

OS Lab 06

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Part A

Q1)

```
k230073@RAYYAN: ~/OS/Lab06
GNU nano 7.2 ordinarypipe.c
#include <sys/types.h>
#include <stdio.h>
#include <string.h>
#include <unistd.h>

#define BUFFER_SIZE 25
#define READ_END 0
#define WRITE_END 1

int main(void) {
    char write_msg[BUFFER_SIZE] = "Greetings";
    char read_msg[BUFFER_SIZE];
    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) {
        close(fd[READ_END]);
        write(fd[WRITE_END], write_msg, strlen(write_msg) + 1);
        close(fd[WRITE_END]);
    } else {
        close(fd[WRITE_END]);
        read(fd[READ_END], read_msg, BUFFER_SIZE);
        printf("read %s\n", read_msg);
        close(fd[READ_END]);
    }

    return 0;
}

k230073@RAYYAN:~/OS/Lab06$ gcc ordinarypipe.c -o ordinarypipe
k230073@RAYYAN:~/OS/Lab06$ ./ordinarypipe
read Greetings
k230073@RAYYAN:~/OS/Lab06$ ps aux | grep ordinarypipe
k230073  3699  0.0  0.0  4088 1928 pts/0    S+   14:50   0:00 grep --color=auto ordinarypipe
k230073@RAYYAN:~/OS/Lab06$
```

```
k230073@RAYYAN: ~/OS/Lab06
top - 14:47:50 up 39 min,  0 user,  load average: 0.00, 0.02, 0.04
Tasks:  5 total,   1 running,  4 sleeping,   0 stopped,   0 zombie
%Cpu(s):  0.0 us,   0.0 sy,   0.0 ni,100.0 id,   0.0 wa,   0.0 hi,   0.0 si,   0.0 st
MiB Mem : 12699.9 total, 11522.0 free,   343.5 used,  1105.1 buff/cache
MiB Swap:  4096.0 total,  4096.0 free,    0.0 used, 12356.4 avail Mem

  PID USER      PR  NI   VIRT   RES   SHR S  %CPU  %MEM    TIME+  COMMAND
    1 root        20   0   1056    516   476 S   0.0   0.0   0:01.00 init
    9 root        20   0    908     80    20 S   0.0   0.0   0:00.00 init
   10 root        20   0    908     80    20 S   0.0   0.0   0:01.03 init
   11 k230073     20   0   6068   5308  3588 S   0.0   0.0   0:00.14 bash
  3687 k230073     20   0   9332   5276  3128 R   0.0   0.0   0:00.00 top
```

Q2)

```
k230073@RAYYAN: ~/OS/Lab06
GNU nano 7.2 ordinarypipe.c
#include <sys/types.h>
#include <stdio.h>
#include <string.h>
#include <unistd.h>

#define BUFFER_SIZE 100
#define READ_END 0
#define WRITE_END 1

int main(void) {
    char write_msg[BUFFER_SIZE];
    char read_msg[BUFFER_SIZE];
    int fd[2];
    pid_t pid;

    printf("Enter a message: ");
    fgets(write_msg, BUFFER_SIZE, stdin);

    write_msg[strcspn(write_msg, "\n")] = '\0';

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

    pid = fork();

    if (pid < 0) {
        fprintf(stderr, "Fork Failed\n");
        return 1;
    }

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

    return 0;
}
```

 k230073@RAYYAN: ~/OS/Lab06

```
k230073@RAYYAN:~/OS/Lab06$ gcc ordinarypipe.c -o ordinarypipe
```

```
k230073@RAYYAN:~/OS/Lab06$ ./ordinarypipe
```

```
Enter a message: hello heloo hello, rayyan here!!
```

```
Child Process Received: hello heloo hello, rayyan here!!
```

```
k230073@RAYYAN:~/OS/Lab06$
```

Part B:

Q1 & Q2

```
k230073@RAYYAN: ~/OS/Lab06/6b
GNU nano 7.2 producer.c *
#define FIFO_FILE "/tmp/myfifo"

#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <fcntl.h>
#include <sys/types.h>
#include <sys/stat.h>
#include <string.h>

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): ");
        fflush(stdout);
        fgets(buffer, BUFSIZ, stdin);
        num_bytes = write(fd, buffer, strlen(buffer)+1); // Write input to the named pipe
        if (num_bytes == -1) {
            perror("write");
            exit(EXIT_FAILURE);
        }

        if (strncmp(buffer, "exit", 4) == 0) {
            break;
        }
    }

    close(fd);
    unlink(FIFO_FILE);

    return 0;
}
```

 k230073@RAYYAN: ~/OS/Lab06/6b

```
k230073@RAYYAN:~/OS/Lab06/6b$ nano producer.c
k230073@RAYYAN:~/OS/Lab06/6b$ ls /tmp/myfifo
/tmp/myfifo
k230073@RAYYAN:~/OS/Lab06/6b$ ls -l myfifo
ls: cannot access 'myfifo': No such file or directory
k230073@RAYYAN:~/OS/Lab06/6b$ ls -l /tmp/myfifo
prw-r--r-- 1 k230073 k230073 0 Mar  8 15:45 /tmp/myfifo
k230073@RAYYAN:~/OS/Lab06/6b$ gcc producer.c -o producer
k230073@RAYYAN:~/OS/Lab06/6b$ cat /tmp/myfifo
```

Q3)

```
k230073@RAYYAN: ~/OS/Lab06/6b
GNU nano 7.2 consumer.c
#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);
    }

    printf("waiting for messages\n");

    while ((num_bytes = read(fd, buffer, BUFSIZ)) > 0) {
        buffer[num_bytes] = '\0';
        printf("Consumer: Received message: %s", buffer);
    }

    if (num_bytes == -1) {
        perror("read");
        exit(EXIT_FAILURE);
    }

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

k230073@RAYYAN: ~/OS/Lab06/6b

```
k230073@RAYYAN:~/OS/Lab06/6b$ nano producer.c
k230073@RAYYAN:~/OS/Lab06/6b$ nano consumer.c
k230073@RAYYAN:~/OS/Lab06/6b$ gcc producer.c -o producer
k230073@RAYYAN:~/OS/Lab06/6b$ gcc consumer.c -o consumer
k230073@RAYYAN:~/OS/Lab06/6b$ ./consumer
waiting for messages
Consumer: Received message: hello hello heloo
Consumer: Received message: pakistan zindabad
Consumer: Received message: 'exit'
Consumer: Received message: exit
```

k230073@RAYYAN: ~/OS/Lab06/6b

```
k230073@RAYYAN:~$ ./producer
-bash: ./producer: No such file or directory
k230073@RAYYAN:~$ cd OS/Lab06/6b
k230073@RAYYAN:~/OS/Lab06/6b$ ./consumer
^C
k230073@RAYYAN:~/OS/Lab06/6b$ ./producer
Producer: Enter a message (or 'exit' to quit): hello hello heloo
Producer: Enter a message (or 'exit' to quit): pakistan zindabad
Producer: Enter a message (or 'exit' to quit): 'exit'
Producer: Enter a message (or 'exit' to quit): exit
k230073@RAYYAN:~/OS/Lab06/6b$
```