

# Lecture #4. 2D 렌더링

2D 게임 프로그래밍

이대현 교수

# 학습 내용

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- 2D 게임의 정의
- 2D 게임의 기본 요소
- Pico2d 설치
- 캐릭터 이미지의 렌더링과 이동

# 2D 게임?

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## ■ 게임이란?

- “가상 월드에 존재하는 여러 객체들의 상호작용”

## ■ 게임의 기본 구성 요소

- 배경
- 캐릭터, 오브젝트
- UI - GUI, 입력(키,마우스,터치, ...)
- AI
- 사운드

## ■ 2D 게임?

- 현재 진행 중인 게임 가상 월드의 내용을 화면에 2D 그림으로 보여주는 것
- 배경,캐릭터(오브젝트)의 표현(렌더링)을 2D 이미지들의 조합으로 구성함!

# 2D 게임의 기본 요소

GUI

배경(World)

캐릭터

오브젝트



# 2D 게임 개발 접근법

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## ■ 플랫폼 종속적 방법

- Direct X
- OpenGL
- Simple Frame Buffer

## ■ 플랫폼 독립적 방법, Cross Platform

- Unity
- Unreal
- COCOS2D
- SDL
- 그 외의 범용 2D 렌더링 라이브러리

# SDL(Simple DirectMedia Layer)

---

## ■ SDL이란?

- 크로스 플랫폼 멀티미디어 라이브러리.
- 비디오, 오디오 및 사용자 입력을 처리하는 API로 구성.
- 기본적으로 2D 그래픽 라이브러리. 3D는 OpenGL을 통해서 지원.

## ■ SDL이 지원하는 플랫폼

- PC: Windows, Linux, Mac OS
- Phone: Android, iOS,

## ■ 라이선싱(SDL 2.0)

- zlib license
- 자유롭게 상용 게임을 개발할 수 있음.
- SDL1.2 → GNU LGPL 라이선싱

## ■ 홈페이지

- [www.libsdl.org](http://www.libsdl.org)



# 2D 게임 개발 환경 구성

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## ■ 필수 환경

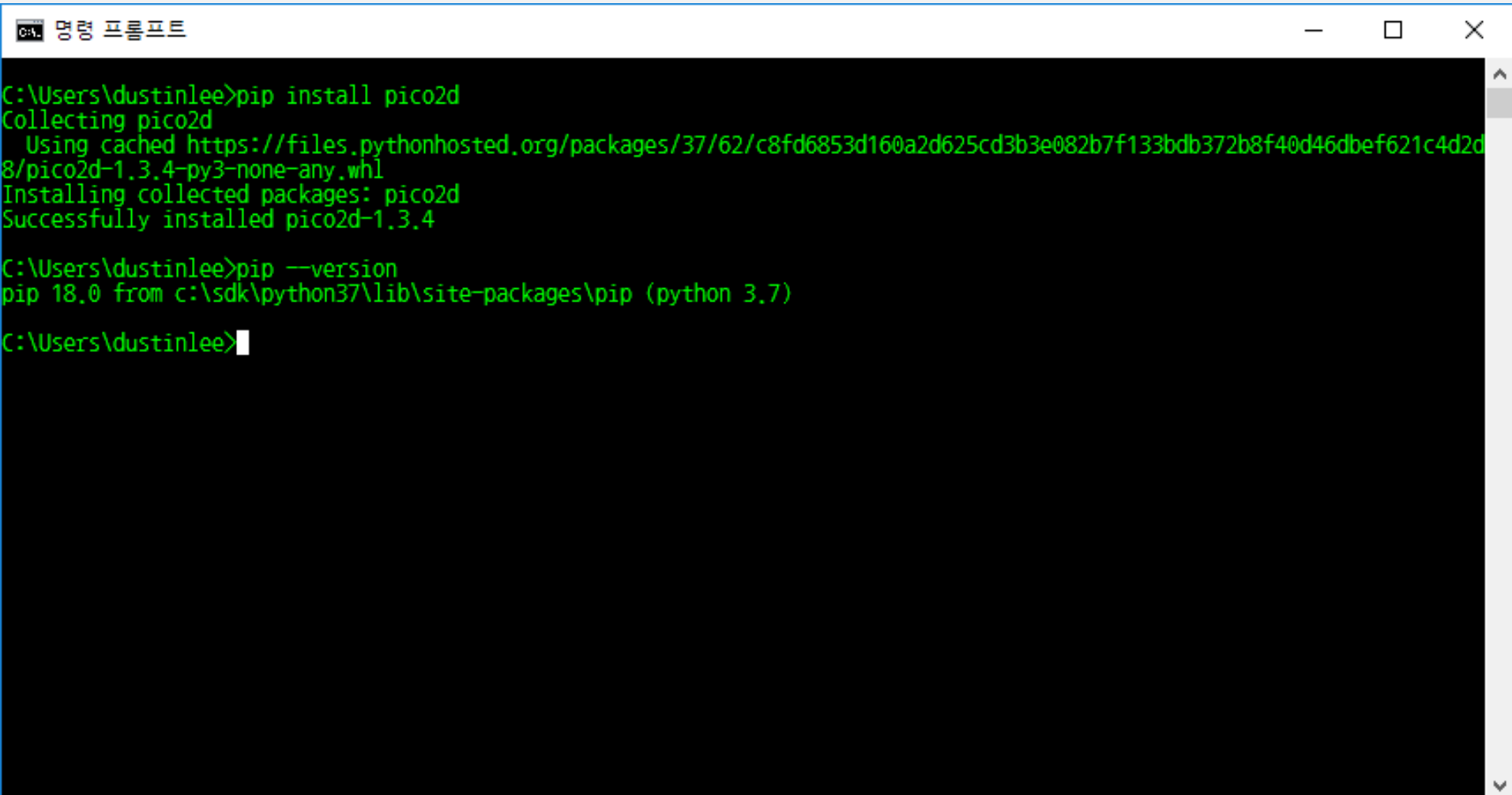
- Windows 10 64 bit
- Python 3.7.0+
- Git / TortoiseGit

## ■ 2D 그래픽 라이브러리

- pico2d - 내부에 SDL라이브러리와 PySDL2 라이브러리를 포함.

# pico2d 의 설치 – pip 이용

- cmd 창에서, “pip install pico2d” 를 입력
  - 경우에 따라서, pip 자체를 update 할 필요가 있음.
  - pip가 실행되지 않는 경우는, python을 다시 설치해야 함.



```
C:\Users\dustinlee>pip install pico2d
Collecting pico2d
  Using cached https://files.pythonhosted.org/packages/37/62/c8fd6853d160a2d625cd3b3e082b7f133bdb372b8f40d46dbef621c4d2d8/pico2d-1.3.4-py3-none-any.whl
Installing collected packages: pico2d
Successfully installed pico2d-1.3.4

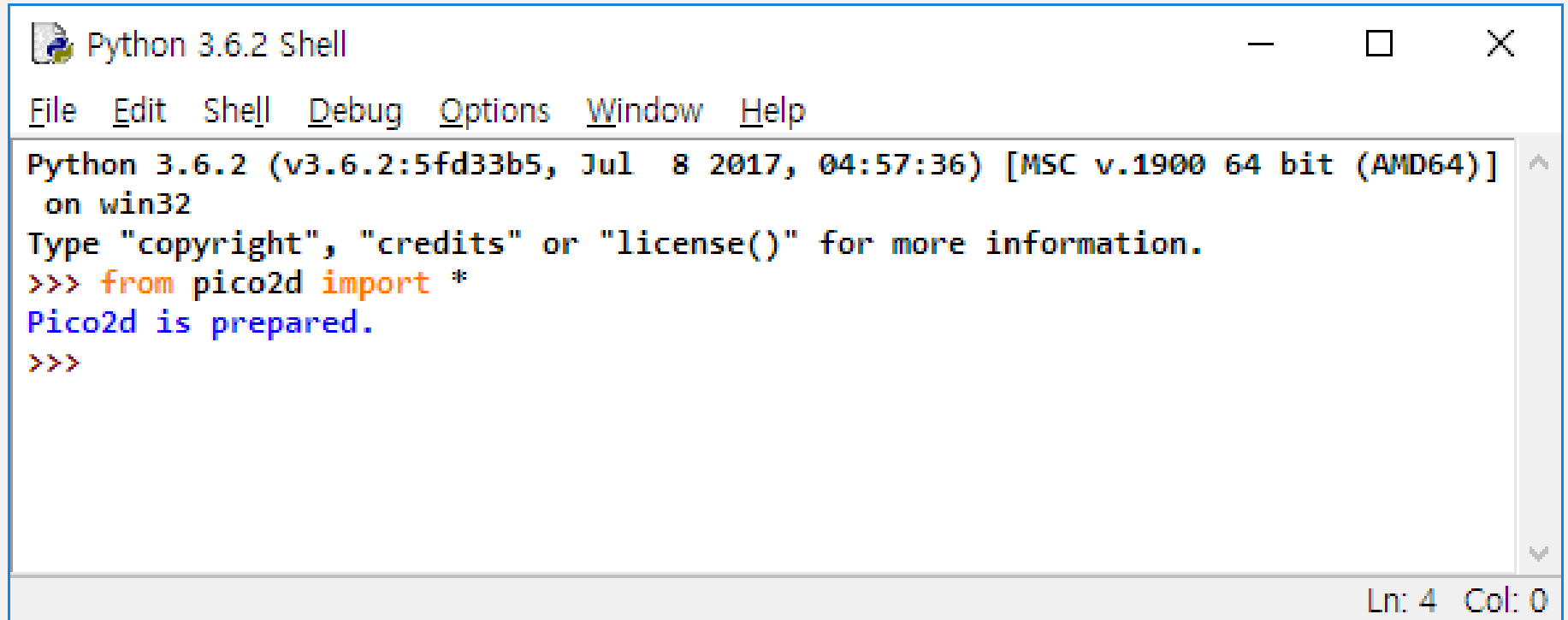
C:\Users\dustinlee>pip --version
pip 18.0 from c:\sdk\python37\lib\site-packages\pip (python 3.7)

C:\Users\dustinlee>
```



# Pico2d 라이브러리 설치 완료 확인

---

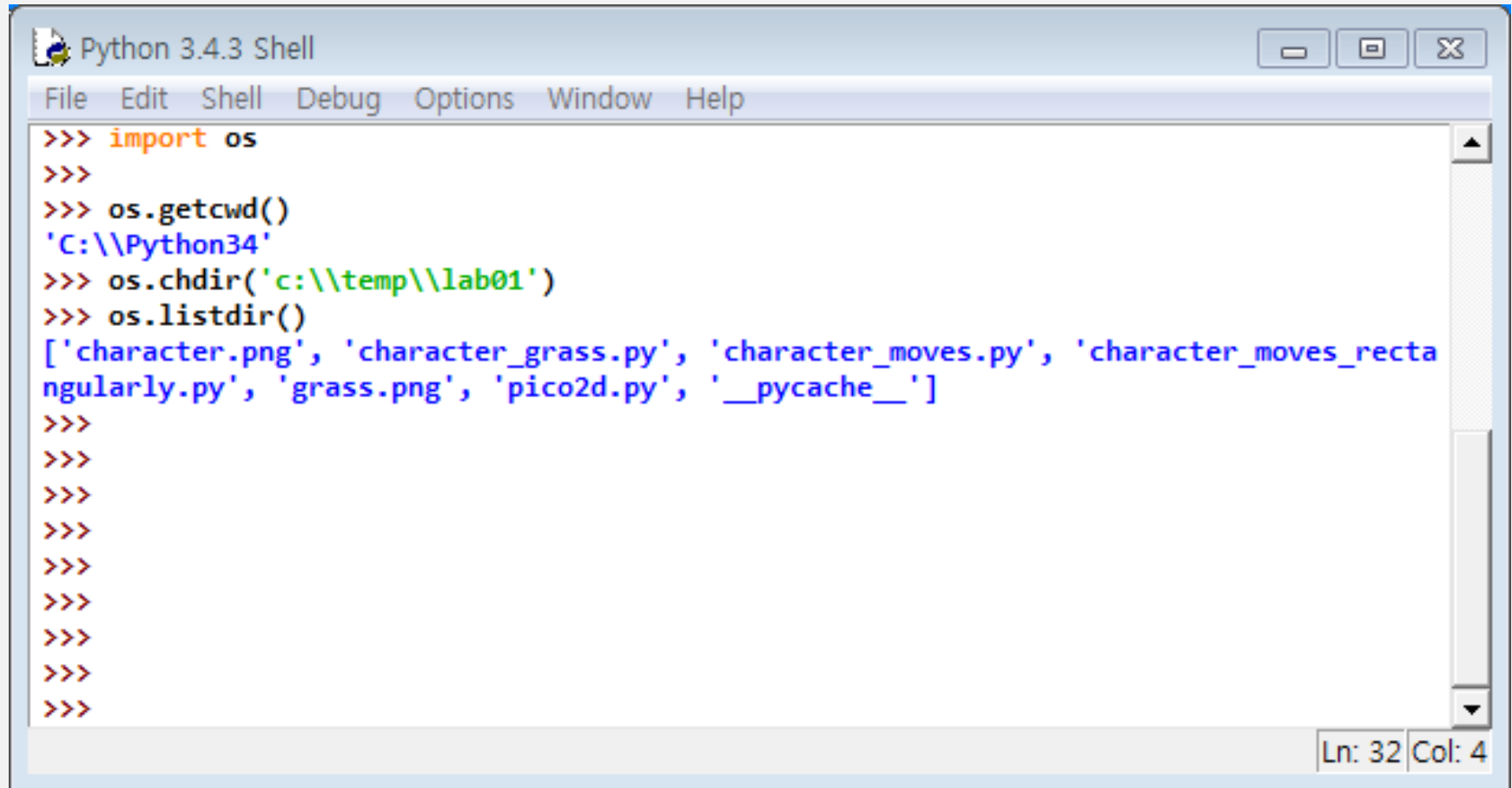


A screenshot of a Python 3.6.2 Shell window. The window title is "Python 3.6.2 Shell". The menu bar includes "File", "Edit", "Shell", "Debug", "Options", "Window", and "Help". The main text area shows the following output:

```
Python 3.6.2 (v3.6.2:5fd33b5, Jul 8 2017, 04:57:36) [MSC v.1900 64 bit (AMD64)]  
on win32  
Type "copyright", "credits" or "license()" for more information.  
>>> from pico2d import *  
Pico2d is prepared.  
>>>
```

The status bar at the bottom right indicates "Ln: 4 Col: 0".

# OS 모듈을 이용한 Working Directory 설정

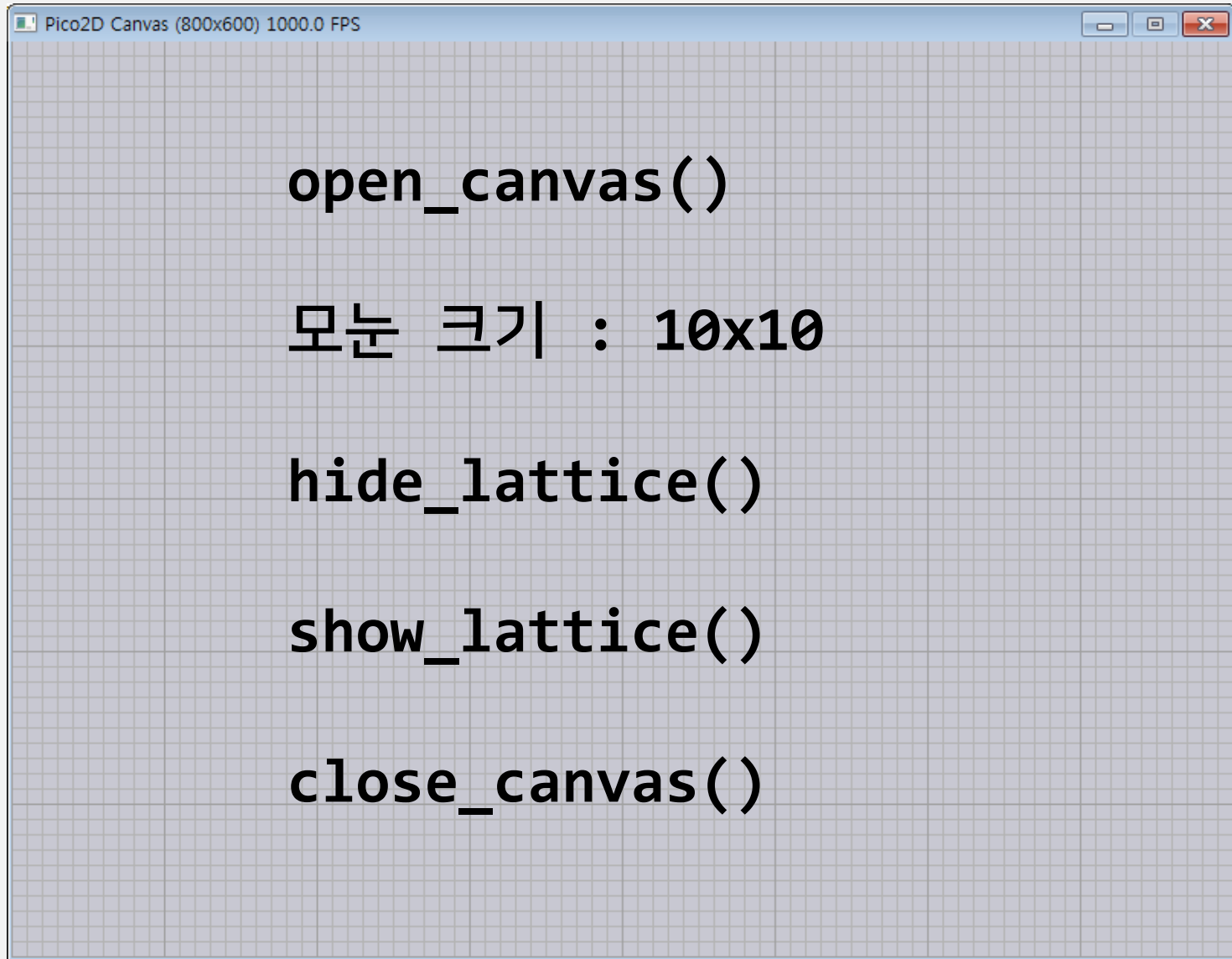
A screenshot of a Python 3.4.3 Shell window. The window has a title bar with the text 'Python 3.4.3 Shell' and standard window controls (minimize, maximize, close). Below the title bar is a menu bar with 'File', 'Edit', 'Shell', 'Debug', 'Options', 'Window', and 'Help'. The main area is a text editor showing a Python script. The script starts with 'import os', followed by 'os.getcwd()' which returns 'C:\\Python34'. Then 'os.chdir('c:\\temp\\lab01')' is executed, and 'os.listdir()' returns a list of files: ['character.png', 'character\_grass.py', 'character\_moves.py', 'character\_moves\_rectangularly.py', 'grass.png', 'pico2d.py', '\_\_pycache\_\_']. The script ends with several empty lines. The status bar at the bottom right shows 'Ln: 32 Col: 4'.

```
>>> import os
>>>
>>> os.getcwd()
'C:\\Python34'
>>> os.chdir('c:\\temp\\lab01')
>>> os.listdir()
['character.png', 'character_grass.py', 'character_moves.py', 'character_moves_recta
ngularly.py', 'grass.png', 'pico2d.py', '__pycache__']
>>>
>>>
>>>
>>>
>>>
>>>
>>>
>>>
>>>
```

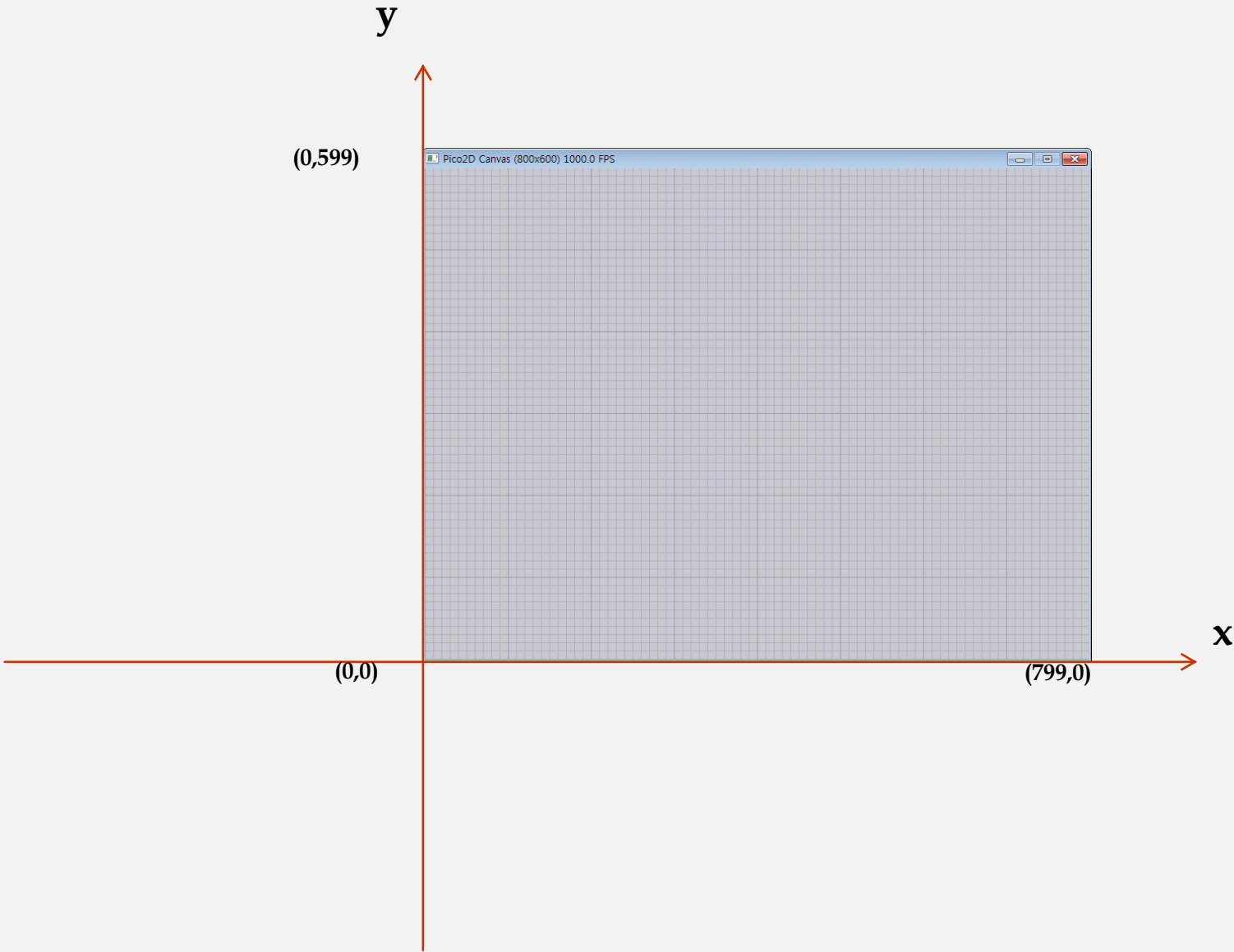
Ln: 32 Col: 4

## 캔버스 열기 - open\_canvas(800,600)

---



# 캔버스의 좌표계



## JPG vs PNG

# 우리의 주인공

---



```
>>> image = load_image('character.png')
```

# 피봇(Pivot)

---

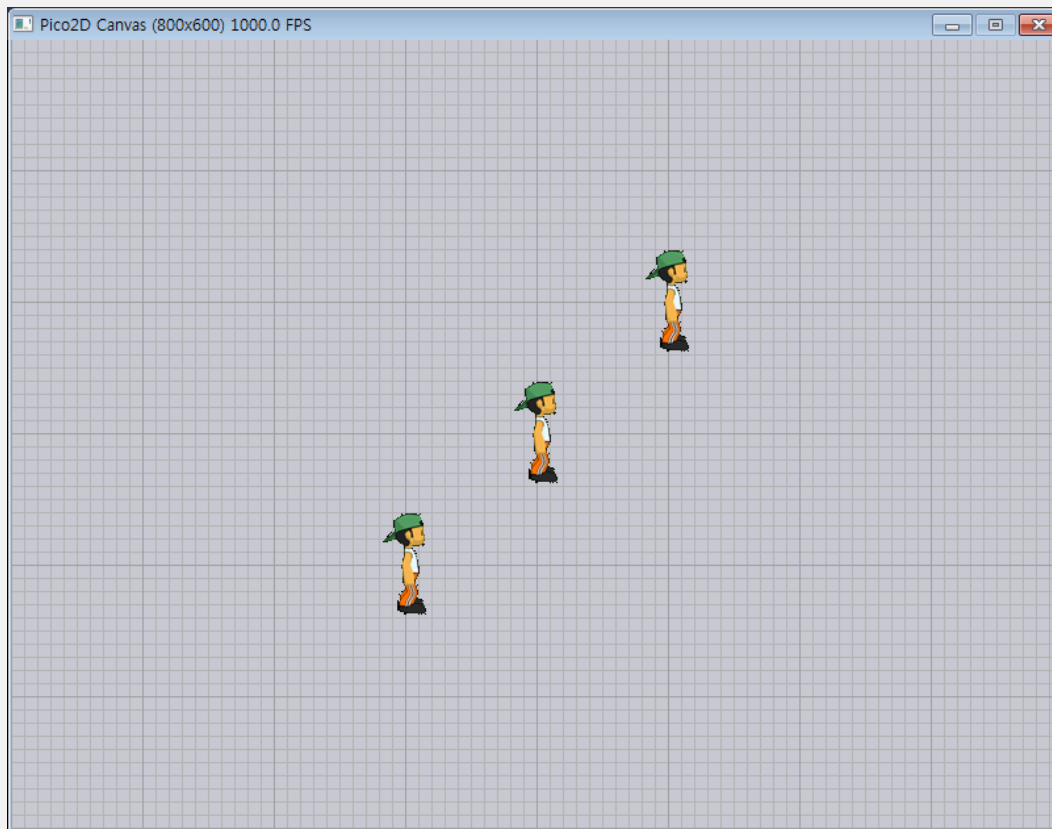


여기가 피봇입니다.

이 점을 피봇으로 삼기도 합니다

## 몇 명 더 그려 봅시다~

---



```
>>> image.draw_now(300, 200)  
>>> image.draw_now(500, 400)
```

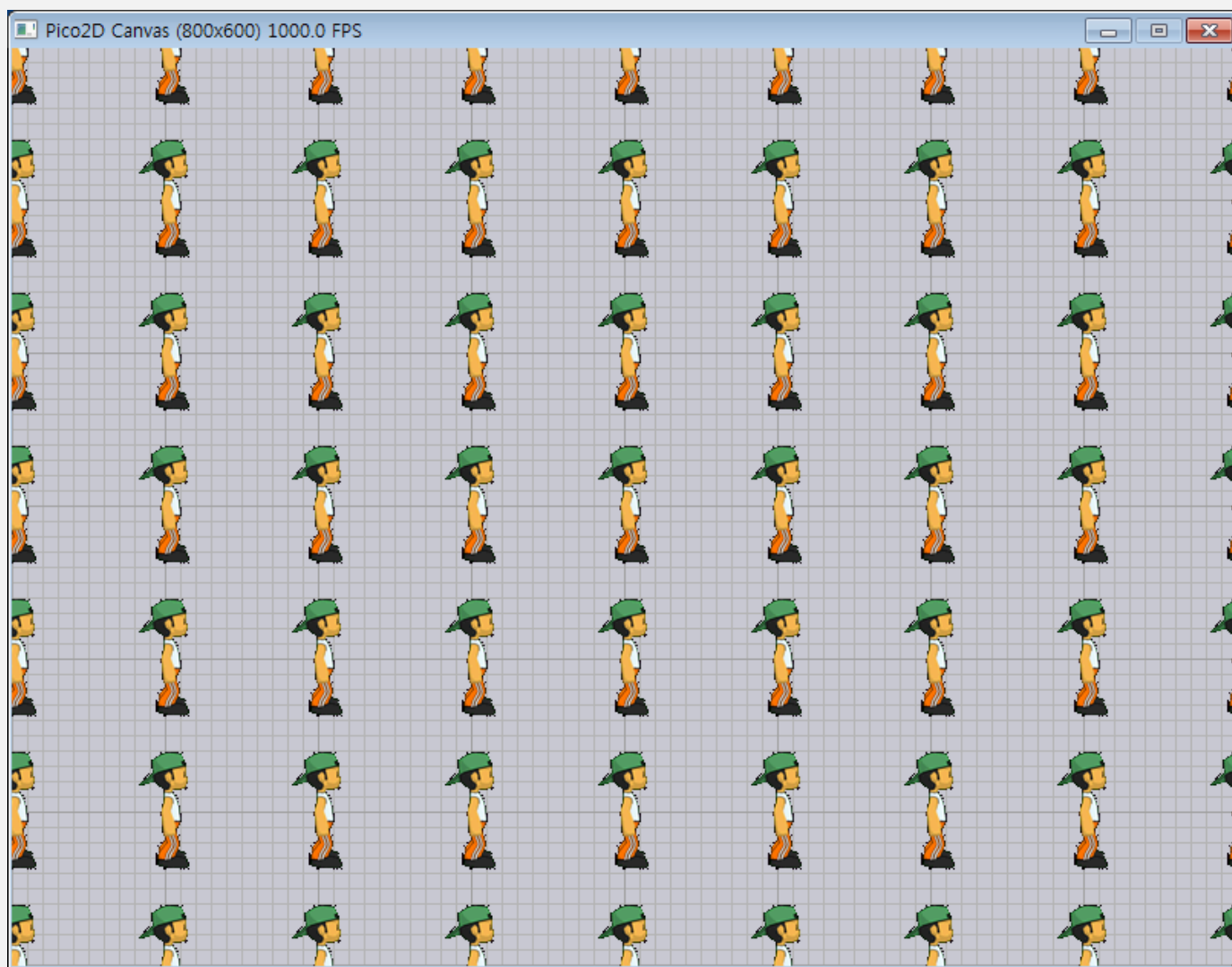


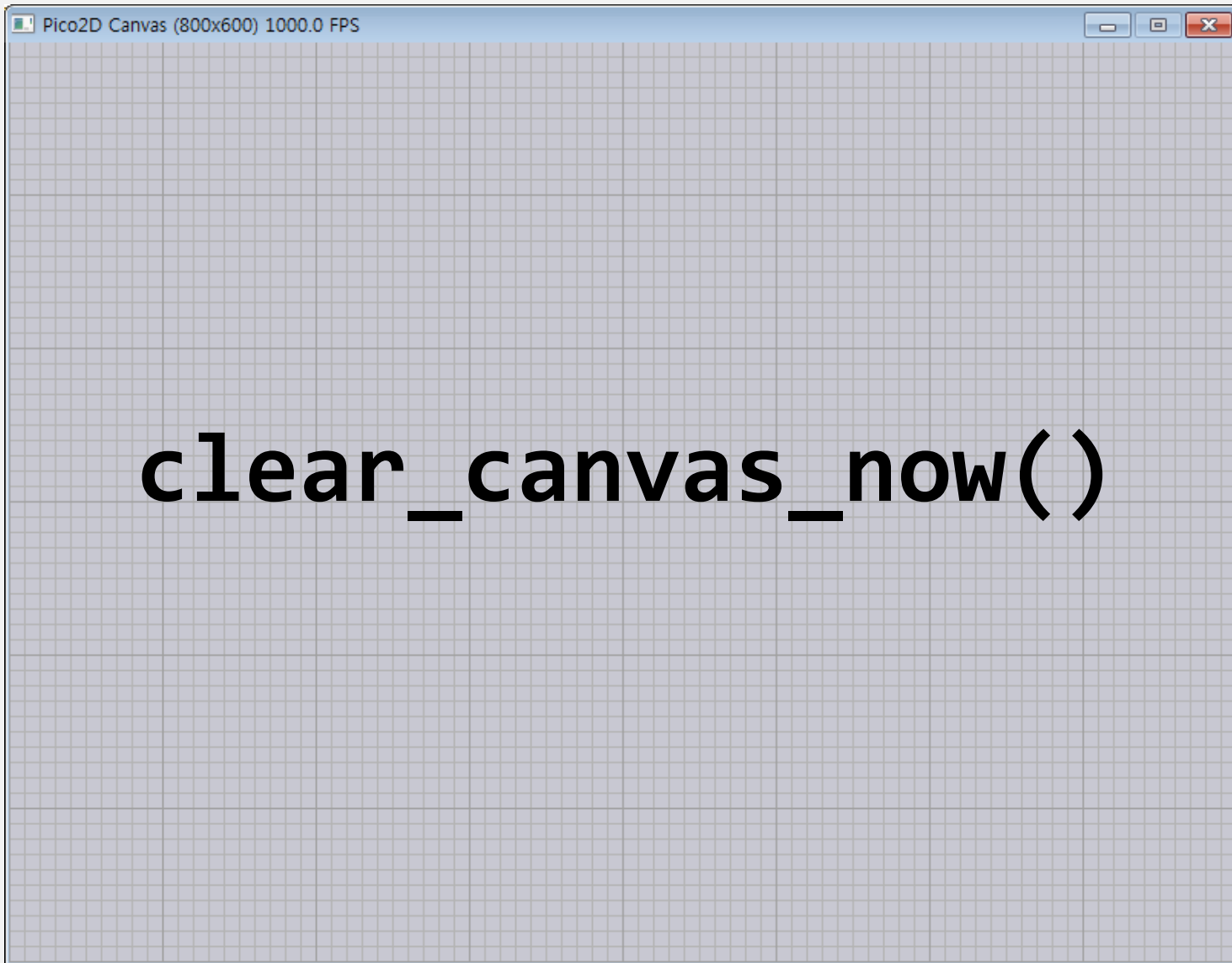
# 테로 그리기

---

```
>>> for x in range(0,9):  
    for y in range (0, 7):  
        image.draw_now(x * 100, y * 100)
```

# 캐릭터 데!





시스템



캐릭터 이동

# character\_grass.py

```
from pico2d import *
```

```
open_canvas()
```

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

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

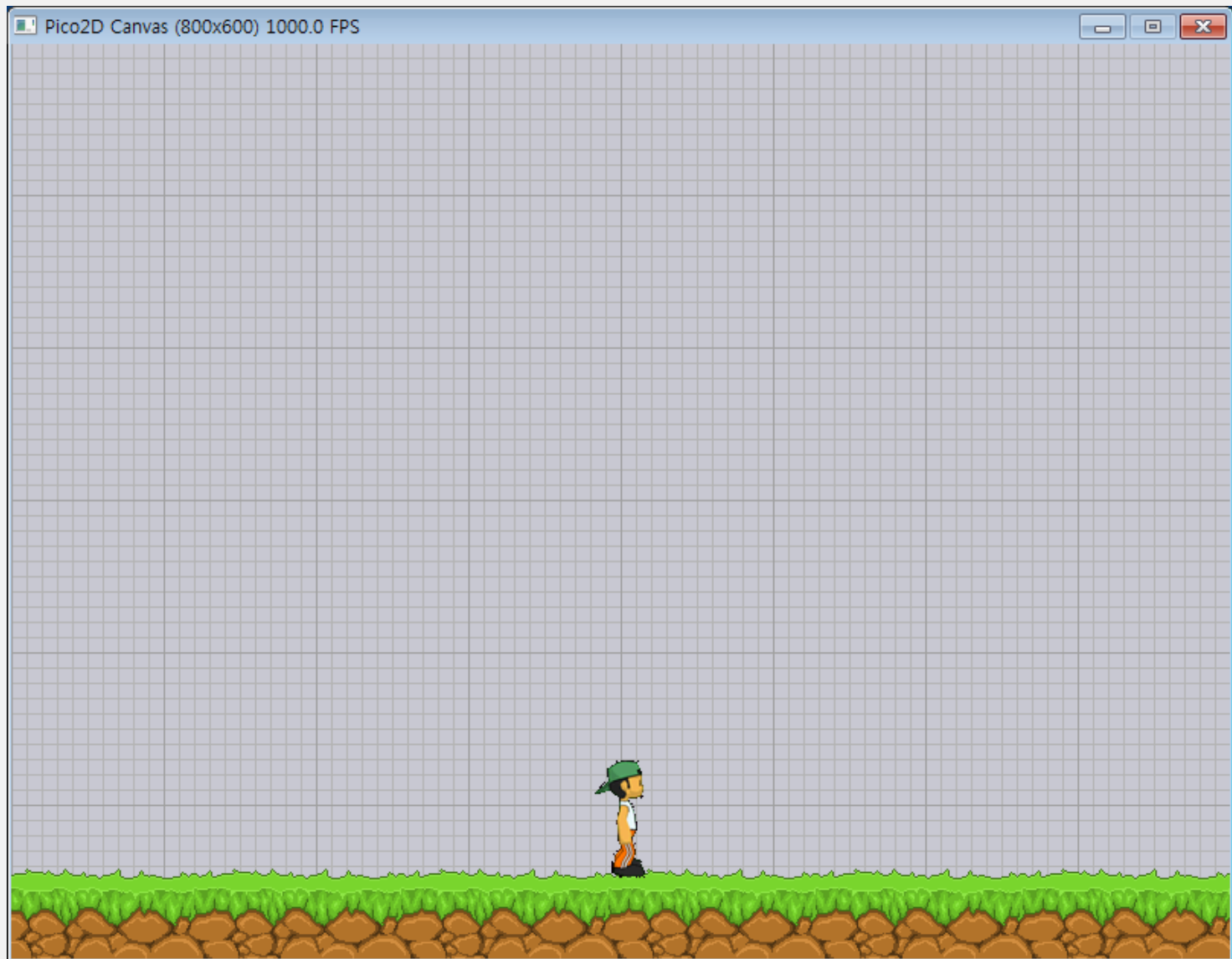
```
grass.draw_now(400, 30)
```

```
character.draw_now(400, 90)
```

```
delay(5)
```

```
close_canvas()
```





# 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_now()
```

```
    grass.draw_now(400, 30)
```

```
    character.draw_now(x, 90)
```

```
    x = x + 2
```

```
    delay(0.01)
```

```
close_canvas()
```

# 게임 루프

---

```
x = 0  
while (x < 800):
```

```
    clear_canvas_now()  
    grass.draw_now(400, 30)  
    character.draw_now(x, 90)
```

Game Rendering

```
    x = x + 2
```

Game Logic

```
    delay(0.01)
```



# 초간단 Github 사용

# 깃허브 페이지 <https://github.com>

The screenshot shows the GitHub homepage. The browser's address bar displays 'https://github.com'. The navigation bar includes links for Features, Platform, Business, Explore, and Pricing, along with a search bar and 'Sign in' and 'Sign up' buttons. The 'Sign up' button is highlighted with an orange box. A red box labeled '신규 등록' (New Registration) is positioned above the sign-up form. The form itself is a white overlay with fields for Username, Email, and Password. The Username field contains 'game-lecture' and has a red error message 'Username is already taken' below it. The Email field contains 'you@example.com'. The Password field is masked with dots. A green 'Sign up for GitHub' button is at the bottom of the form. Below the button, there is a disclaimer about agreeing to the terms of service and privacy statement.

Build for developers

GitHub is a development platform inspired by the way you work. From open source to business, you can host and review code, manage projects, and build software alongside 28 million developers.

Username

game-lecture

Username is already taken

you@example.com

Password

.....

Use at least one letter, one numeral, and seven characters.

Sign up for GitHub

By clicking "Sign up for GitHub", you agree to our [terms of service](#) and [privacy statement](#). We'll occasionally send you account related emails.

# Create your personal account

## Username

daehyun-lee-dev



This will be your username. You can add the name of your organization later.

## Email address

daehyun.lee.dev@gmail.com



We'll occasionally send updates about your account to this inbox. We'll never share your email address with anyone.

## Password

.....

Use at least one lowercase letter, one numeral, and seven characters.

## Verify account



---

By clicking "Create an account" below, you agree to our [terms of service](#) and [privacy statement](#). We'll occasionally send you account related emails.

---

Create an account



Completed

Set up a personal account



Step 2:

Choose your plan

## Choose your personal plan

- ☒ Unlimited public repositories for free.
- ☐ Unlimited private repositories for \$7/month. [\(view in KRW\)](#)

Don't worry, you can cancel or upgrade at any time.

### ☐ Help me set up an organization next

Organizations are separate from personal accounts and are best suited for businesses who need to manage permissions for many employees.

[Learn more about organizations](#)

### ☐ Send me updates on GitHub news, offers, and events

Unsubscribe anytime in your email preferences. [Learn more](#)

Continue



Completed

Set up a personal account



Step 2:

Choose your plan



Step 3:

Tailor your experience

How would you describe your level of programming experience?

- ☐ Totally new to programming      ☐ Somewhat experienced      ☒ Very experienced

What do you plan to use GitHub for? (check all that apply)

- ☐ Development      ☒ School projects      ☐ Project Management  
☐ Design      ☐ Research      ☐ Other (please specify)

Which is closest to how you would describe yourself?

- ☐ I'm a hobbyist      ☒ I'm a professional      ☐ I'm a student  
☐ Other (please specify)

What are you interested in?

computer ×

game ×

e.g. tutorials, android, ruby, web-development, machine-learning, open-source

Submit

[skip this step](#)

# Learn Git and GitHub without any code!

Using the Hello World guide, you'll create a repository, start a branch, write comments, and open a pull request.

[Read the guide](#)[Start a project](#)

Our new Terms of Service and Privacy Statement are in effect.



Repositories

[New repository](#)

You don't have any repositories yet!

Browse activity

[Discover repositories](#)

## Discover interesting projects and people to populate your personal news feed.

Your news feed helps you keep up with recent activity on repositories you [watch](#) and people you [follow](#).

[Explore GitHub](#)



## Please verify your email address

Before you can contribute on GitHub, we need you to verify your email address.  
An email containing verification instructions was sent to **daehyun.lee.dev@gmail.com**.

Didn't get the email? [Resend verification email](#) or [change your email settings](#).

# 메일 주소 확인

[GitHub] Please verify your email address. Inbox x



**GitHub** <noreply@github.com>

11:33 AM (5 minutes ago)



to me ▾

Hi @daehyun-lee-dev!

Help us secure your GitHub account by verifying your email address ([daehyun.lee.dev@gmail.com](mailto:daehyun.lee.dev@gmail.com)). This lets you access all of GitHub's features.

[Verify email address](#)

Button not working? Paste the following link into your browser:

[https://github.com/users/daehyun-lee-dev/emails/58877963/confirm\\_verification/178994d57f5ef56318db517d3bdac7a81fdc08dd](https://github.com/users/daehyun-lee-dev/emails/58877963/confirm_verification/178994d57f5ef56318db517d3bdac7a81fdc08dd)

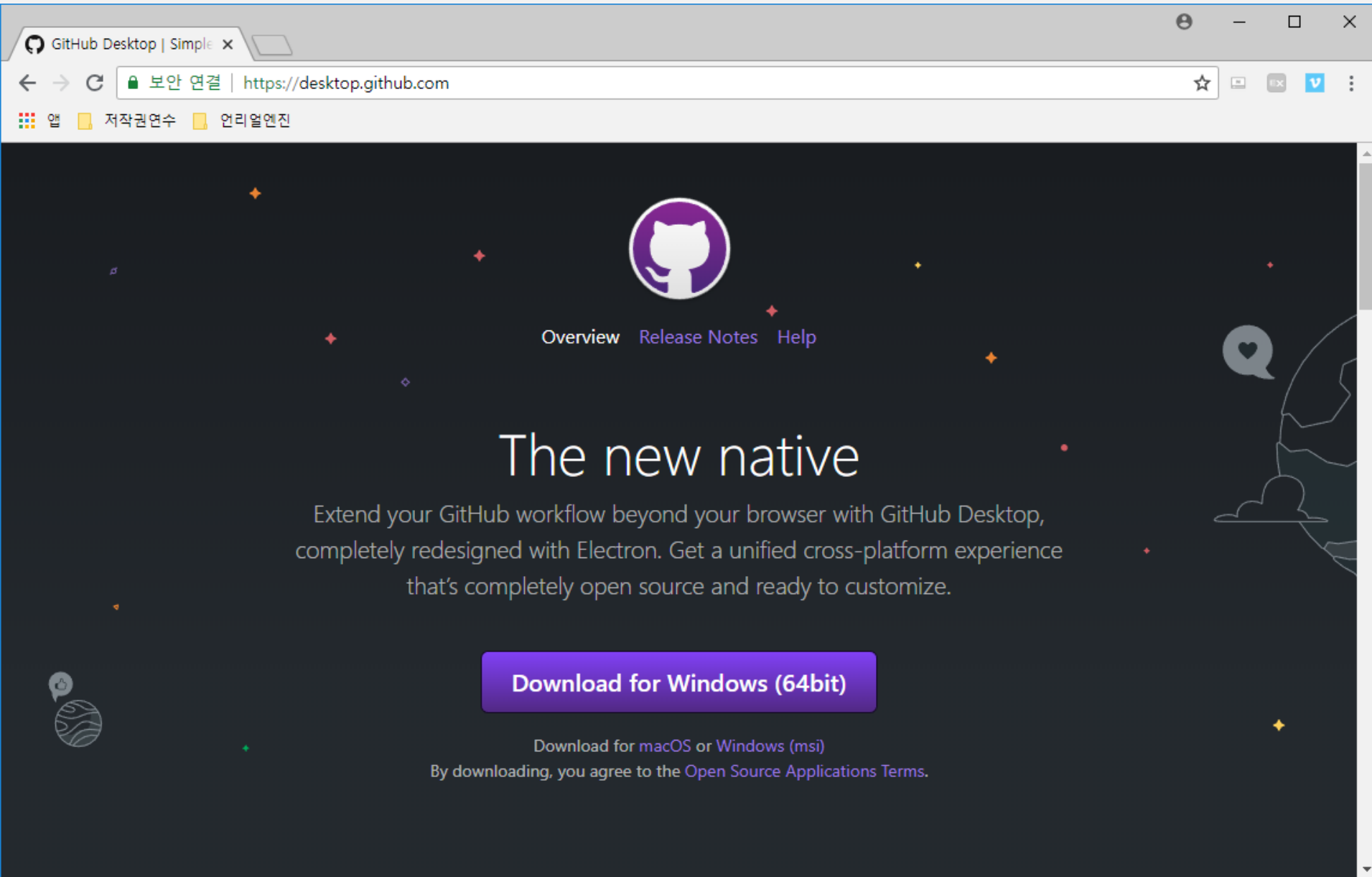
You're receiving this email because you recently created a new GitHub account or added a new email address. If this wasn't you, please ignore this email.

← Reply

➡ Forward



# Github Desktop 설치



# Github Desktop Login



## Sign in to GitHub.com

Username or email address

daehyun-lee-dev


Password

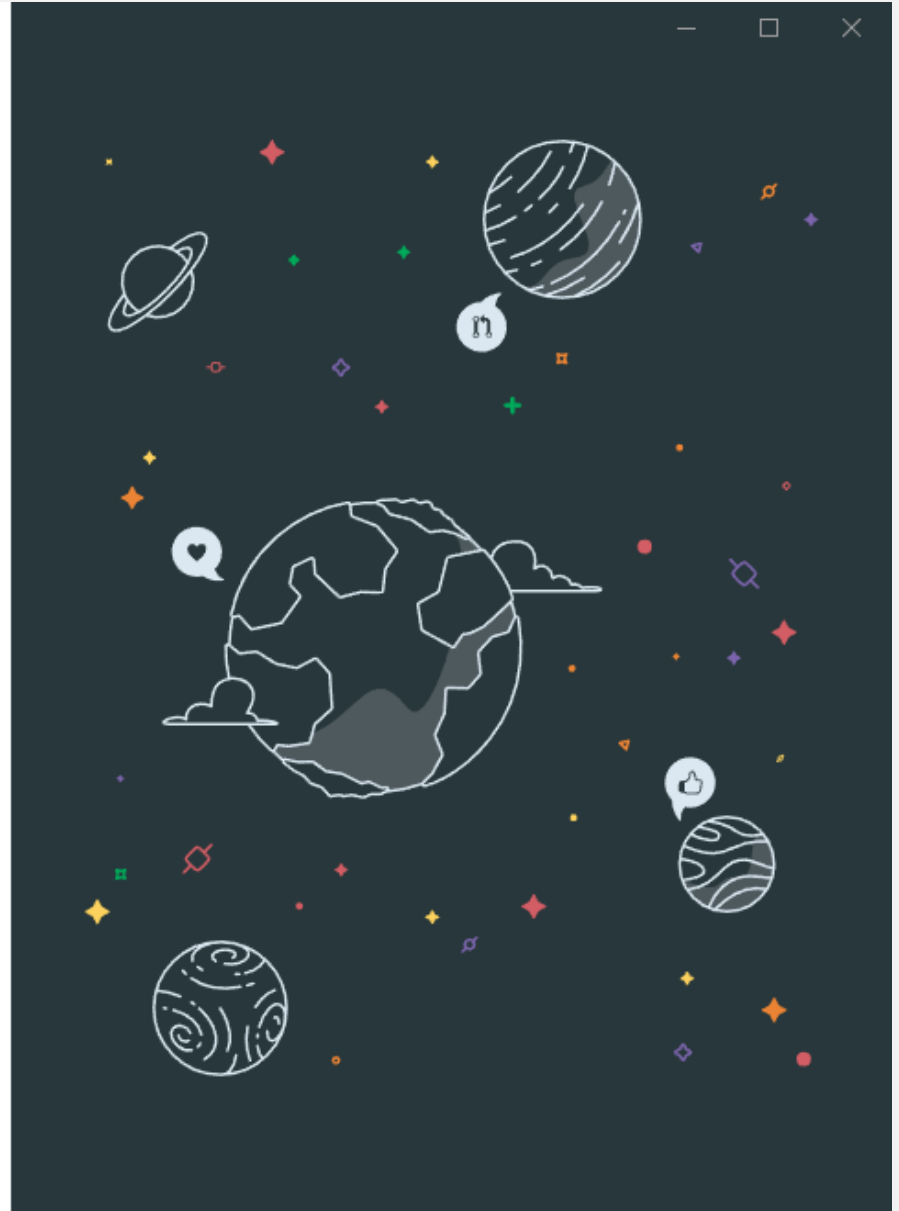
••••••••

Sign in

Cancel

[Forgot password?](#)

[Sign in using your browser](#) 





# Configure Git

This is used to identify the commits you make. It is not possible to see this information if you do not share it.

Name

daehyunlee(XPS13)

Email


daehyun.lee.dev@gmail.com

Continue

Cancel

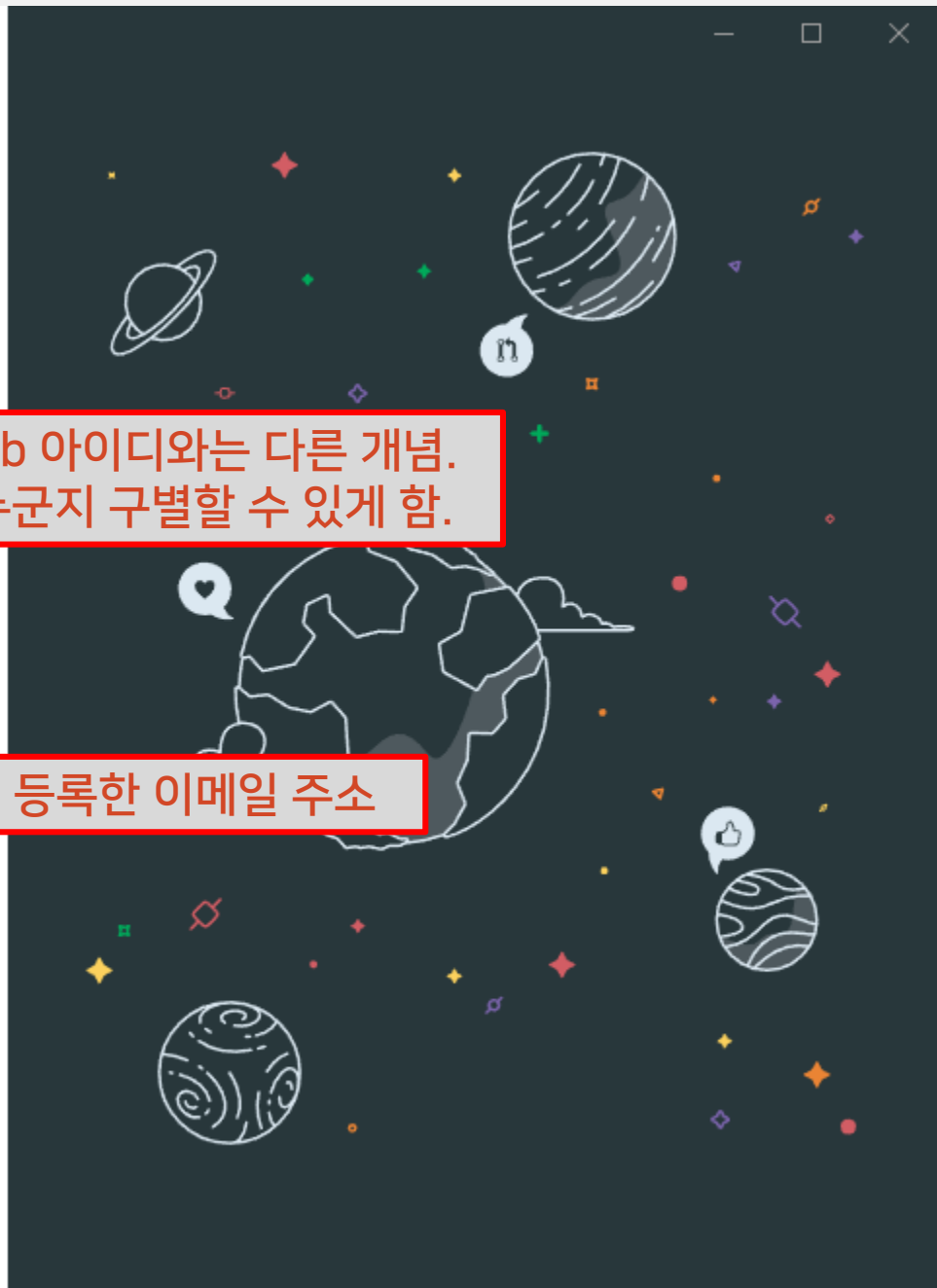
Example commit

Fix all the things

 daehyunlee(XPS13) committed 30 minutes ago

사용자의 이름. Github 아이디와는 다른 개념.  
실제로 올린 사람이 누군지 구별할 수 있게 함.

Github 계정 만들 때, 등록한 이메일 주소





# Let's get started!

Add a repository to GitHub Desktop to start collaborating



Filter



Couldn't find any repositories for the account `daehyun-lee-dev` on GitHub.com. [Refresh the list](#) if you've created a repository recently.



Clone a repository from the Internet...



Create a New Repository on your hard drive...



Add an Existing Repository from your hard drive...

내 PC 에 새로운 저장소(repository)를 생성.

내 PC에 만들어지는 저장소를 Local Repository라고 함.



**ProTip!** You can drag & drop an existing repository folder here to add it to Desktop

## Create a new repository



Name

89418022-2DGP-DRILL

Description

Local path

D:\890418DHLEE

☒ Initialize this repository with a README

Git ignore

Python

License

None

Create repository

Cancel

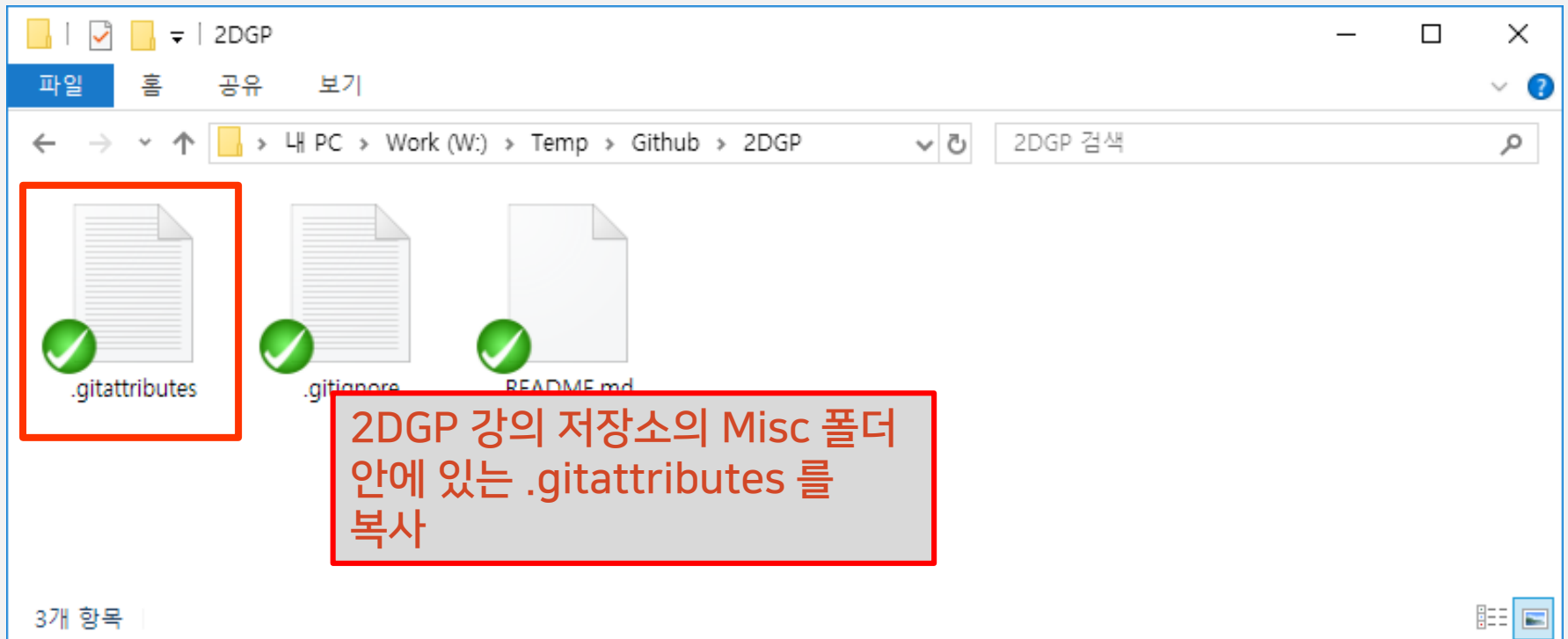
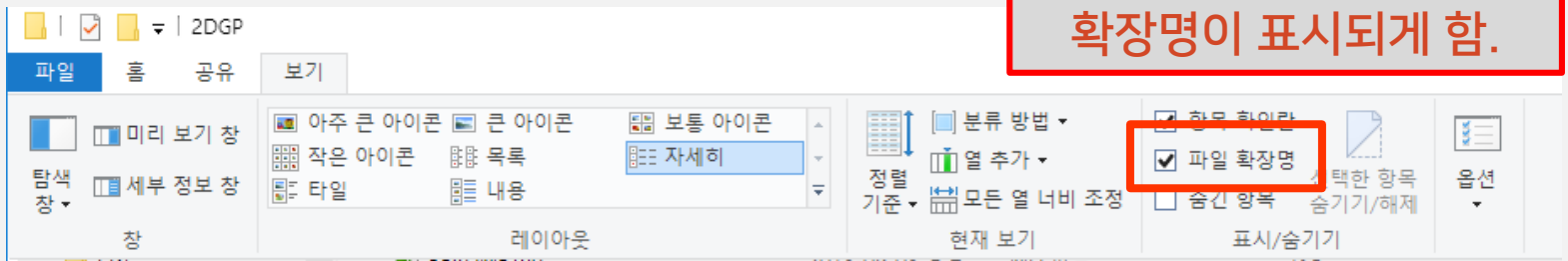
저장소의 이름. 원격 저장소 폴더의 이름이 됨.

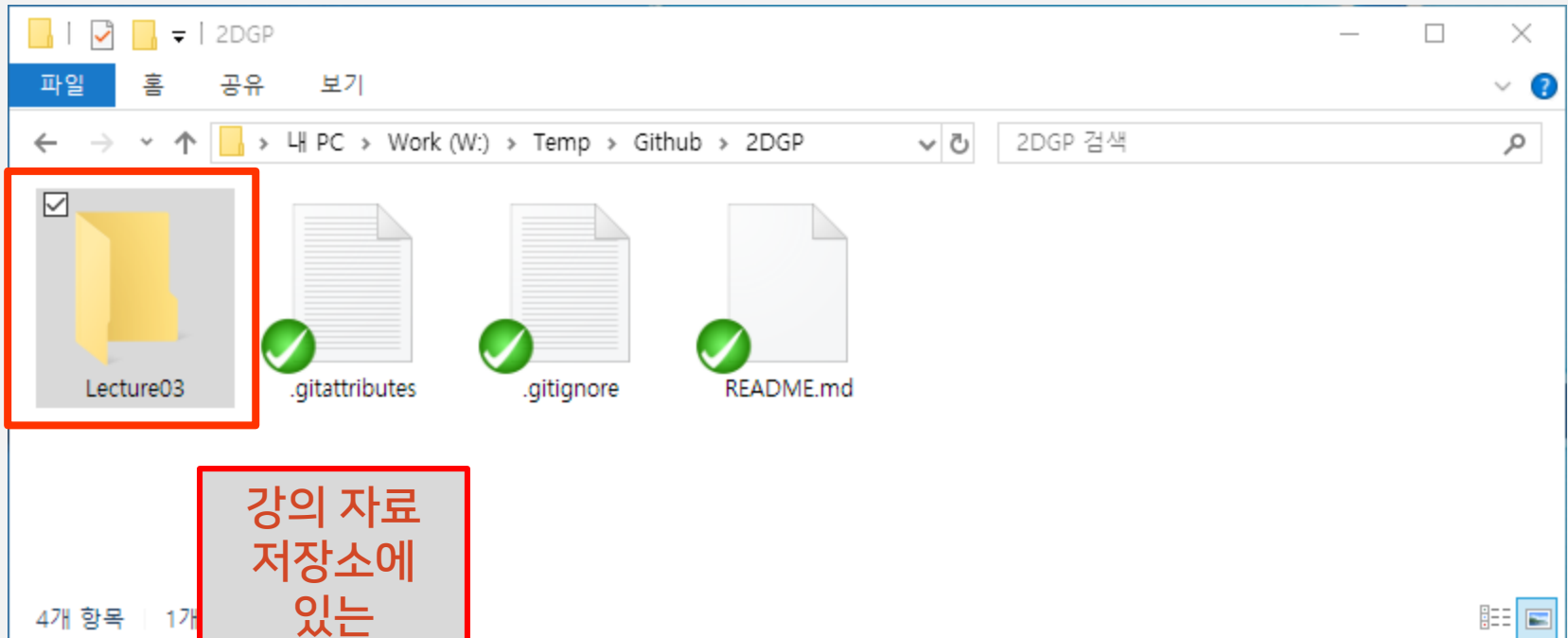
주의: 공용 PC에서는 사용자마다 다르게 지정하는 것이 바람직.

저장소 폴더가 생성되는 경로. 이 경로 아래에 저장소가 생성됨.

주의: 공용 PC에서는 사용자마다 다르게 지정하는 것이 바람직.

# 생성된 저장소





강의 자료  
저장소에  
있는  
소스코드  
폴더를  
통째로 복사

FileEditViewRepositoryBranchHelp

Current repository  
2DGP-DRILL

Current branch  
master

Fetch origin  
Last fetched 4 minutes ago

Changes 6History

6 changed files

Lecture03\gitattributes

Lecture03\gitignore

Lecture03\character.png

Lecture03\character\_grass.py

Lecture03\character\_moves.py

Lecture03\grass.png

Lecture03\gitattributes

@@ -0,0 +1,2 @@

1 += Auto detect text files and perform LF normalization

2 += text=auto

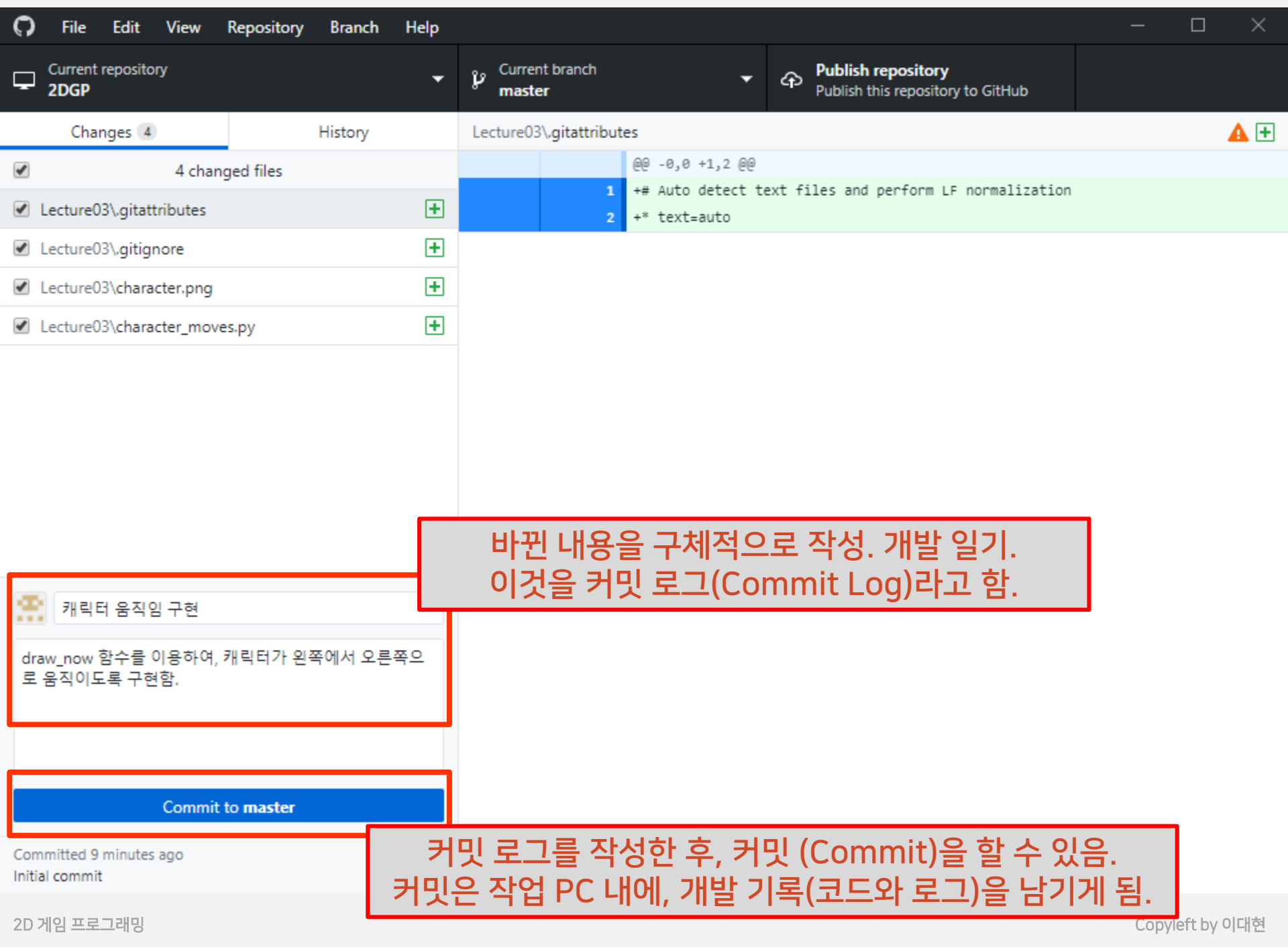
Summary (required)

Description

Commit to master

폴더의 파일 변화를 자동으로 감지함.





바뀐 내용을 구체적으로 작성. 개발 일기.  
이것을 커밋 로그(Commit Log)라고 함.

커밋 로그를 작성한 후, 커밋 (Commit)을 할 수 있음.  
커밋은 작업 PC 내에, 개발 기록(코드와 로그)을 남기게 됨.

FileEditViewRepositoryBranchHelp

Current repository  
2DGP

ChangesHistory

0 changed files

Current branch  
master

Publish repository  
Publish this repository to GitHub

커밋이 끝나면, 더 이상 기록할 내용이 없음.  
현재 PC에는 더 이상 업데이트할 필요가 없음.  
하지만, 서버는 ?

Github 서버에 현재 PC의 내용을 그대로  
가져다 올려야 함.  
이것을 "Push" 또는 "Publish"라고 함.


Summary (required)

Description

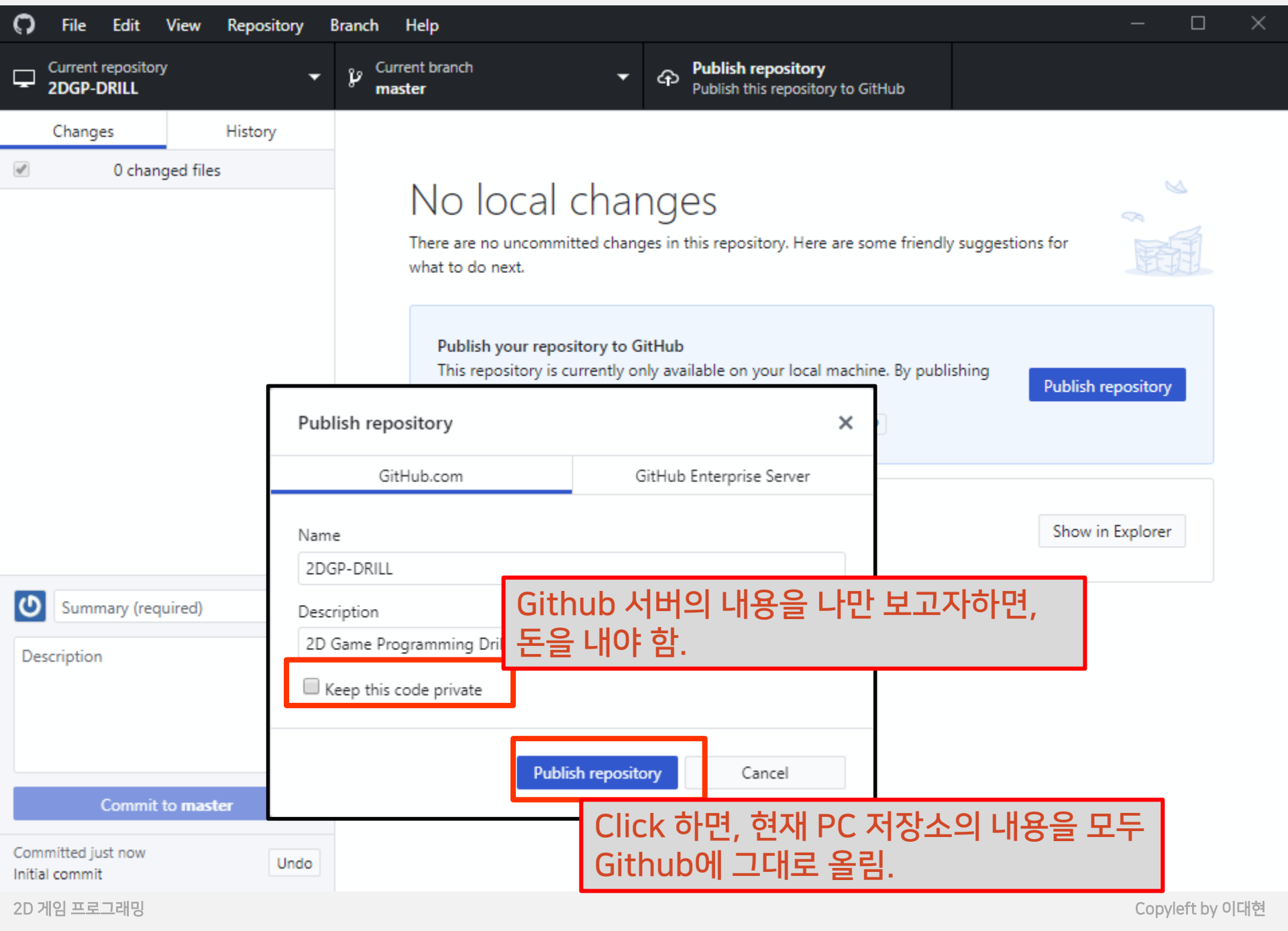
Commit to master

Committed just now  
캐릭터 움직임 구현

Undo



No local changes  
Would you like to [open this repository](#) in Explorer?



## No local changes

There are no uncommitted changes in this repository. Here are some friendly suggestions for what to do next.

Publish your repository to GitHub

This repository is currently only available on your local machine. By publishing

Publish repository

Publish repository

GitHub.com

GitHub Enterprise Server

Name

2DGP-DRILL

Description

2D Game Programming Dr

☐ Keep this code private

Show in Explorer

Publish repository

Cancel

Github 서버의 내용을 나만 보고자하면,  
돈을 내야 함.

Click 하면, 현재 PC 저장소의 내용을 모두  
Github에 그대로 올림.

Summary (required)

Description

Commit to master

Committed just now  
Initial commit

Undo

2D Game Programming Edit

Add topics

2 commits 1 branch 0 releases 1 contributor

Branch: master New pull request Create new file Upload files Find file Clone or download

daehyun-lee-dev 캐릭터 움직임 구현 ...			Latest commit 14fd374 29 minutes ago
Lecture03	캐릭터 움직임 구현		29 minutes ago
.gitattributes	Initial commit		38 minutes ago
.gitignore	Initial commit		38 minutes ago
README.md	Initial commit		38 minutes ago

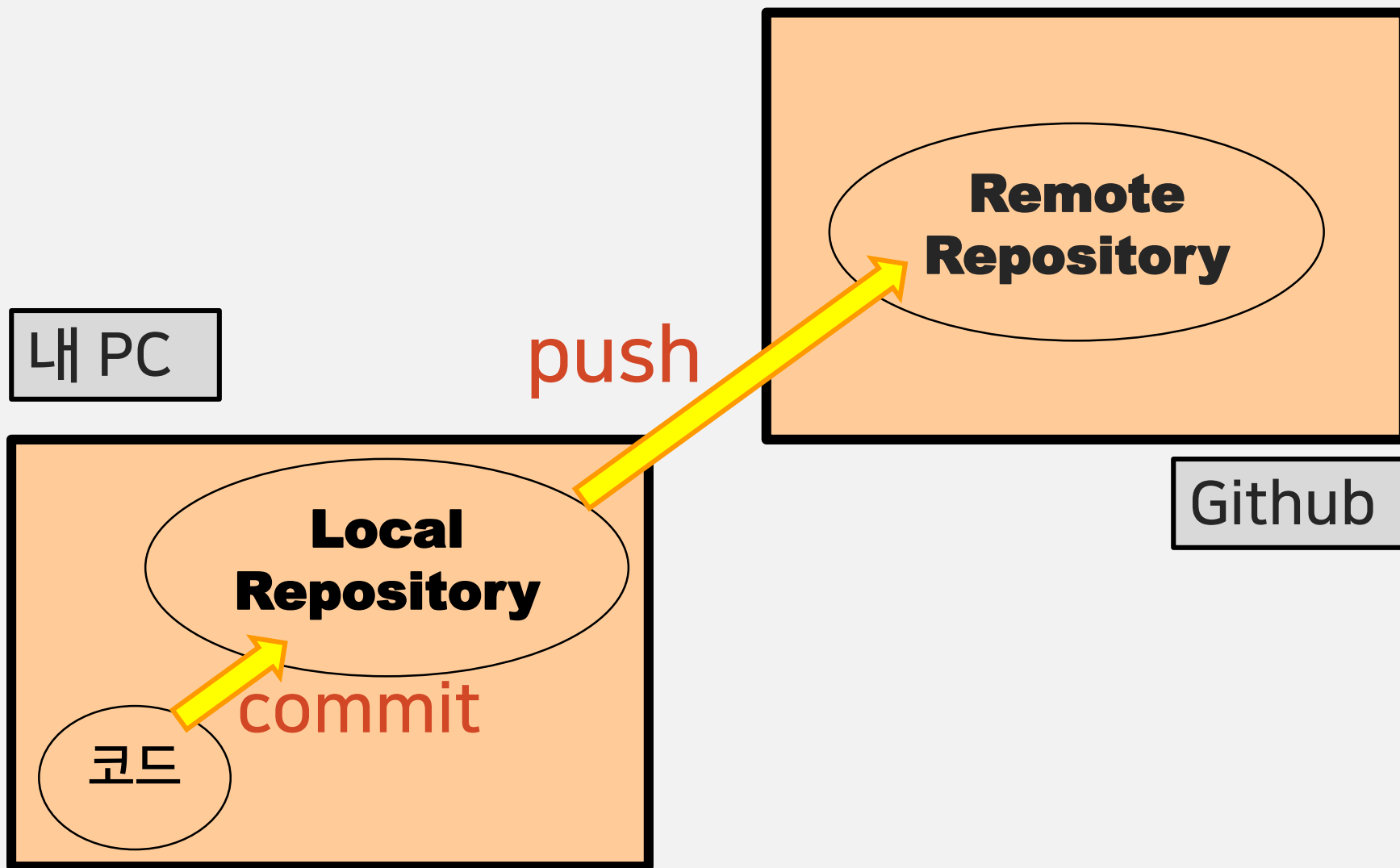
README.md

# 2DGP

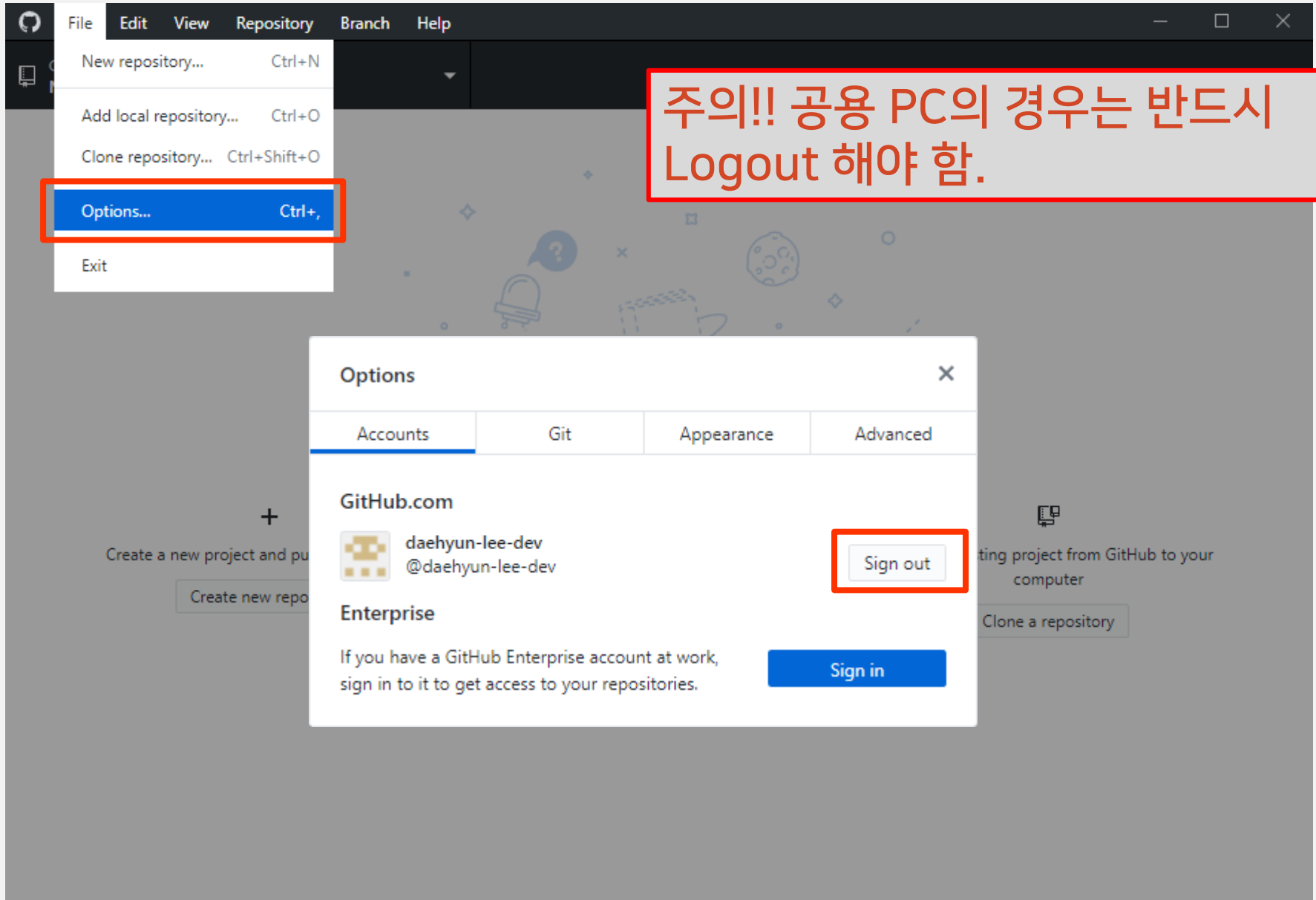
Github 서버 홈페이지에 접속하면, PC 저장소와 동일한 저장소가 만들어짐.

서버의 저장소를 "Remote Repository"라고 함.

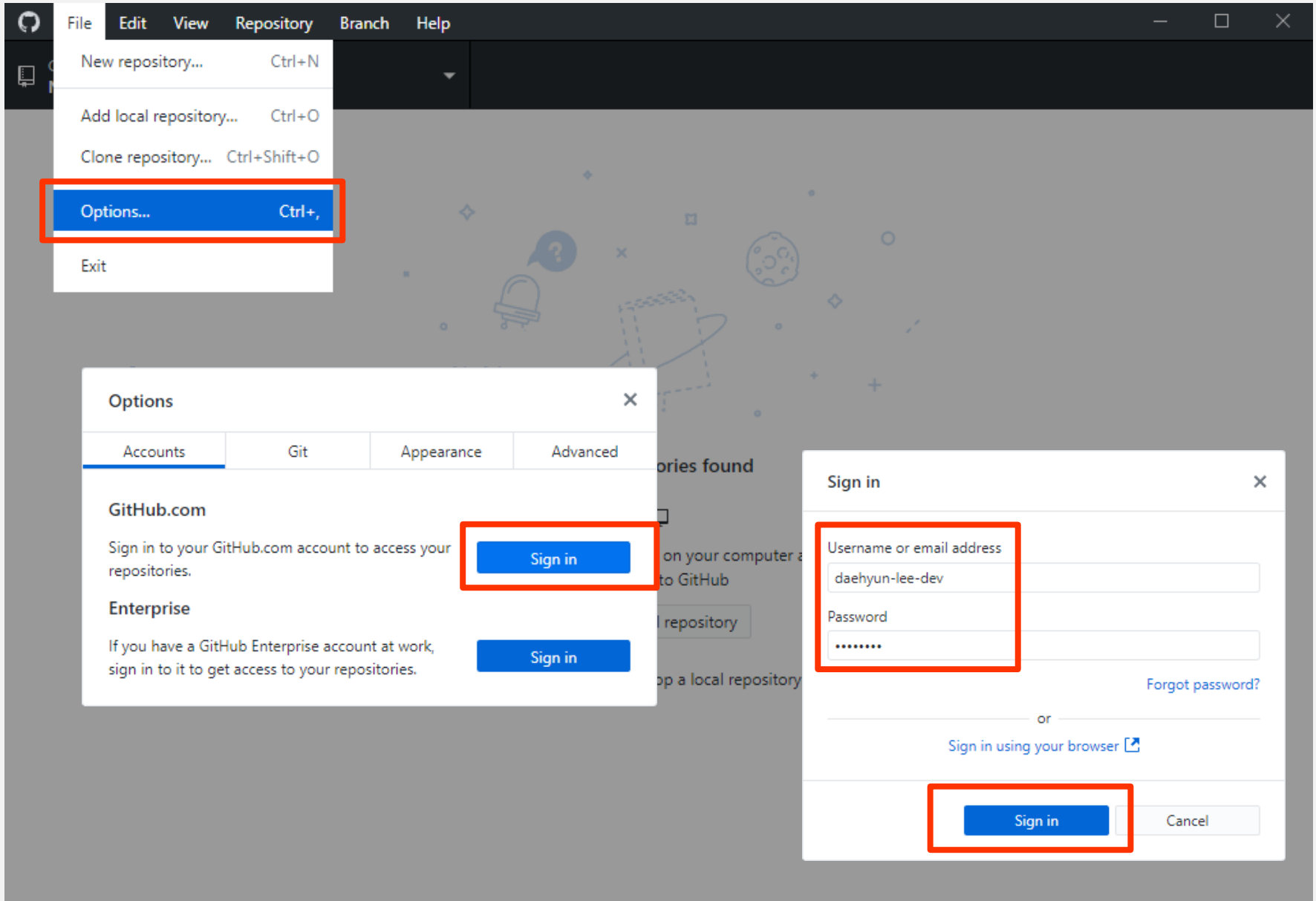
# Commit 과 Push



# Github Desktop Logout



# Github Desktop Login



# 공용 PC에서 Publish 할 때, Git 사용자 설정 재확인

Options

Accounts

Git

Appearance

Advanced

Name

daehyunlee(XPS13)

Email

daehyun.lee@gmail.com

Save

공용 PC의 경우, 접속자(위치)는 git 설정을 따라 감. 반드시 자신의 정보도 그때 그 때 재설정해야 함.