

Operating Systems - Lab 06 Tasks

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Lab Questions:

Experiment 6a (Ordinary Pipe) :

```
//exp 6a
#include <stdio.h>
#include <sys/types.h>
#include <string.h>
#include <unistd.h>
#define BUFFER_SIZE 25
#define READ_END 0
#define WRITE_END 1

int main(int argc, char *argv[])
{
    char write_msg[BUFFER_SIZE] = "Greetings";
    char read_msg[BUFFER_SIZE];

    if (argc > 1)
        strcpy(write_msg, argv[1]);

    int fd[2];
    pid_t pid;

    if (pipe(fd) == -1)
    {
        fprintf(stderr, "pipe failed");
        return 1;
    }

    pid = fork();

    if (pid < 0)
    {
        fprintf(stderr, "fork failed");
        return 1;
    }

    if (pid > 0)
    {
        printf("parent id: %d\n", getpid());
        close(fd[READ_END]);
        write(fd[WRITE_END], write_msg, strlen(write_msg) + 1);
    }
    else
    {
        printf("child id: %d\n", getpid());
        close(fd[WRITE_END]);
        read(fd[READ_END], read_msg, BUFFER_SIZE);
        printf("read: %s\n", read_msg);
        close(fd[READ_END]);
    }

    return 0;
}
```

```
ibrahim-johar@ibrahim-johar-VirtualBox: ~/06
ibrahim-johar@ibrahim-johar-VirtualBox:~$ cd /home/ibrahim-johar/06/
ibrahim-johar@ibrahim-johar-VirtualBox:~/06$ gcc exp6a.c -o exp6a
ibrahim-johar@ibrahim-johar-VirtualBox:~/06$ ./exp6a
parent id: 5013
child id: 5014
read: Greetings
ibrahim-johar@ibrahim-johar-VirtualBox:~/06$
```

Normal Pipe

Experiment 6b

Producer:

```
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <fcntl.h>
#include <sys/types.h>
#include <sys/stat.h>
#include <string.h>
#define FIFO_FILE "/tmp/myfifo"

int main()
{
    int fd;
    char buffer[BUFSIZ];
    ssize_t num_bytes;

    mkfifo(FIFO_FILE, 0666);
    fd = open(FIFO_FILE, O_WRONLY);
    if (fd == -1)
    {
        perror("open");
        exit(EXIT_FAILURE);
    }

    while (1)
    {
        printf("producer: enter a message (or 'exit' to quit): ");
        fgets(buffer, BUFSIZ, stdin);
        buffer[strcspn(buffer, "\n")] = '\0';

        num_bytes = write(fd, buffer, strlen(buffer));
        if (num_bytes == -1)
        {
            perror("write");
            exit(EXIT_FAILURE);
        }

        if (strcmp(buffer, "exit") == 0)
            break;
    }

    close(fd);
    unlink(FIFO_FILE);
    return 0;
}
```

read: greetings

```
ibrahim-johar@ibrahim-johar-VirtualBox:~/06$ gcc producer.c -o producer
```

```
ibrahim-johar@ibrahim-johar-VirtualBox:~/06$ ./producer
```

```
ibrahim-johar@ibrahim-johar-VirtualBox:~$ cd /home/ibrahim-johar/06/
```

```
ibrahim-johar@ibrahim-johar-VirtualBox:~/06$ ls -l /tmp/myfifo
```

```
prw-rw-r-- 1 ibrahim-johar ibrahim-johar 0 Mar  8 01:19 /tmp/myfifo
```

```
ibrahim-johar@ibrahim-johar-VirtualBox:~/06$ ls /tmp
```

```
myfifo
```

```
snap-private-tmp
```

```
systemd-private-387f64fff7d84cd89aeeb92c87343c60-colord.service-jVTGDL
```

```
systemd-private-387f64fff7d84cd89aeeb92c87343c60-fwupd.service-apSW0G
```

```
systemd-private-387f64fff7d84cd89aeeb92c87343c60-ModemManager.service-Lc76wR
```

```
systemd-private-387f64fff7d84cd89aeeb92c87343c60-polkit.service-FNQPrt
```

```
systemd-private-387f64fff7d84cd89aeeb92c87343c60-power-profiles-daemon.service-K  
doaX2
```

```
systemd-private-387f64fff7d84cd89aeeb92c87343c60-switcheroo-control.service-rJJE  
jP
```

```
systemd-private-387f64fff7d84cd89aeeb92c87343c60-systemd-logind.service-0x7d0V
```

```
systemd-private-387f64fff7d84cd89aeeb92c87343c60-systemd-oond.service-8FbDAk
```

```
systemd-private-387f64fff7d84cd89aeeb92c87343c60-systemd-resolved.service-k8uWdi
```

```
systemd-private-387f64fff7d84cd89aeeb92c87343c60-systemd-timesyncd.service-mBRW2  
j
```

```
systemd-private-387f64fff7d84cd89aeeb92c87343c60-upower.service-QeNo0m
```

```
VMwareDnD
```

```
ibrahim-johar@ibrahim-johar-VirtualBox:~/06$
```

Consumer:

```
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <fcntl.h>
#include <sys/types.h>
#include <sys/stat.h>
#include <string.h>
#define FIFO_FILE "/tmp/myfifo"

int main()
{
    int fd;
    char buffer[BUFSIZ];
    ssize_t num_bytes;

    fd = open(FIFO_FILE, O_RDONLY);
    if (fd == -1)
    {
        perror("open");
        exit(EXIT_FAILURE);
    }

    while (1)
    {
        num_bytes = read(fd, buffer, BUFSIZ);
        if (num_bytes > 0)
        {
            buffer[num_bytes] = '\0';
            printf("consumer: received message '%s'\n", buffer);
            if (strcmp(buffer, "exit") == 0)
                break;
        }
    }

    close(fd);
    return 0;
}
```

```
ibrahim-johar@ibrahim-johar-VirtualBox: ~/06
ibrahim-johar@ibrahim-johar-VirtualBox:~/06$ gcc producer.c -o producer
ibrahim-johar@ibrahim-johar-VirtualBox:~/06$ gcc consumer.c -o consumer
ibrahim-johar@ibrahim-johar-VirtualBox:~/06$ ./producer
producer: enter a message (or 'exit' to quit): hi world
producer: enter a message (or 'exit' to quit): this is cool
producer: enter a message (or 'exit' to quit): can this work forever?
producer: enter a message (or 'exit' to quit): maybe
producer: enter a message (or 'exit' to quit): this
producer: enter a message (or 'exit' to quit): is
producer: enter a message (or 'exit' to quit): ibrahim
producer: enter a message (or 'exit' to quit): johar
producer: enter a message (or 'exit' to quit): exit
ibrahim-johar@ibrahim-johar-VirtualBox:~/06$
```

```
ibrahim-johar@ibrahim-johar-VirtualBox: ~/06
ibrahim-johar@ibrahim-johar-VirtualBox:~/06$ cd /home/ibrahim-johar/06/
ibrahim-johar@ibrahim-johar-VirtualBox:~/06$ ./consumer
consumer: received message 'hi world'
consumer: received message 'this is cool'
consumer: received message 'can this work forever?'
consumer: received message 'maybe'
consumer: received message 'this'
consumer: received message 'is'
consumer: received message 'ibrahim'
consumer: received message 'johar'
consumer: received message 'exit'
ibrahim-johar@ibrahim-johar-VirtualBox:~/06$
```