Session 30

Inter-Process Communication – Named Pipes (FIFO)

Named Pipes, also known as **FIFOs (First In, First Out)**, are a type of **Inter-Process Communication (IPC)** mechanism used to allow **unrelated processes** to communicate with each other through a **named file** in the file system.

🔹 What is a Named Pipe (FIFO)?

A **named pipe** is:

- A **special file** that exists in the filesystem.
- Acts as a **channel between two processes**—one can write data to it, the other can read from it.
- Unlike unnamed pipes, it works **even if the processes do not share a parent-child relationship**.

🔸 Creating and Using a FIFO

🧱 Step 1: Create a FIFO

You can create a FIFO using either:

Command Line:

mkfifo myfifo

C Program:

#include <sys/types.h>

#include <sys/stat.h>

```
int main() {
    mkfifo("myfifo", 0666);  // Creates a FIFO with read-write permissions
    return 0;
}
```

📜 **Step 2: Communication Example**

In one terminal (writer):

```
echo "Hello from writer" > myfifo
```

In another terminal (reader):

```
cat < myfifo
```

Or in C:

👷 **Writer (C Program):**

```
#include <stdio.h>
#include <fcntl.h>
#include <unistd.h>

int main() {
    int fd = open("myfifo", O_WRONLY);
    write(fd, "Hello from writer\n", 18);
    close(fd);
    return 0;
}
```

👩‍💻 Reader (C Program):

```
#include <stdio.h>
#include <fcntl.h>
#include <unistd.h>

int main() {
    char buffer[100];
    int fd = open("myfifo", O_RDONLY);
    read(fd, buffer, sizeof(buffer));
    printf("Reader received: %s", buffer);
    close(fd);
    return 0;
}
```

📦 Features of FIFO

- **Persistent file**: FIFO exists until explicitly removed (rm myfifo).
- **Unidirectional**: For two-way communication, use two FIFOs.
- **Blocking behavior**:
    - Read blocks until writer writes.
    - Write blocks until reader opens.

🆚 FIFO vs Unnamed Pipes

Feature	Named Pipe (FIFO)	Unnamed Pipe
File in filesystem	Yes (mkfifo)	No
Scope	Any processes	Parent-child only
Lifetime	Until deleted	Until processes exit
Visibility	Persistent as a file	Not visible in file system

🧹 Clean Up

Always delete FIFOs after use:

rm myfifo