OS_LAB_08_Assignment

CE_054

Aim :- Program to Implement a Basic shell in C programming Language.

Shell Code :-

```
    // Author : Dhruv B Kakadiya
// CE_054
// shell mini shell

#include<stdio.h>
#include<string.h>
#include<stdlib.h>
#include<unistd.h>
#include<sys/types.h>
#include<sys/wait.h>
#include<readline/readline.h>
#include<readline/history.h>

#define WRDLENMAX 200
#define CMDLENMAX 500

int getIpstr(char* ipstringarg)
{
    char* line;
    char cwd[512];
    getcwd(cwd, sizeof(cwd));
    printf("\n%s", cwd);

    line = readline(" $ ");
    if (strlen(line) != 0)
    {
        add_history(line);
        strcpy(ipstringarg, line);
        return 0;
    }
    else
    {
        return 1;
    }
}

void cmdExecutionWithoutPipe(char** parBeforePipeArgument)
{
```

```
    int pid = fork();
    int wst;
    if (pid == -1)
    {
        printf("\nError while creaating the child.\n");
        return;
    }
    else if (pid == 0)
    {
        if (execvp(parBeforePipeArgument[0], parBeforePipeArgument) < 0)
        {
            printf("\nError while executing the command.");
        }
        exit(0);
    }
    else
    {
        wait(&wst);
        return;
    }
}

void cmdExecutionWithPipe(char** parBeforePipeArgument, char** parAfterPipeArg
ument)
{
    int pid1, pid2, wst, pret, pipefd[2];
    pret = pipe(pipefd);
    if (pret < 0)
    {
        printf("\nError while creating the pipe.\n");
        return;
    }

    pid1 = fork();
    if (pid1 < 0)
    {
        printf("\n1_Error while creaating the child.");
        return;
    }

    if (pid1 == 0)
    {
        close(pipefd[0]);
        dup2(pipefd[1], STDOUT_FILENO);
        close(pipefd[1]);

        if (execvp(parBeforePipeArgument[0], parBeforePipeArgument) < 0)
        {
```

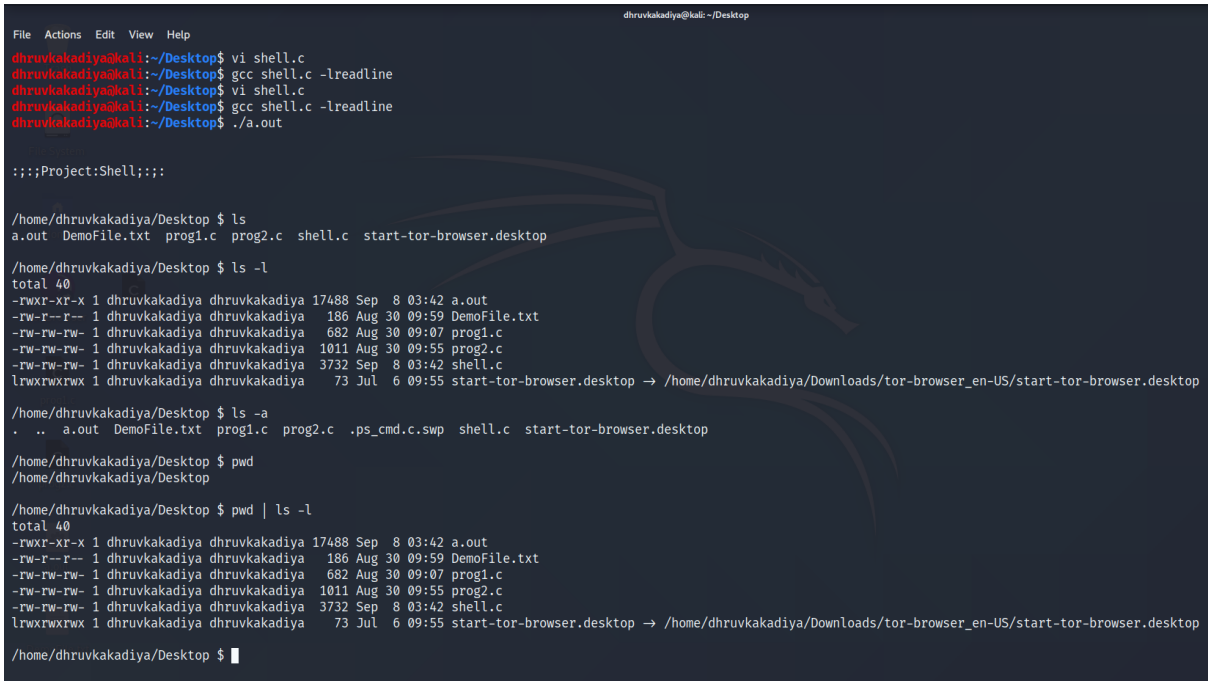
```
            printf("\n1_Error while executing the command.");
            exit(0);
        }
    }
    else
    {
        pid2 = fork();

        if (pid2 < 0)
        {
            printf("\n2_Error while creaating the child.");
            return;
        }

        if (pid2 == 0)
        {
            close(pipefd[1]);
            dup2(pipefd[0], STDIN_FILENO);
            close(pipefd[0]);

            if (execvp(parAfterPipeArgument[0], parAfterPipeArgument) < 0)
            {
                printf("\n2_Error while executing the command.");
                exit(0);
            }
        }
        else
        {
            wait(&wst);
            wait(&wst);
        }
    }
}


int pipeParsingFunc(char* ipstringarg, char** befAftPipeDuoArg)
{

    befAftPipeDuoArg[0] = strsep(&ipstringarg, "|");
    if (befAftPipeDuoArg[0] != NULL)
    {
        befAftPipeDuoArg[1] = strsep(&ipstringarg, "|");
    }

    if (befAftPipeDuoArg[1] != NULL)
    {
        return 1;
    }
    else
```

```
    {
        return 0;
    }
}

void parseWords(char* ipstringarg, char** parPipeArg)
{
    int i;

    for (i = 0; i < WRDLENMAX; i++)
    {
        parPipeArg[i] = strsep(&ipstringarg, " ");

        if (parPipeArg[i] == NULL)
        {
            break;
        }
        if (strlen(parPipeArg[i]) == 0)
        {
            i--;
        }
    }
}

int strProcess(char* ipstringarg, char** parBeforePipeArg, char** parAfterPipe
Arg)
{

    char* befAftPipeDuo[2];
    int cmdTypeRet = 0;

    cmdTypeRet = pipeParsingFunc(ipstringarg, befAftPipeDuo);

    if (cmdTypeRet)
    {
        parseWords(befAftPipeDuo[0], parBeforePipeArg);
        parseWords(befAftPipeDuo[1], parAfterPipeArg);

    }
    else
    {
        parseWords(ipstringarg, parBeforePipeArg);
    }

    return cmdTypeRet;
}

int main()
```

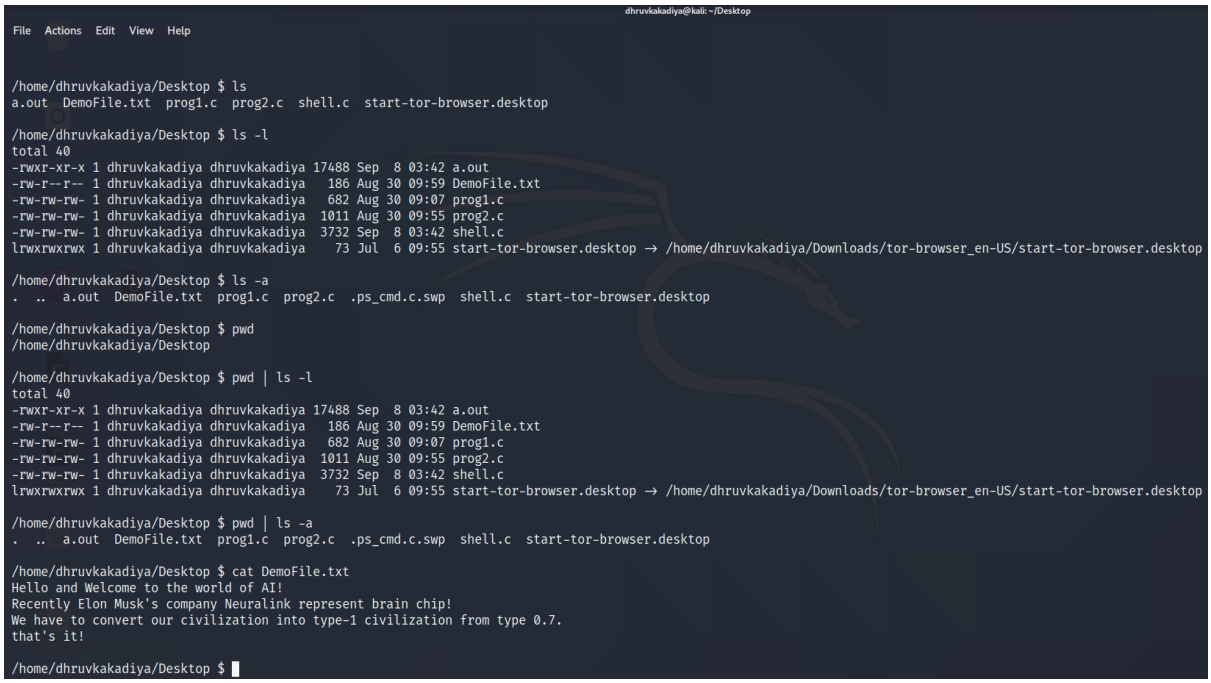
```
{
    char ipstring[CMDLENMAX], *parBeforePipe[WRDLENMAX];
    char* parAfterPipe[WRDLENMAX];
    int cmdType = 0;

        printf("\n\n:;:;Project:Shell;:;:\n\n");

    while (1)
    {
        if (getIpstr(ipstring))
        {
            continue;
        }

        cmdType = strProcess(ipstring, parBeforePipe, parAfterPipe);

        if(cmdType)
        {
                    cmdExecutionWithPipe(parBeforePipe, parAfterPipe);
        }
            else
        {
                    cmdExecutionWithoutPipe(parBeforePipe);
        }
    }
    return 0;
}
```

Outputs :-

1.


dhruvkakadiya@kali: ~/Desktop
File Actions Edit View Help
dhruvkakadiya@kali:~/Desktop$ vi shell.c
dhruvkakadiya@kali:~/Desktop$ gcc shell.c -lreadline
dhruvkakadiya@kali:~/Desktop$ vi shell.c
dhruvkakadiya@kali:~/Desktop$ gcc shell.c -lreadline
dhruvkakadiya@kali:~/Desktop$ ./a.out
:;:;Project:Shell;:;:
/home/dhruvkakadiya/Desktop $ ls
a.out DemoFile.txt prog1.c prog2.c shell.c start-tor-browser.desktop
/home/dhruvkakadiya/Desktop $ ls -l
total 40
-rwxr-xr-x 1 dhruvkakadiya dhruvkakadiya 17488 Sep 8 03:42 a.out
-rw-r--r-- 1 dhruvkakadiya dhruvkakadiya 186 Aug 30 09:59 DemoFile.txt
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 682 Aug 30 09:07 prog1.c
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 1011 Aug 30 09:55 prog2.c
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 3732 Sep 8 03:42 shell.c
lrwxrwxrwx 1 dhruvkakadiya dhruvkakadiya 73 Jul 6 09:55 start-tor-browser.desktop → /home/dhruvkakadiya/Downloads/tor-browser_en-US/start-tor-browser.desktop
/home/dhruvkakadiya/Desktop $ ls -a
. .. a.out DemoFile.txt prog1.c prog2.c .ps_cmd.c.swp shell.c start-tor-browser.desktop
/home/dhruvkakadiya/Desktop $ pwd
/home/dhruvkakadiya/Desktop
/home/dhruvkakadiya/Desktop $ pwd | ls -l
total 40
-rwxr-xr-x 1 dhruvkakadiya dhruvkakadiya 17488 Sep 8 03:42 a.out
-rw-r--r-- 1 dhruvkakadiya dhruvkakadiya 186 Aug 30 09:59 DemoFile.txt
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 682 Aug 30 09:07 prog1.c
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 1011 Aug 30 09:55 prog2.c
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 3732 Sep 8 03:42 shell.c
lrwxrwxrwx 1 dhruvkakadiya dhruvkakadiya 73 Jul 6 09:55 start-tor-browser.desktop → /home/dhruvkakadiya/Downloads/tor-browser_en-US/start-tor-browser.desktop
/home/dhruvkakadiya/Desktop $

2.


dhruvkakadiya@kali: ~/Desktop
File Actions Edit View Help
/home/dhruvkakadiya/Desktop $ ls
a.out DemoFile.txt prog1.c prog2.c shell.c start-tor-browser.desktop
/home/dhruvkakadiya/Desktop $ ls -l
total 40
-rwxr-xr-x 1 dhruvkakadiya dhruvkakadiya 17488 Sep 8 03:42 a.out
-rw-r--r-- 1 dhruvkakadiya dhruvkakadiya 186 Aug 30 09:59 DemoFile.txt
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 682 Aug 30 09:07 prog1.c
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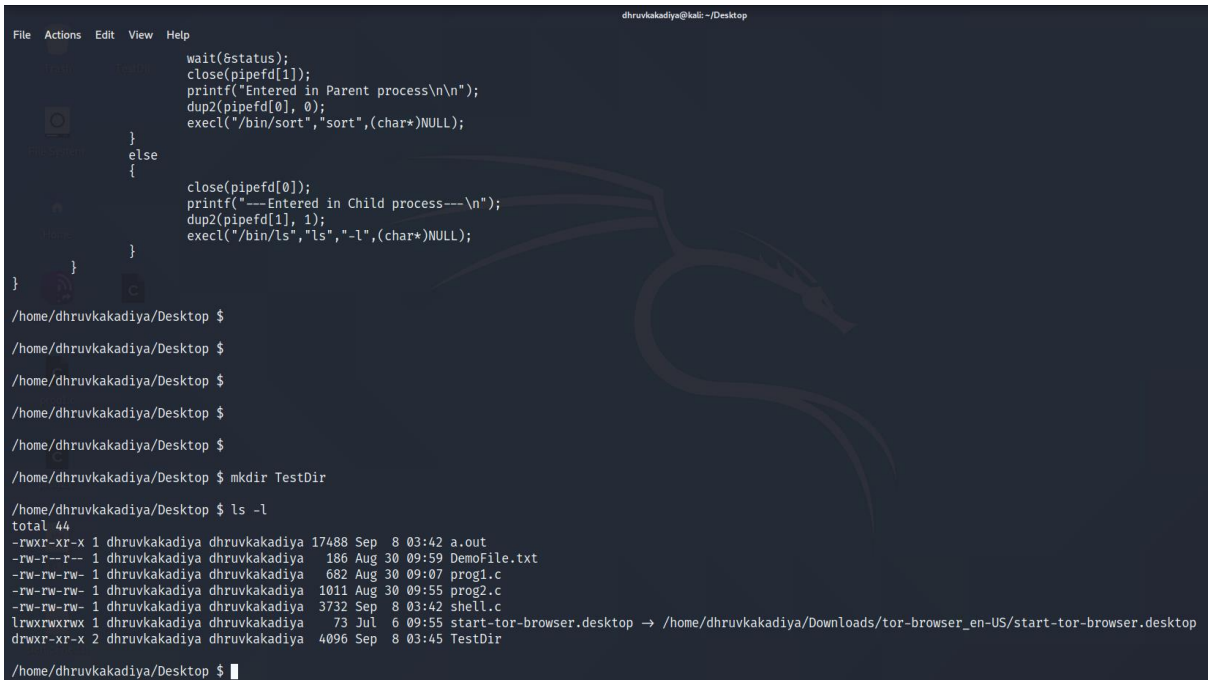
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 3732 Sep 8 03:42 shell.c
lrwxrwxrwx 1 dhruvkakadiya dhruvkakadiya 73 Jul 6 09:55 start-tor-browser.desktop → /home/dhruvkakadiya/Downloads/tor-browser_en-US/start-tor-browser.desktop
/home/dhruvkakadiya/Desktop $ ls -a
. .. a.out DemoFile.txt prog1.c prog2.c .ps_cmd.c.swp shell.c start-tor-browser.desktop
/home/dhruvkakadiya/Desktop $ pwd
/home/dhruvkakadiya/Desktop
/home/dhruvkakadiya/Desktop $ pwd | ls -l
total 40
-rwxr-xr-x 1 dhruvkakadiya dhruvkakadiya 17488 Sep 8 03:42 a.out
-rw-r--r-- 1 dhruvkakadiya dhruvkakadiya 186 Aug 30 09:59 DemoFile.txt
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 682 Aug 30 09:07 prog1.c
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 1011 Aug 30 09:55 prog2.c
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 3732 Sep 8 03:42 shell.c
lrwxrwxrwx 1 dhruvkakadiya dhruvkakadiya 73 Jul 6 09:55 start-tor-browser.desktop → /home/dhruvkakadiya/Downloads/tor-browser_en-US/start-tor-browser.desktop
/home/dhruvkakadiya/Desktop $ pwd | ls -a
. .. a.out DemoFile.txt prog1.c prog2.c .ps_cmd.c.swp shell.c start-tor-browser.desktop
/home/dhruvkakadiya/Desktop $ cat DemoFile.txt
Hello and Welcome to the world of AI!
Recently Elon Musk's company Neuralink represent brain chip!
We have to convert our civilization into type-1 civilization from type 0.7.
that's it!
/home/dhruvkakadiya/Desktop $

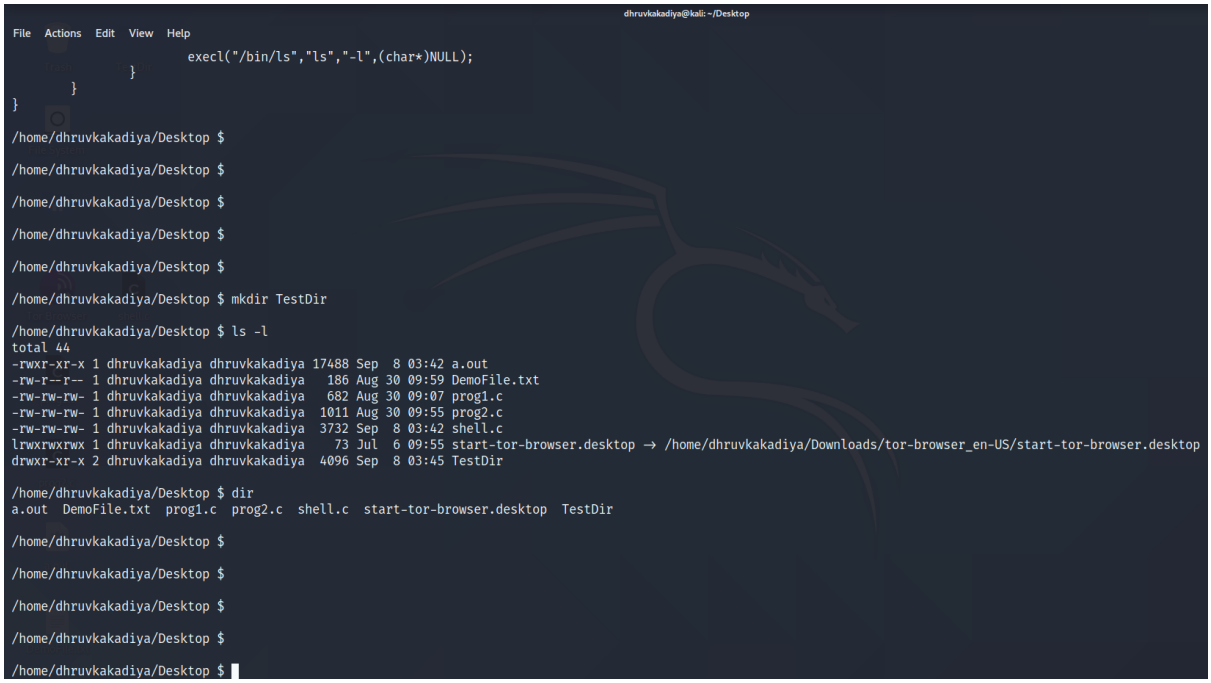
3.


dhruvkakadiya@kali: ~/Desktop
File Actions Edit View Help
/home/dhruvkakadiya/Desktop $ cat prog1.c
#include<stdio.h>
#include<unistd.h>
#include<sys/wait.h>
#include<sys/stat.h>
#include<fcntl.h>
#include<string.h>
void main()
{
int pid, pret, pipefd[2], status;
pret = pipe(pipefd);
if (pret == -1)
{
printf("\n\n Could not create pipe.\n\n");
}
else
{
pid = fork();
if (pid == -1)
{
printf("\n\n Could not create pipe.\n\n");
}
else if (pid > 0)
{
wait(&status);
close(pipefd[1]);
printf("Entered in Parent process\n\n");
dup2(pipefd[0], 0);
execl("/bin/sort","sort",(char*)NULL);
}
else
{
close(pipefd[0]);
printf("---Entered in Child process---\n");
dup2(pipefd[1], 1);
execl("/bin/ls","ls","-l",(char*)NULL);
}
}

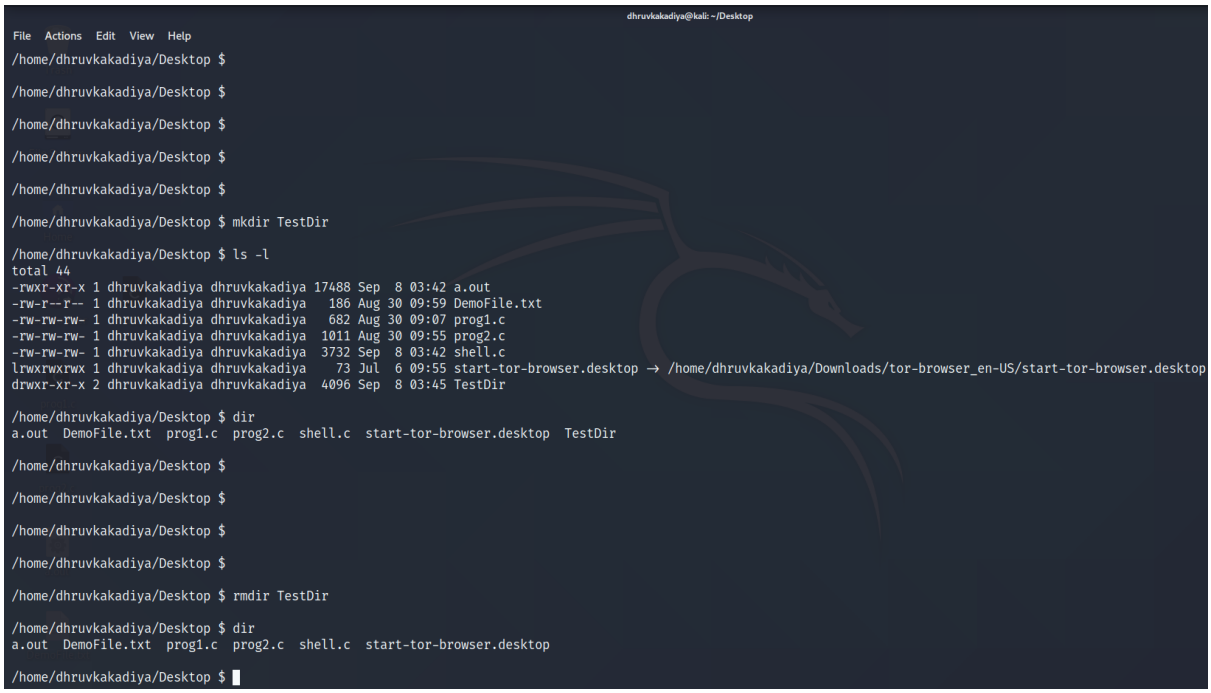
4.


dhruvkakadiya@kali: ~/Desktop
File Actions Edit View Help
wait(&status);
close(pipefd[1]);
printf("Entered in Parent process\n\n");
dup2(pipefd[0], 0);
execl("/bin/sort","sort",(char*)NULL);
}
else
{
close(pipefd[0]);
printf("---Entered in Child process---\n");
dup2(pipefd[1], 1);
execl("/bin/ls","ls","-l",(char*)NULL);
}
}
}
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $ mkdir TestDir
/home/dhruvkakadiya/Desktop $ ls -l
total 44
-rwxr-xr-x 1 dhruvkakadiya dhruvkakadiya 17488 Sep 8 03:42 a.out
-rw-r--r-- 1 dhruvkakadiya dhruvkakadiya 186 Aug 30 09:59 DemoFile.txt
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 682 Aug 30 09:07 prog1.c
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 1011 Aug 30 09:55 prog2.c
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 3732 Sep 8 03:42 shell.c
lrwxrwxrwx 1 dhruvkakadiya dhruvkakadiya 73 Jul 6 09:55 start-tor-browser.desktop → /home/dhruvkakadiya/Downloads/tor-browser_en-US/start-tor-browser.desktop
drwxr-xr-x 2 dhruvkakadiya dhruvkakadiya 4096 Sep 8 03:45 TestDir
/home/dhruvkakadiya/Desktop $

5.


dhruvkakadiya@kali: ~/Desktop
File Actions Edit View Help
execl("/bin/ls","ls","-l",(char*)NULL);
}
}
}
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $ mkdir TestDir
/home/dhruvkakadiya/Desktop $ ls -l
total 44
-rwxr-xr-x 1 dhruvkakadiya dhruvkakadiya 17488 Sep 8 03:42 a.out
-rw-r--r-- 1 dhruvkakadiya dhruvkakadiya 186 Aug 30 09:59 DemoFile.txt
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 682 Aug 30 09:07 prog1.c
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 1011 Aug 30 09:55 prog2.c
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 3732 Sep 8 03:42 shell.c
lrwxrwxrwx 1 dhruvkakadiya dhruvkakadiya 73 Jul 6 09:55 start-tor-browser.desktop → /home/dhruvkakadiya/Downloads/tor-browser_en-US/start-tor-browser.desktop
drwxr-xr-x 2 dhruvkakadiya dhruvkakadiya 4096 Sep 8 03:45 TestDir
/home/dhruvkakadiya/Desktop $ dir
a.out DemoFile.txt prog1.c prog2.c shell.c start-tor-browser.desktop TestDir
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $

6.


dhruvkakadiya@kali: ~/Desktop
File Actions Edit View Help
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $ mkdir TestDir
/home/dhruvkakadiya/Desktop $ ls -l
total 44
-rwxr-xr-x 1 dhruvkakadiya dhruvkakadiya 17488 Sep 8 03:42 a.out
-rw-r--r-- 1 dhruvkakadiya dhruvkakadiya 186 Aug 30 09:59 DemoFile.txt
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 682 Aug 30 09:07 prog1.c
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 1011 Aug 30 09:55 prog2.c
-rw-rw-rw- 1 dhruvkakadiya dhruvkakadiya 3732 Sep 8 03:42 shell.c
lrwxrwxrwx 1 dhruvkakadiya dhruvkakadiya 73 Jul 6 09:55 start-tor-browser.desktop → /home/dhruvkakadiya/Downloads/tor-browser_en-US/start-tor-browser.desktop
drwxr-xr-x 2 dhruvkakadiya dhruvkakadiya 4096 Sep 8 03:45 TestDir
/home/dhruvkakadiya/Desktop $ dir
a.out DemoFile.txt prog1.c prog2.c shell.c start-tor-browser.desktop TestDir
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $
/home/dhruvkakadiya/Desktop $ rmdir TestDir
/home/dhruvkakadiya/Desktop $ dir
a.out DemoFile.txt prog1.c prog2.c shell.c start-tor-browser.desktop
/home/dhruvkakadiya/Desktop $