190905514 MOHAMMAD TOFIIK BATCH : C3
ROLLNO : 62 SECTION : C SEM : 5th

- : OS-LAB-7 :-

LAB EXCERCISE :

1.Process A wants to send a number to Process B. Once received, Process B has to check whether the number is palindrome or not. Write a C program to implement this interprocess communication using a message queue.

/*SENDER CODE*/

```
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/types.h>
#include <limits.h>
#include <fcntl.h>
#include <sys/msg.h>
#include <sys/stat.h>
#include <string.h>
#include <sys/msg.h>
#include <sys/ipc.h>
#include <errno.h>
#define MAX_TEXT 512
struct my_msg_st
{
long int my_msg_type;
int msg;
};
int main(int argc, char const *argv[])
{
int running = 1;
struct my_msg_st some_data;
int msgid;
int num;
msgid = msgget((key_t)1234, 0666 | IPC_CREAT);
if (msgid == -1)
{
```

```
fprintf(stderr, "msgget failed with error%d\n", errno);
exit(EXIT_FAILURE);
}
printf("Enter -1 to quit\n");
while (running)
{
printf("Enter a number\n");
scanf("%d", &num);
some_data.my_msg_type = 1;
some_data.msg = num;
if (msgsnd(msgid, (void *)&some_data, MAX_TEXT, 0) == -1)
{
fprintf(stderr, "msgsnd failed\n");
exit(EXIT_FAILURE);
}
if (num == -1)
running = 0;
}
exit(EXIT_SUCCESS);
}
```

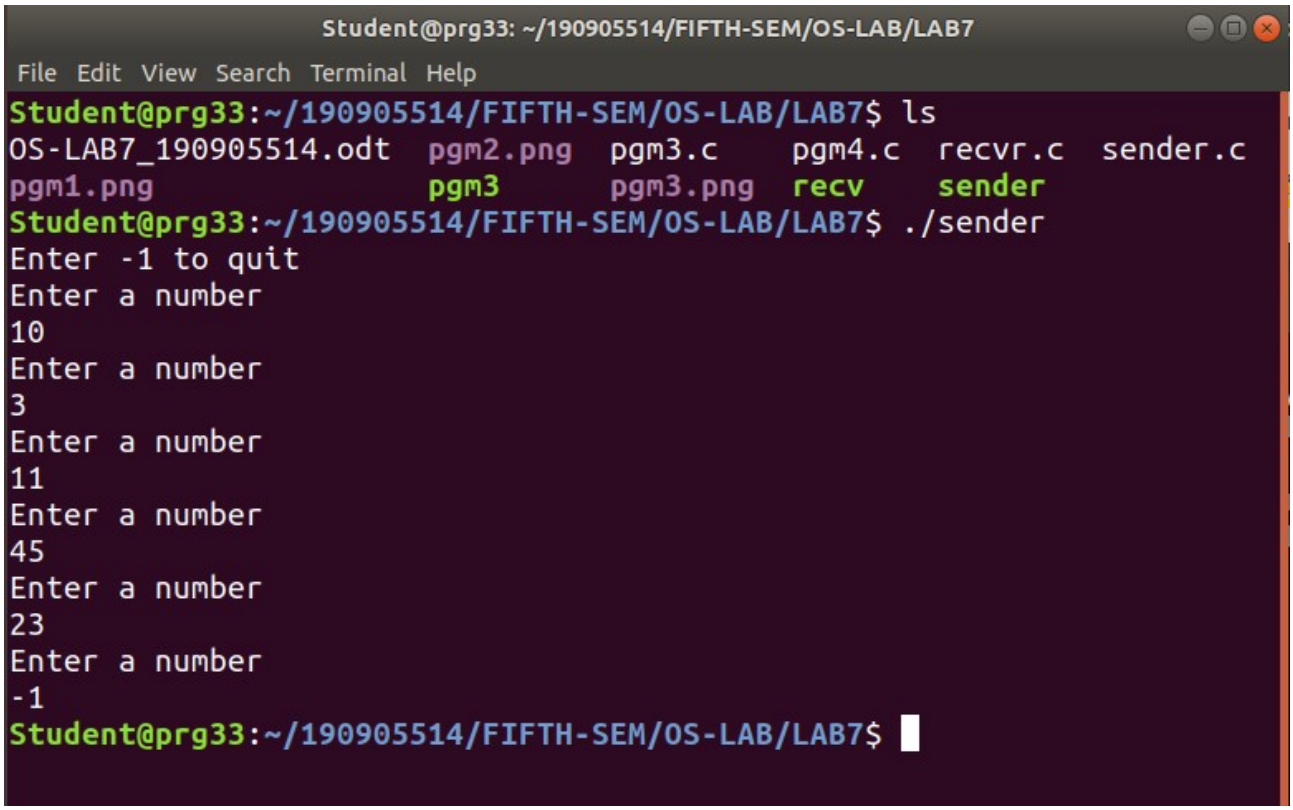
/RECEIVER CODE/**

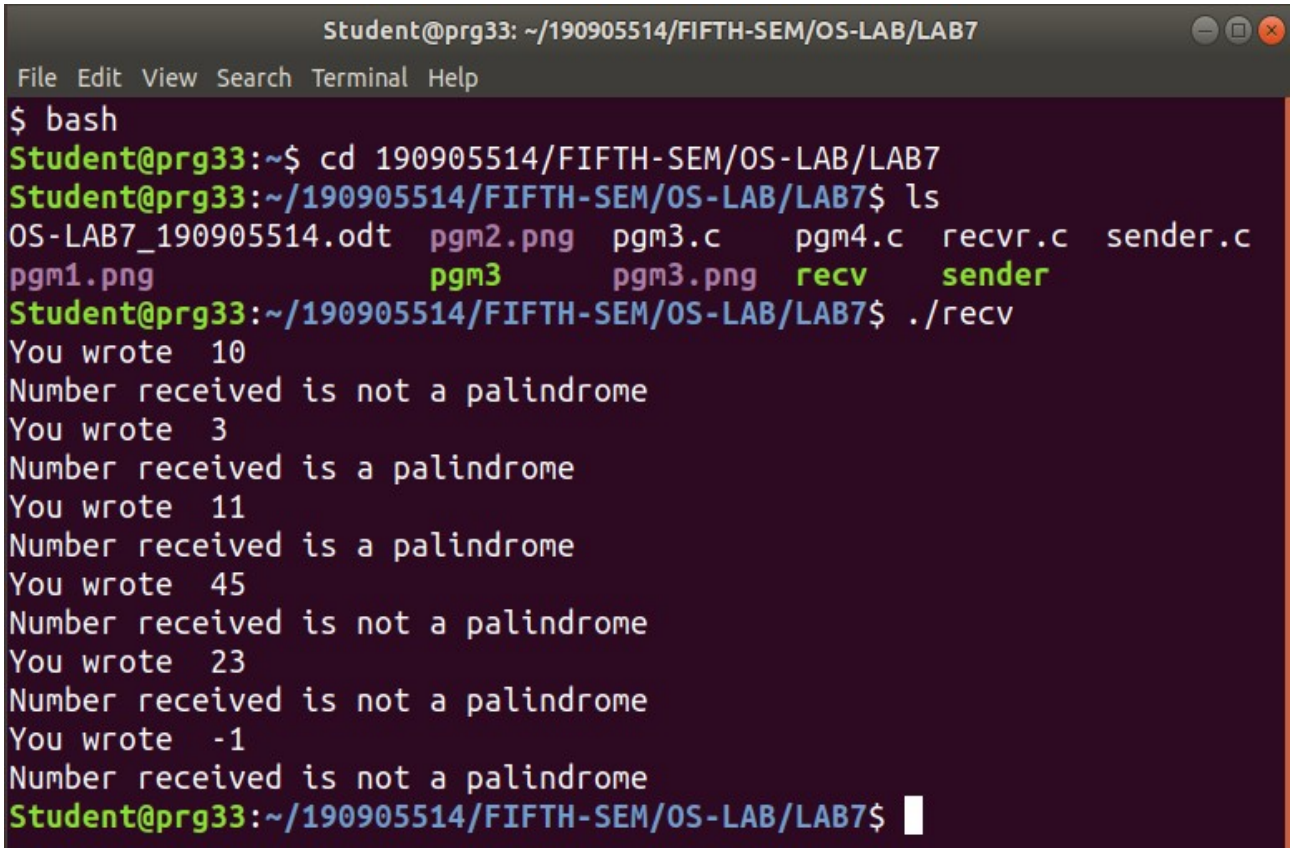
```
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/types.h>
#include <limits.h>
#include <fcntl.h>
#include <sys/msg.h>
#include <sys/stat.h>
#include <string.h>
#include <sys/msg.h>
#include <sys/ipc.h>
#include <errno.h>
#define MAX_TEXT 512
struct my_msg_st
{
long int my_msg_type;
int msg;
};
```

```
int reverse(int x)
{
int y = 0;
while (x > 0)
{
y *= 10;
y += x % 10;
x /= 10;
}
return y;
}
int main(int argc, char const *argv[])
{
int running = 1;
struct my_msg_st some_data;
long int msg_to_receive = 0;
int msgid;
int num;
msgid = msgget((key_t)1234, 0666 | IPC_CREAT);
if (msgid == -1)
{
fprintf(stderr, "msgget failed with error%d\n", errno);
exit(EXIT_FAILURE);
}
while (running)
{
if (msgrcv(msgid, (void *)&some_data, BUFSIZ, msg_to_receive, 0) == -1)
{
fprintf(stderr, "msgrc failedwith error %d\n", errno);
exit(EXIT_FAILURE);
}
printf("You wrote %d\n", some_data.msg);
if (some_data.msg == reverse(some_data.msg))
printf("Number received is a palindrome\n");
else
printf("Number received is not a palindrome\n");
if (some_data.msg == -1)
running = 0;
}
```

```
if (msgctl(msgid, IPC_RMID, 0) == -1)
{fprintf(stderr, "msgctl(IPC_RMID) failed\n");
exit(EXIT_FAILURE);
}exit(EXIT_SUCCESS);}
```

OUTPUT





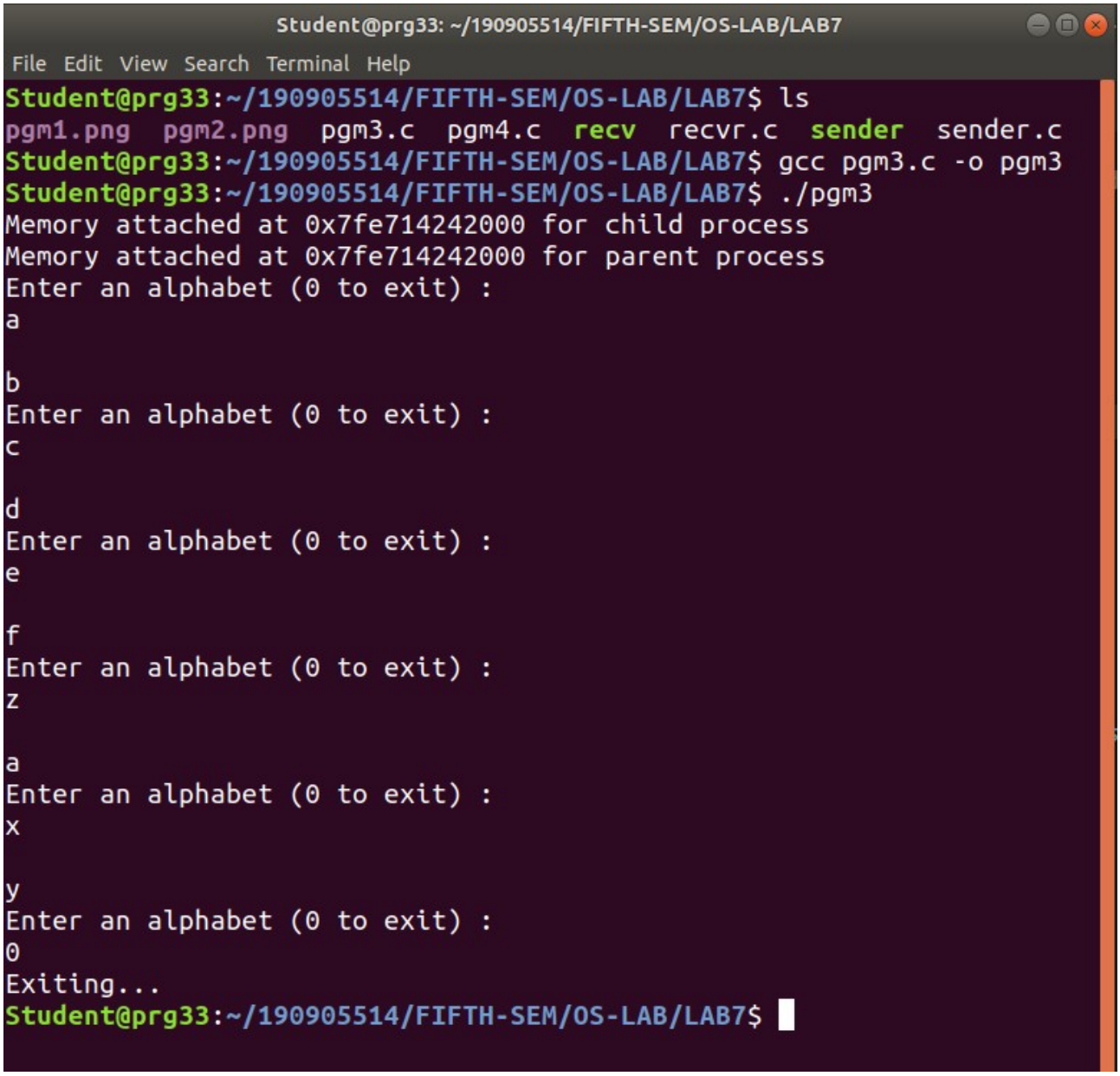
2.) Implement a parent process, which sends an English alphabet to a child process using shared memory. The child process responds with the next English alphabet to the parent. The parent displays the reply from the Child.

```
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <sys/types.h>
#include <sys/ipc.h>
#include <sys/shm.h>
struct shared_str
{
int status;
char alphabet;
};
int main(int argc, char const *argv[])
{
int shmid = shmget((key_t)1234, sizeof(struct shared_str), 0666 |
IPC_CREAT);
pid_t pid = fork();
if (pid < 0)
{
printf("Error in fork()\n");
exit(-1);
}
else if (pid == 0)
{
struct shared_str *shared_mem = shmat(shmid, (void *)0, 0);
if (shared_mem == (void *)-1)
{
printf("shmat() failed\n");
exit(-1);
}
printf("Memory attached at %p for child process\n", shared_mem);

while (1)
{
if (shared_mem->status < 0)
{
if (shmdt(shared_mem) == -1)
```

```
{
printf("shmdt failed\n");
exit(-1);
}
break;
}
if (shared_mem->status == 1)
{
char c = shared_mem->alphabet;
printf("\n");
if ((int)c >= 65 && (int)c <= 90)
{
c = ((c - 'A' + 1) % 26) + 'A';
}

else if ((int)c >= 97 && (int)c <= 122)
{
c = ((c - 'a' + 1) % 26) + 'a';
}
else
{
printf("Non-alphabetic character received\n");
}
shared_mem->alphabet = c;
shared_mem->status = 2;
}
}
}

else
{
sleep(1);
struct shared_str *shared_mem = shmat(shmid, (void *)0, 0);

if (shared_mem == (void *)-1)
{
printf("shmat() failed\n");
exit(-1);
}
printf("Memory attached at %p for parent process\n", shared_mem);
```

```
shared_mem->status = 0;
while (1)
{
if (shared_mem->status == 1)
{
continue;
}
if (shared_mem->status == 2)
{
printf("%c\n", shared_mem->alphabet);
}
shared_mem->status = 0;
char c, nl;
printf("Enter an alphabet (0 to exit) : \n");
scanf("%c", &c);
scanf("%c", &nl);
if (c == '0')
{
shared_mem->status = -1;
printf("Exiting...\n");

if (shmdt(shared_mem) == -1)
{
printf("shmdt failed\n");
exit(-1);
}
if (shmctl(shmid, IPC_RMID, 0) == -1)
{
printf("shmctl failed\n");
exit(-1);
}
break;
}
shared_mem->alphabet = c;
shared_mem->status = 1;
}
}
return 0;
}
```

OUTPUT :


Student@prg33: ~/190905514/FIFTH-SEM/OS-LAB/LAB7
File Edit View Search Terminal Help
Student@prg33:~/190905514/FIFTH-SEM/OS-LAB/LAB7$ ls
pgm1.png pgm2.png pgm3.c pgm4.c recv recvr.c sender sender.c
Student@prg33:~/190905514/FIFTH-SEM/OS-LAB/LAB7$ gcc pgm3.c -o pgm3
Student@prg33:~/190905514/FIFTH-SEM/OS-LAB/LAB7$ ./pgm3
Memory attached at 0x7fe714242000 for child process
Memory attached at 0x7fe714242000 for parent process
Enter an alphabet (0 to exit) :
a
b
Enter an alphabet (0 to exit) :
c
d
Enter an alphabet (0 to exit) :
e
f
Enter an alphabet (0 to exit) :
z
a
Enter an alphabet (0 to exit) :
x
y
Enter an alphabet (0 to exit) :
0
Exiting...
Student@prg33:~/190905514/FIFTH-SEM/OS-LAB/LAB7$