Activity 11 - Filesystem Implementation

Members

- Nipat Chenthanakij 6430215121
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Questions

1. FUSE is a software interface for creating a filesystem in the user space without going into the kernel level. FUSE has many language bindings including Python, which provides ease of development and prototyping of a filesystem.
2. The filesystem used by the mounting point is fuseblk.
3. It is not possible to issue mkdir, copy, move or delete a file inside the mnt directory, since those functionalities must be implemented by the FUSE filesystem.

Source Code

The code shown below is used for both checkpoint #1 and #2.

```python
#!/usr/bin/env python

# 2110352 Operating System
# FUSE/Filesystem exercise
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import os, stat, errno
import fuse
from fuse import Fuse
import requests

if not hasattr(fuse, "__version__"):
    raise RuntimeError(
        "your fuse-py doesn't know of fuse.__version__, probably it's too old."
    )

fuse.fuse_python_api = (0, 2)

containers = {
    "/subject": b"2024/2 - Operating Systems\nCP ENG CU\n",
    "/instructors": b"""0:CP ENG CU OS 2024/2 - Instructors
1: Thongchai Rojkangsadan
2: Veera Muangsin, Ph.D.
3: Krerk Piromsopa, Ph.D.""",
    "/students": b"""0:CP ENG CU OS 2024/2 - Students, Group Name: FC Aj Krerk
1: 6430215121 Nipat Chenthanakij
2: 6431302221 Korntawat Vaewpanich""",
    "/participation": b"a",
}


class MyStat(fuse.Stat):
    def __init__(self):
```

```python
        self.st_mode = 0
        self.st_ino = 0
        self.st_dev = 0
        self.st_nlink = 0
        self.st_uid = 0
        self.st_gid = 0
        self.st_size = 0
        self.st_atime = 0
        self.st_mtime = 0
        self.st_ctime = 0


class MyFS(Fuse):

    def __init__(self, *args, **kw):
        super(MyFS, self).__init__(*args, **kw)
        self.buffer = bytearray()

    def getattr(self, path):
        st = MyStat()
        if path == "/":
            st.st_mode = stat.S_IFDIR | 0o777
            st.st_nlink = 2
        elif path == "/participation":
            st.st_mode = stat.S_IFREG | 0o666
            st.st_nlink = 1
            res = requests.get(
                "https://mis.cp.eng.chula.ac.th/krerk/teaching/2022s2-os/status.php"
            )
            content = bytes(res.text, encoding="utf-8")
            st.st_size = len(content)
        elif path in containers:
            st.st_mode = stat.S_IFREG | 0o444
            st.st_nlink = 1
            content = containers[path]
            st.st_size = len(content)
        else:
            return -errno.ENOENT
        return st

    def readdir(self, path, offset):
        filenames = containers.keys()
        for r in ".", "..":
            yield fuse.Direntry(r)

        for r in filenames:
            yield fuse.Direntry(r[1:])

    def open(self, path, flags):
        if path not in containers:
            return -errno.ENOENT
        if path == "/participation":
            return 0
        accmode = os.O_RDONLY | os.O_WRONLY | os.O_RDWR
```

```python
            if (flags & accmode) != os.O_RDONLY:
                return -errno.EACCES

    def read(self, path, size, offset):
        if path not in containers:
            return -errno.ENOENT

        content = containers[path]

        if path == "/participation":
            res = requests.get(
                "https://mis.cp.eng.chula.ac.th/krerk/teaching/2022s2-os/status.php"
            )
            content = bytes(res.text, encoding="utf-8")

        slen = len(content)
        if offset < slen:
            if offset + size > slen:
                size = slen - offset
            buf = content[offset : offset + size]
        else:
            buf = b""
        return buf

    def write(self, path, buf, offset):
        if path not in containers:
            return -errno.ENOENT

        if path != "/participation":
            return -errno.EACCES

        self.buffer[:offset] = buf
        return len(buf)

    def flush(self, path):
        if path == "/participation":
            data = self.buffer.decode().split(":")
            requests.post(
                "https://mis.cp.eng.chula.ac.th/krerk/teaching/2022s2-os/checkIn.php",
                data={"studentid": data[0], "name": data[1], "email": data[2]},
            )
            self.buffer = bytearray()
        return 0

    def release(self, path, flags):
        return 0


def main():
    usage = (
        """
MyFS mounting_point

"""
```

```
        + Fuse.fusage
    )
    server = MyFS(
        version="%prog " + fuse.__version__, usage=usage, dash_s_do="setsingle"
    )

    server.parse(errex=1)
    server.main()


if __name__ == "__main__":
    main()
```

Checkpoint #1

Checkpoint #2

```
Windows PowerShell        ×    ~/os/hw11        ×    +   ∨                                    —   □   ×

2024-04-09 20:58:11       6432055421       Dej Wongwirathorn        6432055421@student.chula.ac.th 125.24.84.19
2024-04-09 20:58:25       6430104121       Narongkorn Suktongchaiyakun       6430104121@student.chula.ac.th 125.24.84.19
2024-04-09 21:32:46       6431304521       Kittitat Tuntisak        6431304521@student.chula.ac.th 49.228.97.77
2024-04-09 21:33:27       6431314821       Tittaya Worawongtad      6431314821@student.chula.ac.th 49.228.97.77
2024-04-09 21:33:54       6431332021       Ponnapat Darunaitorn     6431332021@student.chula.ac.th 49.228.97.77
2024-04-09 23:38:33       6430315221       Phuvanach Phoemphol      6430315221@student.chula.ac.th 171.101.104.236
2024-04-09 23:40:35       6432086921       Natharika Detbun         6432086921@student.chula.ac.th 1.46.132.235
2024-04-09 23:40:54       6430385121       Supakarin Niansupornpun 6430385121@student.chula.ac.th 1.46.132.235
2024-04-09 23:41:02       6430177021       Teerapat Chantaramanee   6430177021@student.chula.ac.th 1.46.132.235
2024-04-09 23:42:00       6432101621       Panat Chindanuwat        6432101621@student.chula.ac.th 124.120.193.40
2024-04-10 00:35:04       6431307421       Jirawat Lengnoi 6431307421@student.chula.ac.th 49.228.102.254
2024-04-10 00:36:41       6431320521       Tanawin Visanuyothin     6431320521@student.chula.ac.th 49.228.102.254
2024-04-10 00:40:54       6431307421       Jirawat Lengnoi 6431307421@student.chula.ac.th 49.228.102.254
2024-04-10 00:41:13       6431307421       Jirawat Lengnoi 6431307421@student.chula.ac.th 49.228.102.254
2024-04-10 00:42:43       6431307421       Jirawat Lengnoi 6431307421@student.chula.ac.th 49.228.102.254
2024-04-10 00:43:44       6431307421       Jirawat Lengnoi 6431307421@student.chula.ac.th 49.228.102.254
2024-04-10 00:51:43       6430315221       Phuvanach Phoemphol      6430315221@student.chula.ac.th 171.101.104.236
2024-04-10 01:05:33       test    test     test    45.14.71.8
cat: mnt/participation: Invalid argument
) echo "6430215121:Nipat Chenthanakij:6430215121@student.chula.ac.th" >> mnt/participation
) echo "6431302221:Korntawat Vaewpanich:6431302221@student.chula.ac.th" >> mnt/participation
) cat mnt/participation
2023-03-23        38xxxxxx        Krerk    Krerk.p@chula.ac.th        161.200.200.161

2023-03-29 19:21:15       41xxxx  Student Good       Student.G@student.chula.ac.th        182.52.17.220
2023-03-30 01:28:43       42xxxx  Student Good       Student.G@student.chula.ac.th        182.52.17.220
2023-03-31 02:46:48       41xxxx  Student Good       Student.G@student.chula.ac.th        184.22.21.253
2023-03-31 02:49:00       41xxxx  Student Good       Student.G@student.chula.ac.th        184.22.21.253
2023-03-31 12:43:35       "41xxxx Student Good       Student.G@student.chula.ac.th        10.202.165.9
2023-03-31 12:48:10       6331313021       Tuchtham Sungkameka      6331313021@student.chula.ac.th 10.202.165.9
```

```
Windows PowerShell        ×    ~/os/hw11        ×    +   ∨                                    —   □   ×

2024-04-09 18:49:40       6432158421       Vivatsathorn Thitasirivit        6432158421@student.chula.ac.th 49.230.223.29
2024-04-09 18:50:46       6432158421       Vivatsathorn Thitasirivit        6432158421@student.chula.ac.th 49.230.223.29
2024-04-09 18:51:00       6431333721       Pipat Jongpipatchai      6431333721@student.chula.ac.th 49.230.223.29
2024-04-09 18:51:05       6430185021       Theerin Petcharat        6430185021@student.chula.ac.th 49.230.223.29
2024-04-09 19:48:25       6432133721       Phumipat Chaiprasertsud 6432133721@student.chula.ac.th 184.22.19.42
2024-04-09 19:49:24       6431349821       Ittipat Yodprasit        6431349821@student.chula.ac.th 184.22.19.42
2024-04-09 19:49:47       6432085221       Naravit Namson 6432085221@student.chula.ac.th 184.22.19.42
2024-04-09 20:07:06       123     sss       test@ch.hc       61.90.27.125
2024-04-09 20:50:06       6432073721       Tawatwee Aiemarreerat    6432073721@student.chula.ac.th 125.24.84.19
2024-04-09 20:57:38       6432073721       Tawatwee Aiemarreerat    6432073721@student.chula.ac.th 125.24.84.19
2024-04-09 20:58:11       6432055421       Dej Wongwirathorn        6432055421@student.chula.ac.th 125.24.84.19
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2024-04-09 23:40:35       6432086921       Natharika Detbun         6432086921@student.chula.ac.th 1.46.132.235
2024-04-09 23:40:54       6430385121       Supakarin Niansupornpun 6430385121@student.chula.ac.th 1.46.132.235
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2024-04-09 23:42:00       6432101621       Panat Chindanuwat        6432101621@student.chula.ac.th 124.120.193.40
2024-04-10 00:35:04       6431307421       Jirawat Lengnoi 6431307421@student.chula.ac.th 49.228.102.254
2024-04-10 00:36:41       6431320521       Tanawin Visanuyothin     6431320521@student.chula.ac.th 49.228.102.254
2024-04-10 00:40:54       6431307421       Jirawat Lengnoi 6431307421@student.chula.ac.th 49.228.102.254
2024-04-10 00:41:13       6431307421       Jirawat Lengnoi 6431307421@student.chula.ac.th 49.228.102.254
2024-04-10 00:42:43       6431307421       Jirawat Lengnoi 6431307421@student.chula.ac.th 49.228.102.254
2024-04-10 00:43:44       6431307421       Jirawat Lengnoi 6431307421@student.chula.ac.th 49.228.102.254
2024-04-10 00:51:43       6430315221       Phuvanach Phoemphol      6430315221@student.chula.ac.th 171.101.104.236
2024-04-10 01:05:33       test    test     test    45.14.71.8
2024-04-10 01:06:41       6430215121       Nipat Chenthanakij       6430215121@student.chula.ac.th 45.14.71.8
2024-04-10 01:07:18       6431302221       Korntawat Vaewpanich     6431302221@student.chula.ac.th 45.14.71.8
```