**INTER-PROCESS**

**COMMUNICATION**

**LAB # 10**

**Fall 2023**

**CSE-302L**

**Systems Programming Lab**

Submitted by: **AIMAL KHAN**

Registration No.: **21PWCSE1996**

Class Section: **A**

“On my honor, as student of University of Engineering and Technology, I have neither given nor received unauthorized assistance on this academic work.”



Student Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Submitted to:

**Engr. Abdullah Hamid**

Sunday, January 28, 2024

Department of Computer Systems Engineering

University of Engineering and Technology, Peshawar

**CSE 302L: SYSTEMS PROGRAMMING LAB**

**LAB ASSESSMENT RUBRICS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Criteria & Point Assigned** | **Outstanding 2** | **Acceptable 1.5** | **Considerable 1** | **Below Expectations 0.5** | **Score** |
| **Attendance and**  **Attentiveness in Lab**  PLO08 | Attended in proper Time and attentive in Lab | Attended in proper Time but not attentive in Lab | Attended late but attentive in Lab | Attended late not attentive in Lab |  |
| **Capability of writing Program/Algorithm/Drawing Flow Chart**  PLO1, PLO2, PLO3, PLO5 | Right attempt/ no errors and well formatted | Right attempt/ no errors but not well formatted | Right attempt/ minor errors and not well formatted | Wrong attempt |  |
| **Result or Output/ Completion of target in Lab**  PLO9 | 100% target has been completed and well formatted. | 75% target has been completed and well formatted. | 50% target has been completed but not well formatted. | None of the outputs are correct. |  |
| **Overall, Knowledge**  PLO10, | Demonstrates excellent knowledge of lab | Demonstrates good knowledge of lab | Has partial idea about the Lab and procedure followed | Has poor idea about the Lab and procedure followed |  |
| **Attention to Lab Report**  PLO4, | Submission of Lab Report in Proper Time i.e., in next day of lab, with proper documentation. | Submission of Lab Report in proper time but not with proper documentation. | Late Submission with proper documentation. | Late Submission very poor documentation |  |

**Instructor:**

|  |  |
| --- | --- |
| Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  |  |

**INTER-PROCESS COMMUNICATION**

Objectives:

The objectives of this lab are to gain a practical understanding of key system programming concepts, including

* Pipes
* FIFOs

Tasks:

**Task 1**: A program in which a child writes a string to a pipe and the parent reads the string.

**Code in C:**

// A program in which a child writes a string to a pipe and the parent reads the string.

#include <stdio.h>

#include <stdlib.h>

#include <unistd.h>

#include <sys/types.h>

#include <string.h>

#define MAX\_BUFF\_SIZE 128

int main()

{

int fd[2];

if (pipe(fd) == -1)

{

perror("Error While creating pipe.\n");

return 1;

}

pid\_t pid = fork();

if (pid == -1)

{

perror("Error while creating childs.\n");

return 1;

}

if(pid == 0){

char \*str = "Hello Baba\n";

if(write(fd[1], str, strlen(str) + 1) == -1){

perror("Error while writing to pipe.\n");

return 1;

}

}

else{

char buff[MAX\_BUFF\_SIZE];

if(read(fd[0], buff, MAX\_BUFF\_SIZE) == -1){

perror("Error while reading from pipe.\n");

return 1;

}

printf("Parent received: %s", buff);

}

return 0;

}

**Output:**

**A black and white text

Description automatically generated**

**Task 2**: Write a program that creates a process fan. Parent process writes to the pipe and all the child processes read the message from pipe and display it on stdout

**Code in C:**

// Write a program that creates a process fan. Parent process writes to the pipe and all the child processes read the message from pipe and display it on stdout.

#include <stdio.h>

#include <stdlib.h>

#include <unistd.h>

#include <sys/types.h>

#include <string.h>

#include <sys/wait.h>

#define MAX\_BUFF\_SIZE 128

#define CHILD\_COUNT 3

int main()

{

int fd[2], i;

pid\_t pid;

char \*str = "Hello Baba\n", buff[MAX\_BUFF\_SIZE];

if (pipe(fd) == -1)

{

perror("Error While creating pipe.\n");

return 1;

}

for (i = 0; i < CHILD\_COUNT; i++){

if ((pid = fork()) == -1)

{

perror("Error while creating childs.\n");

return 1;

}

if (pid == 0)

{

if (read(fd[0], buff, MAX\_BUFF\_SIZE) == -1)

{

perror("Error while reading from pipe.\n");

return 1;

}

printf("Child [%ld] received: %s", (long)(getpid()), buff);

break;

}

else

{

wait(NULL);

if (write(fd[1], str, strlen(str) + 1) == -1)

{

perror("Error while writing to pipe.\n");

return 1;

}

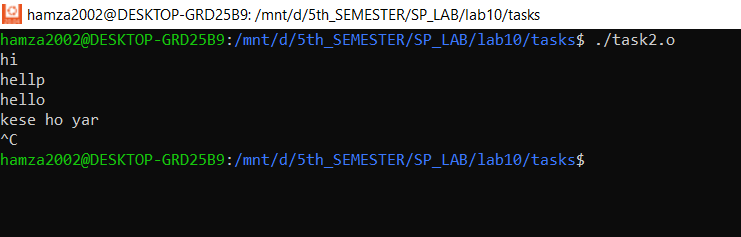
}

}

return 0;

}

**Output:**

****

**Task 3**: Chatting between two process using FIFO

**Code in C:**

#include <stdio.h>

#include <stdlib.h>

#include <unistd.h>

#include <sys/stat.h>

#include <fcntl.h>

int main(int argc, char \*argv[]) {

if (argc != 2) {

fprintf(stderr, "Usage: %s <FIFO\_NAME>\n", argv[0]);

return 1;

}

const char \*fifoName = argv[1];

char buf[1024];

ssize\_t numBytes;

// Create a FIFO if it does not exist

if (mkfifo(fifoName, 0666) == -1) {

perror("mkfifo");

return 1;

}

// Fork a process

pid\_t pid = fork();

if (pid == -1) {

perror("fork");

return 1;

}

if (pid == 0) { // Child process for writing to FIFO

int fifoFd = open(fifoName, O\_WRONLY);

if (fifoFd == -1) {

perror("open");

return 1;

}

while (fgets(buf, sizeof(buf), stdin)) {

write(fifoFd, buf, sizeof(buf));

}

close(fifoFd);

} else { // Parent process for reading from FIFO

int fifoFd = open(fifoName, O\_RDONLY);

if (fifoFd == -1) {

perror("open");

return 1;

}

while ((numBytes = read(fifoFd, buf, sizeof(buf))) > 0) {

write(STDOUT\_FILENO, buf, numBytes);

}

close(fifoFd);

}

return 0;}

Reference:

To view my codes, please refer to my GitHub account:  [https://github.com/aimalexe/DCSE/tree/main/semester\_5\_(fall-23)/systems\_programming\_lab/lab\_reports](%20https://github.com/aimalexe/DCSE/tree/main/semester_5_(fall-23)/systems_programming_lab/lab_reports) .

Conclusion:

In summary, this laboratory experience has provided a comprehensive exploration of various fundamental system programming concepts, including pipes and FIFOs. These newfound insights are valuable assets that will enhance my problem-solving abilities and future project contributions.

The End.