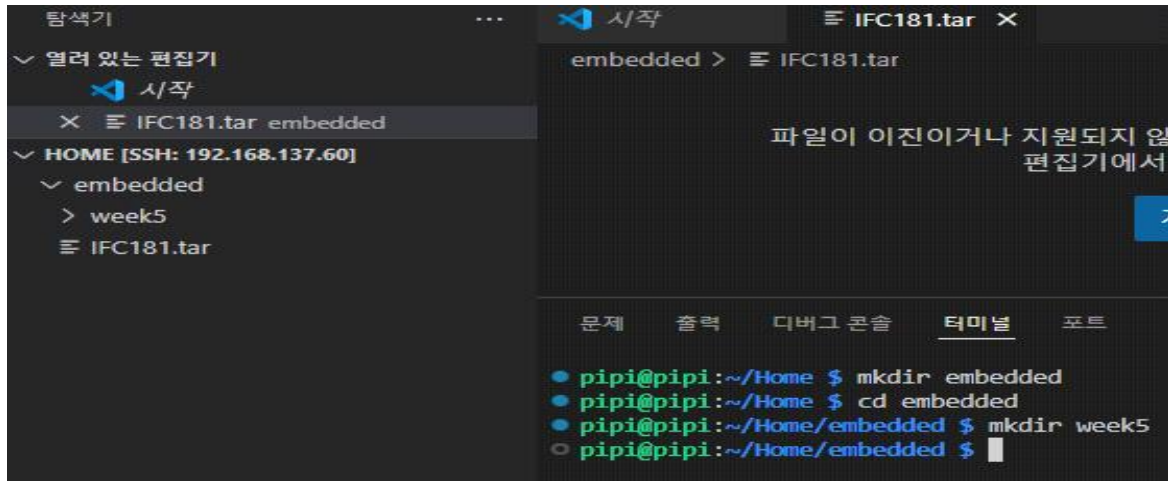


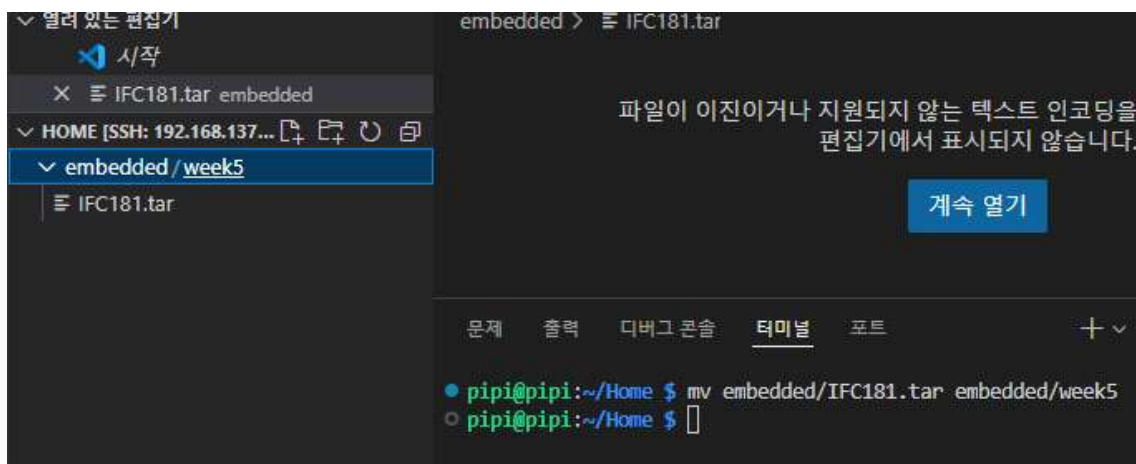
## 임베디드실습 및 응용 (5주차 과제)

2020161047 박종혁

1. IFC181.tar 파일을 받아 ~/embedded/week5 로 옮긴다.

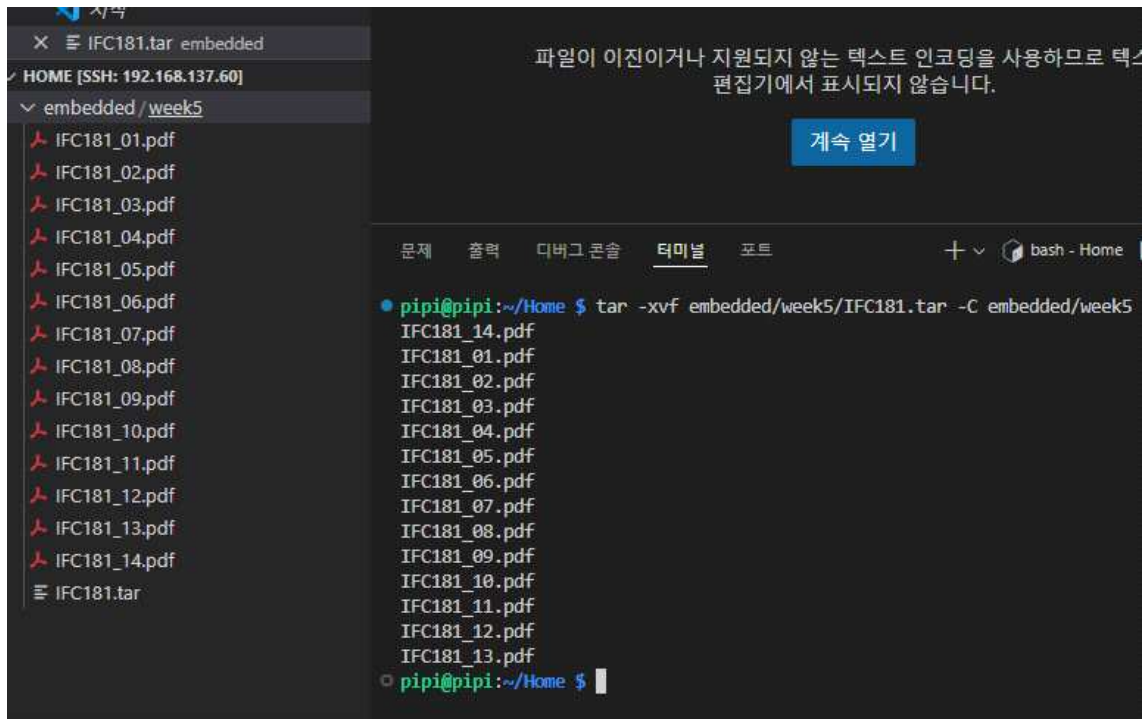


현재 IFC181.tar파일이 embedded에 들어가있어서 다음과 같이 week5로 파일을 옮겼습니다.



2. tar 명령으로 압축을 해제한다.

다음과 같이 tar 명령으로 week5에 있는 tar파일을 압축해제 하였습니다.



The screenshot shows a terminal window with a file explorer on the left and a terminal output on the right. The file explorer shows a directory structure with a file named `IFC181.tar` under the `week5` directory. The terminal output shows the command `tar -xvf embedded/week5/IFC181.tar -C embedded/week5` being executed, which lists the contents of the tar file: `IFC181_14.pdf`, `IFC181_01.pdf`, `IFC181_02.pdf`, `IFC181_03.pdf`, `IFC181_04.pdf`, `IFC181_05.pdf`, `IFC181_06.pdf`, `IFC181_07.pdf`, `IFC181_08.pdf`, `IFC181_09.pdf`, `IFC181_10.pdf`, `IFC181_11.pdf`, `IFC181_12.pdf`, and `IFC181_13.pdf`.

```
pipi@pipi:~/Home $ tar -xvf embedded/week5/IFC181.tar -C embedded/week5
IFC181_14.pdf
IFC181_01.pdf
IFC181_02.pdf
IFC181_03.pdf
IFC181_04.pdf
IFC181_05.pdf
IFC181_06.pdf
IFC181_07.pdf
IFC181_08.pdf
IFC181_09.pdf
IFC181_10.pdf
IFC181_11.pdf
IFC181_12.pdf
IFC181_13.pdf
pipi@pipi:~/Home $
```

3. 2에서 압축해제된 파일들을 IFC181\_re.tar로 압축한다.

```
● pipi@pipi:~/Home/embedded/week5 $ tar -cvf IFC181_re.tar IFC181_*.pdf
IFC181_01.pdf
IFC181_02.pdf
IFC181_03.pdf
IFC181_04.pdf
IFC181_05.pdf
IFC181_06.pdf
IFC181_07.pdf
IFC181_08.pdf
IFC181_09.pdf
IFC181_10.pdf
IFC181_11.pdf
IFC181_12.pdf
IFC181_13.pdf
IFC181_14.pdf
○ pipi@pipi:~/Home/embedded/week5 $
```

▼ HOME [SSH: 192.168.137.60]

▼ embedded / week5

👤 IFC181\_01.pdf

👤 IFC181\_02.pdf

👤 IFC181\_03.pdf

👤 IFC181\_04.pdf

👤 IFC181\_05.pdf

👤 IFC181\_06.pdf

👤 IFC181\_07.pdf

👤 IFC181\_08.pdf

👤 IFC181\_09.pdf

👤 IFC181\_10.pdf

👤 IFC181\_11.pdf

👤 IFC181\_12.pdf

👤 IFC181\_13.pdf

👤 IFC181\_14.pdf

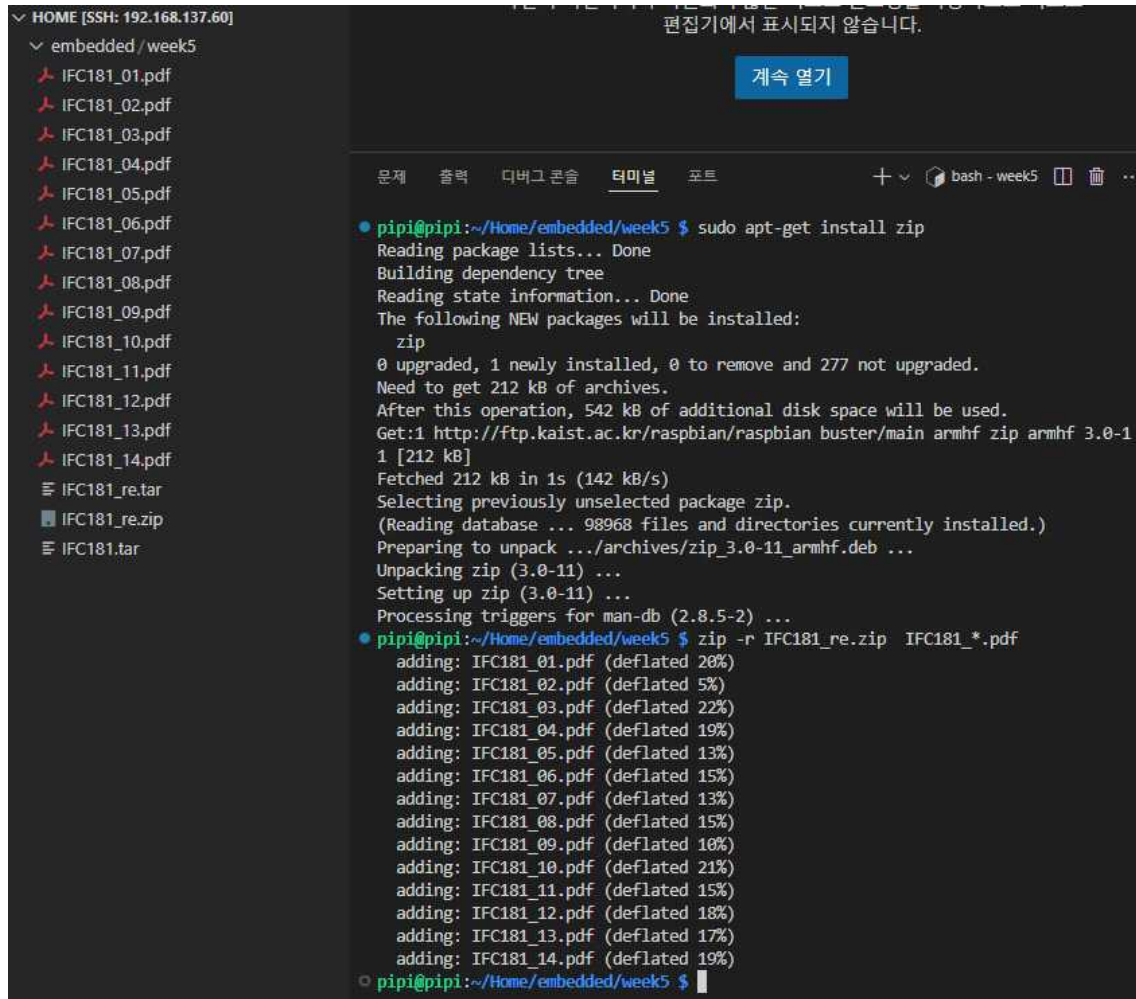
≡ IFC181\_re.tar

≡ IFC181.tar

4. 2에서 압축해제된 파일들을 zip명령으로 IFC181\_re.zip으로 압축한다.

- 이때 zip 명령을 수행할 수 있도록 zip을 설치한다.

: sudo apt-get install zip

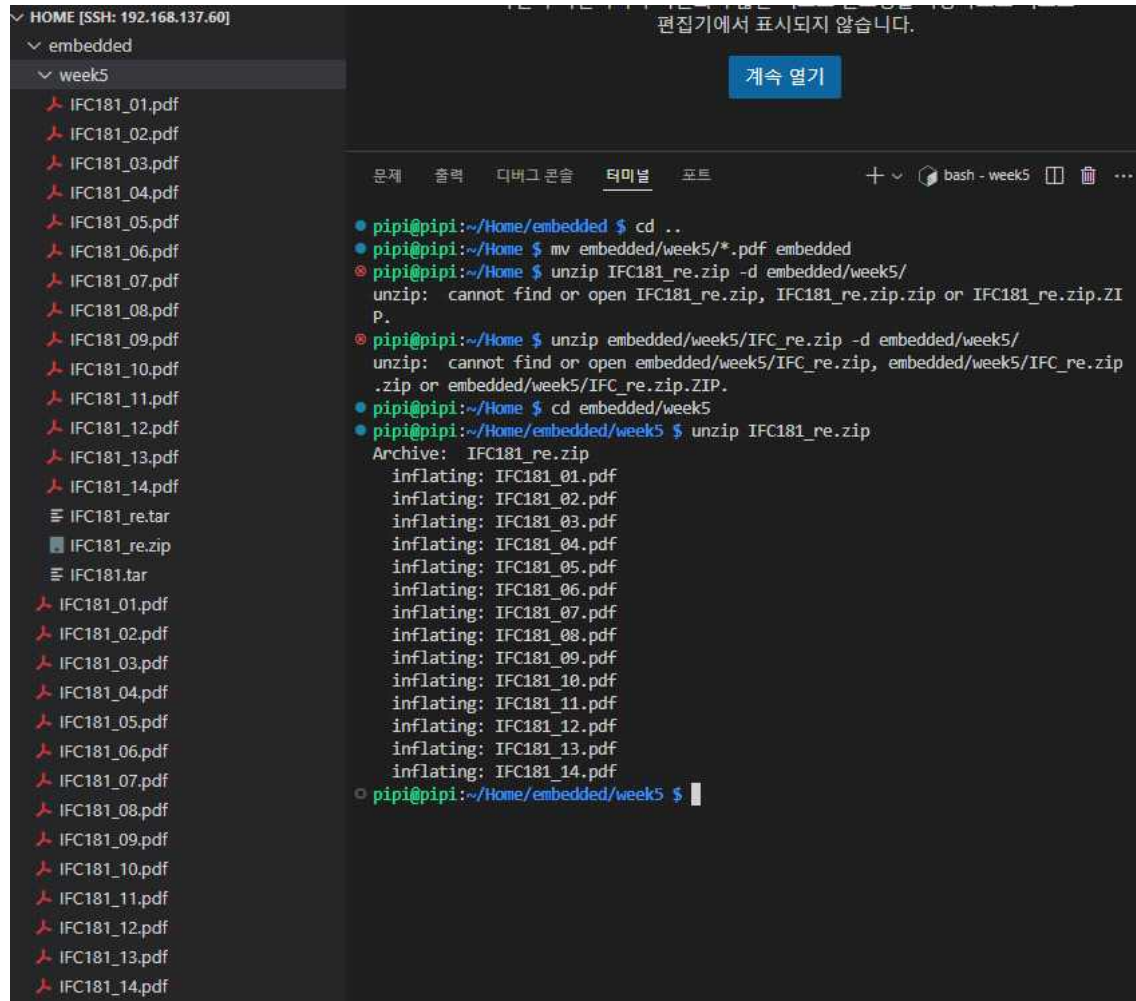


The screenshot shows a terminal window with a file explorer on the left and a terminal output on the right. The file explorer shows a directory named 'embedded/week5' containing several PDF files (IFC181\_01.pdf to IFC181\_14.pdf), 'IFC181\_re.tar', 'IFC181\_re.zip', and 'IFC181.tar'. The terminal output shows the command 'sudo apt-get install zip' being executed, followed by the command 'zip -r IFC181\_re.zip IFC181\_\*.pdf'. The output of the zip command shows the files being added to the archive with their respective compression ratios.

```
pipi@pipi:~/Home/embedded/week5 $ sudo apt-get install zip
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  zip
0 upgraded, 1 newly installed, 0 to remove and 277 not upgraded.
Need to get 212 kB of archives.
After this operation, 542 kB of additional disk space will be used.
Get:1 http://ftp.kaist.ac.kr/raspbian/raspbian buster/main armhf zip armhf 3.0-11 [212 kB]
Fetched 212 kB in 1s (142 kB/s)
Selecting previously unselected package zip.
(Reading database ... 98968 files and directories currently installed.)
Preparing to unpack .../archives/zip_3.0-11_armhf.deb ...
Unpacking zip (3.0-11) ...
Setting up zip (3.0-11) ...
Processing triggers for man-db (2.8.5-2) ...
pipi@pipi:~/Home/embedded/week5 $ zip -r IFC181_re.zip IFC181_*.pdf
adding: IFC181_01.pdf (deflated 20%)
adding: IFC181_02.pdf (deflated 5%)
adding: IFC181_03.pdf (deflated 22%)
adding: IFC181_04.pdf (deflated 19%)
adding: IFC181_05.pdf (deflated 13%)
adding: IFC181_06.pdf (deflated 15%)
adding: IFC181_07.pdf (deflated 13%)
adding: IFC181_08.pdf (deflated 15%)
adding: IFC181_09.pdf (deflated 10%)
adding: IFC181_10.pdf (deflated 21%)
adding: IFC181_11.pdf (deflated 15%)
adding: IFC181_12.pdf (deflated 18%)
adding: IFC181_13.pdf (deflated 17%)
adding: IFC181_14.pdf (deflated 19%)
pipi@pipi:~/Home/embedded/week5 $
```

-> 먼저 zip을 설치하고 다음 명령어로 압축해제된 파일들을 IFC181\_re.zip으로 압축했습니다.

5. 4에서 나온 IFC181\_re.zip 파일을 unzip 명령을 통해 압축해제 한다.



The screenshot shows a terminal window with a file explorer on the left and a terminal output on the right. The file explorer shows a directory structure with 'week5' containing various PDF files and a 'IFC181\_re.zip' file. The terminal output shows the following commands and results:

```
pipi@pipi:~/Home/embedded $ cd ..
pipi@pipi:~/Home $ mv embedded/week5/*.pdf embedded
pipi@pipi:~/Home $ unzip IFC181_re.zip -d embedded/week5/
unzip: cannot find or open IFC181_re.zip, IFC181_re.zip.zip or IFC181_re.zip.ZIP.
pipi@pipi:~/Home $ unzip embedded/week5/IFC_re.zip -d embedded/week5/
unzip: cannot find or open embedded/week5/IFC_re.zip, embedded/week5/IFC_re.zip.zip or embedded/week5/IFC_re.zip.ZIP.
pipi@pipi:~/Home $ cd embedded/week5
pipi@pipi:~/Home/embedded/week5 $ unzip IFC181_re.zip
Archive: IFC181_re.zip
  inflating: IFC181_01.pdf
  inflating: IFC181_02.pdf
  inflating: IFC181_03.pdf
  inflating: IFC181_04.pdf
  inflating: IFC181_05.pdf
  inflating: IFC181_06.pdf
  inflating: IFC181_07.pdf
  inflating: IFC181_08.pdf
  inflating: IFC181_09.pdf
  inflating: IFC181_10.pdf
  inflating: IFC181_11.pdf
  inflating: IFC181_12.pdf
  inflating: IFC181_13.pdf
  inflating: IFC181_14.pdf
pipi@pipi:~/Home/embedded/week5 $
```

이전에 tar파일을 압축해제한 .pdf파일을 embedded로 보내고 week5에 있는 .zip파일을 압축해제 하였습니다.



6. ~ (home) 디렉토리로 이동하고 find 명령을 통해 embedded폴더에서(하위폴더 포함) .pdf 파일을 찾는 명령을 수행해본다.

```
● pipi@pipi:~ $ find ~/Home/embedded -type f -name "*.pdf"
/home/pipi/Home/embedded/IFC181_05.pdf
/home/pipi/Home/embedded/IFC181_04.pdf
/home/pipi/Home/embedded/IFC181_08.pdf
/home/pipi/Home/embedded/IFC181_12.pdf
/home/pipi/Home/embedded/IFC181_09.pdf
/home/pipi/Home/embedded/IFC181_07.pdf
/home/pipi/Home/embedded/IFC181_13.pdf
/home/pipi/Home/embedded/IFC181_02.pdf
/home/pipi/Home/embedded/week5/IFC181_05.pdf
/home/pipi/Home/embedded/week5/IFC181_04.pdf
/home/pipi/Home/embedded/week5/IFC181_08.pdf
/home/pipi/Home/embedded/week5/IFC181_12.pdf
/home/pipi/Home/embedded/week5/IFC181_09.pdf
/home/pipi/Home/embedded/week5/IFC181_07.pdf
/home/pipi/Home/embedded/week5/IFC181_13.pdf
/home/pipi/Home/embedded/week5/IFC181_02.pdf
/home/pipi/Home/embedded/week5/IFC181_01.pdf
/home/pipi/Home/embedded/week5/IFC181_14.pdf
/home/pipi/Home/embedded/week5/IFC181_11.pdf
/home/pipi/Home/embedded/week5/IFC181_10.pdf
/home/pipi/Home/embedded/week5/IFC181_03.pdf
/home/pipi/Home/embedded/week5/IFC181_06.pdf
/home/pipi/Home/embedded/IFC181_01.pdf
/home/pipi/Home/embedded/IFC181_14.pdf
/home/pipi/Home/embedded/IFC181_11.pdf
/home/pipi/Home/embedded/IFC181_10.pdf
/home/pipi/Home/embedded/IFC181_03.pdf
/home/pipi/Home/embedded/IFC181_06.pdf
○ pipi@pipi:~ $
```

7. 아래의 명령 결과가 동일한지 아닌지 결과를 보이고 동작 결과를 설명하시오

```
innosm@innosm:~ $find . -name *.pdf
```

```
innosm@innosm:~ $find ./ -name *.pdf
```

```
innosm@innosm:~ $find -name *.pdf
```

```
innosm@innosm:~ $find ~ -name *.pdf
```

```
innosm@innosm:~ $find /home/innosm -name *.pdf
```

- 첫 번째 명령어 수행

```
● pipi@pipi:~ $ find . -name *.pdf
./Bookshelf/BeginnersGuide-4thEd-Eng_v2.pdf
./Home/embedded/IFC181_05.pdf
./Home/embedded/IFC181_04.pdf
./Home/embedded/IFC181_08.pdf
./Home/embedded/IFC181_12.pdf
./Home/embedded/IFC181_09.pdf
./Home/embedded/IFC181_07.pdf
./Home/embedded/IFC181_13.pdf
./Home/embedded/IFC181_02.pdf
./Home/embedded/week5/IFC181_05.pdf
./Home/embedded/week5/IFC181_04.pdf
./Home/embedded/week5/IFC181_08.pdf
./Home/embedded/week5/IFC181_12.pdf
./Home/embedded/week5/IFC181_09.pdf
./Home/embedded/week5/IFC181_07.pdf
./Home/embedded/week5/IFC181_13.pdf
./Home/embedded/week5/IFC181_02.pdf
./Home/embedded/week5/IFC181_01.pdf
./Home/embedded/week5/IFC181_14.pdf
./Home/embedded/week5/IFC181_11.pdf
./Home/embedded/week5/IFC181_10.pdf
./Home/embedded/week5/IFC181_03.pdf
./Home/embedded/week5/IFC181_06.pdf
./Home/embedded/IFC181_01.pdf
./Home/embedded/IFC181_14.pdf
./Home/embedded/IFC181_11.pdf
./Home/embedded/IFC181_10.pdf
./Home/embedded/IFC181_03.pdf
./Home/embedded/IFC181_06.pdf
○ pipi@pipi:~ $
```

현재 디렉토리를 표현하는 .에서 name이 .pdf로 끝나는 파일 찾습니다.

현재 모든 경로에 있는 .pdf파일의 경로를 보여줍니다.

- 두 번째 명령어 수행

```
pipi@pipi:~ $ find ./ -name *.pdf
./Bookshelf/BeginnersGuide-4thEd-Eng_v2.pdf
./Home/embedded/IFC181_05.pdf
./Home/embedded/IFC181_04.pdf
./Home/embedded/IFC181_08.pdf
./Home/embedded/IFC181_12.pdf
./Home/embedded/IFC181_09.pdf
./Home/embedded/IFC181_07.pdf
./Home/embedded/IFC181_13.pdf
./Home/embedded/IFC181_02.pdf
./Home/embedded/week5/IFC181_05.pdf
./Home/embedded/week5/IFC181_04.pdf
./Home/embedded/week5/IFC181_08.pdf
./Home/embedded/week5/IFC181_12.pdf
./Home/embedded/week5/IFC181_09.pdf
./Home/embedded/week5/IFC181_07.pdf
./Home/embedded/week5/IFC181_13.pdf
./Home/embedded/week5/IFC181_02.pdf
./Home/embedded/week5/IFC181_01.pdf
./Home/embedded/week5/IFC181_14.pdf
./Home/embedded/week5/IFC181_11.pdf
./Home/embedded/week5/IFC181_10.pdf
./Home/embedded/week5/IFC181_03.pdf
./Home/embedded/week5/IFC181_06.pdf
./Home/embedded/IFC181_01.pdf
./Home/embedded/IFC181_14.pdf
./Home/embedded/IFC181_11.pdf
./Home/embedded/IFC181_10.pdf
./Home/embedded/IFC181_03.pdf
./Home/embedded/IFC181_06.pdf
pipi@pipi:~ $
```

./는 현재 디렉토리와 해당 디렉토리 내의 경로에서 .pdf 파일을 찾습니다.  
~에서 실행했으므로 ./와 ./차이는 없습니다.



- 세 번째 명령어 수행

```
● pipi@pipi:~ $ find -name *.pdf
./Bookshelf/BeginnersGuide-4thEd-Eng_v2.pdf
./Home/embedded/IFC181_05.pdf
./Home/embedded/IFC181_04.pdf
./Home/embedded/IFC181_08.pdf
./Home/embedded/IFC181_12.pdf
./Home/embedded/IFC181_09.pdf
./Home/embedded/IFC181_07.pdf
./Home/embedded/IFC181_13.pdf
./Home/embedded/IFC181_02.pdf
./Home/embedded/week5/IFC181_05.pdf
./Home/embedded/week5/IFC181_04.pdf
./Home/embedded/week5/IFC181_08.pdf
./Home/embedded/week5/IFC181_12.pdf
./Home/embedded/week5/IFC181_09.pdf
./Home/embedded/week5/IFC181_07.pdf
./Home/embedded/week5/IFC181_13.pdf
./Home/embedded/week5/IFC181_02.pdf
./Home/embedded/week5/IFC181_01.pdf
./Home/embedded/week5/IFC181_14.pdf
./Home/embedded/week5/IFC181_11.pdf
./Home/embedded/week5/IFC181_10.pdf
./Home/embedded/week5/IFC181_03.pdf
./Home/embedded/week5/IFC181_06.pdf
./Home/embedded/IFC181_01.pdf
./Home/embedded/IFC181_14.pdf
./Home/embedded/IFC181_11.pdf
./Home/embedded/IFC181_10.pdf
./Home/embedded/IFC181_03.pdf
./Home/embedded/IFC181_06.pdf
○ pipi@pipi:~ $
```

경로 표기없이 -name \*.pdf 명령을 했으므로 현재 디렉토리에서 .pdf로 끝나는 파일을 찾아냅니다.

- 네 번째 명령어 수행

```
● pipi@pipi:~ $ find ~ -name *.pdf
/home/pipi/Bookshelf/BeginnersGuide-4thEd-Eng_v2.pdf
/home/pipi/Home/embedded/IFC181_05.pdf
/home/pipi/Home/embedded/IFC181_04.pdf
/home/pipi/Home/embedded/IFC181_08.pdf
/home/pipi/Home/embedded/IFC181_12.pdf
/home/pipi/Home/embedded/IFC181_09.pdf
/home/pipi/Home/embedded/IFC181_07.pdf
/home/pipi/Home/embedded/IFC181_13.pdf
/home/pipi/Home/embedded/IFC181_02.pdf
/home/pipi/Home/embedded/week5/IFC181_05.pdf
/home/pipi/Home/embedded/week5/IFC181_04.pdf
/home/pipi/Home/embedded/week5/IFC181_08.pdf
/home/pipi/Home/embedded/week5/IFC181_12.pdf
/home/pipi/Home/embedded/week5/IFC181_09.pdf
/home/pipi/Home/embedded/week5/IFC181_07.pdf
/home/pipi/Home/embedded/week5/IFC181_13.pdf
/home/pipi/Home/embedded/week5/IFC181_02.pdf
/home/pipi/Home/embedded/week5/IFC181_01.pdf
/home/pipi/Home/embedded/week5/IFC181_14.pdf
/home/pipi/Home/embedded/week5/IFC181_11.pdf
/home/pipi/Home/embedded/week5/IFC181_10.pdf
/home/pipi/Home/embedded/week5/IFC181_03.pdf
/home/pipi/Home/embedded/week5/IFC181_06.pdf
/home/pipi/Home/embedded/IFC181_01.pdf
/home/pipi/Home/embedded/IFC181_14.pdf
/home/pipi/Home/embedded/IFC181_11.pdf
/home/pipi/Home/embedded/IFC181_10.pdf
/home/pipi/Home/embedded/IFC181_03.pdf
/home/pipi/Home/embedded/IFC181_06.pdf
○ pipi@pipi:~ $
```

경로를 ~로 지정해주었으므로 ~에서 이름이 .pdf로 끝나는 파일을 찾아줍니다.

- 다섯 번째 명령어 수행

```
● pipi@pipi:~ $ find /home/pipi -name *.pdf
/home/pipi/Bookshelf/BeginnersGuide-4thEd-Eng_v2.pdf
/home/pipi/Home/embedded/IFC181_05.pdf
/home/pipi/Home/embedded/IFC181_04.pdf
/home/pipi/Home/embedded/IFC181_08.pdf
/home/pipi/Home/embedded/IFC181_12.pdf
/home/pipi/Home/embedded/IFC181_09.pdf
/home/pipi/Home/embedded/IFC181_07.pdf
/home/pipi/Home/embedded/IFC181_13.pdf
/home/pipi/Home/embedded/IFC181_02.pdf
/home/pipi/Home/embedded/week5/IFC181_05.pdf
/home/pipi/Home/embedded/week5/IFC181_04.pdf
/home/pipi/Home/embedded/week5/IFC181_08.pdf
/home/pipi/Home/embedded/week5/IFC181_12.pdf
/home/pipi/Home/embedded/week5/IFC181_09.pdf
/home/pipi/Home/embedded/week5/IFC181_07.pdf
/home/pipi/Home/embedded/week5/IFC181_13.pdf
/home/pipi/Home/embedded/week5/IFC181_02.pdf
/home/pipi/Home/embedded/week5/IFC181_01.pdf
/home/pipi/Home/embedded/week5/IFC181_14.pdf
/home/pipi/Home/embedded/week5/IFC181_11.pdf
/home/pipi/Home/embedded/week5/IFC181_10.pdf
/home/pipi/Home/embedded/week5/IFC181_03.pdf
/home/pipi/Home/embedded/week5/IFC181_06.pdf
/home/pipi/Home/embedded/IFC181_01.pdf
/home/pipi/Home/embedded/IFC181_14.pdf
/home/pipi/Home/embedded/IFC181_11.pdf
/home/pipi/Home/embedded/IFC181_10.pdf
/home/pipi/Home/embedded/IFC181_03.pdf
/home/pipi/Home/embedded/IFC181_06.pdf
○ pipi@pipi:~ $
```

경로를 /home/pipi로 지정해주었기에 그 경로를 포함하여 이름이 .pdf로 끝나는 파일을 찾아냅니다.

8. ~ (home) 디렉토리로 이동하고, week5 폴더가 있는지 검색하려고 한다.  
적절한 명령을 수행하여 week5 폴더를 검색하고 결과를 보이시오.

```
pipi@pipi:~ $ find . -type d -name "week5"
./Home/embedded/week5
pipi@pipi:~ $
```

-> 현재 디렉토리에서 검색하는데 타입은 디렉토리로 디렉토리만 검색한다.  
-name "week5"로 이름이 week5인 항목을 검색한다.

9. 아래 명령을 수행한 결과를 보이시오.  
df -h

```
pipi@pipi:~/Home $ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/root        15G   4.0G   9.8G  29% /
devtmpfs         1.8G     0   1.8G   0% /dev
tmpfs            1.9G     0   1.9G   0% /dev/shm
tmpfs            1.9G   17M   1.9G   1% /run
tmpfs            5.0M   4.0K   5.0M   1% /run/lock
tmpfs            1.9G     0   1.9G   0% /sys/fs/cgroup
/dev/mmcblk0p1   253M   49M   204M  20% /boot
tmpfs            384M   4.0K   384M   1% /run/user/1000
pipi@pipi:~/Home $
```

10. 아래 명령을 수행한 결과를 보이시오.  
cd ~  
cd embedded  
du -h

```
pipi@pipi:~/Home $ cd ~
pipi@pipi:~ $ cd embedded
pipi@pipi:~/embedded $ du -h
4.0K  .
pipi@pipi:~/embedded $
```

다만 홈 디렉토리에 embedded라는 폴더가 있고 home디렉토리에 embedded 폴더가 있습니다. 위에서 했던 작업은 home 디렉토리에 embedded 폴더에서 수행했기 때문에 사용량이 다릅니다.

따라서 위 작업을 한 폴더의 사용량을 보고 싶다면 다음과 같이 명령하여 실행결과를 도출하겠습니다.



```

• pipi@pipi:~ $ cd Home
• pipi@pipi:~/Home $ ls
  embedded
• pipi@pipi:~/Home $ cd embedded
• pipi@pipi:~/Home/embedded $ du -h
16M    ./week5
20M    .
• pipi@pipi:~/Home/embedded $ █

```

11. 10번에서 현재 embedded 폴더의 총 사용량은(하위폴더 포함, 단위 표시)?

-> 현재 embedded 폴더의 총 사용량은 10번의 결과로 알 수 있다시피 4.0KB입니다.

home 폴더 안에 있는 embedded폴더의 총 사용량은 현재에서 20MB이고 week5의 폴더에서의 사용량은 16MB입니다.

12. cd embedded/week5 를 수행하여 위치를 이동하고, 아래 명령을 차례로 수행하십시오

- 1) df .
- 2) 이 폴더에 temp\_file 파일 생성하고 파일에 1을 기록
- 3) stat temp\_file 명령을 통해 파일의 크기를 확인
- 4) df .

1)과 4)에서 줄어든 용량과 3)에서 확인한 용량이 다르다면 그 이유는?

```

• pipi@pipi:~/Home/embedded/week5 $ df .
Filesystem      1K-blocks    Used Available Use% Mounted on
/dev/root        14986204 4096968 10227728 29% /
• pipi@pipi:~/Home/embedded/week5 $ █

```

```

• pipi@pipi:~/Home/embedded/week5 $ cat > temp_file
1
• pipi@pipi:~/Home/embedded/week5 $ stat temp_file
  File: temp_file
  Size: 2             Blocks: 8           IO Block: 4096   regular file
Device: b302h/45826d Inode: 269171       Links: 1
Access: (0644/-rw-r--r--)  Uid: ( 1000/   pipi)   Gid: ( 1000/   pipi)
Access: 2024-10-08 05:09:16.702048723 +0100
Modify: 2024-10-08 05:09:18.702035665 +0100
Change: 2024-10-08 05:09:18.702035665 +0100
 Birth: -
• pipi@pipi:~/Home/embedded/week5 $ df .
Filesystem      1K-blocks    Used Available Use% Mounted on
/dev/root        14986204 4096972 10227724 29% /
• pipi@pipi:~/Home/embedded/week5 $ █

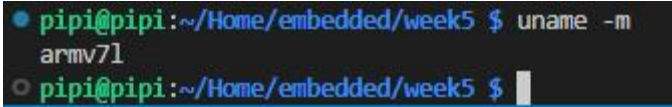
```



1)과 4)에서 줄어든 용량은 4KB로 3)에서 확인할 수 있는 IO Block이 4096인 4KB와 같은 값을 갖게 되고 이는 temp\_file을 생성하기 전과 후의 변경된 사용량과 같습니다. 따라서 temp\_file이 2바이트로 작더라도 디스크는 블록 단위로 저장하므로 사용량은 4KB가 증가한 것으로 알 수 있습니다.

<cpu architecture>

13. 현재 사용하는 라즈비언 OS가 몇비트 시스템인지 확인하고 결과를 첨부하시오.



```
● pipi@pipi:~/Home/embedded/week5 $ uname -m
armv7l
○ pipi@pipi:~/Home/embedded/week5 $
```

armv7l로 실행결과가 나왔으므로 32비트 시스템임을 알 수 있습니다.