ASSIGNMENT 4

Aditya Anil, AM.EN.U4AIE19006

QUESTION 1

Write a C Program that allows communication between parent and child process using ordinary pipes. The child should take an input (a String) from the user and supply it to the parent and parent should change it to a string in uppercase and print it there.

CODE:

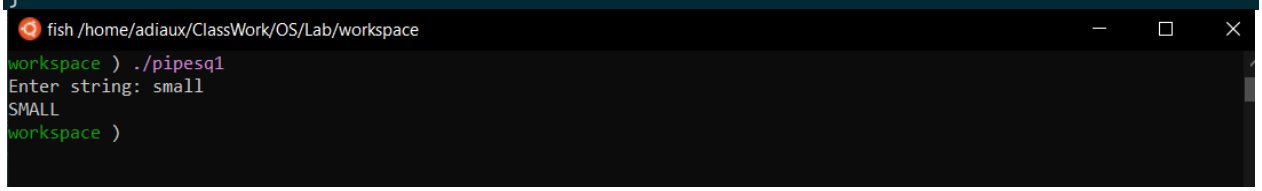
```c
#include <stdio.h>
#include <unistd.h>
#include <string.h>
#define MSGSIZE 100
char msg1[] ;
int main()
{
    char inbuf[MSGSIZE];
    int p[2], pid, nbytes;

    if (pipe(p) < 0)
        exit(1);

    /* continued */
    if ((pid = fork()) == 0) {
        //Child process
        printf("Enter string: ");
        scanf("%s",msg1);
        write(p[1], msg1, MSGSIZE);
    }

    else {
        if ((nbytes = read(p[0], inbuf, MSGSIZE)) > 0)
        {
            for(int i=0;i<=strlen(inbuf);i++){
                if(inbuf[i]>=97&&inbuf[i]<=122)
                    inbuf[i]=inbuf[i]-32;
                    }
            printf("% s\n", inbuf);
        }
    }
    return 0;
```

```
}
```



QUESTION 2

Write a C Program that allows communication between parent and child process using ordinary PIPES. The parent should keep on taking integers from user and supplying it to child until a special character is encountered. Child should display the sum of these numbers.

CODE:

```c
#include <stdio.h>
#include <ctype.h>
#include<unistd.h>
#include<stdlib.h>
#include<sys/wait.h>
int main()
{
int pfd[2];
int num;
char temp[1024];
    if(pipe(pfd)==-1){
        perror("Pipe Failed");
        exit(1);
    }

    if(fork()!=0){
        close(pfd[0]);

            printf("Enter number or press special character to exit: ");
            scanf("%s", temp);

            while((temp[0]>=48 && temp[0]<=57) || (temp[0]>=65 && temp[0]<=90) ||
 (temp[0]>=97 && temp[0]<=122)){

            write(pfd[1],temp,sizeof(temp));
            printf("Enter number or press special character to exit: ");

            scanf("%s", temp);
```

```
            }

            close(pfd[1]);
            wait(NULL);


    }

    else{

        close(pfd[1]);
        int sum=0;
        while(read(pfd[0],temp,1024)){
        sum=sum+atoi(temp);
        }

        printf("%d",sum);

        close(pfd[0]);
    }

    return 0;
}
```

```
fish /home/adiaux/ClassWork/OS/Lab/workspace
workspace ) ./pipesq2
Enter number or press special character to exit: 2
Enter number or press special character to exit: 3
Enter number or press special character to exit: 4
Enter number or press special character to exit: 1
Enter number or press special character to exit: %
10⏎
workspace )
```

QUESTION 3

Write a c program using pipes to find average of square of numbers supplied by a user using 3 processes. 1 parent and two children. a. Parent should continuously take integers as input from the user until a special character, square it and supply it to both children. b. Child #1 should find sum of these numbers, send it to the parent and exit. c. Child #2 should count these numbers, send it to the parent and exit d. Parent on getting response from both the children should find mean of square of numbers supplied by the user by dividing the child #1's result with child 2's and give it to the user.

CODE:

```
#include <stdio.h>
#include <ctype.h>
#include<unistd.h>
#include<stdlib.h>
#include<sys/wait.h>
int main()
{
int fd[2],fd2[2],fd3[2],fd4[2];// Initializing the pipes
pid_t pid,pid2;//Initialize process id
char temp[1024];
int sum = 0, nos = 0;
float final=0.0;
    if((pipe(fd)==-1) ||(pipe(fd2)==-1)||(pipe(fd3)==-1)||(pipe(fd4)==-1)){
        printf("Pipe Failed");
        exit(1);
    }
pid=fork();
    if(pid>0){
        close(fd[0]);
        close(fd2[1]);
        //reading
        printf("Enter number or special char to exit ");
        scanf("%s", temp);
        while((temp[0]>=48 && temp[0]<=57) || (temp[0]>=65 && temp[0]<=90) || (te
mp[0]>=97 && temp[0]<=122)){
            int sq;
            sscanf(temp, "%d", &sq);
            sq = sq * sq;
            snprintf(temp, sizeof(temp), "%d", sq);
            write(fd[1],temp,sizeof(temp));
            write(fd3[1],temp,sizeof(temp));
            printf("Enter number or special char to exit ");
```

```
            scanf("%s", temp);
        }
        close(fd[1]);
        wait(NULL);
        read(fd2[0],&sum,sizeof(sum));
        close(fd2[0]);
        pid2=fork();

    if(pid2 < 0 ) {exit(1);}//child 1
        else if(pid2 == 0){
            close(fd3[1]);
            close(fd4[0]);
            int count=0;
            while(read(fd3[0],temp,1024)){
                count = count + 1 ;
            }
           close(fd3[0]);
           write(fd4[1],&count,sizeof(count));
           close(fd4[1]);
        }
        else{
            close(fd3[1]);
            close(fd4[1]);
            close(fd3[0]);
            wait(NULL);
            read(fd4[0],&nos,sizeof(nos));
            final=(float)sum/nos;
            printf("Mean= %.1f",final);
            close(fd4[0]);

        }
    }

    if(pid==0){ //child 2
        close(fd[1]);
        int s=0;
        while(read(fd[0],temp,1024)){
            s=s+atoi(temp);
        }
        close(fd[0]);
        write(fd2[1],&s,sizeof(s));
        close(fd2[1]);
    }

    return 0;}
```


fish /home/adiaux/ClassWork/OS/Lab/workspace
workspace) ./temp
Enter number or special char to exit 2
Enter number or special char to exit 3
Enter number or special char to exit 4
Enter number or special char to exit 5
Enter number or special char to exit &
Mean= 13.5¶
workspace)