

Made by Lee Yeon Ju

ML Basis



Mentor **Lee Yeon Ju**

반갑습니다!

1. 교재 선정
2. 개발환경 준비
3. 디렉터리 복습

교재 선정 — 첫 번째



파이썬 머신러닝 판다스 분석

오승환, 정문문화사



+ 교재 선정 — 두 번째



파이썬 머신러닝 완벽가이드 (개정판)

권철민, 위키북스



개발환경 준비

1. (필수) 구글 CoLab 준비

2. (권장) Python 및 Pycharm 설치



† 들어가기 앞서..

Jupyter Notebook 이란

웹 브라우저에서 파이썬 코드를 작성하고 실행할 수 있는 개발도구

- 파이썬 설치 필요
- 아나콘다(Anaconda) 설치 권장



† (참고) 왜 **Anaconda** 설치하지?

패키지 종속성 관리 + Anaconda Navigator + Data Science 라이브러리

파이썬을 설치하면 pip라는 패키지 관리자가 있다!

Anaconda 설치하면 conda라는 패키지 관리자가 있다!

pip는 패키지 설치 시 충돌에 대한 사항을 무시하지만,

conda는 패키지 설치 시 현재 환경과 충돌 여부를 확인해준다.



† (참고) 왜 **Anaconda** 설치하지?

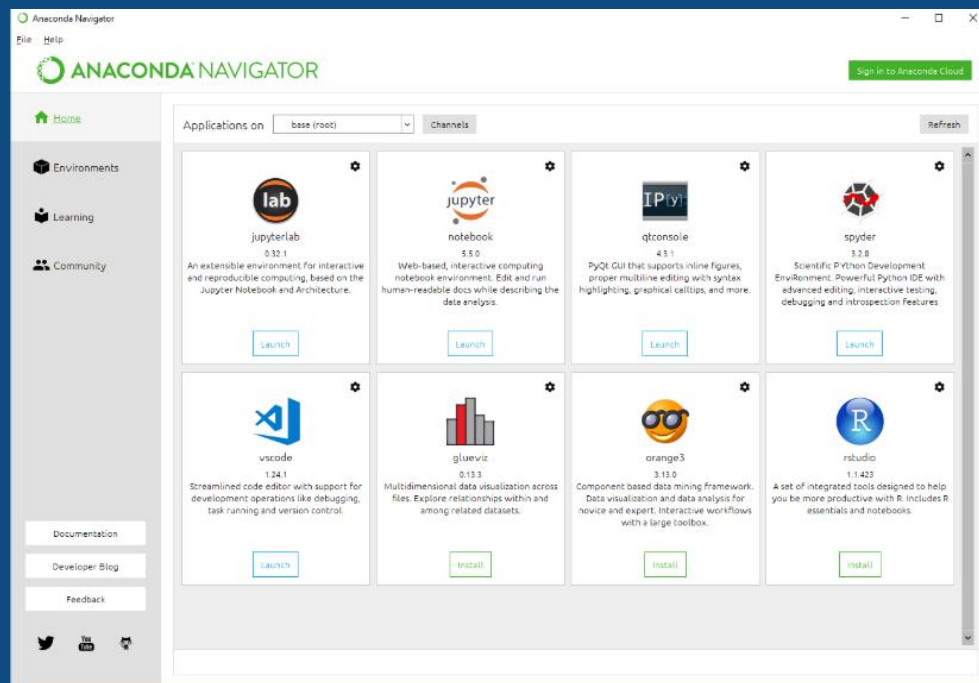
패키지 종속성 관리 + **Anaconda Navigator** + Data Science 라이브러리

GUI 대안으로 하부 컴포넌트를 쉽게 사용하

도록 한 데스크탑 포털 기능을 담당한다.

Jupyter나 Spyder 같은 개발도구를 이

곳에서 Launch할 수 있다.



† (참고) 왜 **Anaconda** 설치하지?

패키지 종속성 관리 + Anaconda Navigator + **Data Science 라이브러리**

Jupyter

R Studio

IDE 개발도구

NumPy

Pandas

과학분석용

matplotlib

Bokeh

데이터시각화용

Tensorflow

sklearn

머신러닝용

머신 러닝, R 등 매번 **개별** 패키지를 설치하는 귀찮음 해소!



Google Drive + Jupyter Notebook

- Google 계정 전용 GPU, TPU 등 컴퓨팅 자원 지원
(특별한 설치 없이 Keras, Tansorflow, PyTorch, OPenCV 라이브러리 사용가능)
 - Google Drive를 통해 협업 가능
 - 동시에 최대 2개 notebook 이용 가능



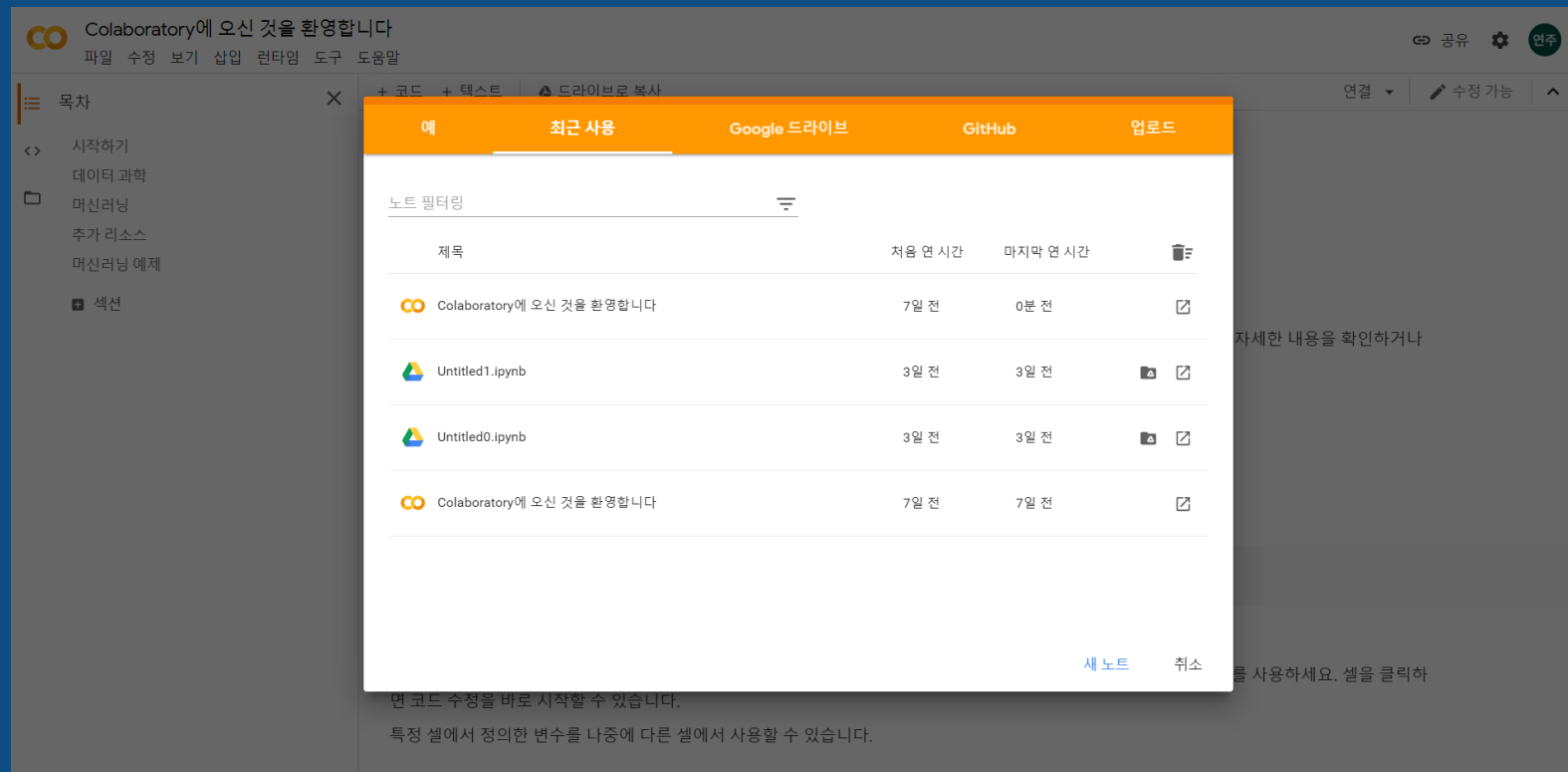


이번 교육기간에는 Colab 으로 진행될 예정



Colab 준비 (개인드라이브)

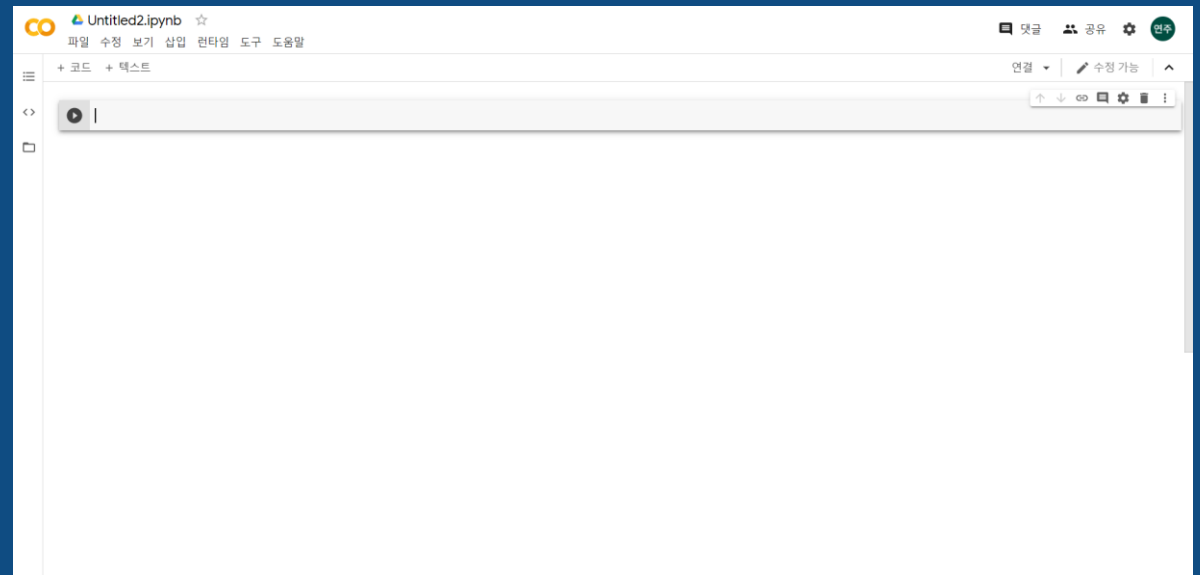
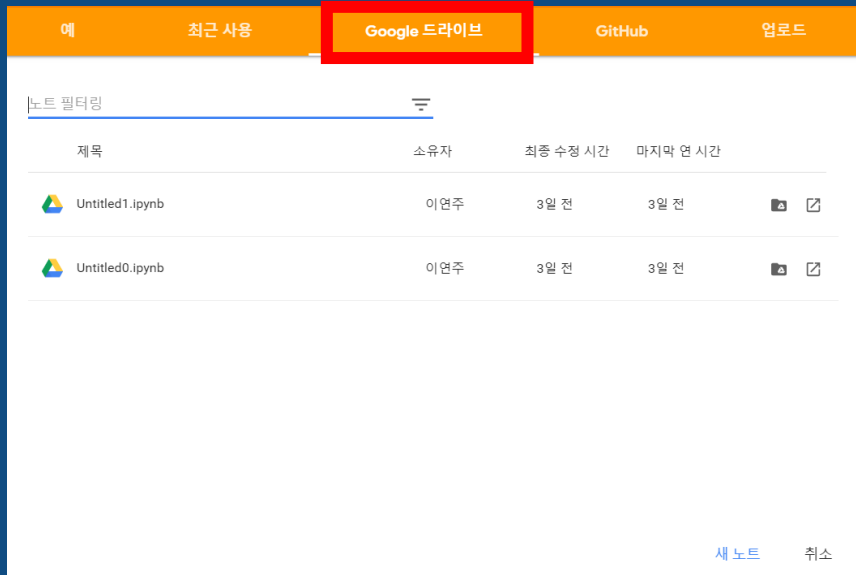
1. Google 로그인 (Google 계정 없을 경우, Google 회원가입하기)
2. <https://colab.research.google.com> 접속



+ Colab 준비 (개인드라이브)

3. 상단 탭 중 'GOOGLE 드라이브' 선택

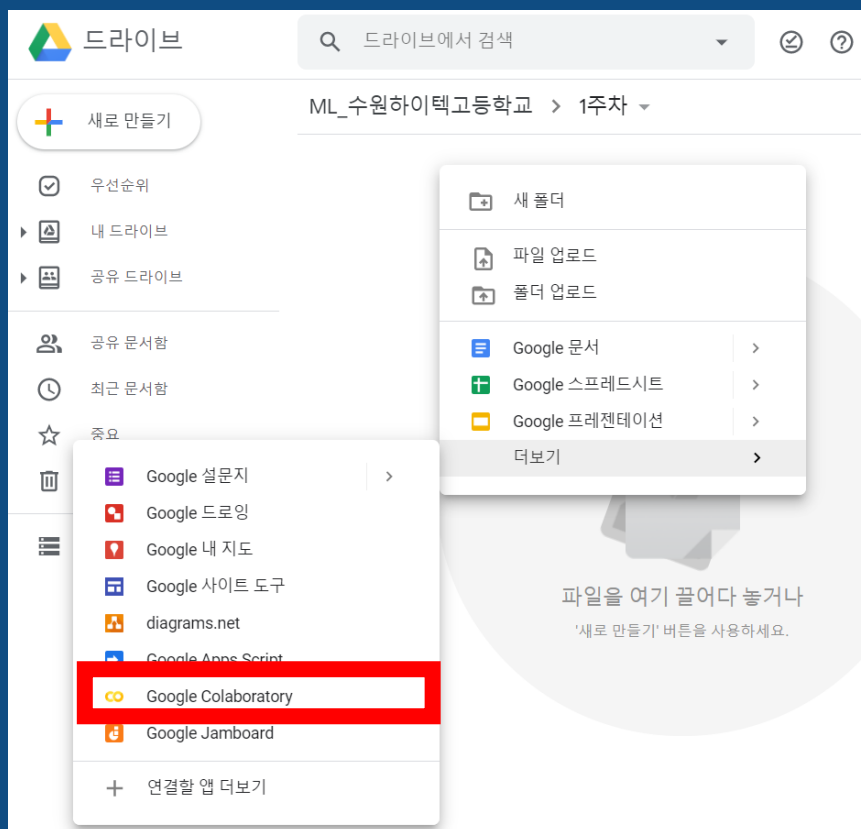
4. '새노트' 클릭하여 새노트 생성



Colab 준비 (공유드라이브)

3. 주차 폴더 이동 후, 빈 곳에다가 우클릭

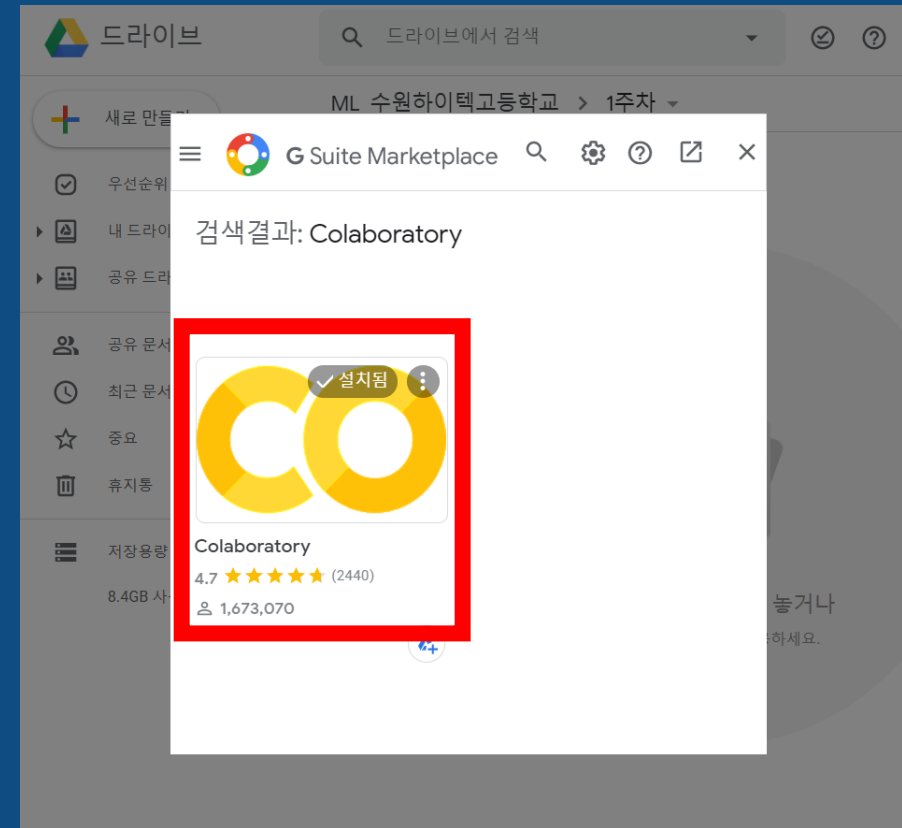
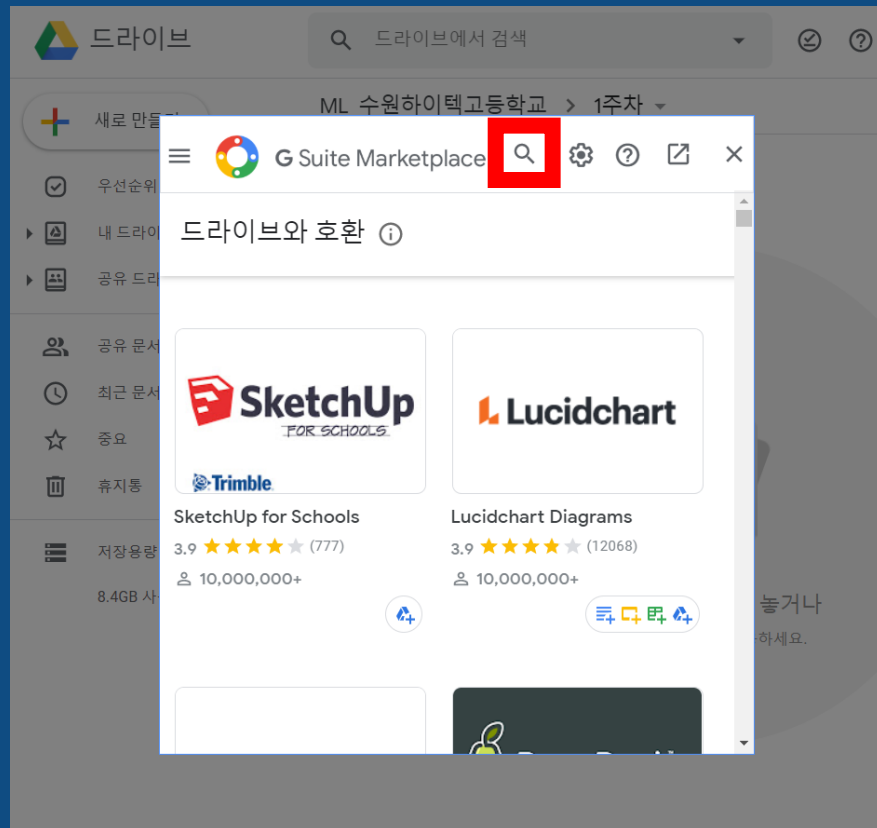
4. Google Colaboratory 선택



† Colab 준비 (공유드라이브)

4-1. 우클릭 시 Google Colaboratory가 없을 경우

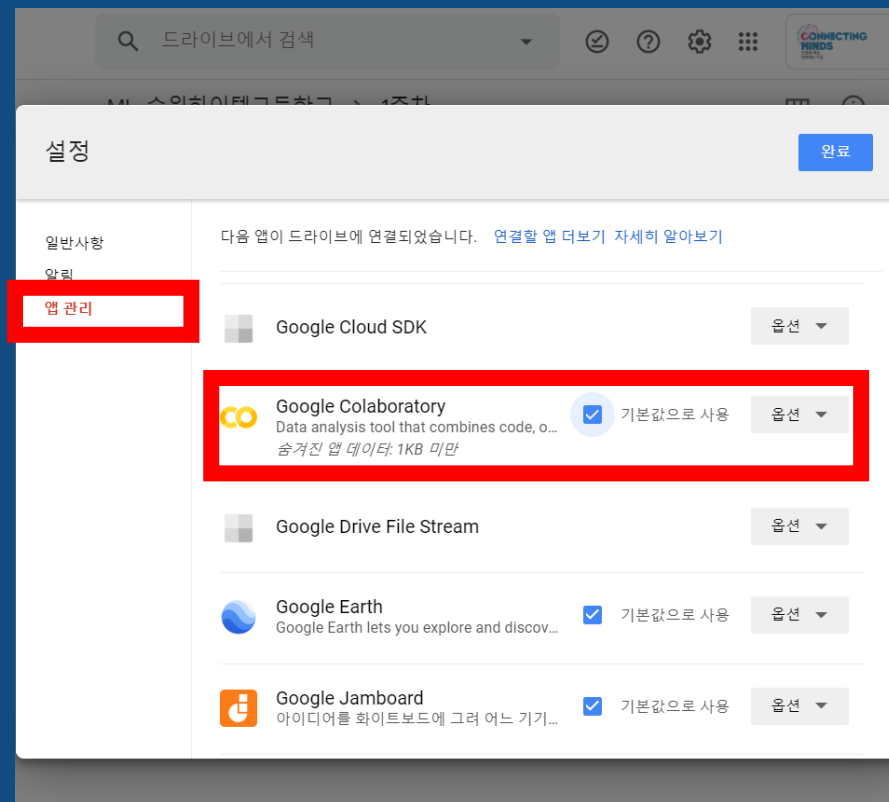
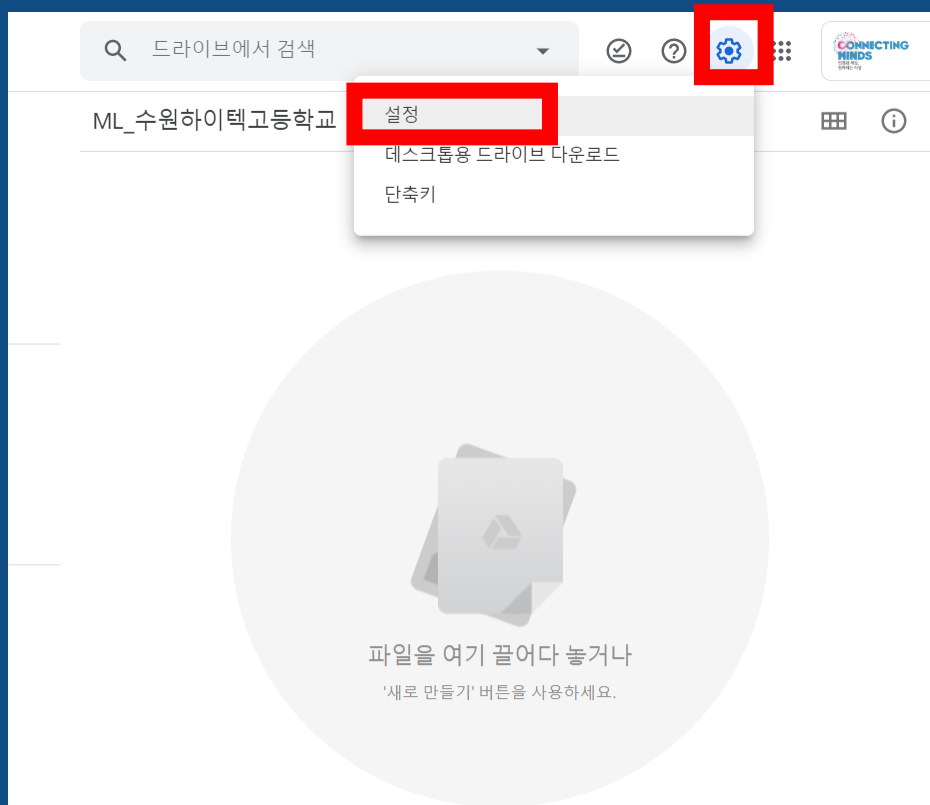
1. Colaboratory 검색 후 연결



Colab 준비 (공유드라이브)

4-1. 우클릭 시 Google Colaboratory가 없을 경우

- 1) 설정 - 앱관리 이동
- 2) Google Colaboratory 기본값으로 사용

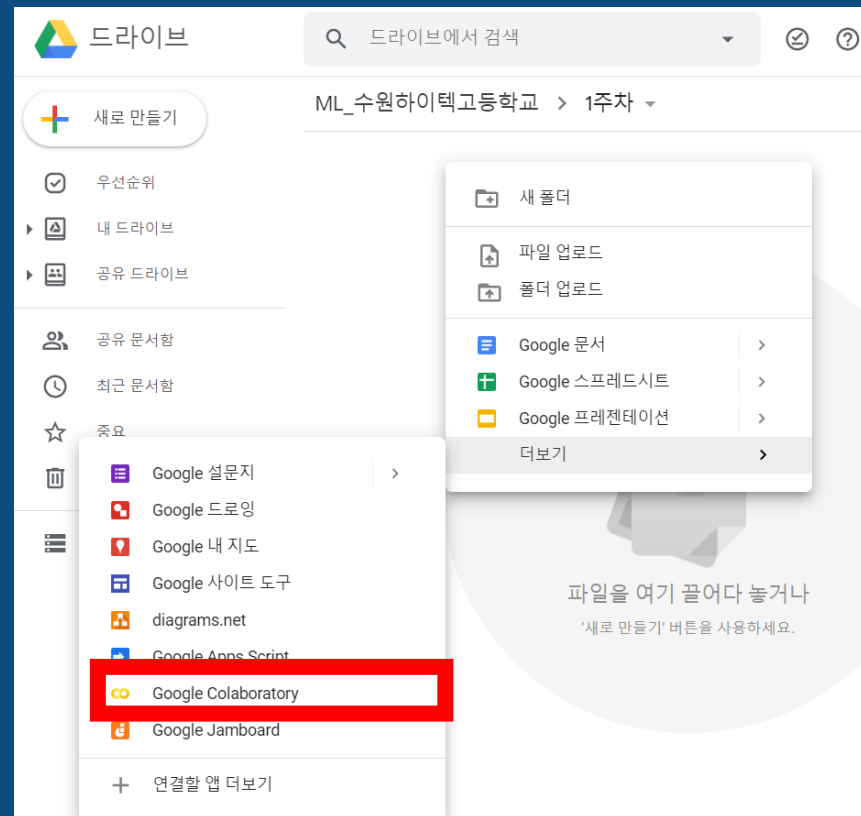


+ Colab 준비 (공유드라이브)

4-1. 우클릭 시 Google Colaboratory가 없을 경우

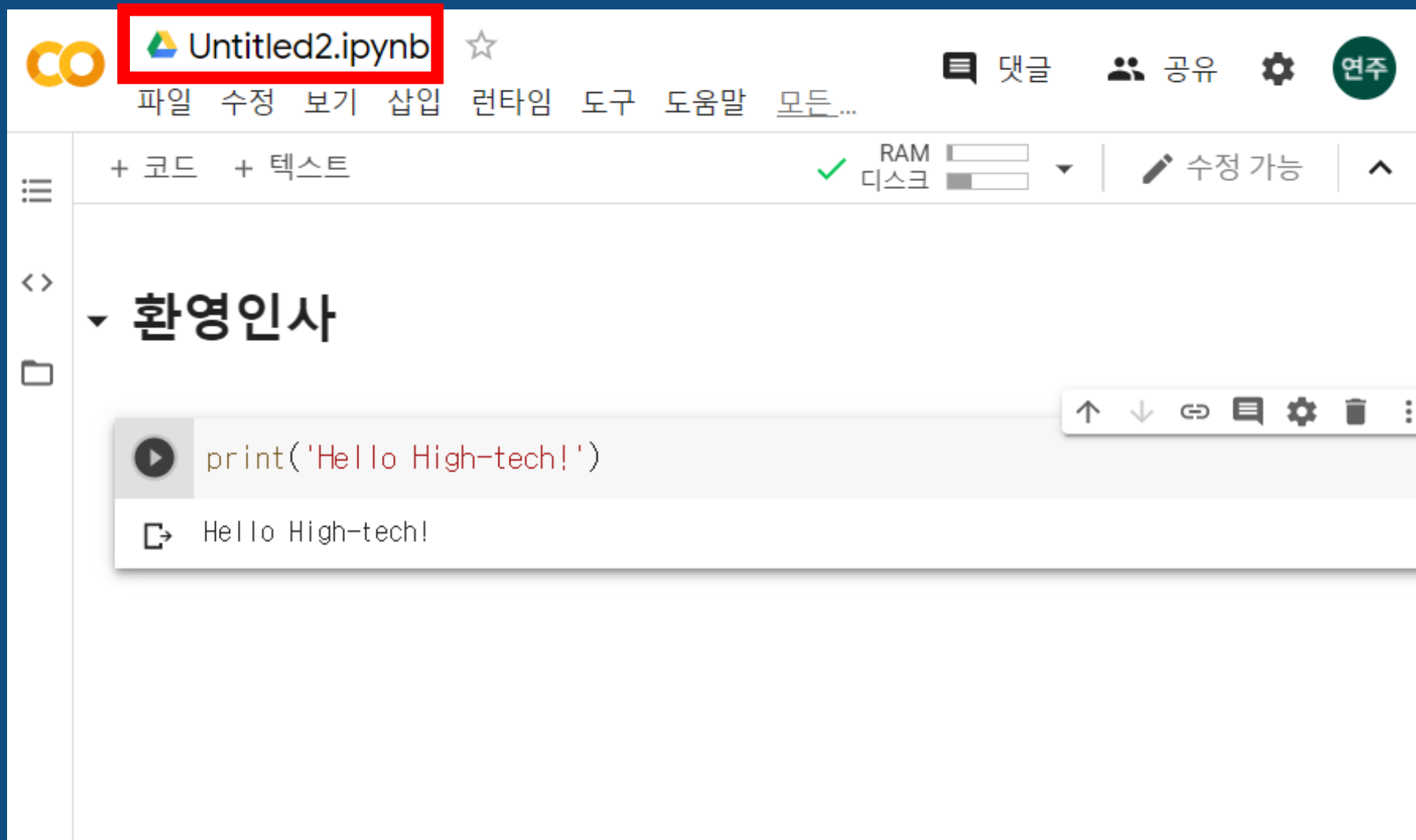
3) 다시 1주차 폴더 이동 후, 빈 곳에다가 우클릭

4) Google Colaboratory 선택



Colab 사용법

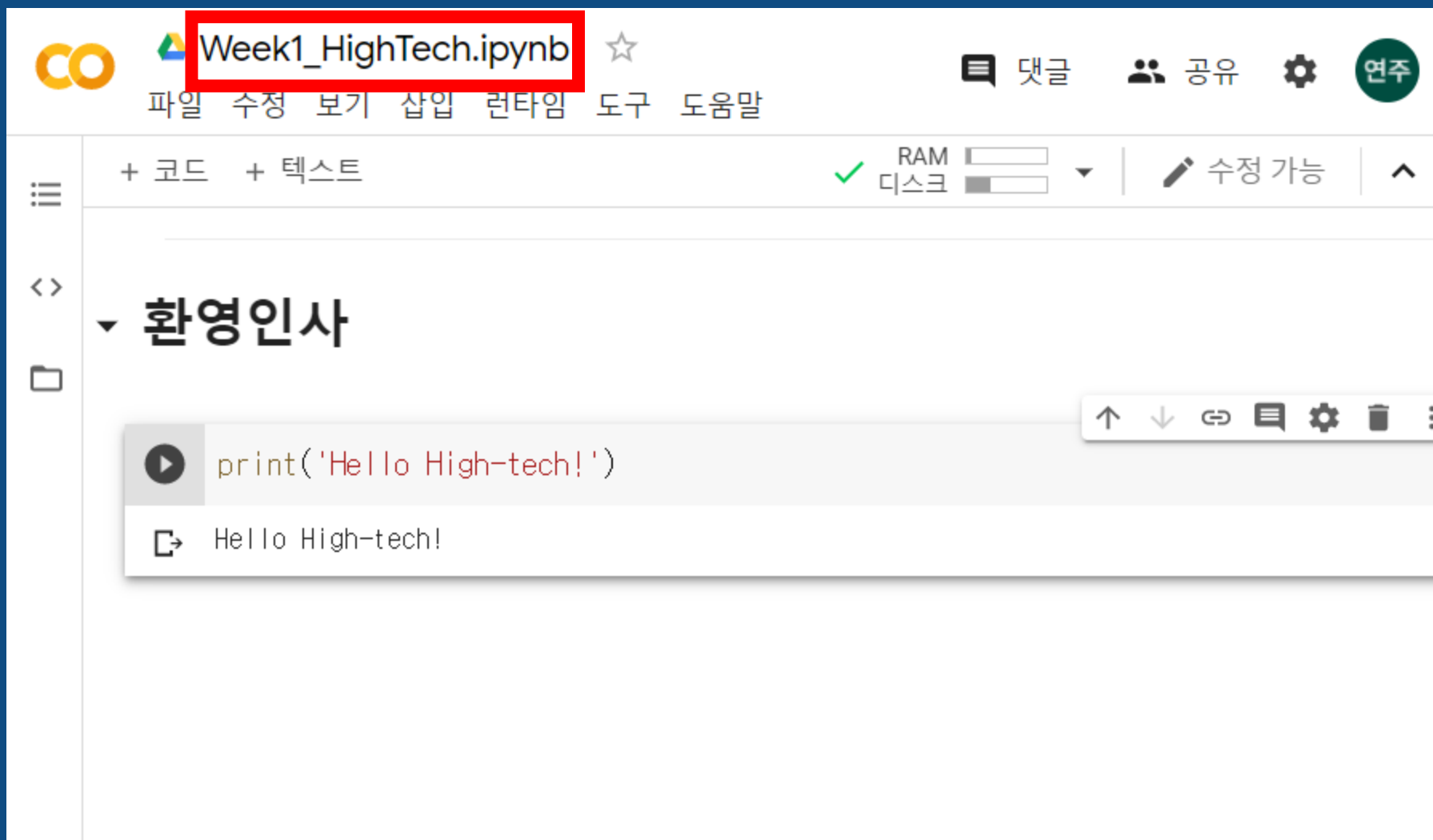
1. 더블 클릭해서 파일이름변경



The screenshot displays the Google Colab web interface. At the top, the file name 'Untitled2.ipynb' is highlighted with a red rectangular box. Below the file name, a menu bar contains options: '파일' (File), '수정' (Edit), '보기' (View), '삽입' (Insert), '런타임' (Runtime), '도구' (Tools), '도움말' (Help), and '모든...' (All...). To the right of the menu bar are icons for '댓글' (Comments), '공유' (Share), '설정' (Settings), and a green circular button labeled '연주' (Run). Below the menu bar, there are tabs for '+ 코드' (Code) and '+ 텍스트' (Text). On the right side of this section, there is a green checkmark, a 'RAM' usage indicator, a '디스크' (Disk) usage indicator, and a '수정 가능' (Editable) status with a pencil icon. The main workspace area shows a folder icon on the left and a title '환영인사' (Welcome) with a dropdown arrow. Below the title, there is a code cell containing the Python code `print('Hello High-tech!')`. The output of the code cell is displayed below it, showing 'Hello High-tech!'. A toolbar with various icons (up, down, link, comment, settings, trash, and more) is located to the right of the code cell.

Colab 사용법

1. 더블 클릭해서 파일이름변경

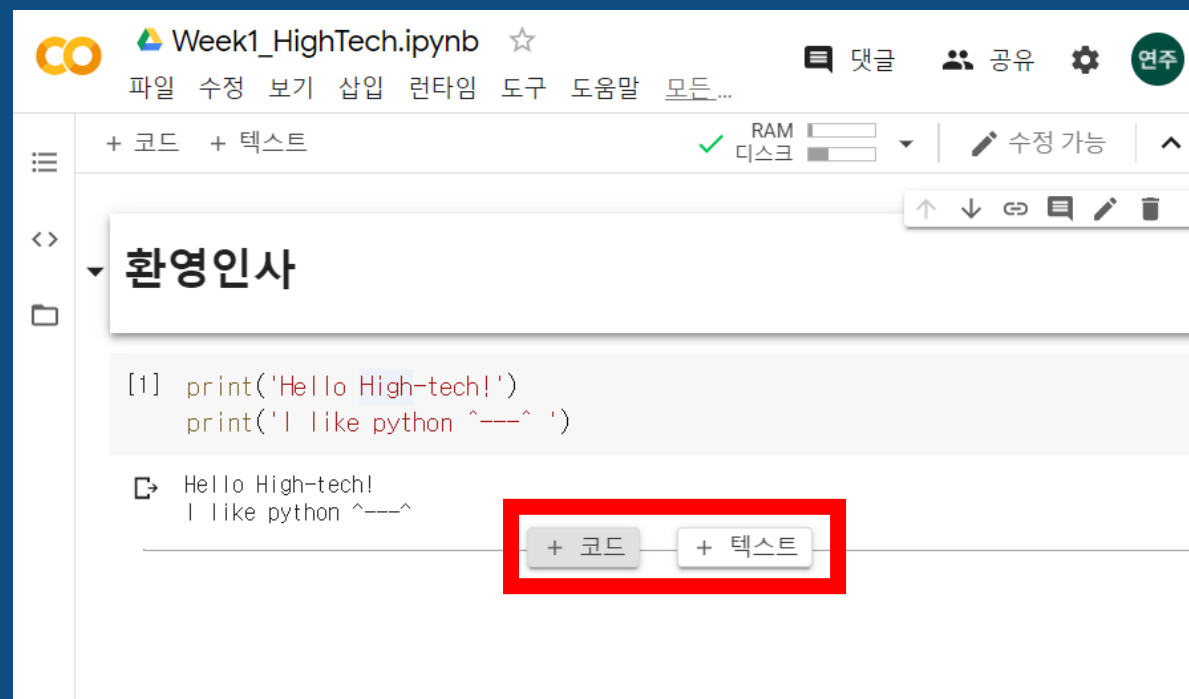
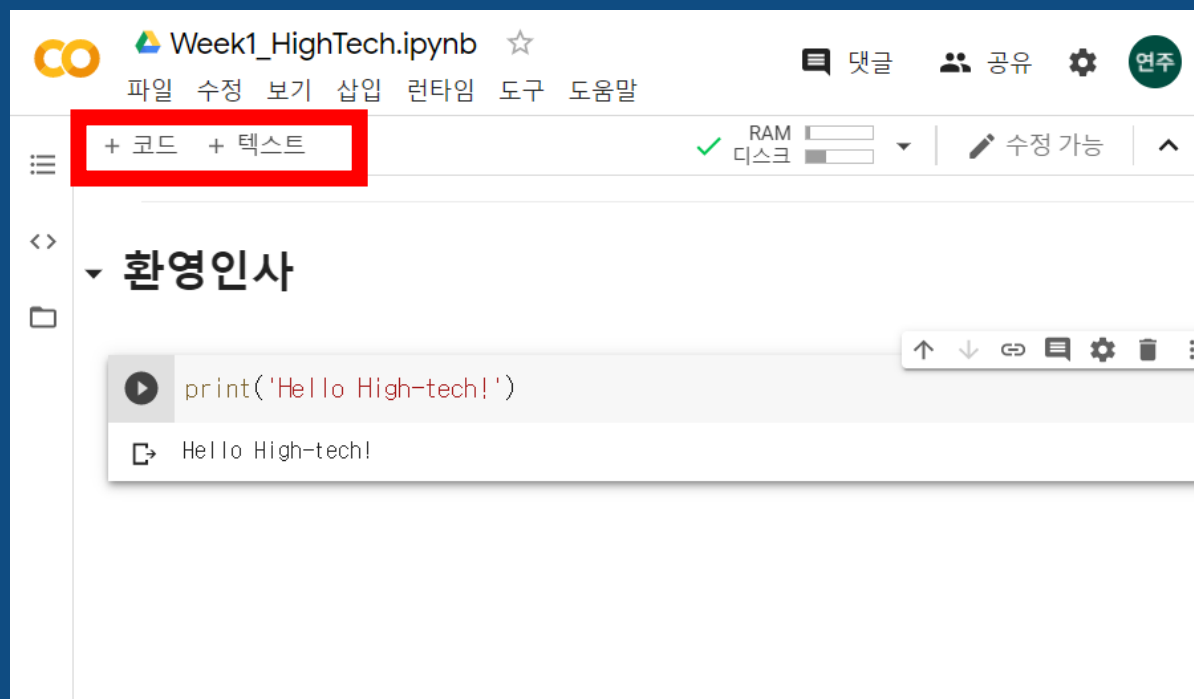


The screenshot shows the Google Colab interface. At the top, the file name 'Week1_HighTech.ipynb' is highlighted with a red rectangular box. Below the file name, there are icons for '파일' (File), '수정' (Edit), '보기' (View), '삽입' (Insert), '런타임' (Runtime), '도구' (Tools), and '도움말' (Help). To the right of these icons are buttons for '댓글' (Comments), '공유' (Share), a settings gear icon, and a profile icon labeled '연주'. Below the top bar, there are tabs for '+ 코드' (Code) and '+ 텍스트' (Text). On the right side of this bar, there is a green checkmark, a 'RAM' indicator, a '디스크' (Disk) indicator, and a '수정 가능' (Editable) button. The main workspace shows a folder icon on the left and a code cell titled '환영인사' (Welcome). The code cell contains the text `print('Hello High-tech!')` and its output is 'Hello High-tech!'. A toolbar with various icons is visible on the right side of the code cell.



Colab 사용법

2. 코드 셀 or 텍스트 셀 추가

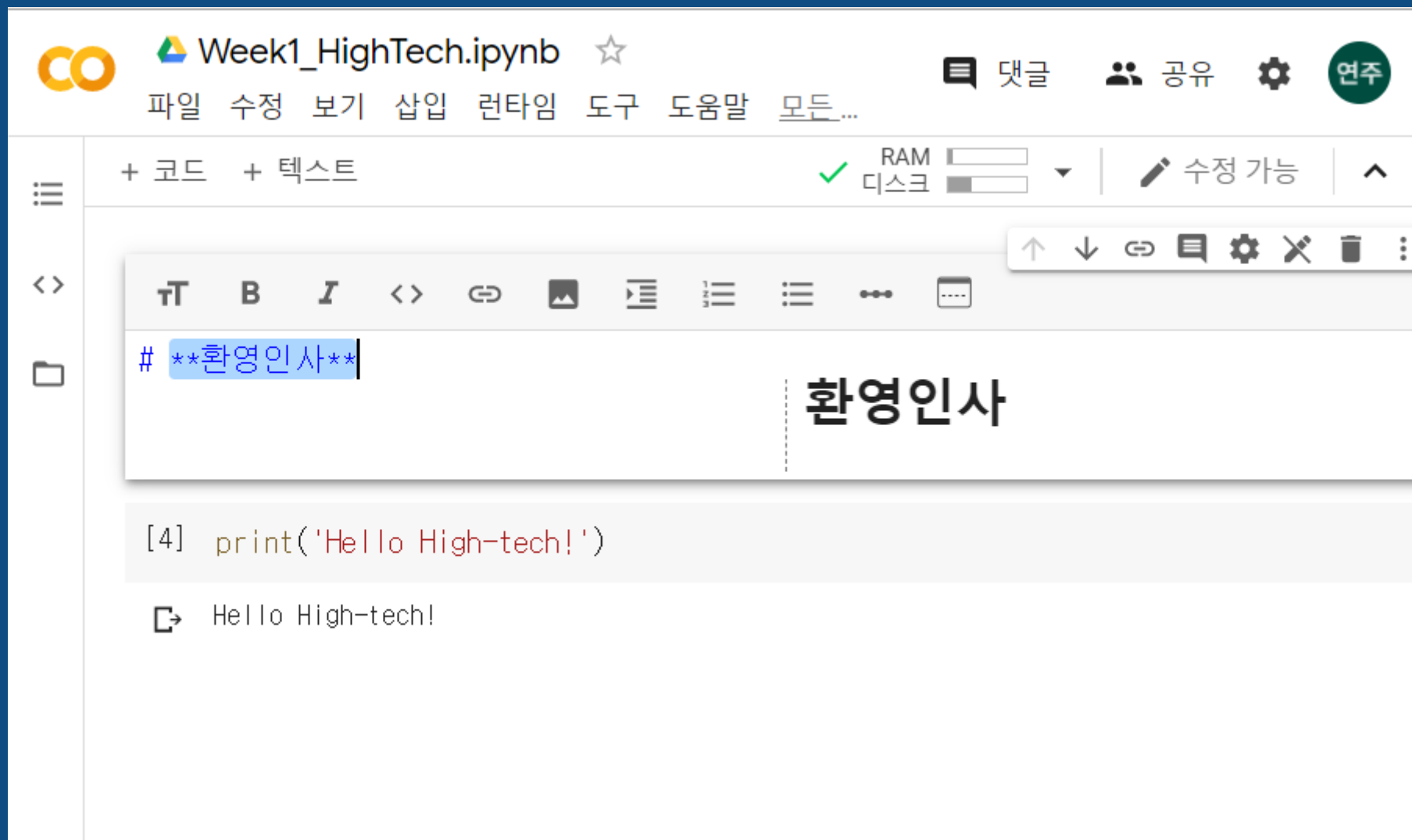


2. 코드 셀 or 텍스트 셀 추가

The screenshot displays the Google Colab interface for a notebook titled 'Week1_HighTech.ipynb'. The top navigation bar includes the Colab logo, file management options (파일, 수정, 보기, 삽입, 런타임, 도구, 도움말), and user controls (댓글, 공유, settings, and a profile icon labeled '연주'). Below the navigation bar, a toolbar shows '+ 코드' and '+ 텍스트' buttons, along with RAM and disk usage indicators and a '수정 가능' (Editable) status. The notebook content area contains two cells, both highlighted with red rectangles. The first cell is a text cell containing the Korean text '환영인사' (Welcome), with a red arrow pointing to the label '텍스트 셀' (Text cell). The second cell is a code cell containing the Python code `print('Hello High-tech!')`, with a red arrow pointing to the label '코드 셀' (Code cell). The code cell's output, 'Hello High-tech!', is visible below the code input area. A small toolbar with navigation and action icons is located to the right of the code cell.

Colab 사용법

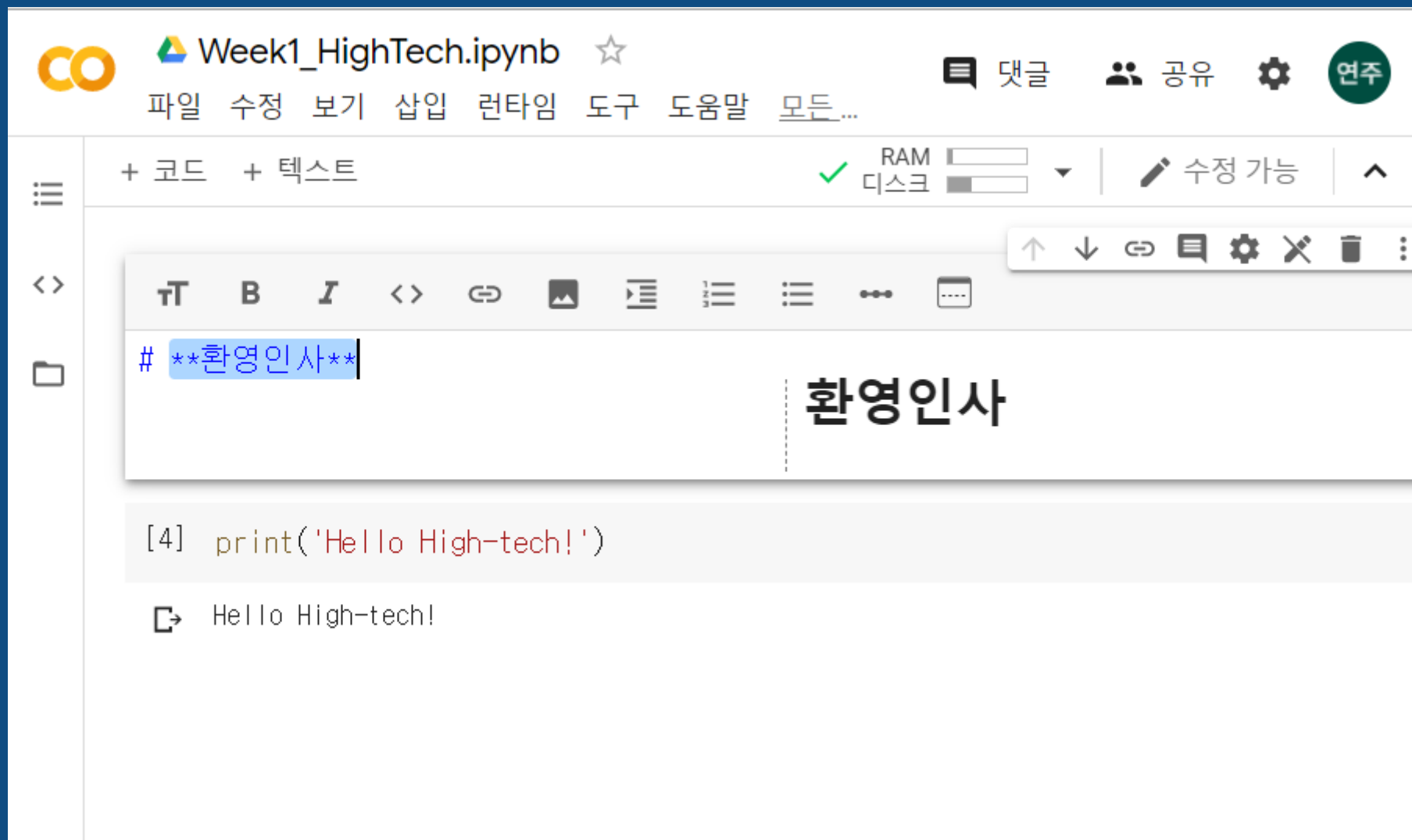
2-1 텍스트 셀 (마크다운 문법 참고)



The screenshot displays the Google Colab web interface. At the top, the file name 'Week1_HighTech.ipynb' is shown with a star icon. Below it, a menu bar includes '파일' (File), '수정' (Edit), '보기' (View), '삽입' (Insert), '런타임' (Runtime), '도구' (Tools), '도움말' (Help), and '모든...' (All...). On the right, there are icons for '댓글' (Comments), '공유' (Share), a settings gear, and a '연주' (Run) button. The main workspace has a toolbar with '+ 코드' (Code) and '+ 텍스트' (Text) buttons. A status bar shows 'RAM' and '디스크' (Disk) usage with a green checkmark, and a '수정 가능' (Editable) indicator. The text cell is active, showing a rich text editor with a toolbar containing bold, italic, code, link, image, list, and other formatting icons. The text '# **환영인사**' is entered, which is rendered as '환영인사' (Welcome). Below the text cell, a code cell is visible with the code '[4] print('Hello High-tech!')' and its output 'Hello High-tech!'.

Colab 사용법

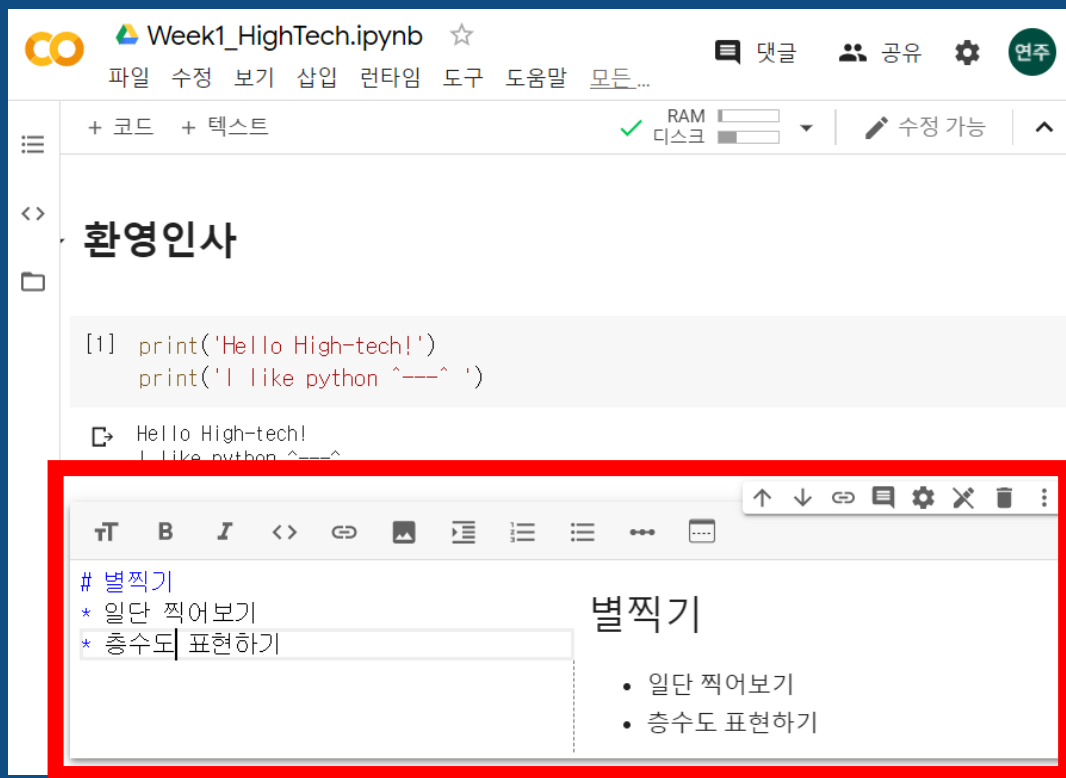
2-1 텍스트 셀 (마크다운 문법 참고)



The screenshot displays the Google Colab web interface. At the top, the file name 'Week1_HighTech.ipynb' is shown with a star icon. Below it, a menu bar includes '파일' (File), '수정' (Edit), '보기' (View), '삽입' (Insert), '런타임' (Runtime), '도구' (Tools), '도움말' (Help), and '모든...' (All...). On the right, there are icons for '댓글' (Comments), '공유' (Share), a settings gear, and a '연주' (Run) button. The main workspace has a toolbar with '+ 코드' (Code) and '+ 텍스트' (Text) options. A text cell is selected, showing a rich text editor with a toolbar containing bold, italic, code, link, image, list, and other formatting icons. The text content of the cell is '# **환영인사**', which is rendered as '환영인사' (Welcome) in the preview area. Below the text cell, a code cell is visible with the code '[4] print('Hello High-tech!')' and its output 'Hello High-tech!'.

Colab 사용법

2-1 텍스트 셀 (마크다운 문법 참고)



Week1_HighTech.ipynb

파일 수정 보기 삽입 런타임 도구 도움말 모든...

+ 코드 + 텍스트

✓ RAM 디스크 수정 가능

<> 환영인사

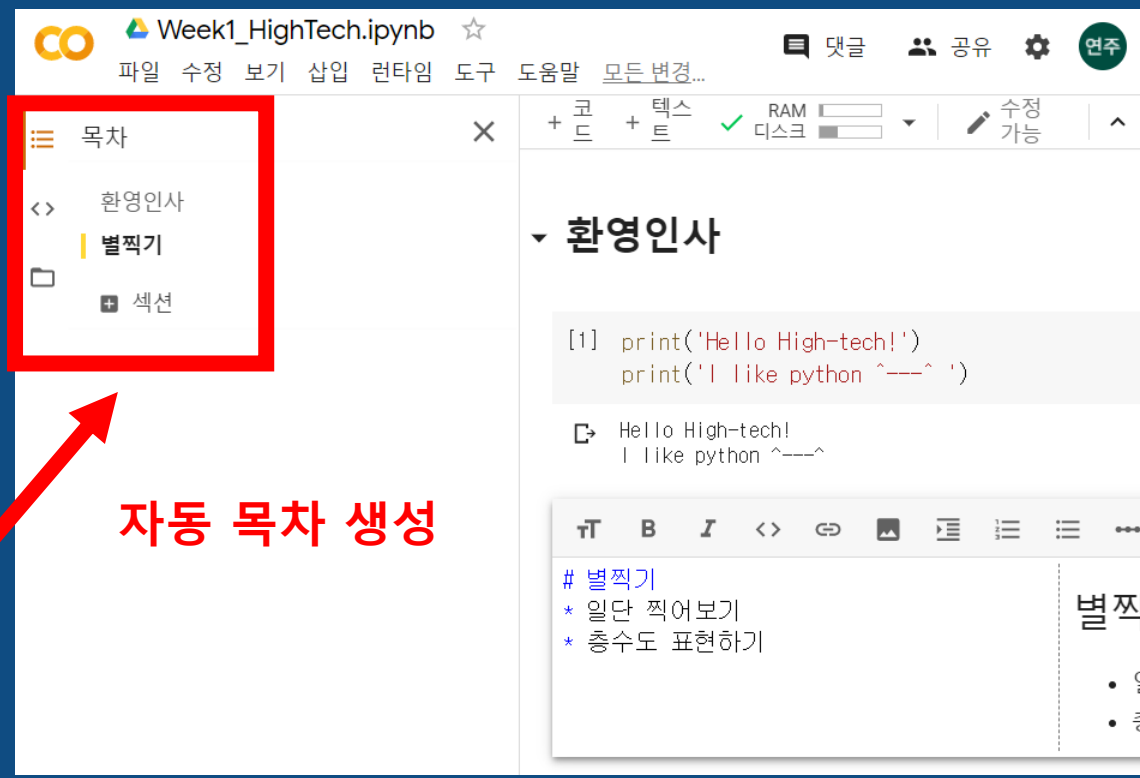
```
[1] print('Hello High-tech!')
    print('I like python ^---^')
```

▶ Hello High-tech!
I like python ^---^

별찍기
* 일단 찍어보기
* 총수도 표현하기

별찍기

- 일단 찍어보기
- 총수도 표현하기



Week1_HighTech.ipynb

파일 수정 보기 삽입 런타임 도구 도움말 모든 변경...

+ 코드 + 텍스트

✓ RAM 디스크 수정 가능

목차

- <> 환영인사
- | 별찍기
- 섹션

<> 환영인사

```
[1] print('Hello High-tech!')
    print('I like python ^---^')
```

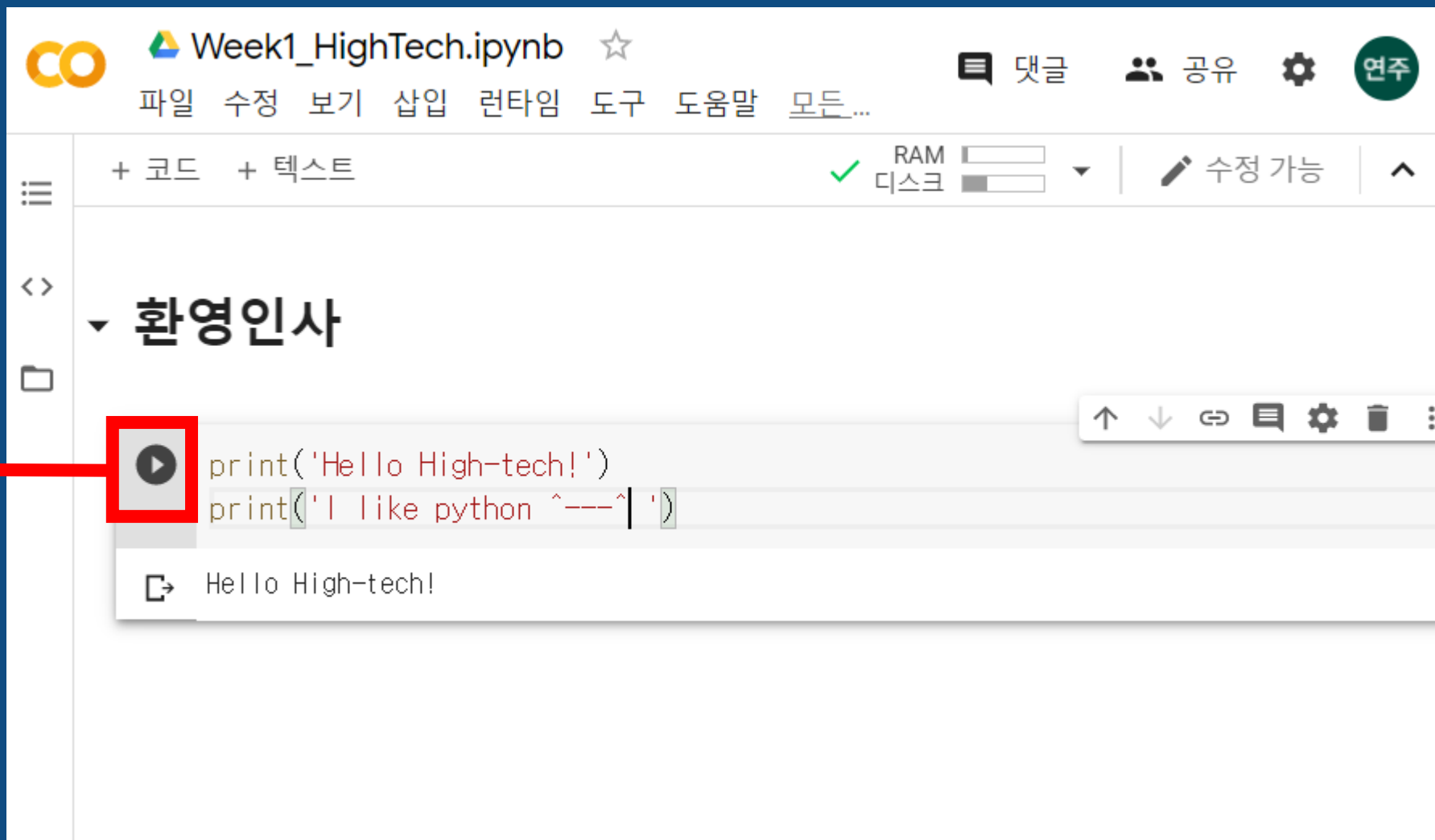
▶ Hello High-tech!
I like python ^---^

별찍기
* 일단 찍어보기
* 총수도 표현하기

별찍기

- 일단 찍어보기
- 총수도 표현하기

자동 목차 생성



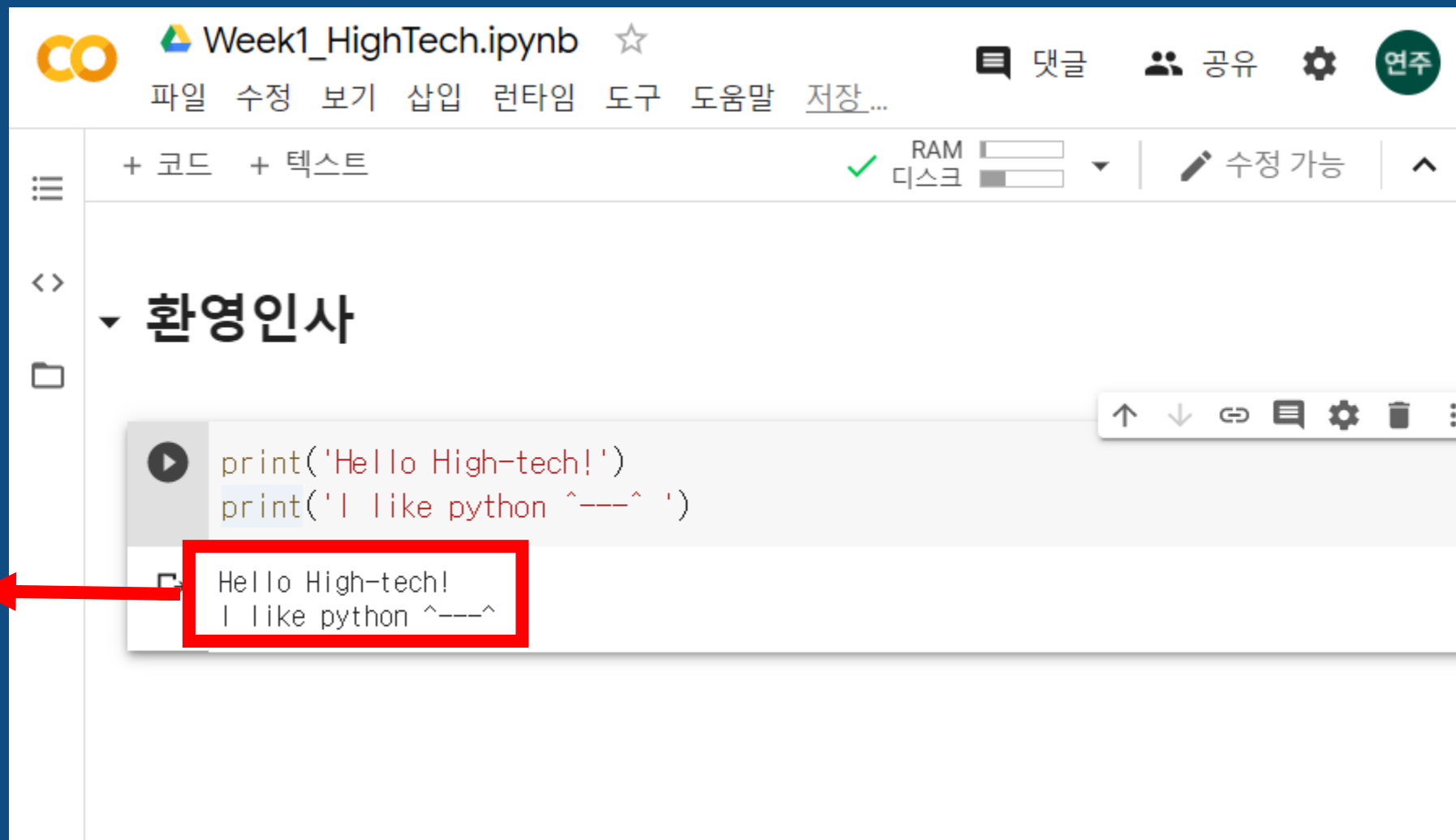
실행버튼

또는

Ctrl+Enter



실행결과



The screenshot shows a Google Colab notebook interface. At the top, the title bar displays 'Week1_HighTech.ipynb' with a star icon. Below the title bar, there are tabs for '파일' (File), '수정' (Edit), '보기' (View), '삽입' (Insert), '런타임' (Runtime), '도구' (Tools), '도움말' (Help), and '저장...' (Save...). On the right side of the title bar, there are icons for '댓글' (Comments), '공유' (Share), '설정' (Settings), and '연주' (Run). Below the title bar, there is a toolbar with '+ 코드' (Code) and '+ 텍스트' (Text) buttons. To the right of the toolbar, there are indicators for 'RAM' and '디스크' (Disk) usage, a green checkmark, and a '수정 가능' (Editable) status. The main content area shows a code cell titled '환영인사' (Welcome). The code cell contains two lines of Python code: `print('Hello High-tech!')` and `print('I like python ^---^ ')`. Below the code cell, the output is displayed: 'Hello High-tech!' and 'I like python ^---^'. A red box highlights the output text, and a red arrow points from the text '실행결과' (Execution Result) to the output box.

Week1_HighTech.ipynb ☆

파일 수정 보기 삽입 런타임 도구 도움말 저장...

+ 코드 + 텍스트

✓ RAM 디스크 수정 가능

환영인사

```
print('Hello High-tech!')
print('I like python ^---^ ')
```

Hello High-tech!
I like python ^---^

2-1 코드 셀

해당 코드셀
실행번호

```
Week1_HighTech.ipynb
파일 수정 보기 삽입 런타임 도구 도움말 모든 변경...

+ 코드 + 텍스트
RAM 디스크 수정 가능

<> ▾ 환영인사
[1] print('Hello High-tech!')
    print('I like python ^---^ ')

Hello High-tech!
I like python ^---^

▾ 별찍기
• 일단 찍어보기
• 층수도 표현하기

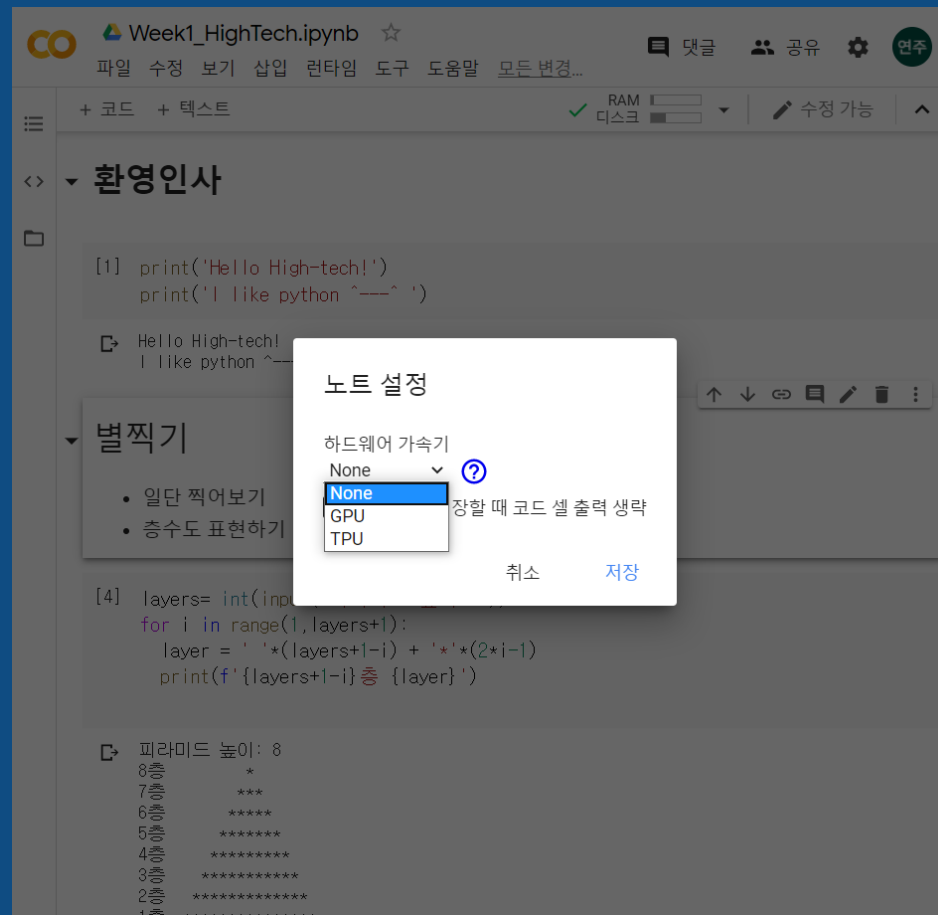
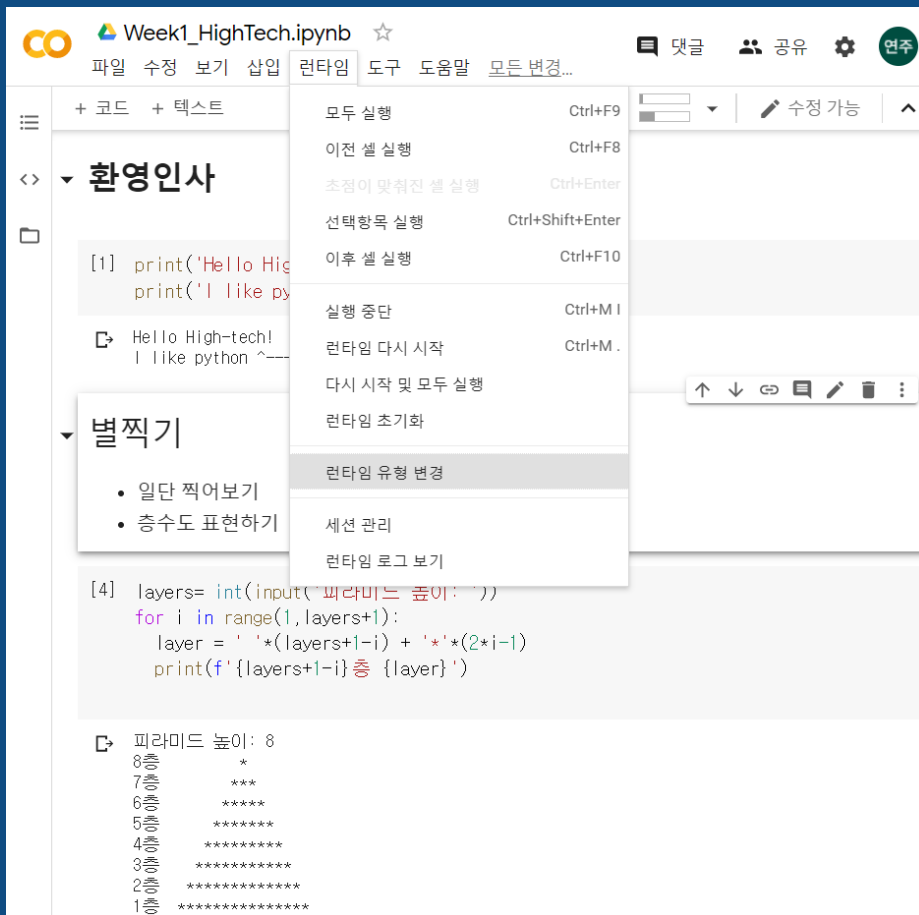
[4] layers= int(input('피라미드 높이: '))
    for i in range(1, layers+1):
        layer = ' '*(layers+1-i) + '*'*(2*i-1)
        print(f'{layers+1-i}층 {layer} ')

피라미드 높이: 8
8층      *
7층     ***
6층    *****
5층   *****
4층  *****
3층 *****
2층 *****
1층 *****
```

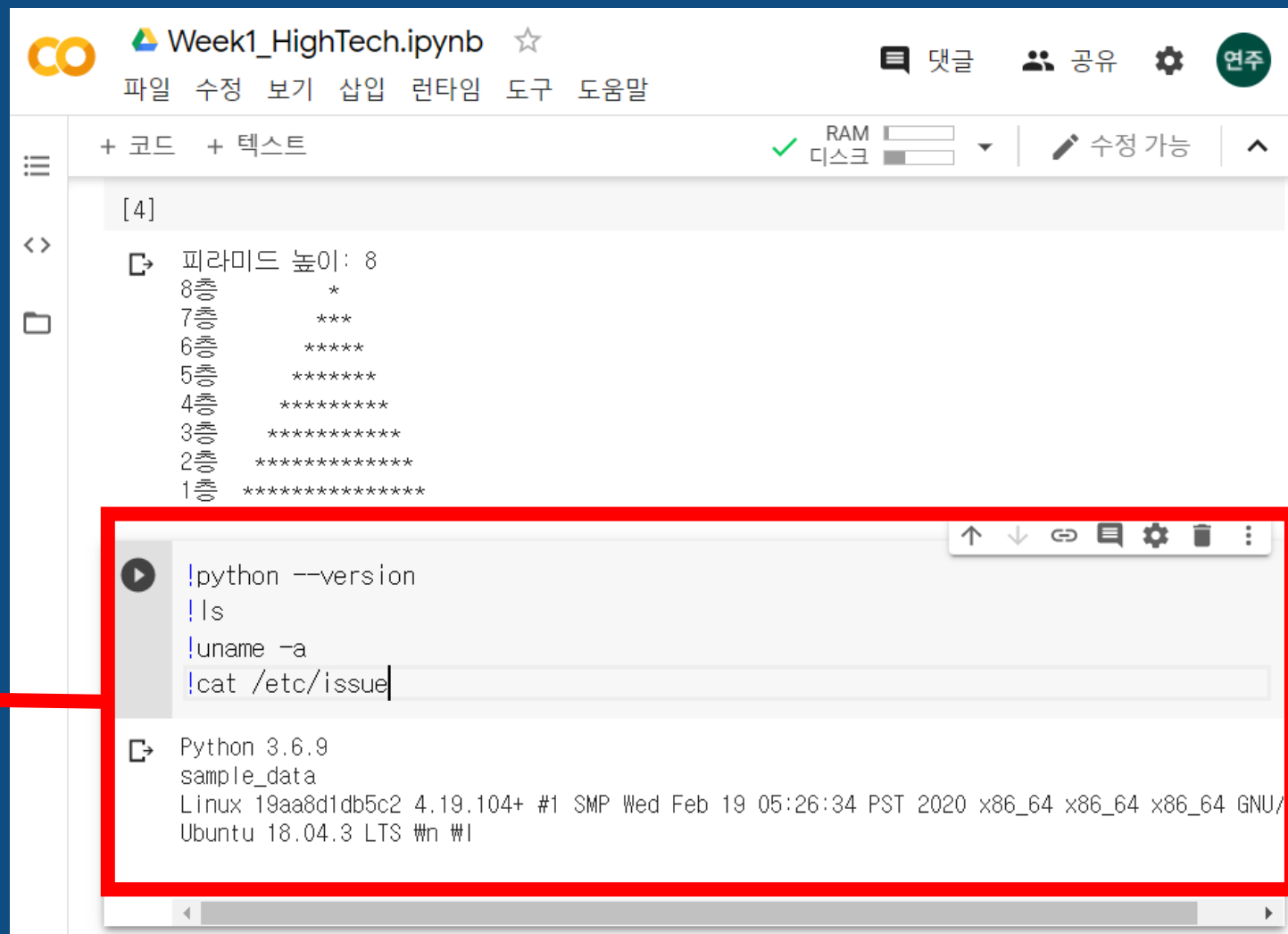


3. GPU 설정

GPU 최대 12시간 동안만 지원! 실행 후 12시간이 지나면 런타임 다시시작해주어야 한다!



3. !터미널 명령어 실행 (리눅스 명령어 참조)



The screenshot shows a Google Colab notebook interface. At the top, the notebook is titled "Week1_HighTech.ipynb". Below the title bar, there are tabs for "파일", "수정", "보기", "삽입", "런타임", "도구", and "도움말". On the right side of the top bar, there are icons for "댓글", "공유", "설정", and "연주". The main area of the notebook shows a code cell with the following content:

```
[4]  
↳ 피라미드 높이: 8  
8층      *  
7층      ***  
6층      *****  
5층      *****  
4층      *****  
3층      *****  
2층      *****  
1층      *****
```

Below the code cell, there is a terminal output section. It contains the following commands and their output:

```
!python --version  
!ls  
!uname -a  
!cat /etc/issue
```

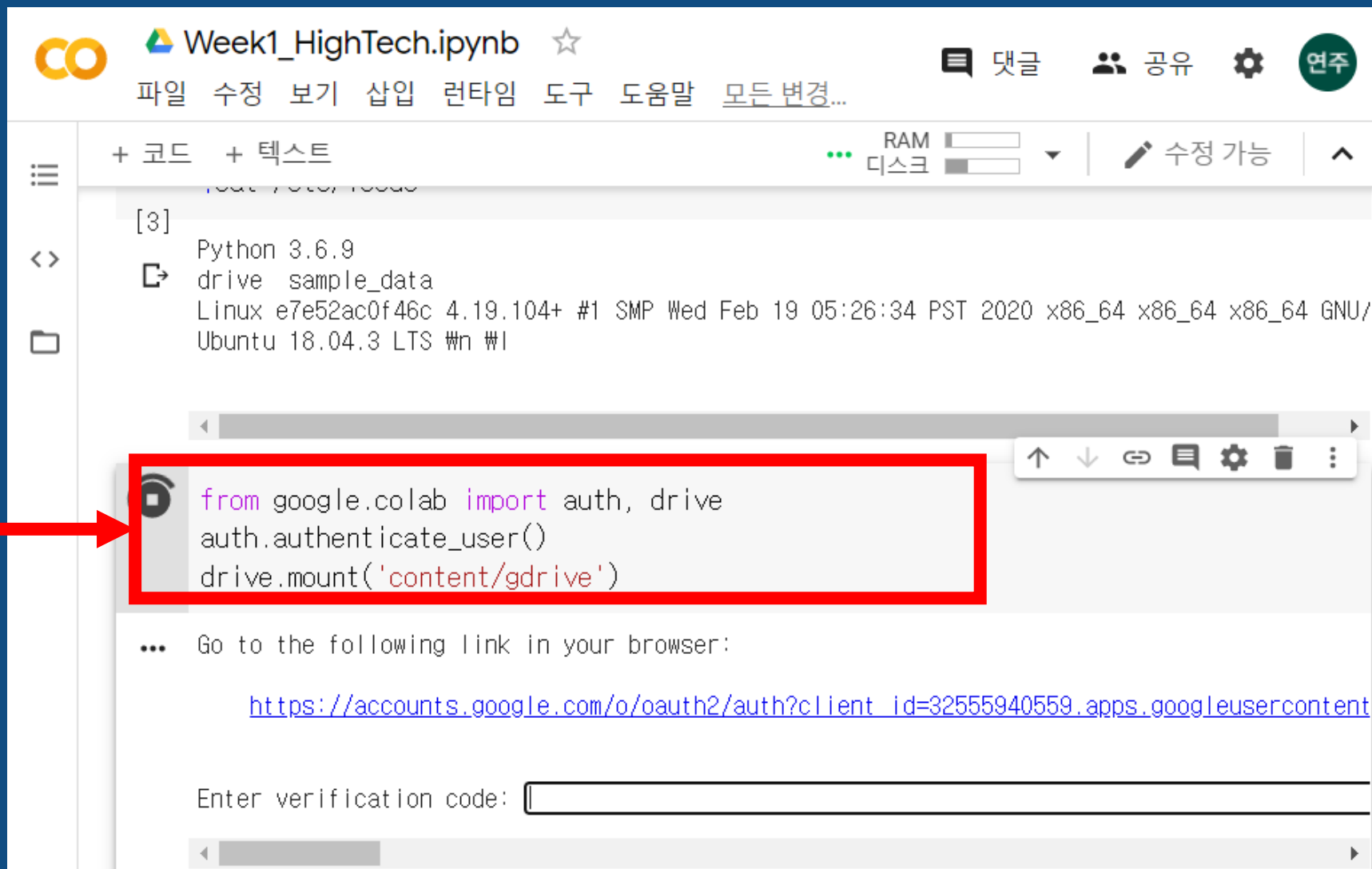
The output of the terminal commands is as follows:

```
Python 3.6.9  
sample_data  
Linux 19aa8d1db5c2 4.19.104+ #1 SMP Wed Feb 19 05:26:34 PST 2020 x86_64 x86_64 x86_64 GNU/  
Ubuntu 18.04.3 LTS #n #l
```

코드셀에서
!터미널명령어를 실행하면
터미널 실행된 결과를 출력

3. 구글 드라이브와 Colab 연동

코드 셀에서
다음 코드 입력



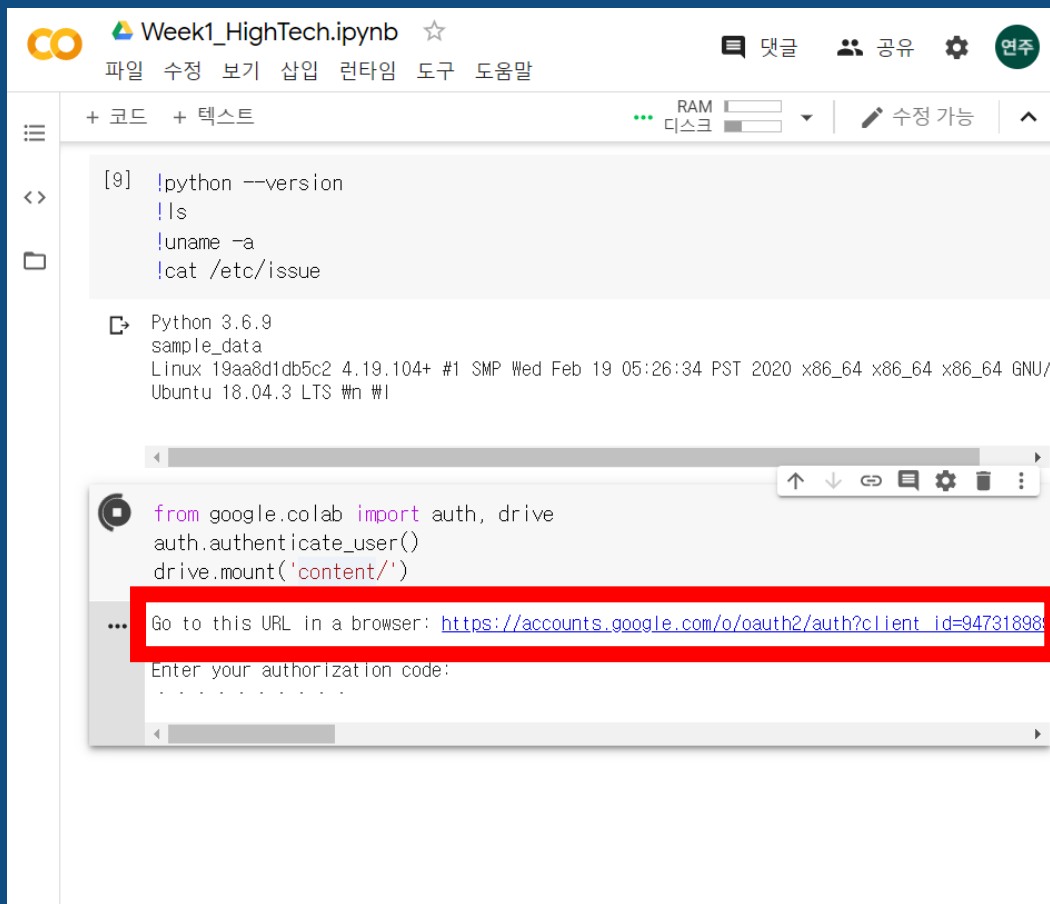
```
from google.colab import auth, drive
auth.authenticate_user()
drive.mount('content/gdrive')
```

... Go to the following link in your browser:

https://accounts.google.com/o/oauth2/auth?client_id=32555940559.apps.googleusercontent.com&redirect_uri=https://colab.research.google.com/&scope=https://www.googleapis.com/auth/drive

Enter verification code:

3. 구글 드라이브와 Colab 연동



The screenshot shows the Google Colab interface with a notebook named 'Week1_HighTech.ipynb'. The code cell contains the following commands:

```
[9] !python --version
!ls
!uname -a
!cat /etc/issue
```

The output shows the system information:

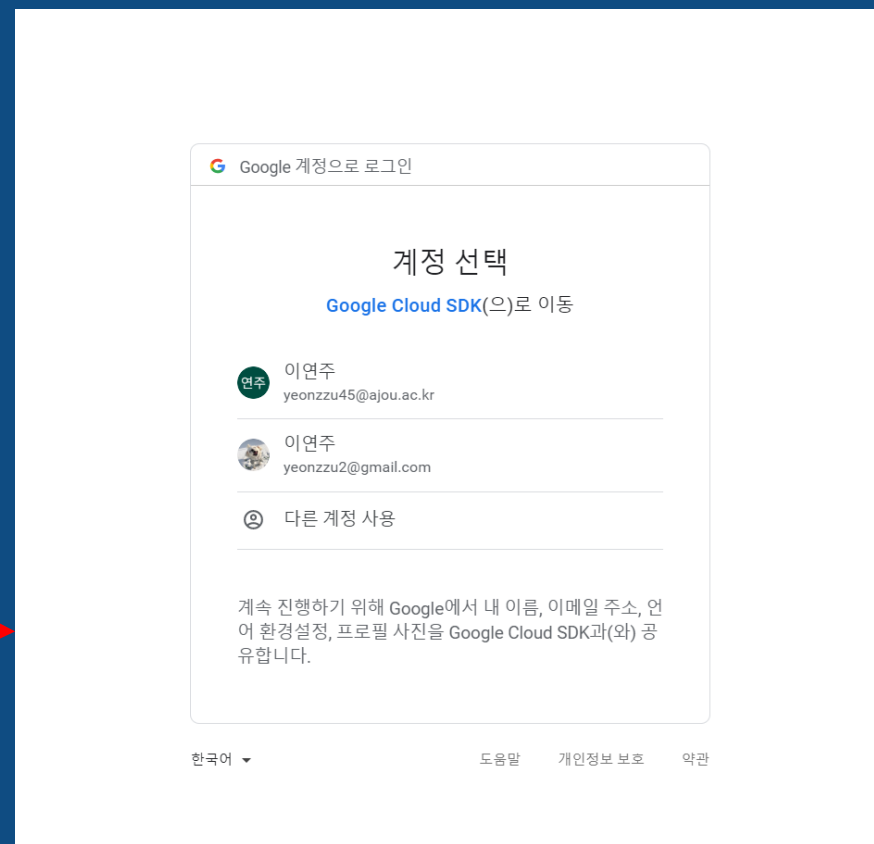
```
Python 3.6.9
sample_data
Linux 19aa8d1db5c2 4.19.104+ #1 SMP Wed Feb 19 05:26:34 PST 2020 x86_64 x86_64 x86_64 GNU/
Ubuntu 18.04.3 LTS #n #l
```

Below the code cell, there is a red box highlighting the following text:

```
Go to this URL in a browser: https://accounts.google.com/o/oauth2/auth?client\_id=94731898
```

A red arrow points from this URL to the right, towards the Google login page.

다음 url 클릭



The screenshot shows the Google account selection page. The title is '계정 선택' (Account Selection). Below the title, it says 'Google Cloud SDK(으)로 이동' (Move to Google Cloud SDK). There are two accounts listed:

- 이연주 (yeonzzu45@ajou.ac.kr)
- 이연주 (yeonzzu2@gmail.com)

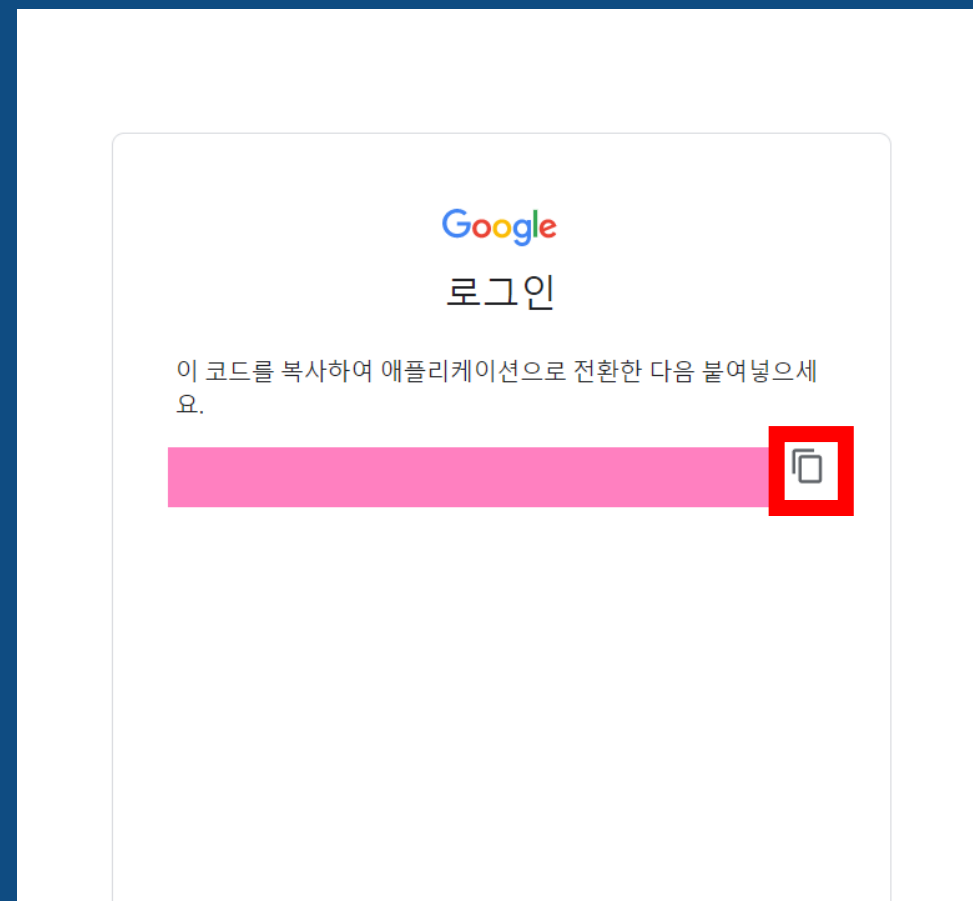
Below the accounts, there is a link '다른 계정 사용' (Use another account). At the bottom, there is a message: '계속 진행하기 위해 Google에서 내 이름, 이메일 주소, 언어 환경설정, 프로필 사진을 Google Cloud SDK과(와) 공유합니다.' (To continue, Google will share my name, email address, language settings, and profile picture with Google Cloud SDK and (and) me).

3. 구글 드라이브와 Colab 연동

허용 클릭



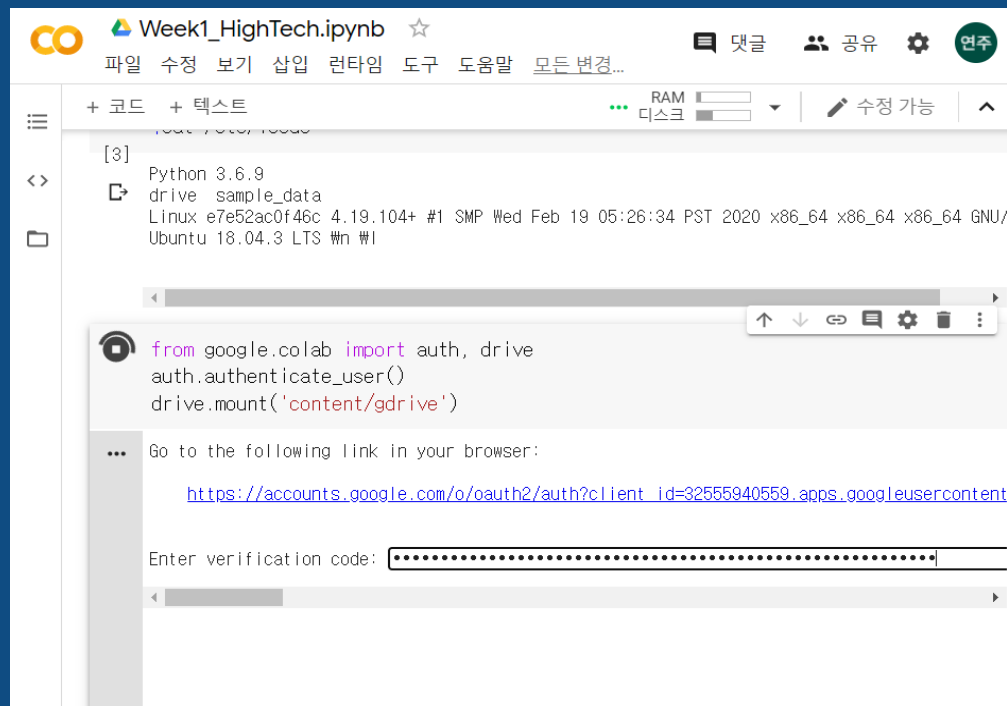
복사하기 클릭 (코드가 복사됩니다)



Colab 사용법

3. 구글 드라이브와 Colab 연동

복사된 코드 붙여넣기



Week1_HighTech.ipynb

파일 수정 보기 삽입 런타임 도구 도움말 모든 변경...

+ 코드 + 텍스트

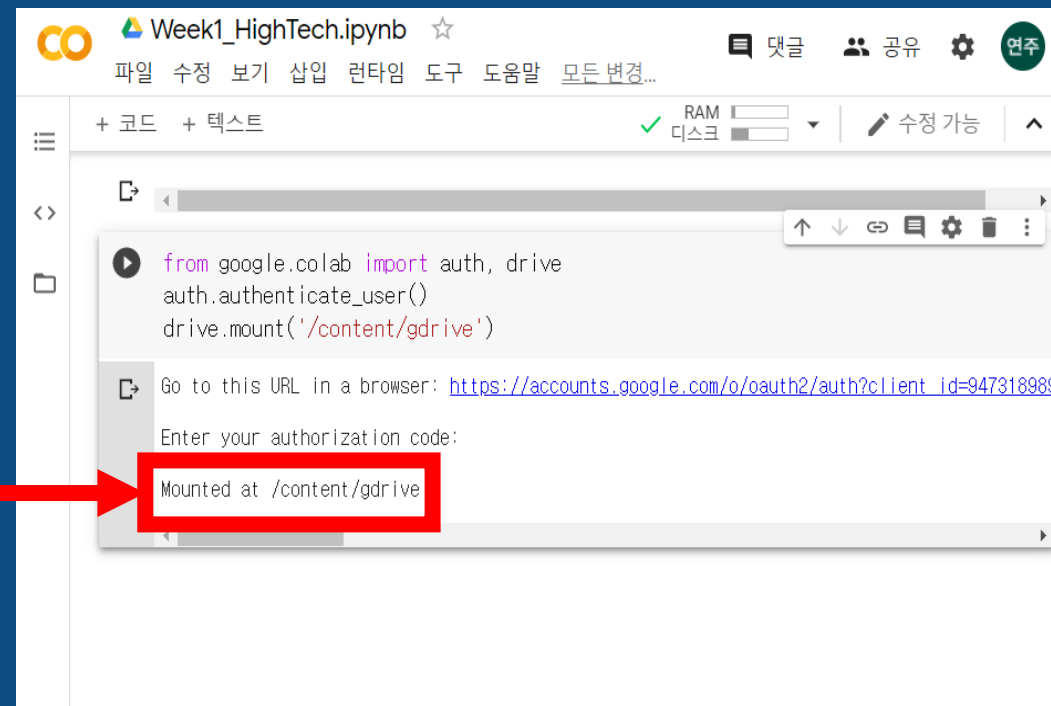
[3] Python 3.6.9
drive sample_data
Linux e7e52ac0f46c 4.19.104+ #1 SMP Wed Feb 19 05:26:34 PST 2020 x86_64 x86_64 x86_64 GNU/
Ubuntu 18.04.3 LTS #n #l

```
from google.colab import auth, drive
auth.authenticate_user()
drive.mount('/content/gdrive')
```

Go to the following link in your browser:
https://accounts.google.com/o/oauth2/auth?client_id=32555940559.apps.googleusercontent.com&scope=https://www.googleapis.com/auth/drive

Enter verification code:

성공1



Week1_HighTech.ipynb

파일 수정 보기 삽입 런타임 도구 도움말 모든 변경...

+ 코드 + 텍스트

```
from google.colab import auth, drive
auth.authenticate_user()
drive.mount('/content/gdrive')
```

Go to this URL in a browser: https://accounts.google.com/o/oauth2/auth?client_id=947318989...

Enter your authorization code:

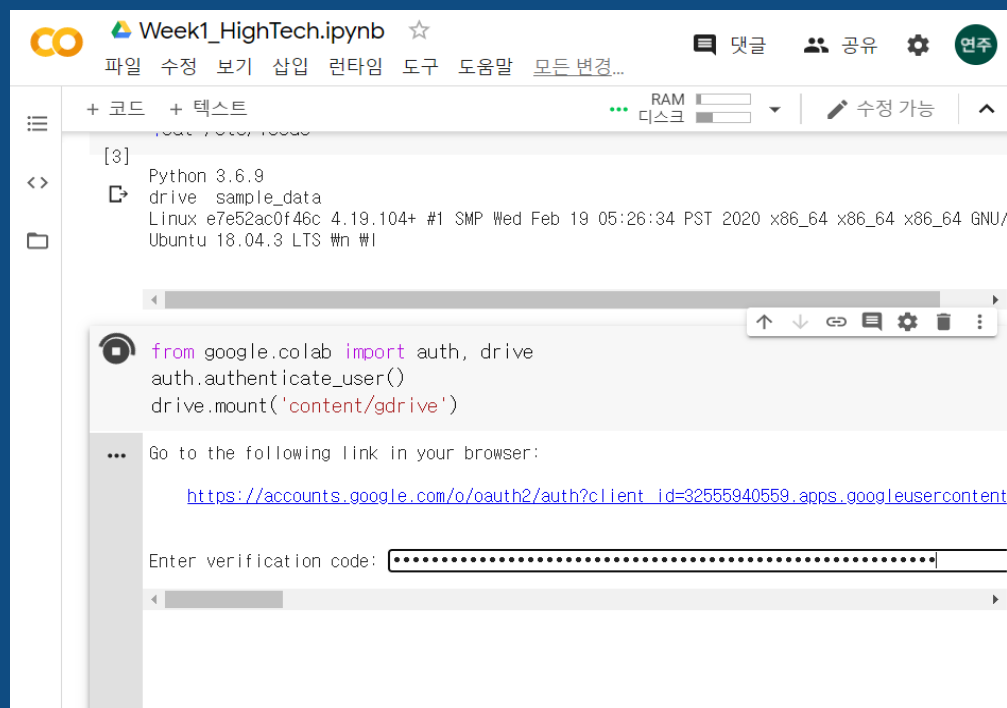
Mounted at /content/gdrive



Colab 사용법

3. 구글 드라이브와 Colab 연동

복사된 코드 붙여넣기



```
[3] Python 3.6.9
drive sample_data
Linux e7e52ac0f46c 4.19.104+ #1 SMP Wed Feb 19 05:26:34 PST 2020 x86_64 x86_64 x86_64 GNU/
Ubuntu 18.04.3 LTS #n #l
```

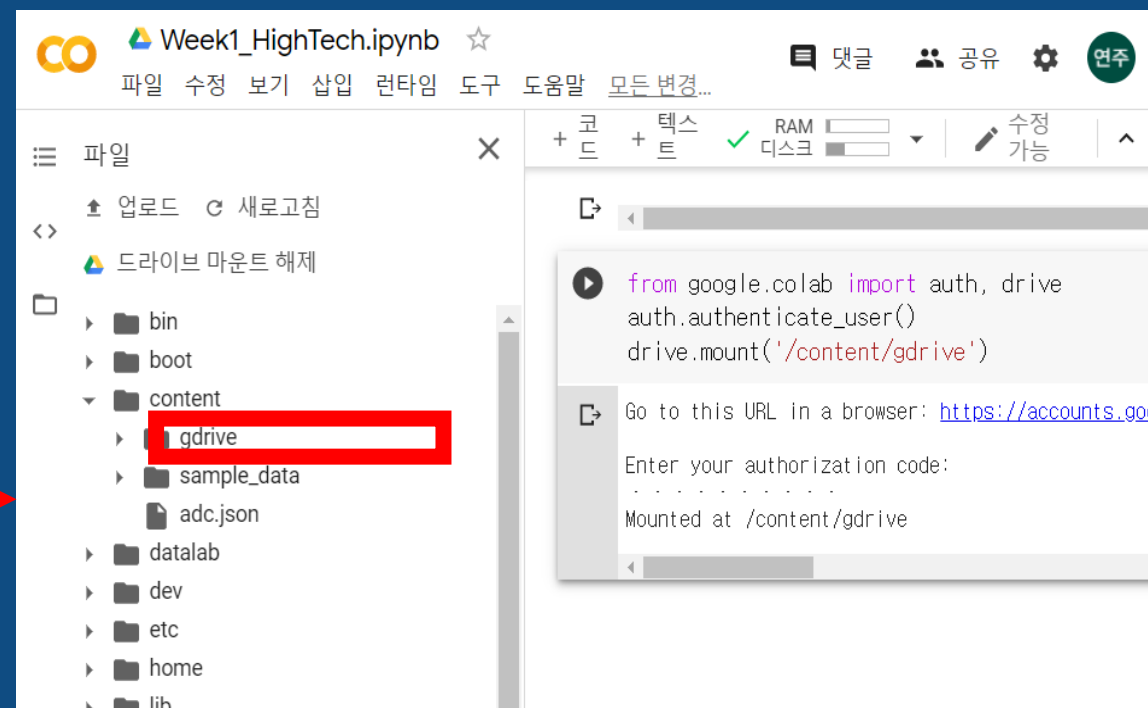
```
from google.colab import auth, drive
auth.authenticate_user()
drive.mount('/content/gdrive')
```

Go to the following link in your browser:

https://accounts.google.com/o/oauth2/auth?client_id=32555940559.apps.googleusercontent.com&scope=https://www.googleapis.com/auth/drive

Enter verification code:

성공2



```
from google.colab import auth, drive
auth.authenticate_user()
drive.mount('/content/gdrive')
```

Go to this URL in a browser: https://accounts.google.com/o/oauth2/auth?client_id=32555940559.apps.googleusercontent.com&scope=https://www.googleapis.com/auth/drive

Enter your authorization code:
.....
Mounted at /content/gdrive



Colab 사용법

Mount 된 drive 폴더에는 나의 드라이브와 공유드라이브 모두 볼 수 있음

The screenshot displays the Google Colab interface for a notebook titled 'Week1_HighTech.ipynb'. The top navigation bar includes the Colab logo, file management options (파일, 수정, 보기, 삽입, 런타임, 도구, 도움말), and a status indicator showing '오후 4:53에 마지막...'. On the left, the file explorer shows a directory structure where the 'drive' folder is highlighted with a red box, containing subfolders 'My Drive' and 'Shared drives', along with 'sample_data' and 'adc.json'. The right pane shows a code cell with the following Python code:

```
from google.colab import auth, drive
auth.authenticate_user()
drive.mount('/content/gdrive')
```

Below the code, a message indicates the next step: 'Go to this URL in a browser: <https://accounts.google.com/ConnectApp?app=colab>'. It also prompts the user to 'Enter your authorization code:' and shows the final output: 'Mounted at /content/gdrive'.

Colab 사용법

Mount 된 drive 폴더에는 나의 드라이브와 공유드라이브 모두 볼 수 있음

The screenshot displays the Google Colab interface for a notebook titled 'Week1_HighTech.ipynb'. The top navigation bar includes the Colab logo, file management options (파일, 수정, 보기, 삽입, 런타임, 도구, 도움말), and a status indicator showing '오후 4:53에 마지막...'. The left sidebar shows the file explorer with a red box highlighting the 'drive' folder, which contains 'My Drive' and 'Shared drives'. The main area shows a code cell with the following Python code:

```
from google.colab import auth, drive
auth.authenticate_user()
drive.mount('/content/gdrive')
```

Below the code cell, a message indicates the next step: 'Go to this URL in a browser: https://accounts.google.com/ConnectAuth?continue=https://colab.research.google.com/notebooks/Week1_HighTech.ipynb&authuser=1'. It also prompts the user to 'Enter your authorization code:' and shows the result 'Mounted at /content/gdrive'.

† 딕셔너리 연습문제 (1)

OX문제 (틀렸으면 틀린 이유를 적어주세요.)

1. 딕셔너리는 인덱싱으로 특정 데이터에 접근할 수 있다.
2. 딕셔너리의 모든 키는 동일한 자료형이다.
3. 딕셔너리는 immutable하다.
4. {"a": 1, "b": 2}와 {"b": 2, "a": 1}은 다르다.



† 디렉터리 연습문제 (2)

메모를 할 수 있는 게시판과 관련된 디렉터리 'bulletin'이다. 관련 문제를 풀어주세요.

```
[12] bulletin = [{"writer": "Joy",
                  "memo": [{"Date": "2020-06-10",
                           "contents": "take a midterm of mathematics"},
                           {"Date": "2020-06-12",
                           "contents": ["visit art gallery with Jam", "give flowers to Mother"]},
                           {"Date": "2020-06-14",
                           "contents": "meet Evan"}]},
                 {"writer": "Sue",
                  "memo": [{"Date": "2020-04-20",
                           "contents": "buy some apples"},
                           {"Date": "2020-05-05",
                           "contents": "do hiking with Jeong"},
                           {"Date": "2020-06-12",
                           "contents": "receive flowers from Joy"},
                           {"Date": "2020-06-17",
                           "contents": "meet Jane at 13:00"}]}
                ]
```



딕셔너리 연습문제 (2)

1. 6월 14일에 Joyn가 메모한 내용을 출력하세요.
2. Joyn가 6월 17일에 Ellie와 뮤지컬을 보러 가기로 했다. Joyn가 이를 메모했다고 했을 때, 변화된 딕셔너리를 출력하세요.
3. Ellie도 6월 17일 Joyn와 뮤지컬을 보러가는 일정을 메모했다. 변화된 딕셔너리를 출력하세요.
4. Sue는 Jane과 6월 17일에 만나기로 했지만, Jane의 개인사정으로 일정이 취소되어 이 일정을 메모에서 지웠다. 변화된 딕셔너리를 출력하세요
5. 현재 딕셔너리에 있는 각 writer가 메모한 개수를 출력하세요



이번 주 숙제

1. 공유드라이브 'ML-수원하이텍고등학교'의 '1주차'폴더에 colaburator로 자기이름.ipynb 만들기

2. 자기이름.ipynb 들어가야할 내용

- 1) 코드 셀에 리눅스 명령어 입력 및 실행 결과 출력
- 2) 텍스트 셀과 코드 셀을 활용하여 딕셔너리 문법 정리하기
 - 딕셔너리 선언 및 최소 4개 이상 데이터 생성
 - 딕셔너리 값 변경
 - 딕셔너리 데이터 삭제
 - 딕셔너리 모든 key만 출력, 모든 value만 출력, 모든 데이터 출력
 - 딕셔너리 활용 예제 2개를 찾고 코드 한 라인 당 주석 달기
- 3) 딕셔너리 연습문제 풀이

한 문제당 양식: 텍스트 셀(문제 작성) + 텍스트 셀 or 코드 셀(답안 작성)

