422116-WEEK2

MY Details

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ROLL NO : **422116**

SECTION : **A**

LAB-2 (09-01-2025)

1. Construct a C-program for Client-Server applications using inter-process communication mechanisms using:

a) FIFO / Named Pipes

Client-fifo.c

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

#define FIFO_NAME "myfifo"
#define BUFFER_SIZE 256

int main() {
    char buffer[BUFFER_SIZE];

    int fd = open(FIFO_NAME, O_WRONLY);
    if (fd == -1) {
```

```
        perror("open");
        exit(EXIT_FAILURE);
    }

    printf("Client: Type your messages (type 'exit' to quit):\n"
    while (1) {

        fgets(buffer, sizeof(buffer), stdin);
        buffer[strcspn(buffer, "\n")] = '\0';

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

        if (strcmp(buffer, "exit") == 0) {
            printf("Client exiting...\n");
            break;
        }
    }

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

server-fifo.c

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

```
#define FIFO_NAME "myfifo"
#define BUFFER_SIZE 256

int main()
{
    char buffer[BUFFER_SIZE];
    if (mkfifo(FIFO_NAME, 0666) == -1)
    {
        perror("mkfifo");
        exit(EXIT_FAILURE);
    }

    printf("Server: Waiting for clients...\n");


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

    while (1)
    {

        ssize_t bytes_read = read(fd, buffer, sizeof(buffer)
- 1);
        if (bytes_read > 0)
        {
            buffer[bytes_read] = '\0';
            printf("Server received: %s\n", buffer);

            if (strcmp(buffer, "exit") == 0)
            {
                printf("Server shutting down...\n");
                break;
```

```
            }
        }
    }

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

b) Message queues

client

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <sys/ipc.h>
#include <sys/msg.h>
#include <sys/stat.h>
#include <sys/types.h>

#define KEY 1234
#define BUFFER_SIZE 256


struct message {
    long type;
```

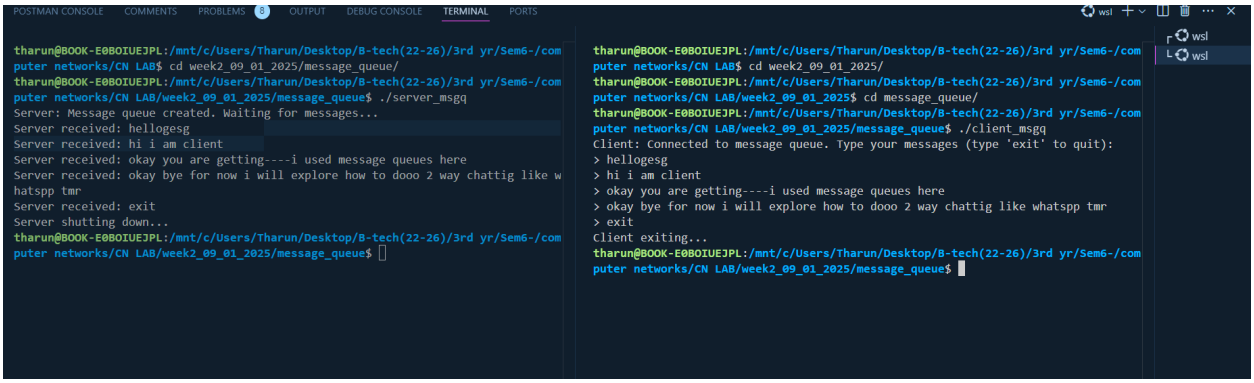
```
    char text[BUFFER_SIZE];
};

int main() {
    struct message msg;
    int msgid;

    // Connect to the message queue
    msgid = msgget(KEY, 0666);
    if (msgid == -1) {
        perror("msgget");
        exit(EXIT_FAILURE);
    }

    printf("Client: Connected to message queue. Type your mes
sages (type 'exit' to quit):\n");

    while (1) {

        printf("> ");
        fgets(msg.text, sizeof(msg.text), stdin);
        msg.text[strcspn(msg.text, "\n")] = '\0';

        msg.type = 1;


        if (msgsnd(msgid, &msg, sizeof(msg.text), 0) == -1) {
            perror("msgsnd");
            exit(EXIT_FAILURE);
        }

        if (strcmp(msg.text, "exit") == 0) {
            printf("Client exiting...\n");
            break;
        }
    }
```

```
    return 0;
}
```

server

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <sys/ipc.h>
#include <sys/msg.h>

#define KEY 1234
#define BUFFER_SIZE 256

struct message {
    long type;
    char text[BUFFER_SIZE];
};

int main() {
    struct message msg;
    int msgid;


    msgid = msgget(KEY, 0666 | IPC_CREAT);
    if (msgid == -1) {
        perror("msgget");
        exit(EXIT_FAILURE);
    }
    printf("Server: Message queue created. Waiting for messag
es...\n");

    while (1) {

        if (msgrcv(msgid, &msg, sizeof(msg.text), 0, 0) == -
```

```
1) {
            perror("msgrcv");
            exit(EXIT_FAILURE);
        }

        printf("Server received: %s\n", msg.text);


        if (strcmp(msg.text, "exit") == 0) {
            printf("Server shutting down...\n");
            break;
        }
    }

    if (msgctl(msgid, IPC_RMID, NULL) == -1) {
        perror("msgctl");
        exit(EXIT_FAILURE);
    }

    return 0;
}
```



c) Shared memory

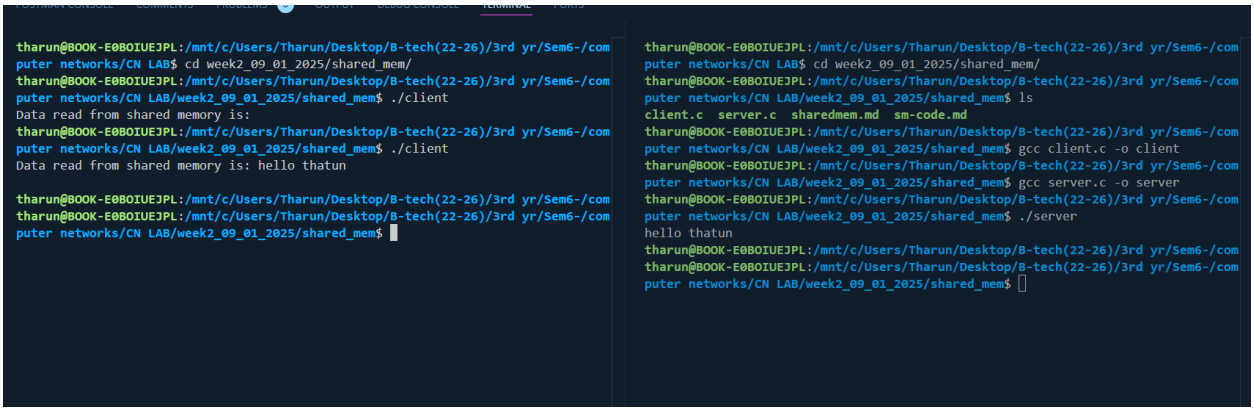
client

```
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/shm.h>
#include <string.h>
#include <errno.h>

int main() {
    int shmid;
    void *shared_memory;


    shmid = shmget((key_t)2345, 1024, 0666);
    if (shmid == -1) {
        perror("shmget failed");
        exit(EXIT_FAILURE);
    }

    shared_memory = shmat(shmid, NULL, 0);
    if (shared_memory == (void *)-1) {
        perror("shmat failed");
        exit(EXIT_FAILURE);
    }

    printf("Data read from shared memory is: %s\n", (char *)s
hared_memory);

    return 0;
}
```

server

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

```c
#include <sys/shm.h>
#include <string.h>
#include <errno.h>

int main() {
    int shmid;
    void *shared_memory;
    char buff[100];

    shmid = shmget((key_t)2345, 1024, 0666 | IPC_CREAT);
    if (shmid == -1) {
        perror("shmget failed");
        exit(EXIT_FAILURE);
    }

    shared_memory = shmat(shmid, NULL, 0);
    if (shared_memory == (void *)-1) {
        perror("shmat failed");
        exit(EXIT_FAILURE);
    }

    if (read(0, buff, 100) == -1) {
        perror("read failed");
        exit(EXIT_FAILURE);
    }

    strcpy(shared_memory, buff);

    return 0;
}
```


tharun@BOOK-E0BOIUEJPL:/mnt/c/Users/Tharun/Desktop/B-tech(22-26)/3rd yr/Sem6-/com
puter networks/CN LAB$ cd week2_09_01_2025/shared_mem/
tharun@BOOK-E0BOIUEJPL:/mnt/c/Users/Tharun/Desktop/B-tech(22-26)/3rd yr/Sem6-/com
puter networks/CN LAB/week2_09_01_2025/shared_mem$ ./client
Data read from shared memory is:
tharun@BOOK-E0BOIUEJPL:/mnt/c/Users/Tharun/Desktop/B-tech(22-26)/3rd yr/Sem6-/com
puter networks/CN LAB/week2_09_01_2025/shared_mem$ ./client
Data read from shared memory is: hello thatun
tharun@BOOK-E0BOIUEJPL:/mnt/c/Users/Tharun/Desktop/B-tech(22-26)/3rd yr/Sem6-/com
tharun@BOOK-E0BOIUEJPL:/mnt/c/Users/Tharun/Desktop/B-tech(22-26)/3rd yr/Sem6-/com
puter networks/CN LAB/week2_09_01_2025/shared_mem$
tharun@BOOK-E0BOIUEJPL:/mnt/c/Users/Tharun/Desktop/B-tech(22-26)/3rd yr/Sem6-/com
puter networks/CN LAB$ cd week2_09_01_2025/shared_mem/
tharun@BOOK-E0BOIUEJPL:/mnt/c/Users/Tharun/Desktop/B-tech(22-26)/3rd yr/Sem6-/com
puter networks/CN LAB/week2_09_01_2025/shared_mem$ ls
client.c server.c sharedmem.md sm-code.md
tharun@BOOK-E0BOIUEJPL:/mnt/c/Users/Tharun/Desktop/B-tech(22-26)/3rd yr/Sem6-/com
puter networks/CN LAB/week2_09_01_2025/shared_mem$ gcc client.c -o client
tharun@BOOK-E0BOIUEJPL:/mnt/c/Users/Tharun/Desktop/B-tech(22-26)/3rd yr/Sem6-/com
puter networks/CN LAB/week2_09_01_2025/shared_mem$ gcc server.c -o server
tharun@BOOK-E0BOIUEJPL:/mnt/c/Users/Tharun/Desktop/B-tech(22-26)/3rd yr/Sem6-/com
puter networks/CN LAB/week2_09_01_2025/shared_mem$ ./server
hello thatun
tharun@BOOK-E0BOIUEJPL:/mnt/c/Users/Tharun/Desktop/B-tech(22-26)/3rd yr/Sem6-/com
tharun@BOOK-E0BOIUEJPL:/mnt/c/Users/Tharun/Desktop/B-tech(22-26)/3rd yr/Sem6-/com
puter networks/CN LAB/week2_09_01_2025/shared_mem$