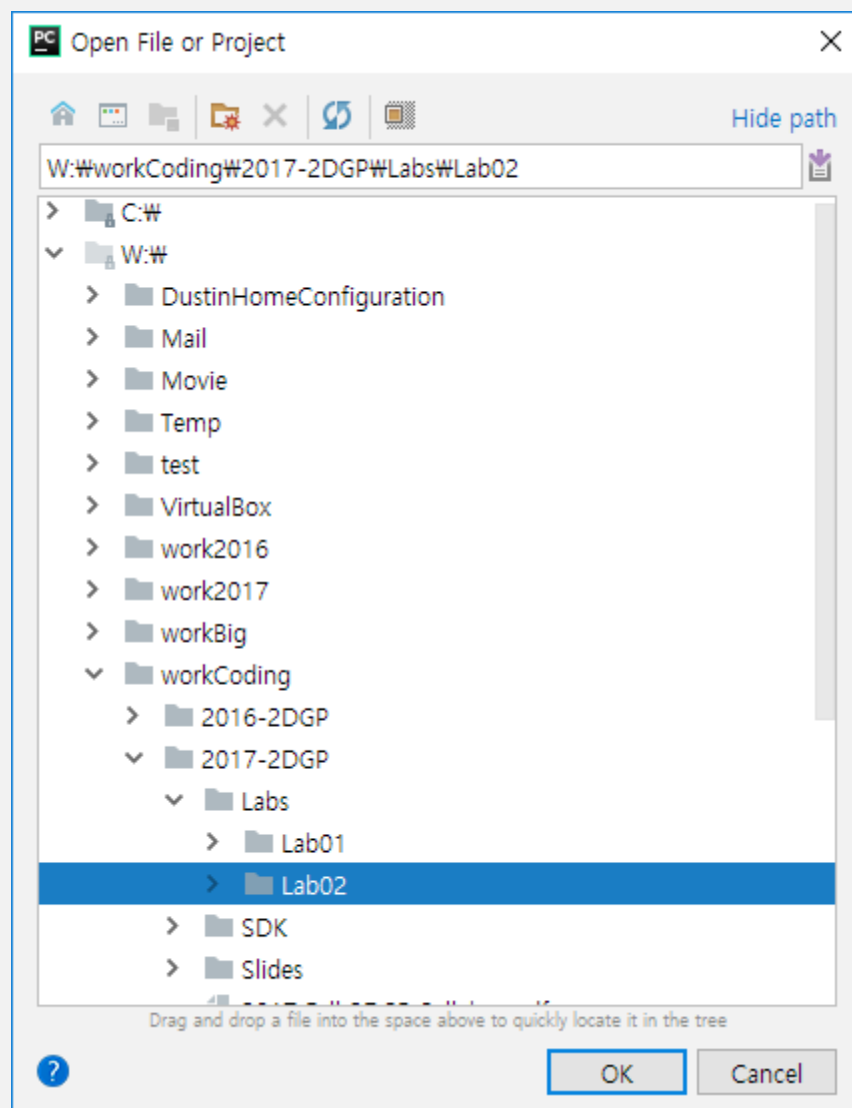


# PyCharm의 실행

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# 폴더 선택



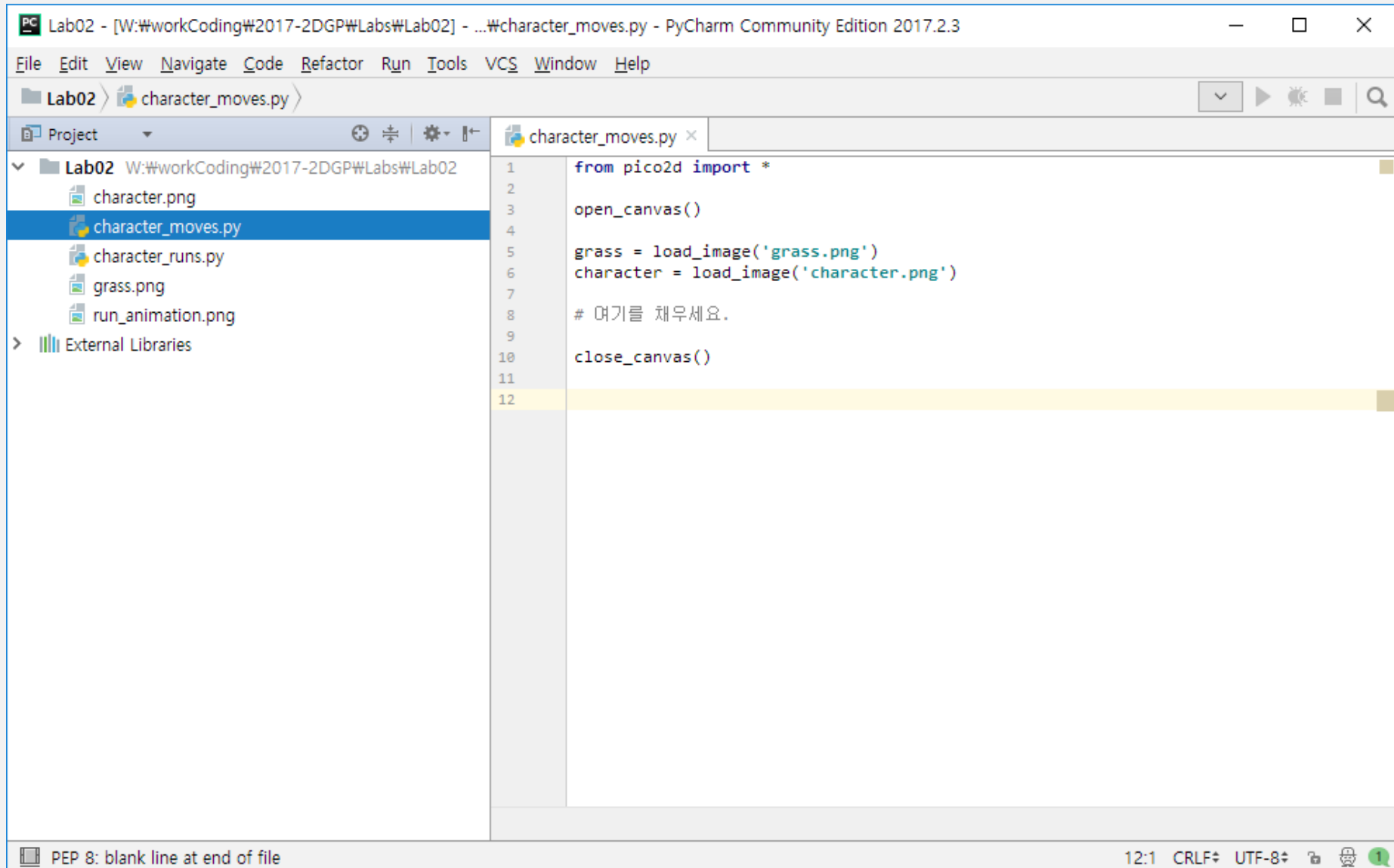
시스템



부드러운 캐릭터 이동



# character\_moves.py 선택 및 코드 입력



# character\_moves.py



```
from pico2d import *

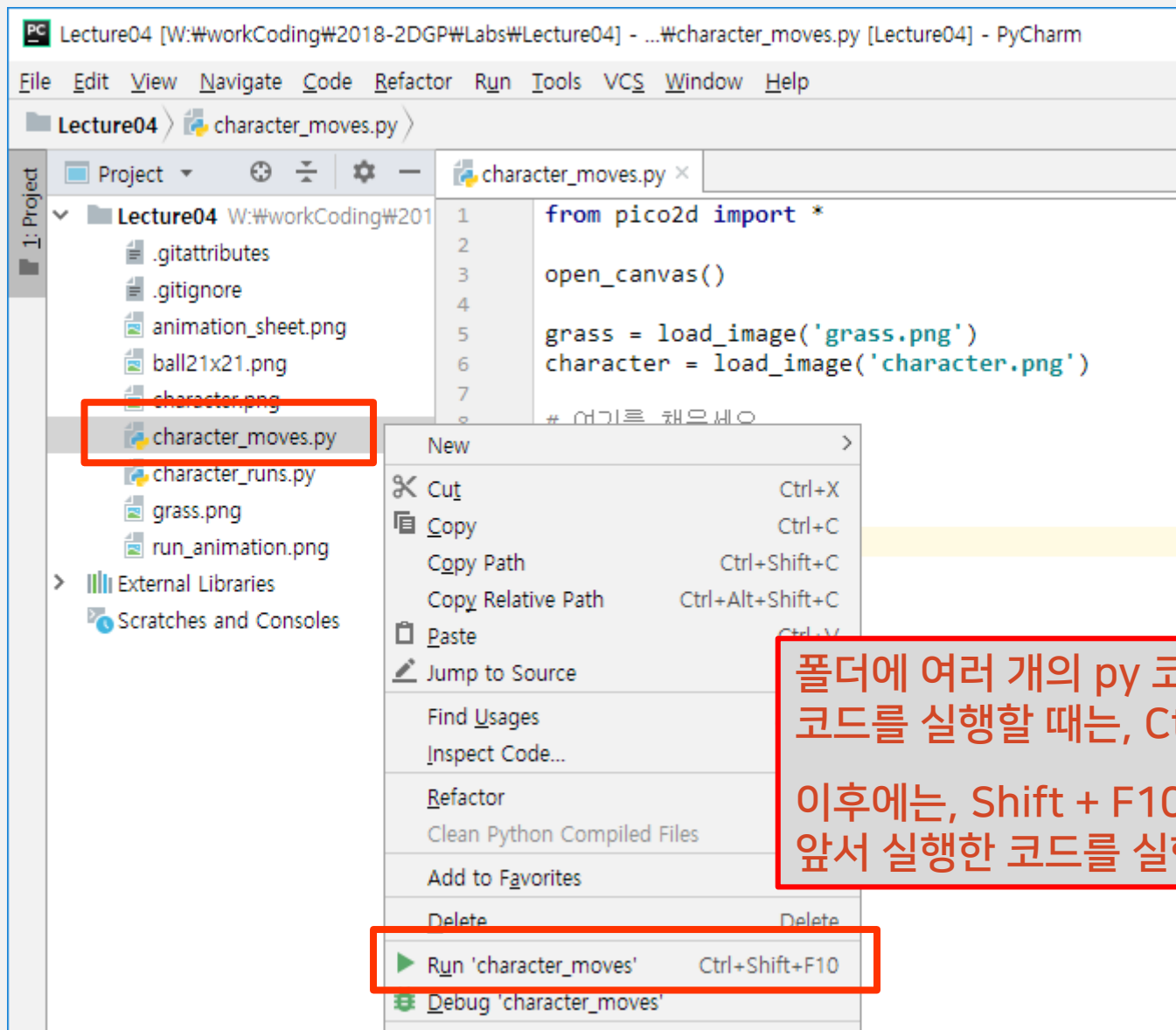
open_canvas()

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()
```

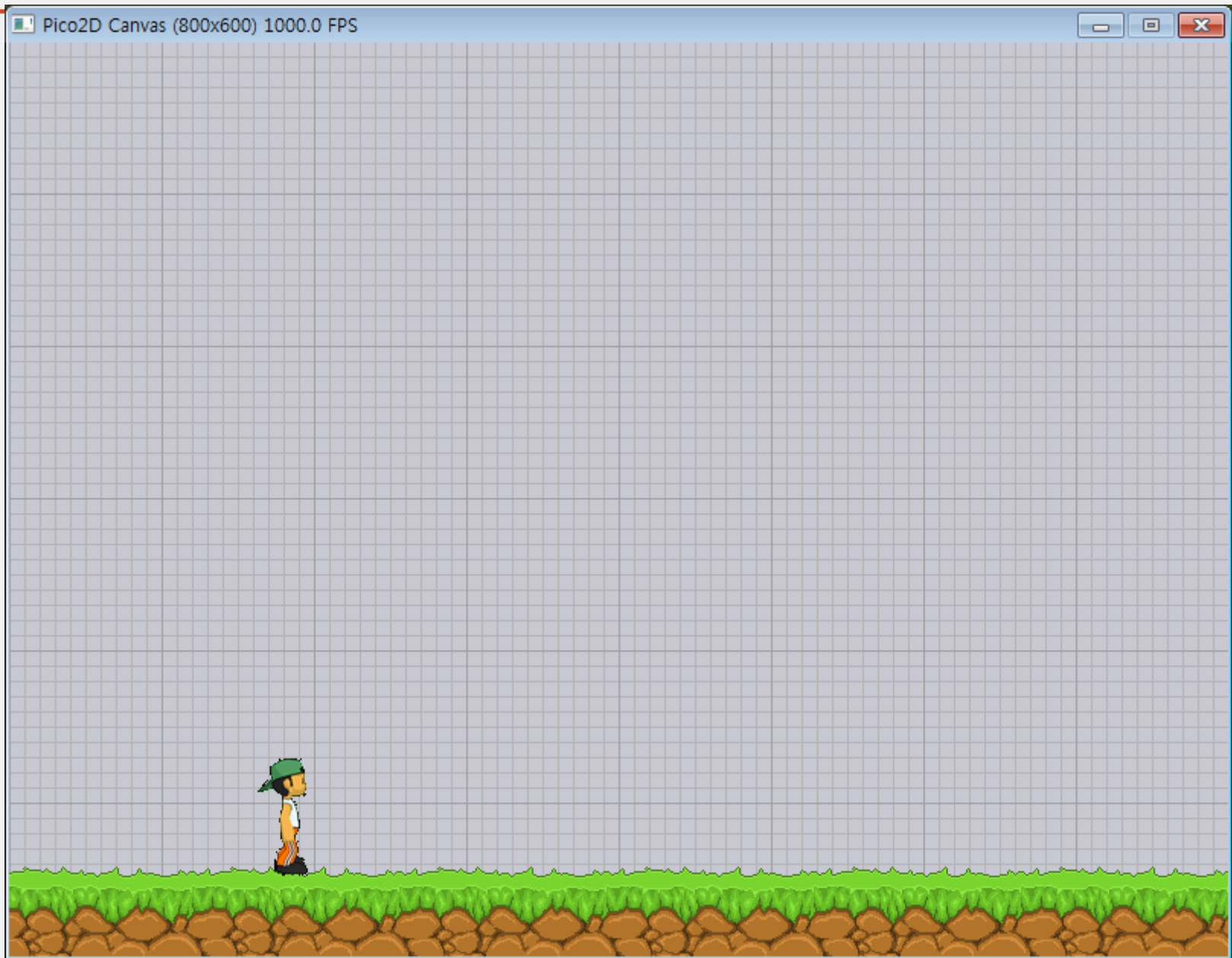
# 선택한 코드의 실행(Ctrl + Shift + F10)



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.

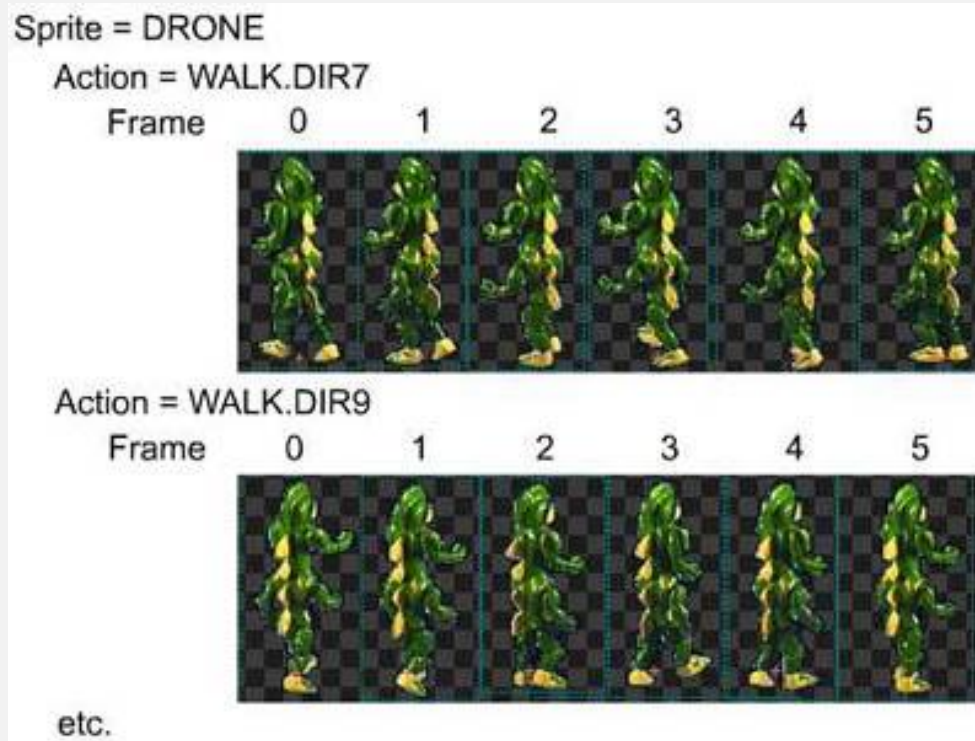


*Metal Slug 3*

# 애니메이션(Animation)

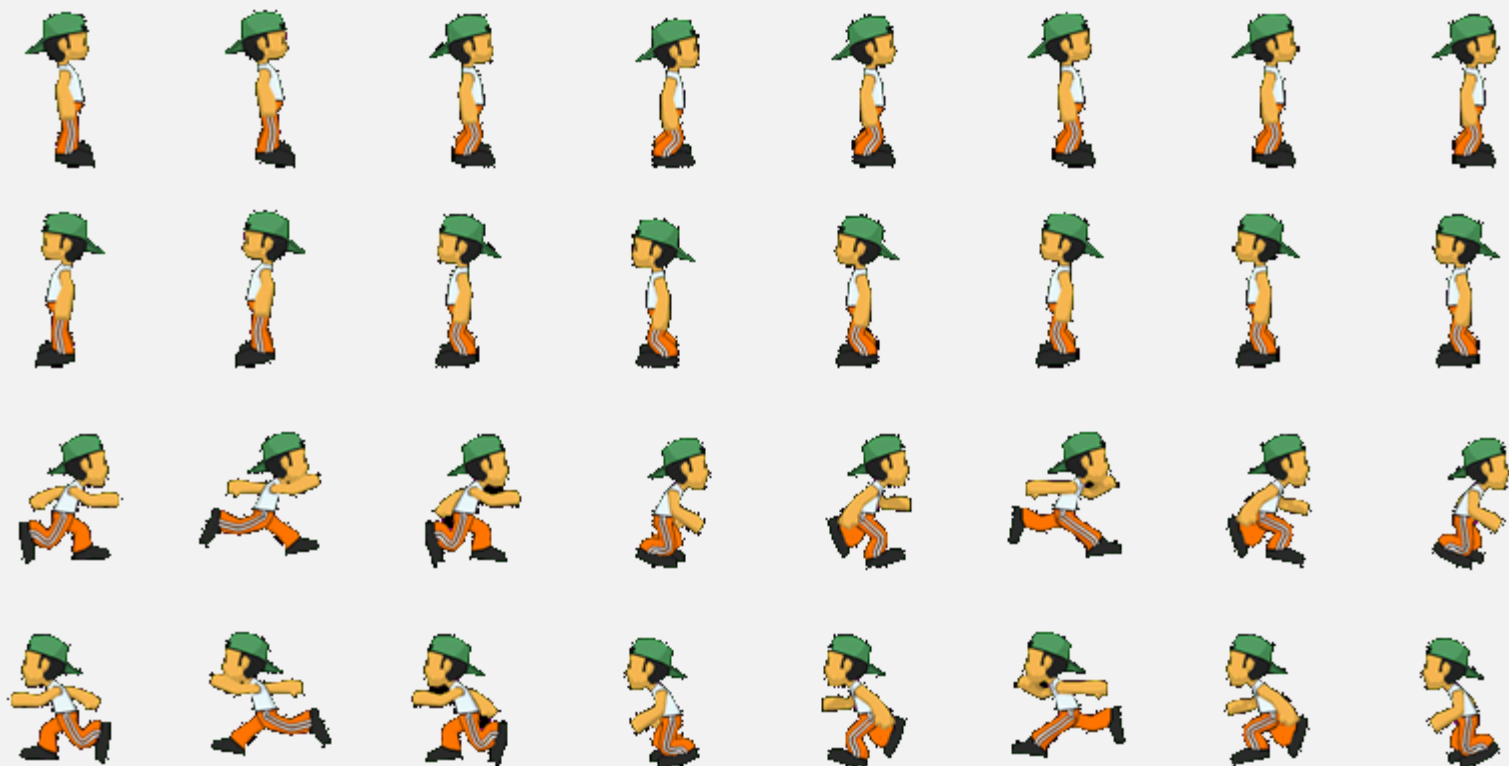
## ■ 애니메이션이란?

- 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

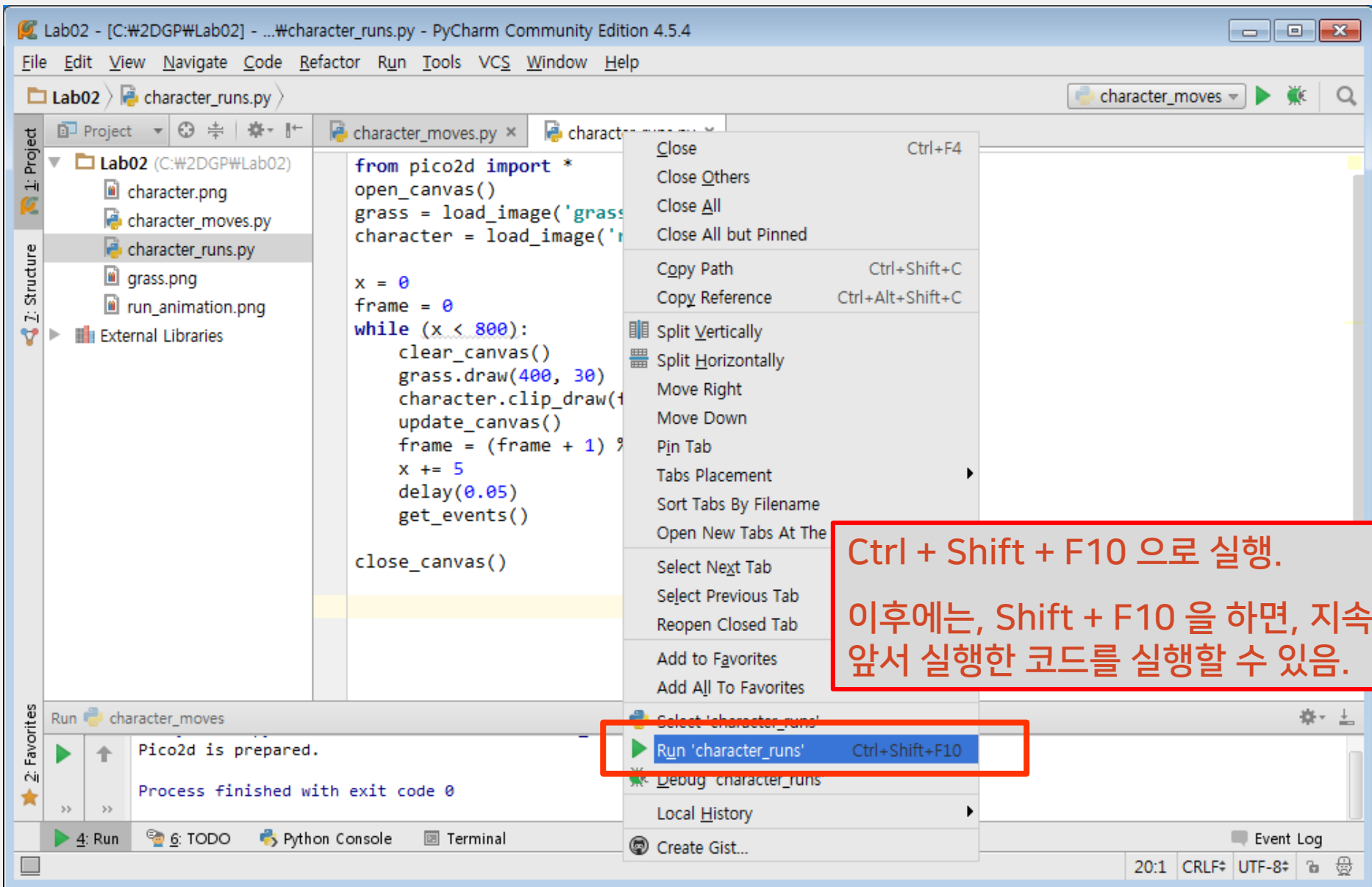


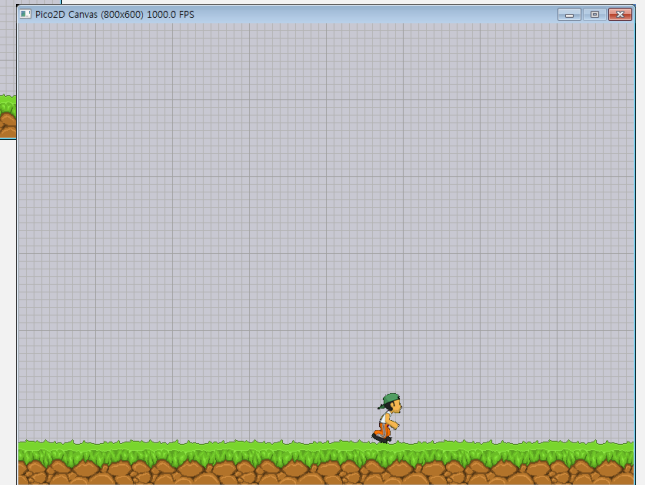
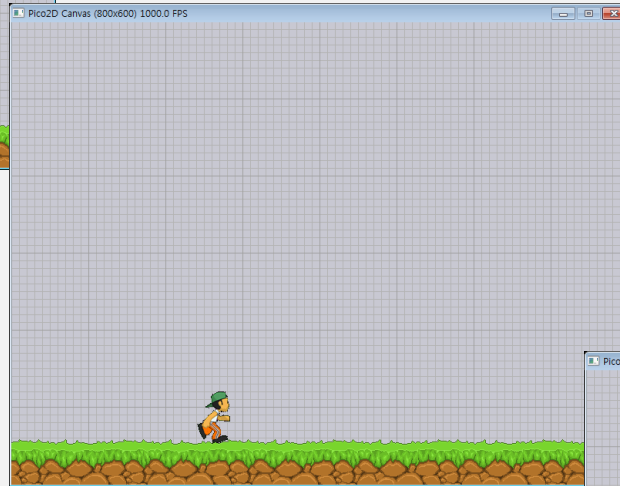
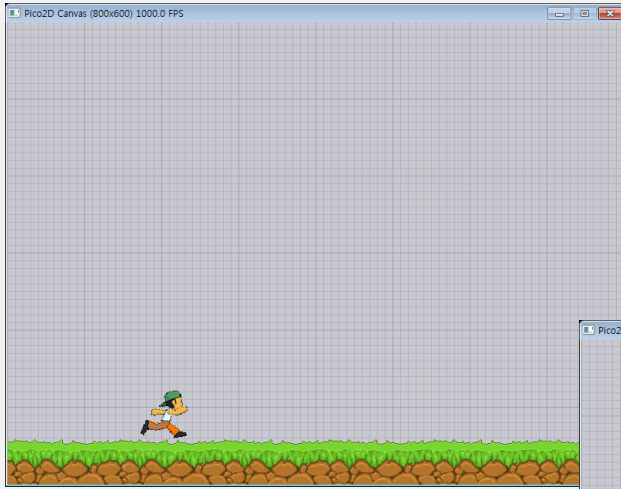
```
from pico2d import *
open_canvas()
grass = load_image('grass.png')
character = load_image('run_animation.png')

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)

