

Lecture #4. 2D 렌더링

2D 게임 프로그래밍

이대현 교수

학습 내용

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

2D 게임?

■ 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

■ 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



2D 게임 개발 환경 구성

■ 필수 환경

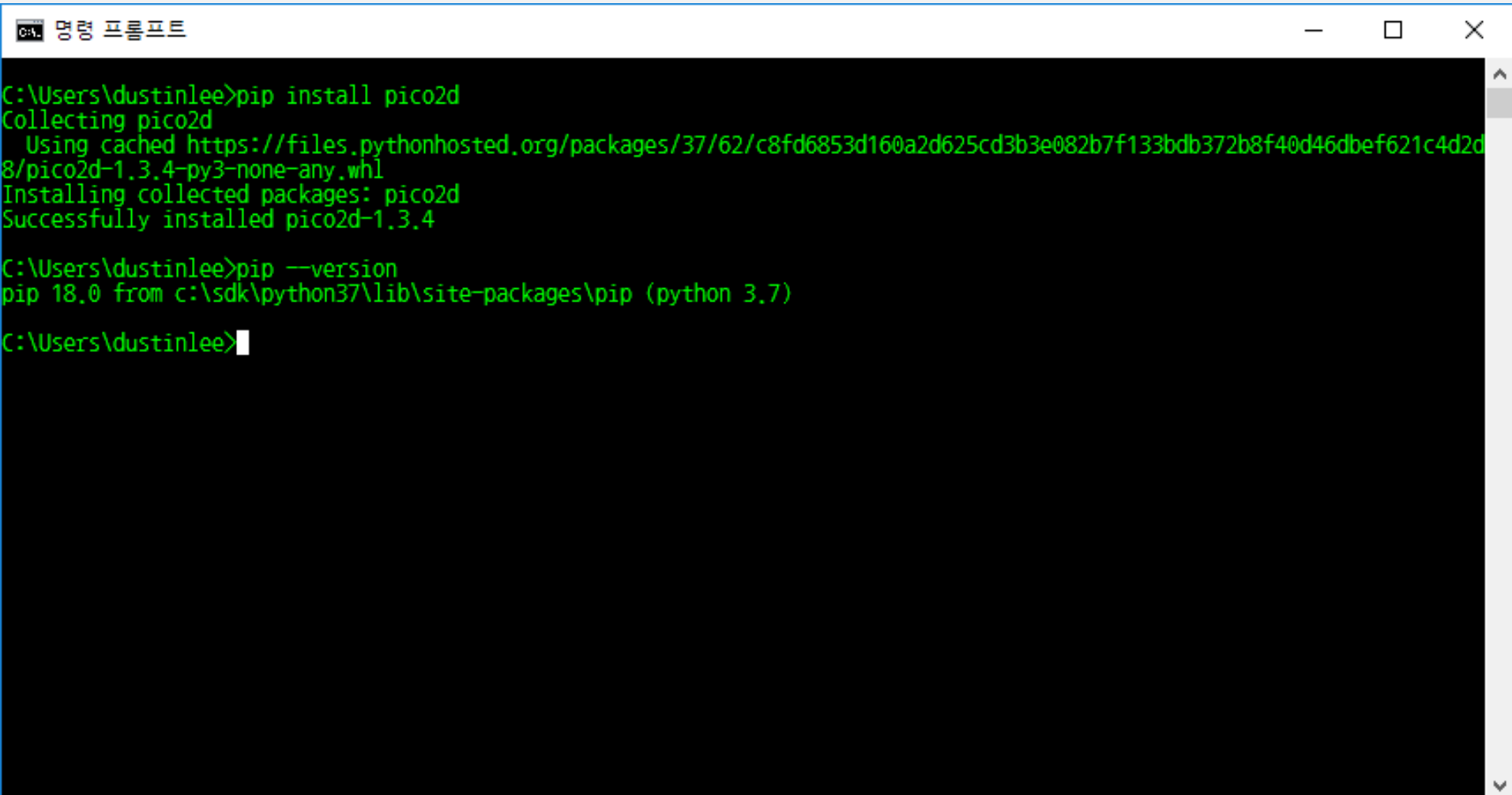
- Windows 10 64 bit
- Python 3.7.0+
- Git / TortoiseGit

■ 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.

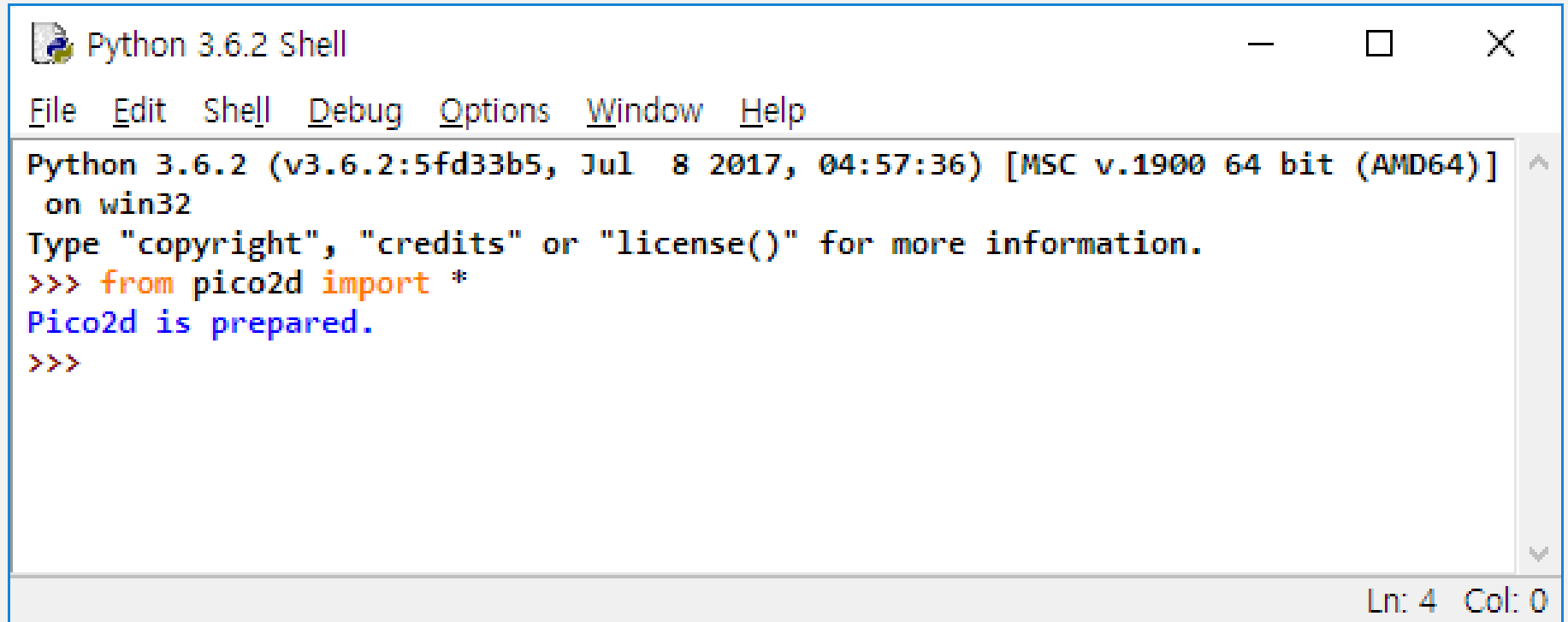


```
C:\Users\dustinlee>pip install pico2d
Collecting pico2d
  Using cached https://files.pythonhosted.org/packages/37/62/c8fd6853d160a2d625cd3b3e082b7f133bdb372b8f40d46dbef621c4d2d8/pico2d-1.3.4-py3-none-any.whl
Installing collected packages: pico2d
Successfully installed pico2d-1.3.4

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

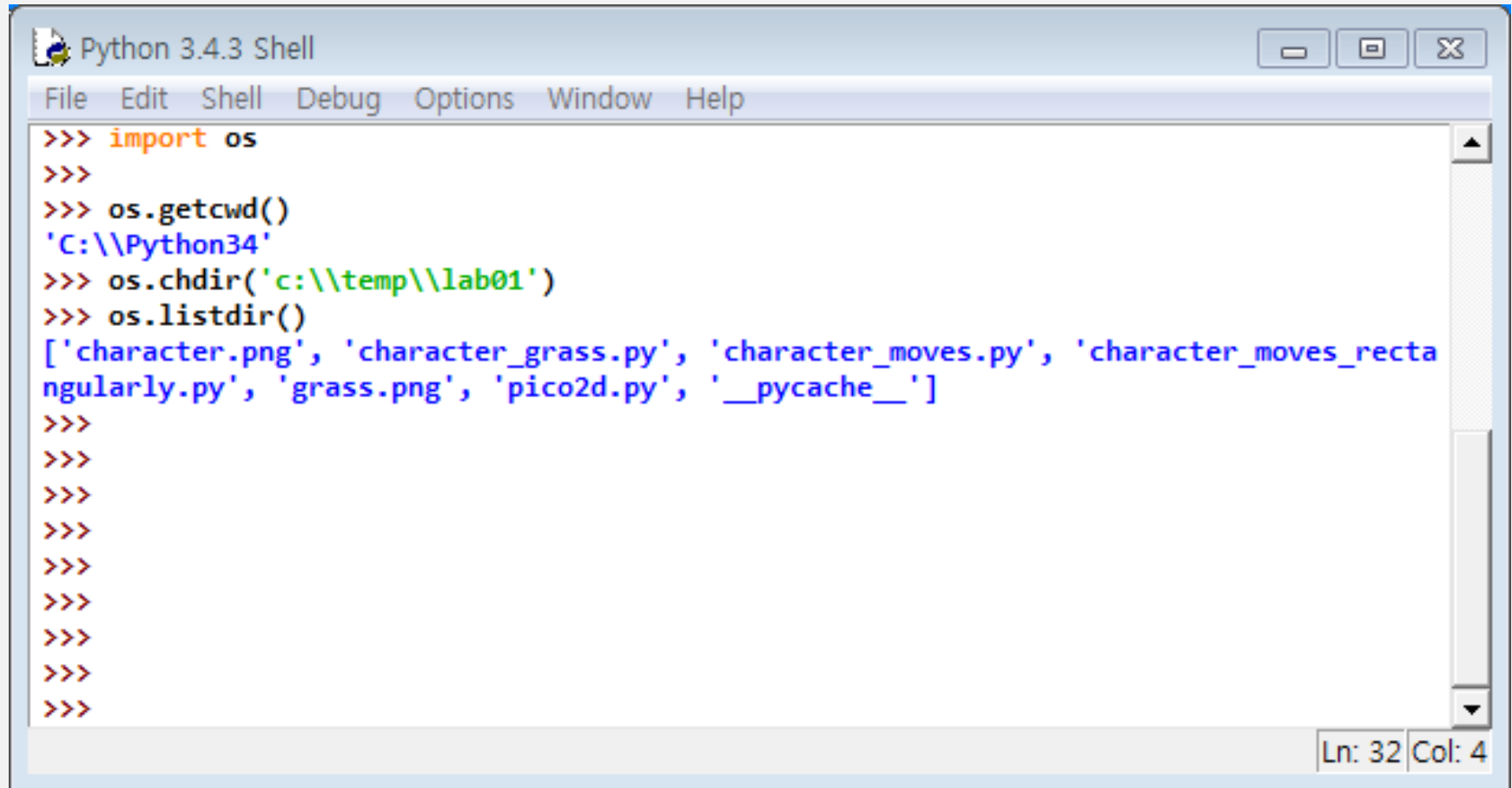


A screenshot of a Python 3.6.2 Shell window. The window title is "Python 3.6.2 Shell". The menu bar includes "File", "Edit", "Shell", "Debug", "Options", "Window", and "Help". The main text area shows the following output:

```
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

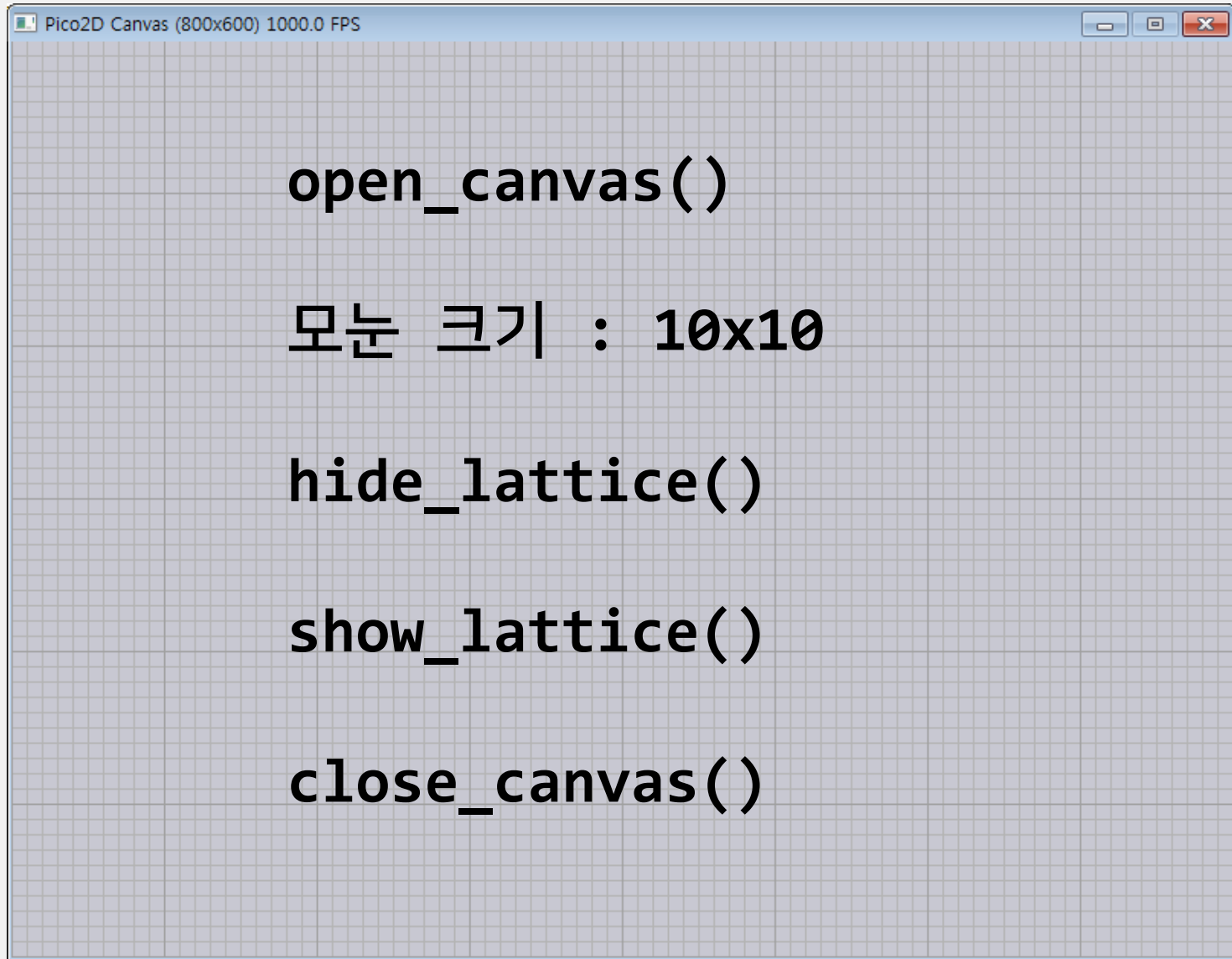


The screenshot shows a Python 3.4.3 Shell window with a menu bar (File, Edit, Shell, Debug, Options, Window, Help) and a command prompt interface. The user has executed the following commands:

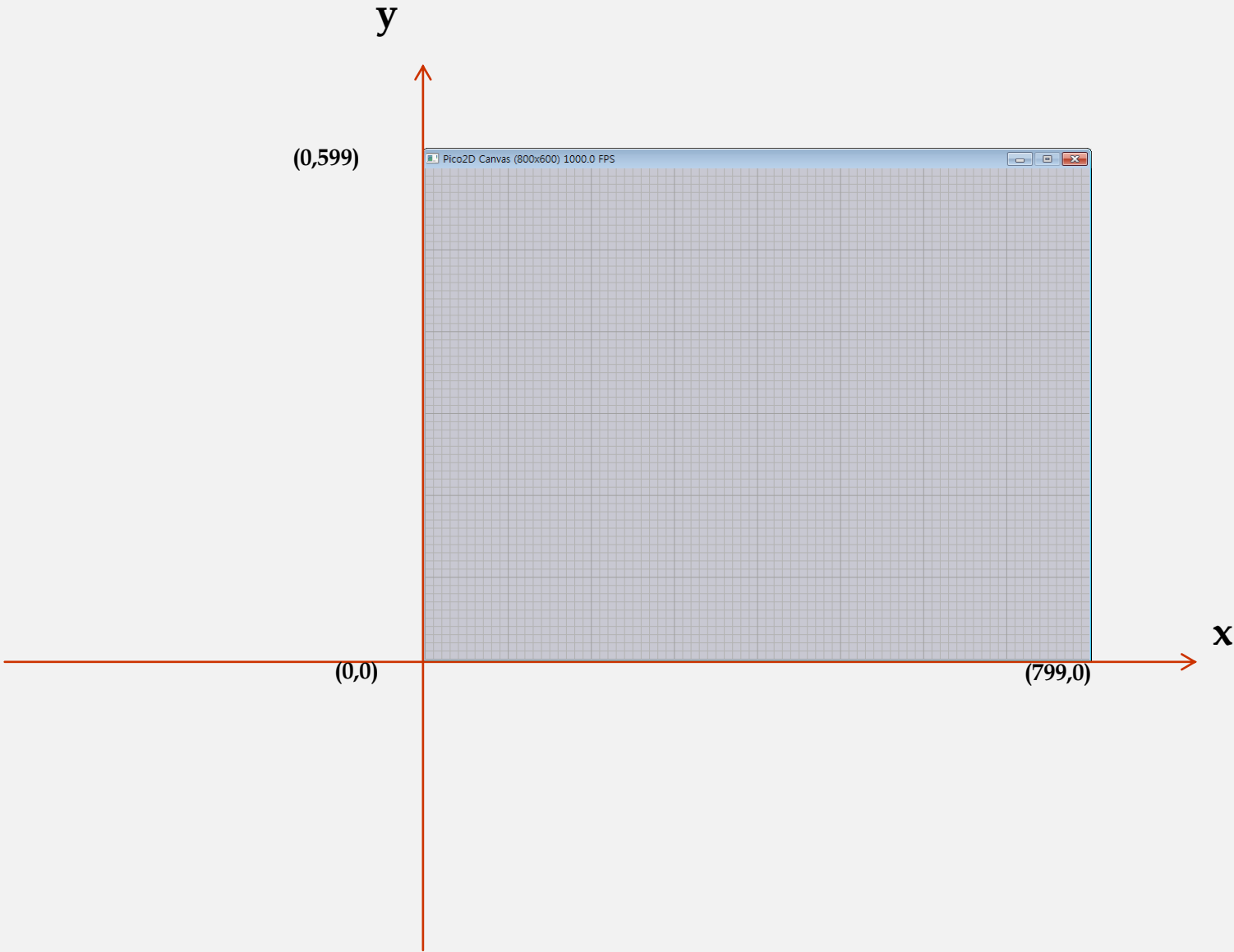
```
>>> import os
>>>
>>> os.getcwd()
'C:\\Python34'
>>> os.chdir('c:\\temp\\lab01')
>>> os.listdir()
['character.png', 'character_grass.py', 'character_moves.py', 'character_moves_recta
ngularly.py', 'grass.png', 'pico2d.py', '__pycache__']
>>>
>>>
>>>
>>>
>>>
>>>
>>>
>>>
>>>
```

The status bar at the bottom right indicates the cursor is at Line 32, Column 4.

캔버스 열기 - open_canvas(800,600)



캔버스의 좌표계



JPG vs PNG

우리의 주인공



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

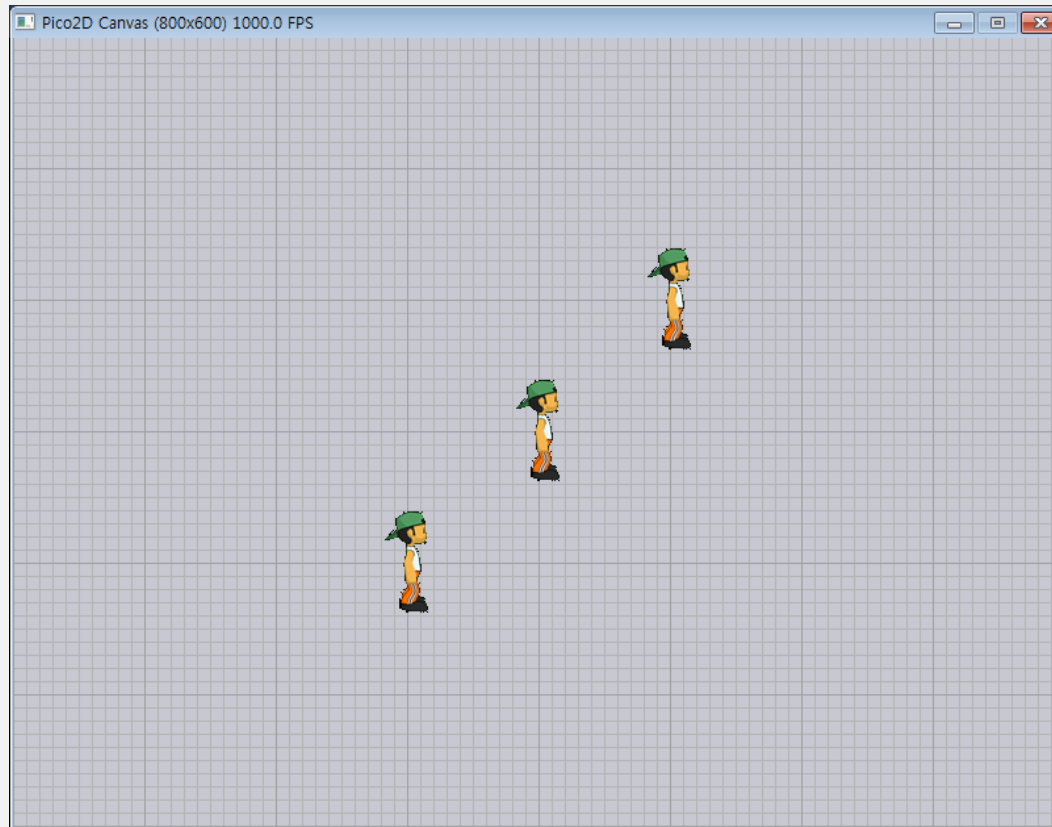
피봇(Pivot)



여기가 피봇입니다.

이 점을 피봇으로 삼기도 합니다

몇 명 더 그려 봅시다~

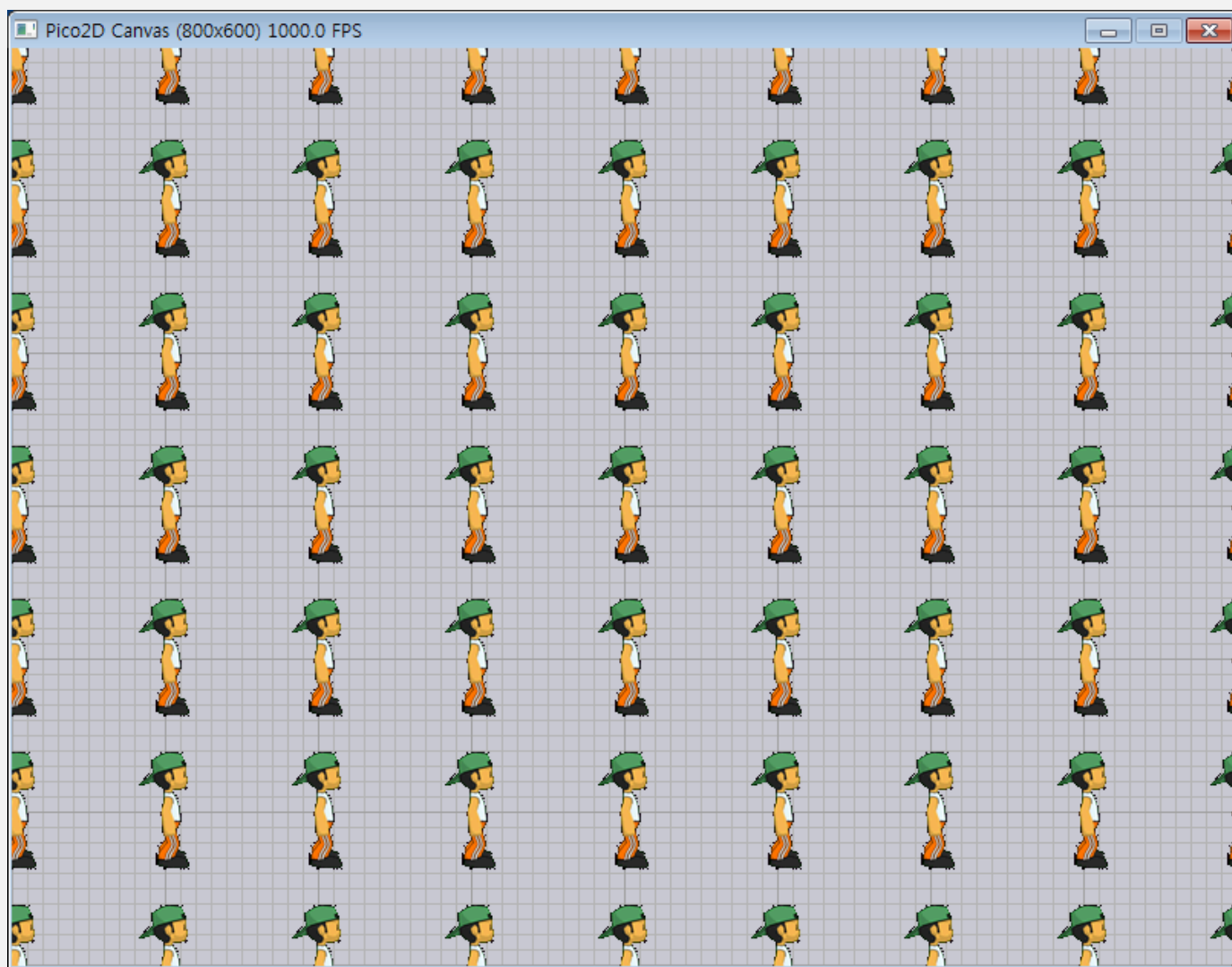


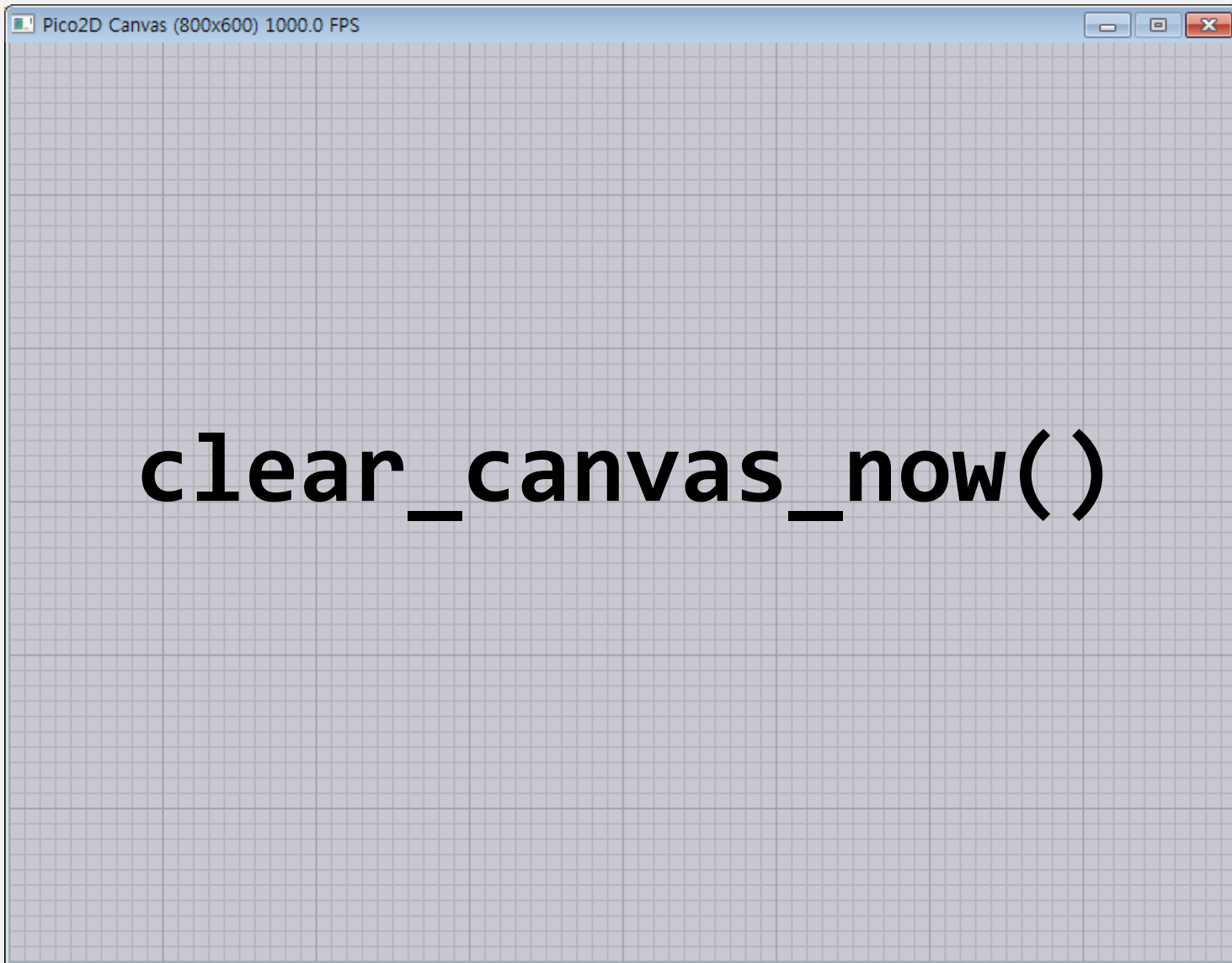
```
>>> image.draw_now(300, 200)  
>>> image.draw_now(500, 400)
```


테로 그리기

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

캐릭터 데!





시작



Character_moves.py

캐릭터 이동

character_grass.py

```
from pico2d import *
```

```
open_canvas()
```

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

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

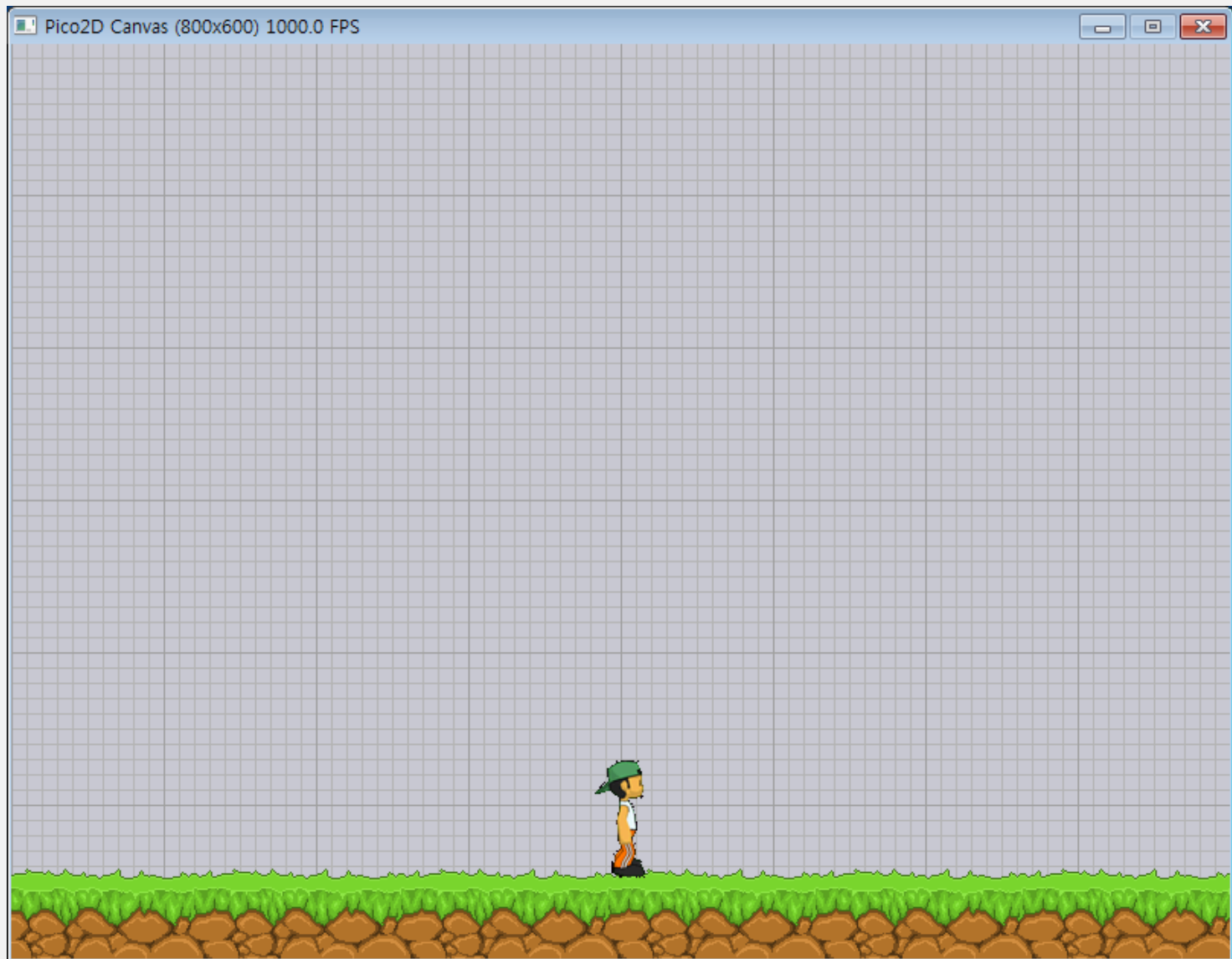
```
grass.draw_now(400, 30)
```

```
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 a red box. Below the navigation bar, the main heading reads "Built for developers". A large text block states: "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." An overlay form for signing up is visible on the right. It contains fields for Username (with the value "game-lecture" and an error message "Username is already taken"), Email (with the value "you@example.com"), and Password (with masked characters "....."). A green button labeled "Sign up for GitHub" is at the bottom of the form. Below the button, a disclaimer states: "By clicking 'Sign up for GitHub', you agree to our terms of service and privacy statement. We'll occasionally send you account related emails."

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.

신규 등록

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>

to me ▾

11:33 AM (5 minutes ago)



Hi @daehyun-lee-dev!

Help us secure your GitHub account by verifying your email address (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:

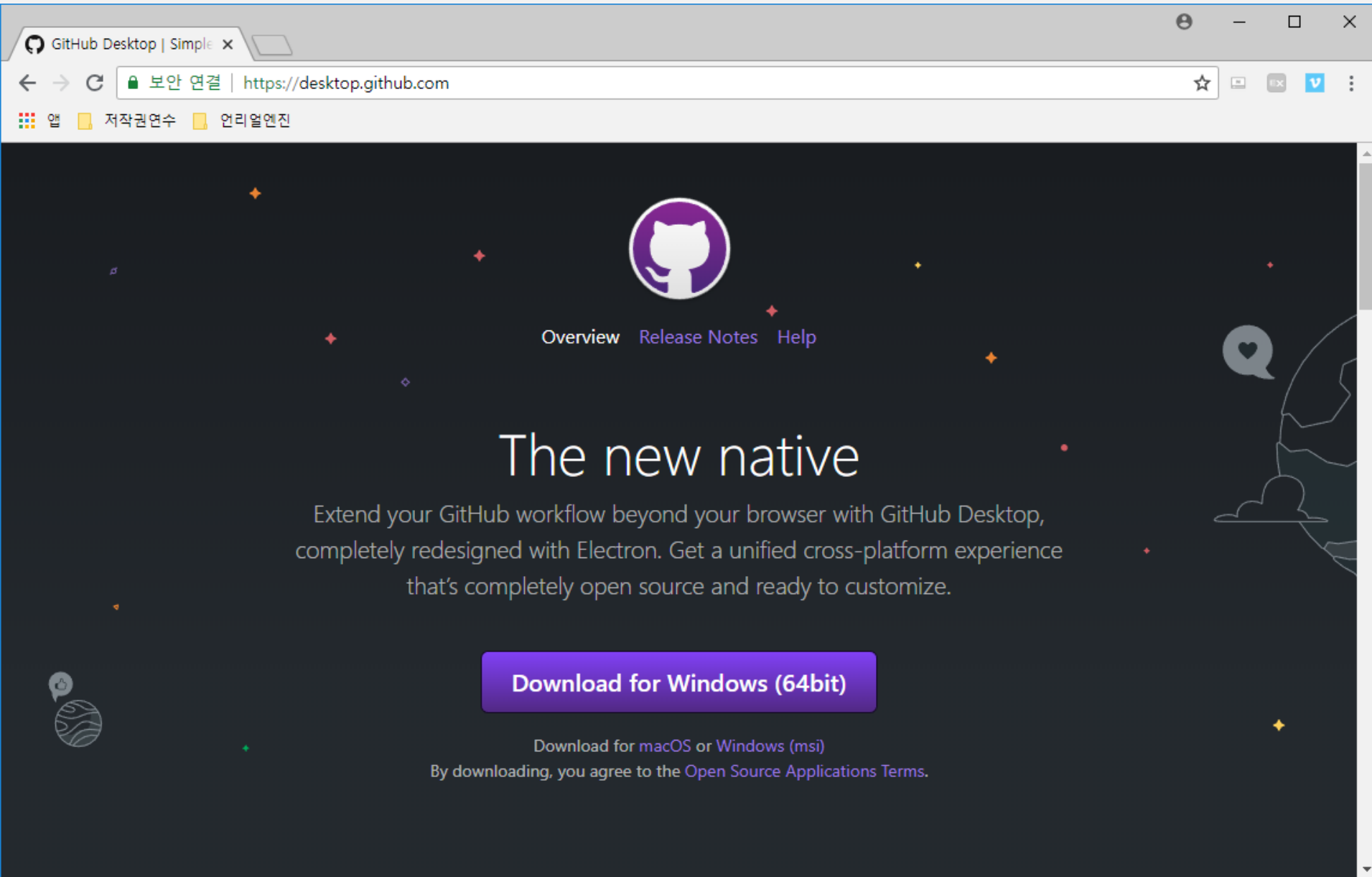
https://github.com/users/daehyun-lee-dev/emails/58877963/confirm_verification/178994d57f5ef56318db517d3bdac7a81fdc08dd

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

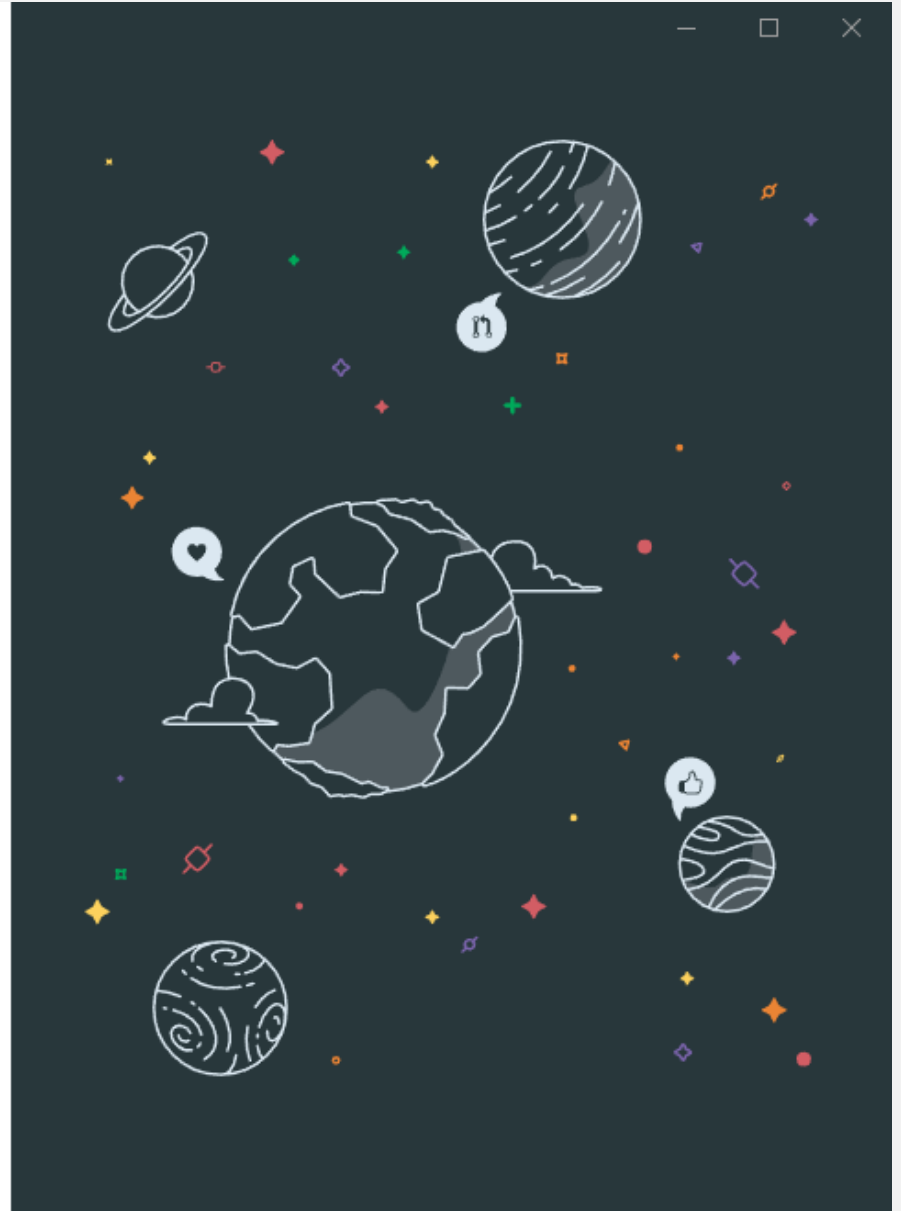
••••••••

Sign in

Cancel

[Forgot password?](#)

[Sign in using your browser](#) 





Configure Git

This is used to identify the commits you make. It is possible to see this information if you push to a public repository.

Name

daehyunlee(XPS13)

Email

daehyun.lee.dev@gmail.com

Continue

Cancel

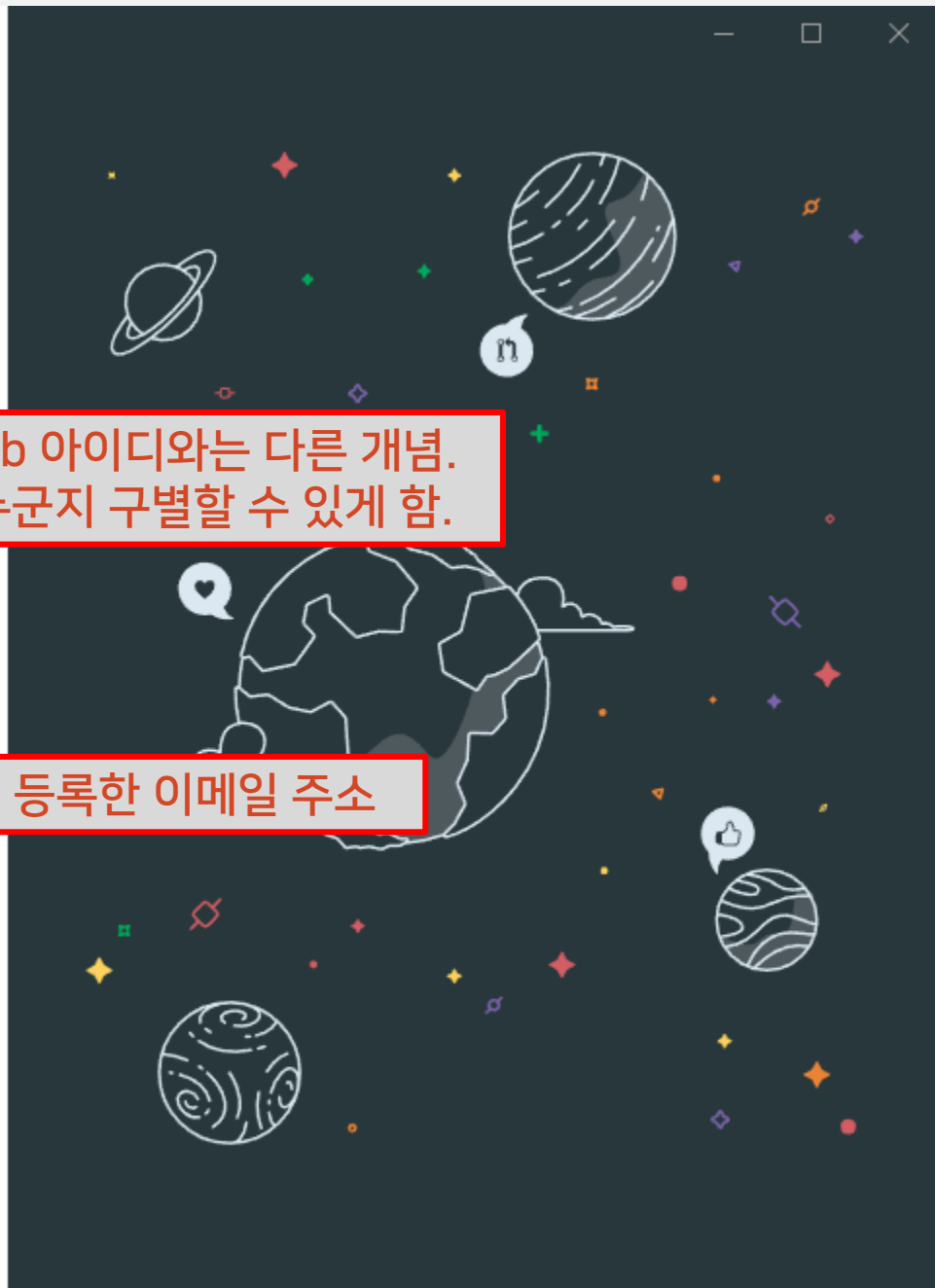
Example commit

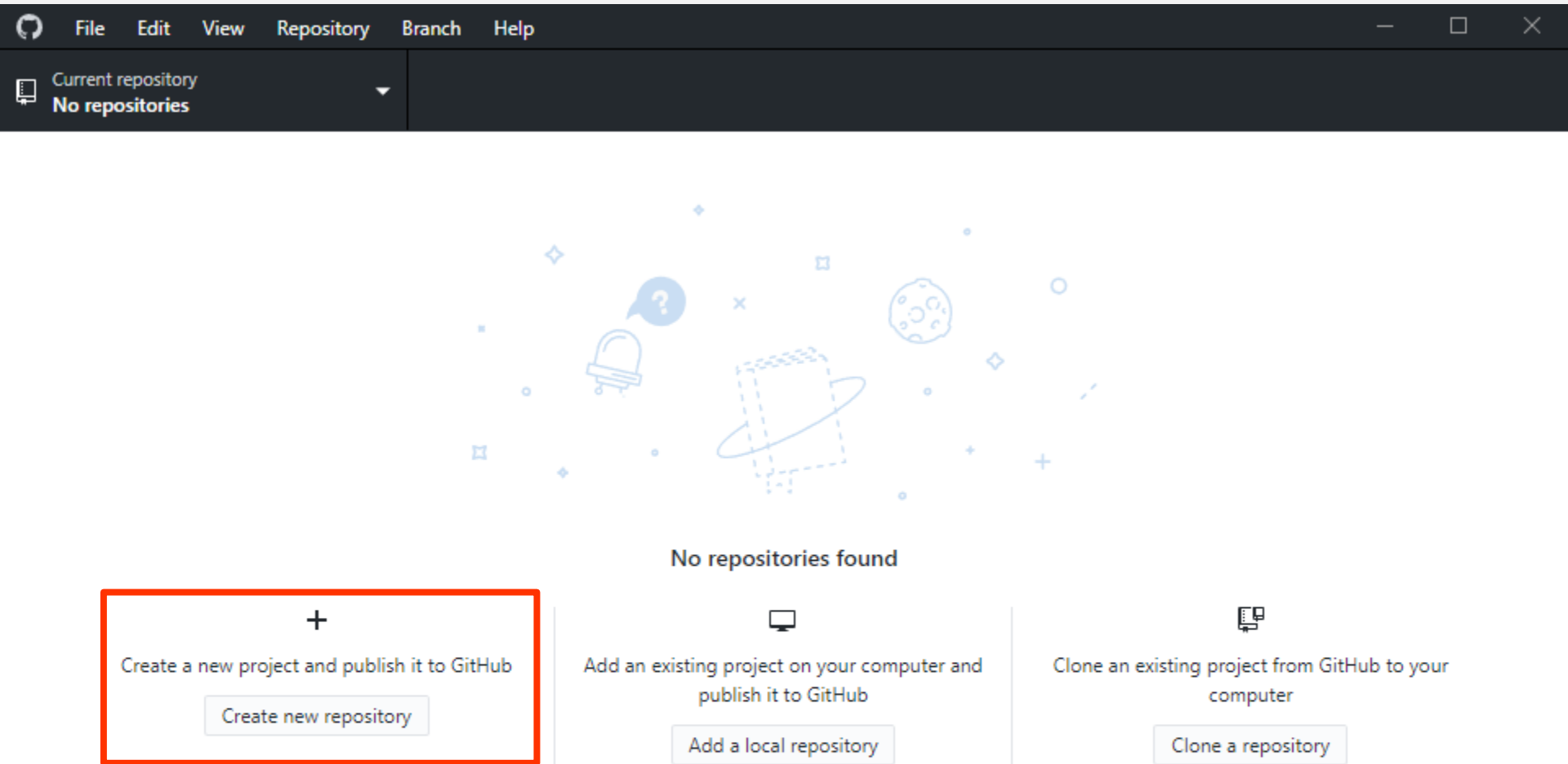
Fix all the things

 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





내 PC 에 새로운 저장소(repository)를 생성.

내 PC에 만들어지는 저장소를 Local Repository라고 함.

Create a new repository

Name

2DGP

Description

2D Game Programming

Local path

W:\Temp\Github

☒ Initialize this repository with a README

Git ignore

None

License

None

Create repository

Cancel

저장소의 이름. 폴더의 이름이 됨.

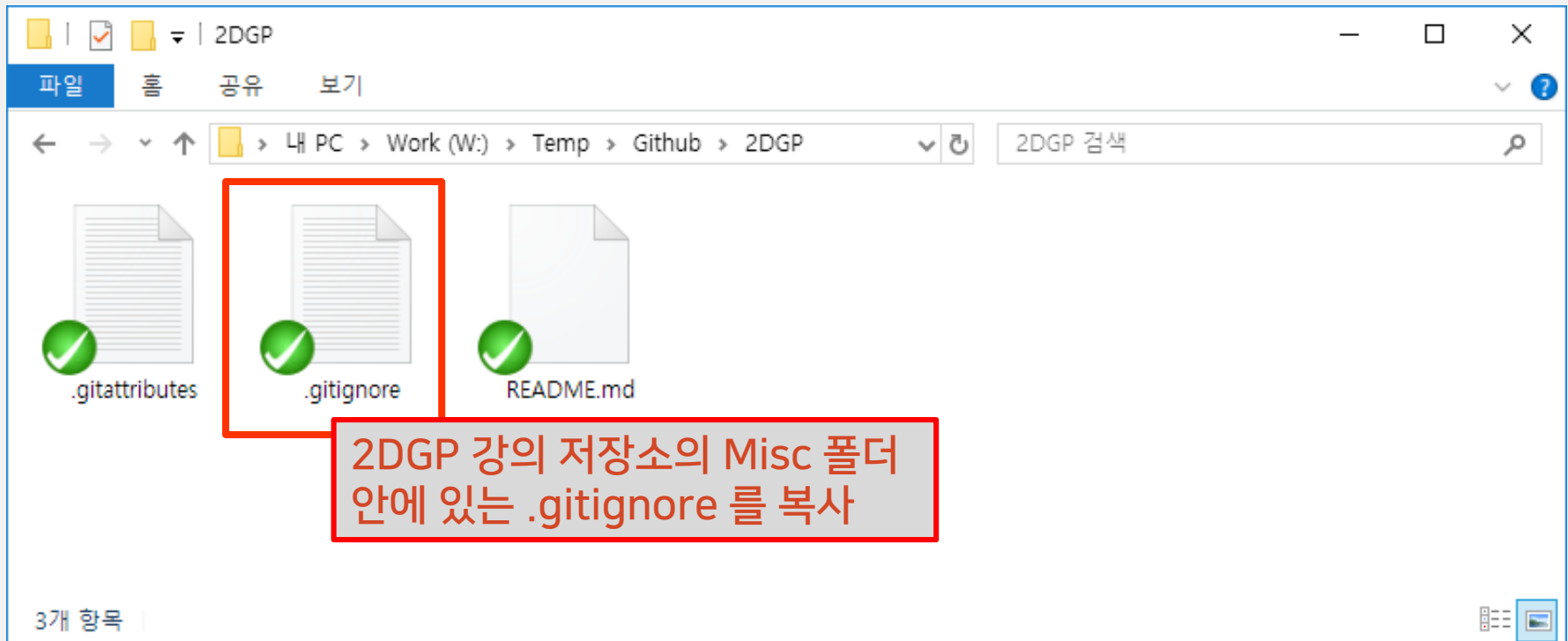
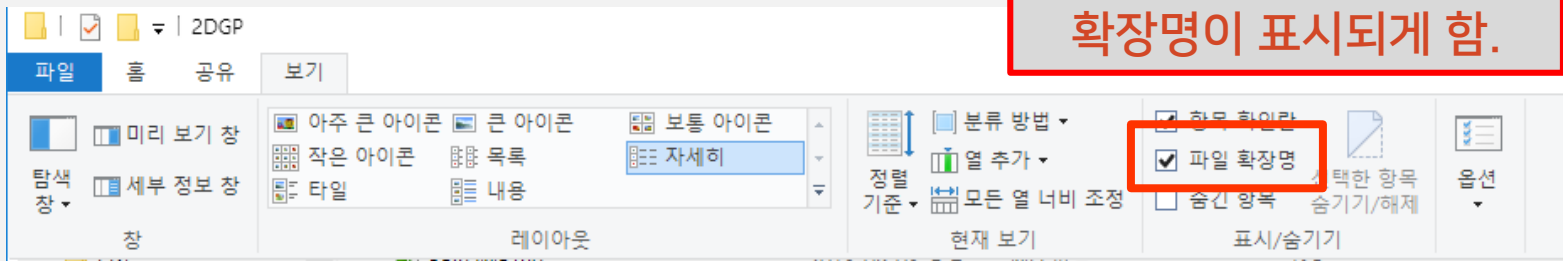
주의: 공용 PC 의 경우는, 사용자마다 구별되는
이름으로 작성하는 것이 좋음.

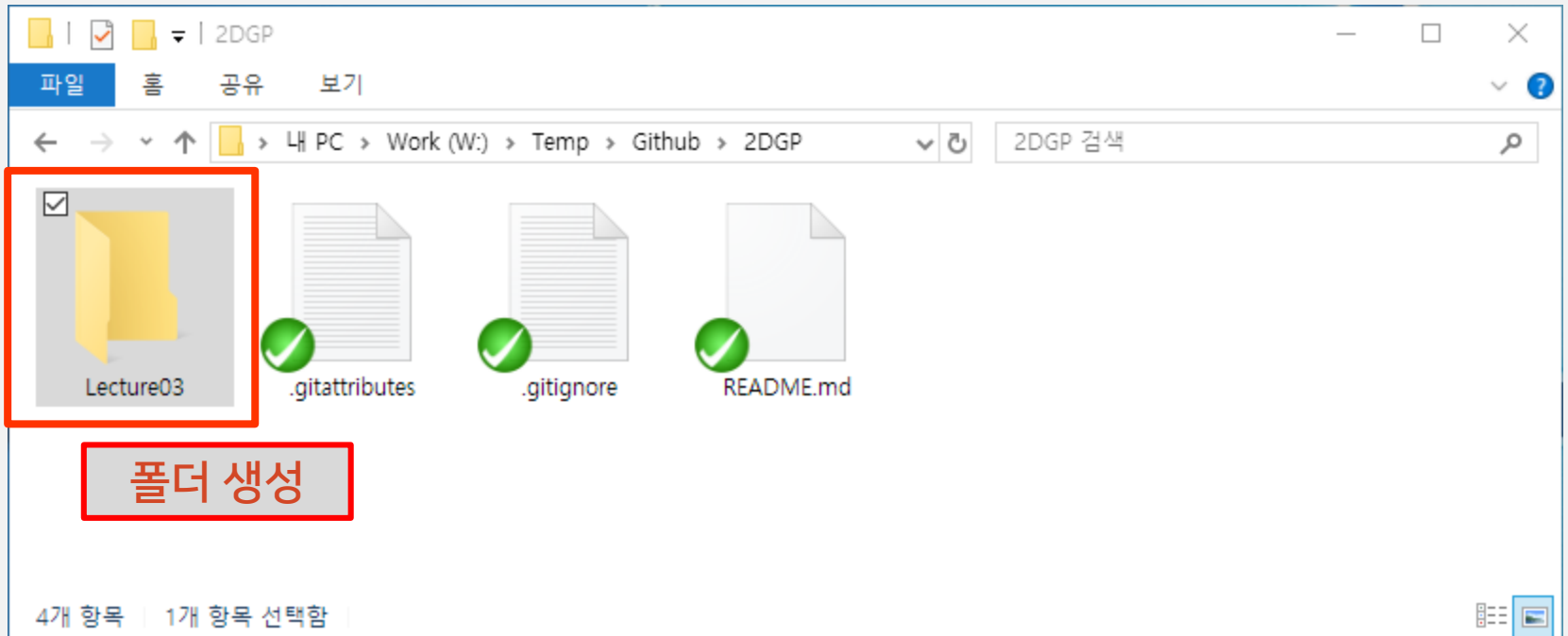
예) 89418022-2DGP

저장소 폴더가 생성되는 경로. 이 경로 아래에
저장소가 생성됨.

주의: 공용 PC에서는 사용자마다 다르게
지정하는 것이 바람직.

생성된 저장소





File Edit View Repository Branch Help

Current repository 2DGP

Current branch master

Publish repository Publish this repository to GitHub

Changes 4 History

4 changed files

- Lecture03\gitattributes
- Lecture03\gitignore
- Lecture03\character.png
- Lecture03\character_moves.py

Lecture03\gitattributes

```
@@ -0,0 +1,2 @@
1  += Auto detect text files and perform LF normalization
2  += text=auto
```

폴더의 파일 변화를 자동으로 감지함.

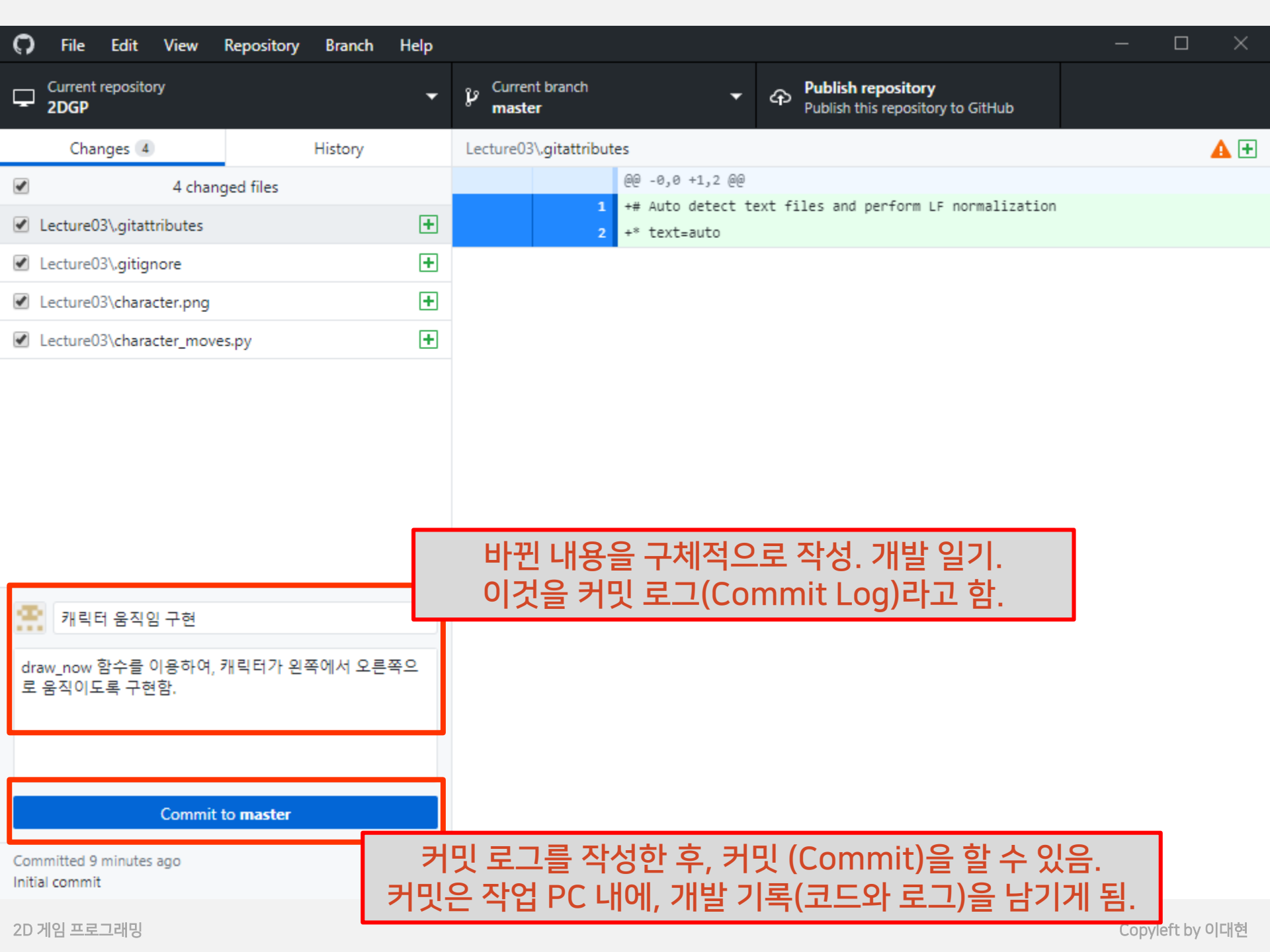
Summary (required)

Description

Commit to master

Committed 6 minutes ago Initial commit

Undo



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

캐릭터 움직임 구현

draw_now 함수를 이용하여, 캐릭터가 왼쪽에서 오른쪽으로 움직이도록 구현함.

Commit to master

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

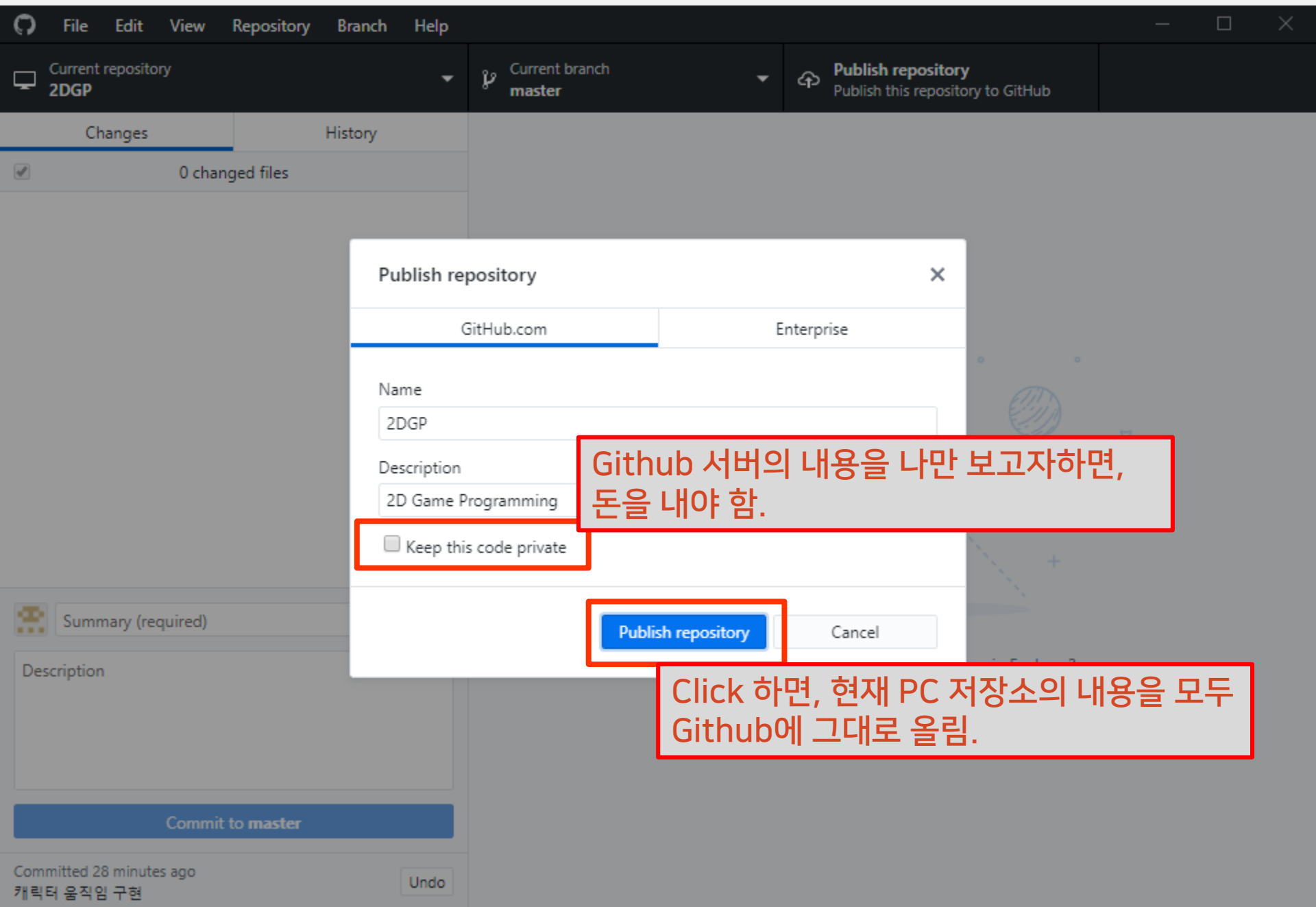
Commit to master

Committed just now
캐릭터 움직임 구현

Undo



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



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

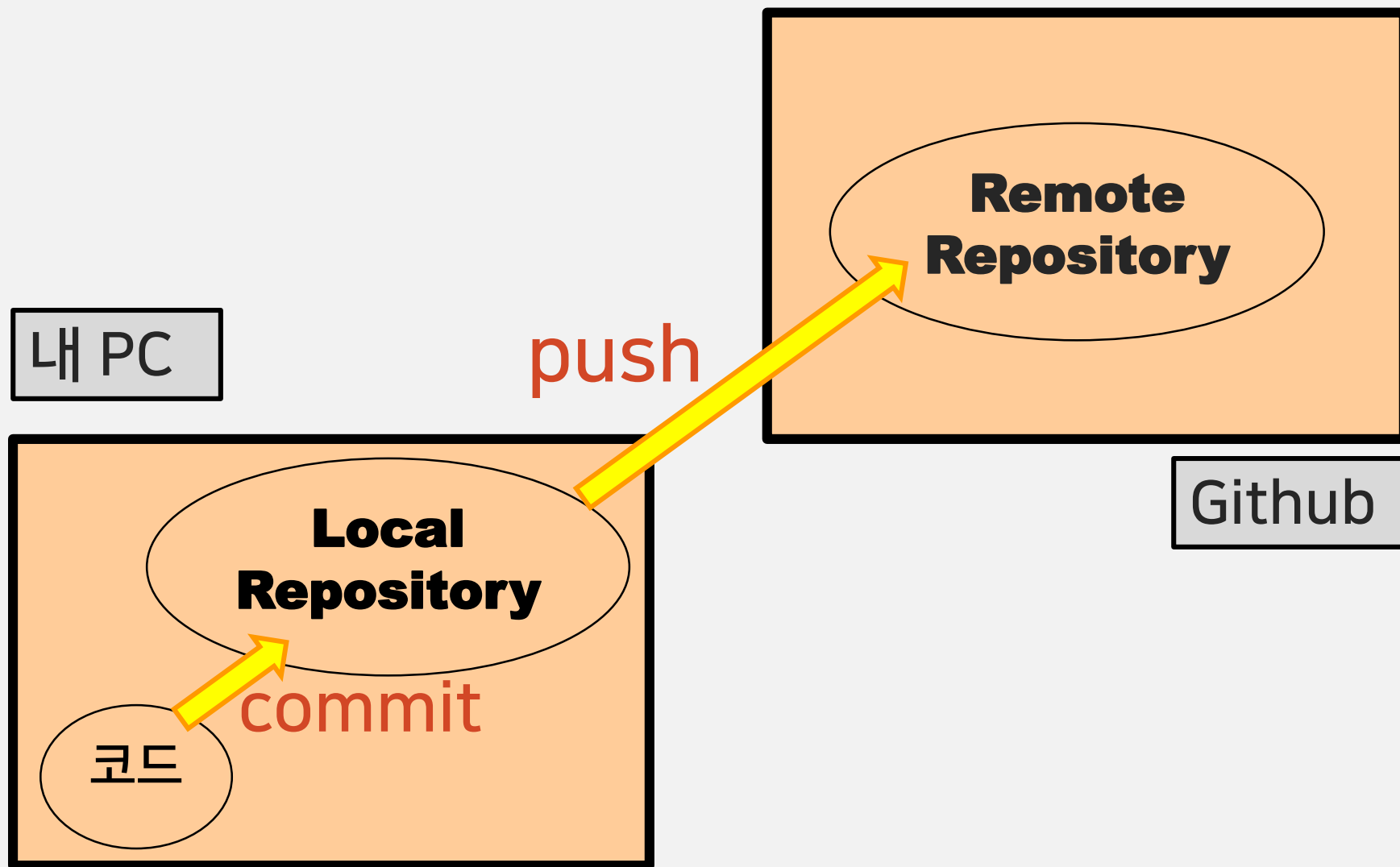
README.md

2DGP

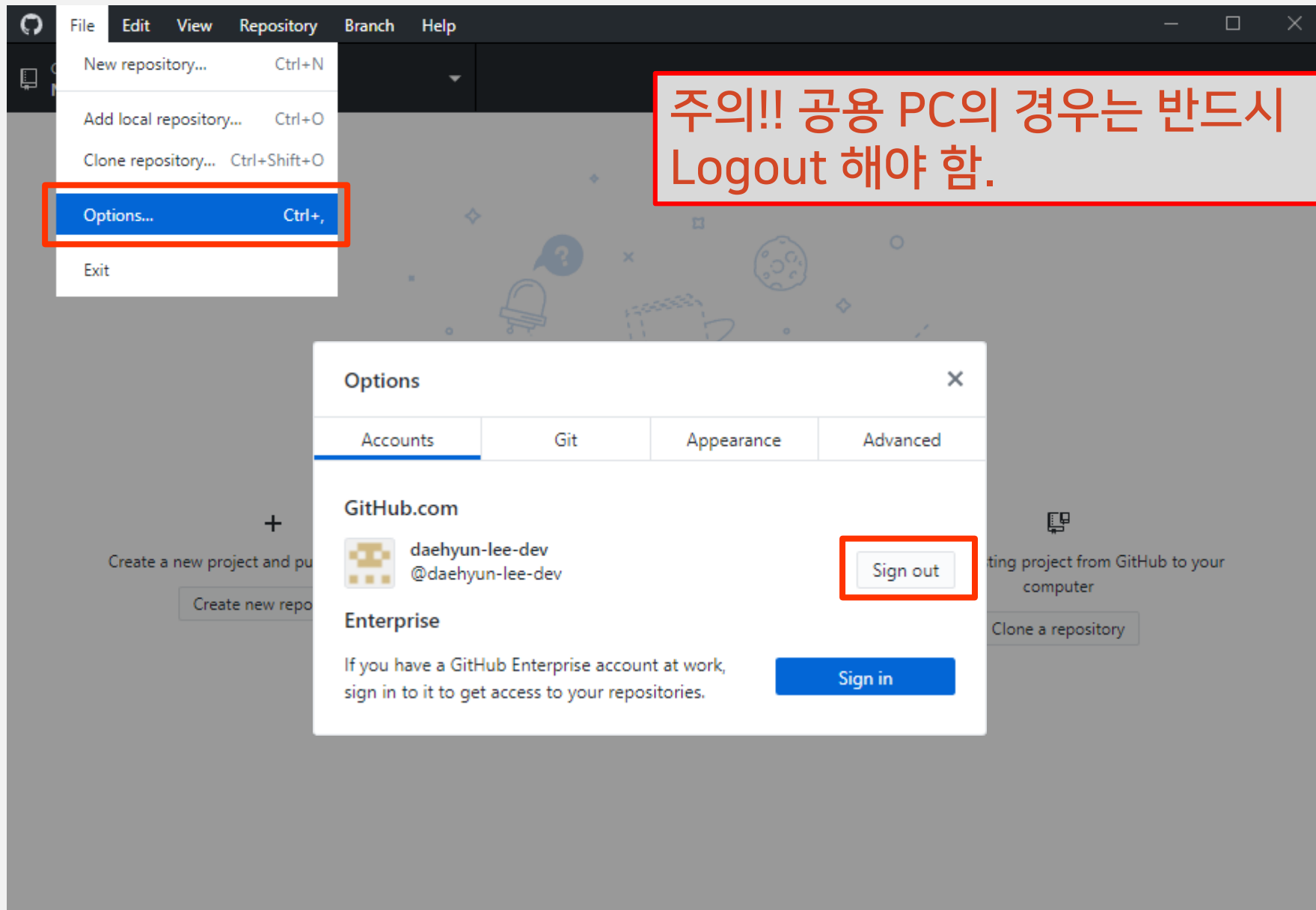
Github 서버 홈페이지에 접속하면, PC 저장소와 동일한 저장소가 만들어짐.

서버의 저장소를 "Remote Repository"라고 함.

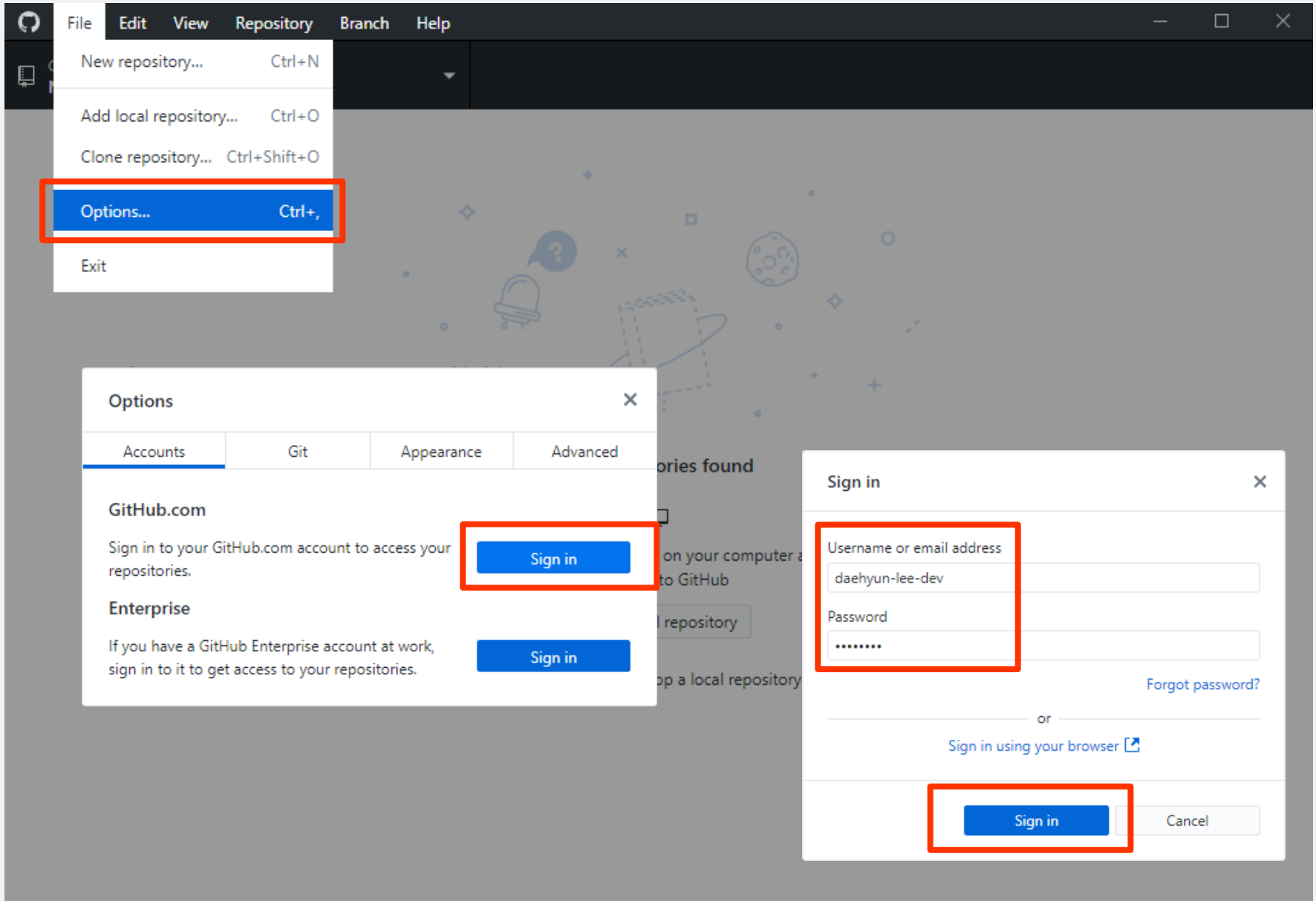
Commit 과 Push



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.