

# UCS 1411 - Operating Systems Lab

## Exercise 5 - Inter Process Communication Using Shared Memory

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### 1 Develop an application for getting a name in parent and convert it into uppercase in child using shared memory.

#### Program

```
#include <sys/ipc.h>
#define NULL 0
#include <sys/shm.h>
#include <sys/types.h>
#include <unistd.h>
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#include <sys/wait.h>
void strupr(char *a)
{
    for(int i = 0; a[i] != '\0'; i++)
        a[i] -= (a[i] >= 'a' && a[i] <= 'z') ? 32 : 0;
}
int main()
{
    int pid, id;
    char *a, *b;
    id = shmget(111, 50, IPC_CREAT | 00666);
    pid = fork();
    if(pid > 0)
    {
        printf("Parent Process\n");
        a = shmat(id, NULL, 0);
        a[0] = '\0';
        printf("Enter a string: ");
        scanf("%[^\n]", a);
        wait(NULL);
        shmdt(a);
    }
    else
    {
        b = shmat(id, NULL, 0);
        while(b[0] == '\0');
        printf("\nChild Process:\n");
        strupr(b);
        printf("Uppercase: %s\n", b);
    }
}
```

```

        shmdt(b);
    }
    shmctl(id, IPC_RMID, NULL);
}

```

## Output

Parent Process

Enter a string: This is a test string

Child Process:

Uppercase: THIS IS A TEST STRING

## 2 Develop an client / server application for file transfer using shared memory

### Server Program

```

#include <sys/ipc.h>
#define NULL 0
#include <sys/shm.h>
#include <sys/types.h>
#include <unistd.h>
#include <fcntl.h>
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#include <sys/wait.h>
int main()
{
    char *a;
    int fd;
    int id = shmget(101, 50, IPC_CREAT);
    a = shmat(id, NULL, 0);
    while(a[0] == '\0');
    fd = open(a, O_RDONLY);
    a[0] = '\0';
    if(fd < 0) {
        strcpy(a, "Does not exist!\n");
        shmdt(a);
        exit(0);
    }
    char r; int i = 0;
    while((read(fd, &r, 1)))
    {
        a[i] = r;
        i++;
    }
    printf("Read!\n");
    shmdt(a);
    shmctl(id, IPC_RMID, NULL);
}

```

## Client Program

```
#include<sys/ipc.h>
#define NULL 0
#include<sys/shm.h>
#include<sys/types.h>
#include<unistd.h>
#include<stdio.h>
#include<string.h>
#include<stdlib.h>
#include<fcntl.h>
#include<sys/wait.h>
int main()
{
    int id;
    char *a;
    char filename[100];
    id = shmget(101, 50, IPC_CREAT | 00666);
    a = shmat(id, NULL, 0);
    a[0] = '\0';
    printf("Enter file name: ");
    scanf("%s", filename);
    strcpy(a, filename);
    strcat(filename, "-copy");
    sleep(3);
    while(a[0] == '\0');

    if(strcmp(a, "Does not exit!\n")){
        printf("%s", a);
        return 1;
    }

    int fd = open(filename, O_WRONLY | O_CREAT, S_IRWXU);
    printf("%s", a);
    write(fd, a, strlen(a));
    shmdt(a);
    shmctl(id, IPC_RMID, NULL);
    close(fd);
    return 0;
}
```

## Output