```
psc@psc-virtual-machine:~$ ls
ex_lseek      ex_read      ex_user_read      moss.pl        공개        비디오
ex_lseek.c  ex_read.c  ex_user_read.c  mymsg.txt      다운로드    사진
ex_open      ex_user      ex_write        newfile.txt    문서        음악
ex_open.c    ex_user.c  ex_write.c        user.dat       바탕화면    템플릿
psc@psc-virtual-machine:~$ cat ex_open.c
#include <stdio.h>
#include <stdlib.h>
#include <fcntl.h>
#include <unistd.h>
#include <sys/stat.h>
#include <sys/types.h>

#define PERMS 0644

int main(void){
    int fd = 0;
    char * pathname = "./newfile.txt";

    fd = open(pathname, O_CREAT | O_RDWR, PERMS);

    if (fd == -1) {
        perror("open() error!");
        exit(-1);
    }

    printf("fd of %s is : %d", pathname, fd);

    close(fd);

    return 0;
}
psc@psc-virtual-machine:~$ ./ex_open
fd of ./newfile.txt is : 3psc@psc-virtual-machine:~$
```

```
psc@psc-virtual-machine:~$ ls
ex_lseek        ex_read        ex_user_read    moss.pl        공개        비디오
ex_lseek.c  ex_read.c  ex_user_read.c  mymsg.txt      다운로드  사진
ex_open         ex_user        ex_write        newfile.txt    문서        음악
ex_open.c   ex_user.c  ex_write.c      user.dat       바탕화면  템플릿
psc@psc-virtual-machine:~$ cat ex_read.c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <fcntl.h>
#include <unistd.h>
#include <sys/stat.h>
#include <sys/types.h>

#define PERMS 0644
#define MAX_BUF_SIZE 1024

int main(void) {
    int fd = 0;
    char * pathname = "./mymsg.txt";

    char buf[MAX_BUF_SIZE + 1] = { '\0', };
    ssize_t rsize = 0;
    ssize_t tsize = 0;

    fd = open(pathname, O_RDONLY, PERMS);
    if(fd == -1) {
        perror("open() error!");
        exit(-1);
    }

    do{
        memset(buf, '\0', MAX_BUF_SIZE + 1);
        rsize = read(fd, buf, MAX_BUF_SIZE);

        if (rsize == -1) {
            perror("read() error!");
            exit(-2);
        }

        printf("%s", buf);
        tsize += rsize;
    } while (rsize > 0);

    printf("fd: %d, total rsize: %ld \n", fd, tsize);

    close(fd);
```

```c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <fcntl.h>
#include <unistd.h>
#include <sys/stat.h>
#include <sys/types.h>

#define PERMS 0644
#define MAX_BUF_SIZE 1024

int main(void) {
    int fd = 0;
    char * pathname = "./mymsg.txt";

    char buf[MAX_BUF_SIZE + 1] = { '\0', };
    ssize_t rsize = 0;
    ssize_t tsize = 0;

    fd = open(pathname, O_RDONLY, PERMS);
    if(fd == -1) {
        perror("open() error!");
        exit(-1);
    }

    do{
        memset(buf, '\0', MAX_BUF_SIZE + 1);
        rsize = read(fd, buf, MAX_BUF_SIZE);

        if (rsize == -1) {
            perror("read() error!");
            exit(-2);
        }

        printf("%s", buf);
        tsize += rsize;
    } while (rsize > 0);

    printf("fd: %d, total rsize: %ld \n", fd, tsize);

    close(fd);

    return 0;
}
```

```
psc@psc-virtual-machine:~$ ./ex_read
Hello World!Bonjour!
fd: 3, total rsize: 21
psc@psc-virtual-machine:~$
```

```
psc@psc-virtual-machine:~$ ls
ex_lseek      ex_read       ex_user_read    moss.pl       공개      비디오
ex_lseek.c  ex_read.c  ex_user_read.c  mymsg.txt     다운로드  사진
ex_open       ex_user       ex_write        newfile.txt   문서      음악
ex_open.c    ex_user.c  ex_write.c      user.dat      바탕화면  템플릿
psc@psc-virtual-machine:~$ cat ex_write.c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <fcntl.h>
#include <unistd.h>
#include <sys/stat.h>
#include <sys/types.h>

#define PERMS 0644

int main(void) {
    int fd = 0;
    char * pathname = "./mymsg.txt";
    char * msg = "Hello World!";
    ssize_t wsize = 0;
    fd = open(pathname, O_CREAT | O_TRUNC | O_RDWR, PERMS);

    if(fd == -1) {
        perror("open() error!");
        exit(-1);
    }

    wsize = write(fd, (char *)msg, strlen(msg));
    if(fd == -1) {
        perror("write() error!");
        exit(-2);
    }

    printf("fd: %d, wsize: %ld \n", fd, wsize);

    close(fd);

    return 0;
}
psc@psc-virtual-machine:~$ ./ex_write
fd: 3, wsize: 12
psc@psc-virtual-machine:~$
```

```
psc@psc-virtual-machine:~$ ls
ex_lseek      ex_read      ex_user_read    moss.pl      공개      비디오
ex_lseek.c    ex_read.c    ex_user_read.c  mymsg.txt    다운로드  사진
ex_open       ex_user      ex_write        newfile.txt  문서      음악
ex_open.c     ex_user.c    ex_write.c      user.dat     바탕화면  템플릿
psc@psc-virtual-machine:~$ cat ex_user.c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <fcntl.h>
#include <unistd.h>
#include <sys/stat.h>
#include <sys/types.h>

#define PERMS 0644
#define MAX_NAME_SIZE 32

struct __User {
    char name[MAX_NAME_SIZE + 1];
    int age;
};
typedef struct __User User;

int main(void) {
    int fd = 0;
    char * pathName = "./user.dat";

    ssize_t wSize = 0;

    char userName[MAX_NAME_SIZE + 1] = {'\0',};
    int userAge = 0;

    User * user = (User *)malloc(sizeof(User));
    memset(user->name, '\0', MAX_NAME_SIZE + 1);
    user->age = 0;

    printf("Name: ");
    scanf("%[^\n]", userName);
    strcpy(user->name, userName);

    printf("Age: ");
    scanf("%d", &userAge);
    user->age = userAge;

    fd = open(pathName, O_CREAT | O_TRUNC | O_RDWR, PERMS);
    if(fd == -1) {
        perror("open() error!");
        exit(-1);
```

```
typedef struct __User User;

int main(void) {
    int fd = 0;
    char * pathName = "./user.dat";

    ssize_t wSize = 0;

    char userName[MAX_NAME_SIZE + 1] = {'\0',};
    int userAge = 0;

    User * user = (User *)malloc(sizeof(User));
    memset(user->name, '\0', MAX_NAME_SIZE + 1);
    user->age = 0;

    printf("Name: ");
    scanf("%[^\n]", userName);
    strcpy(user->name, userName);

    printf("Age: ");
    scanf("%d", &userAge);
    user->age = userAge;

    fd = open(pathName, O_CREAT | O_TRUNC | O_RDWR, PERMS);
    if(fd == -1) {
        perror("open() error!");
        exit(-1);
    }

    wSize = write(fd, (User *)user, sizeof(User));
    if (wSize == -1) {
        perror("write() error!");
        exit(-2);
    }

    printf("fd: %d, wSize: %ld \n", fd, wSize);

    close(fd);
    free(user);

    return 0;
}

psc@psc-virtual-machine:~$ ./ex_user
Name: park sang cheon
Age: 21
fd: 3, wSize: 40
psc@psc-virtual-machine:~$
```

```
psc@psc-virtual-machine:~$ ls
ex_lseek      ex_read      ex_user_read    moss.pl       공개        비디오
ex_lseek.c  ex_read.c   ex_user_read.c  mymsg.txt     다운로드   사진
ex_open       ex_user      ex_write        newfile.txt   문서        음악
ex_open.c   ex_user.c   ex_write.c      user.dat      바탕화면   템플릿
psc@psc-virtual-machine:~$ cat ex_user_read.c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <fcntl.h>
#include <unistd.h>
#include <sys/stat.h>
#include <sys/types.h>

#define PERMS 0644
#define MAX_NAME_SIZE 32

struct __User {
    char name[MAX_NAME_SIZE + 1];
    int age;
};
typedef struct __User User;

int main(void){
    int fd = 0;
    char * pathName = "./user.dat";
    ssize_t rSize = 0;

    User * user = (User *)malloc(sizeof(User));
    memset(user->name, '\0', MAX_NAME_SIZE + 1);
    user->age = 0;

    fd = open(pathName, O_RDONLY, PERMS);
    if (fd == -1) {
        perror("open() error!");
        exit(-1);
    }

    rSize = read(fd, (User *)user, sizeof(User));
    if (rSize == -1) {
        perror("read() error!");
        exit(-2);
    }
    printf("fd: %d, rSize: %ld \n", fd, rSize);

    printf("User Name: %s, Age: %d \n", user->name, user->age);

    close(fd);
```

```c
#include <string.h>
#include <fcntl.h>
#include <unistd.h>
#include <sys/stat.h>
#include <sys/types.h>

#define PERMS 0644
#define MAX_NAME_SIZE 32

struct __User {
    char name[MAX_NAME_SIZE + 1];
    int age;
};
typedef struct __User User;

int main(void){
    int fd = 0;
    char * pathName = "./user.dat";
    ssize_t rSize = 0;

    User * user = (User *)malloc(sizeof(User));
    memset(user->name, '\0', MAX_NAME_SIZE + 1);
    user->age = 0;

    fd = open(pathName, O_RDONLY, PERMS);
    if (fd == -1) {
        perror("open() error!");
        exit(-1);
    }

    rSize = read(fd, (User *)user, sizeof(User));
    if (rSize == -1) {
        perror("read() error!");
        exit(-2);
    }
    printf("fd: %d, rSize: %ld \n", fd, rSize);

    printf("User Name: %s, Age: %d \n", user->name, user->age);

    close(fd);
    free(user);

    return 0;
}
```

```
psc@psc-virtual-machine:~$ ./ex_user_read
fd: 3, rSize: 40
User Name: park sang cheon, Age: 21
psc@psc-virtual-machine:~$
```

```
psc@psc-virtual-machine:~$ ls
ex_lseek      ex_read      ex_user_read    moss.pl        공개        비디오
ex_lseek.c  ex_read.c  ex_user_read.c  mymsg.txt      다운로드   사진
ex_open       ex_user      ex_write        newfile.txt   문서        음악
ex_open.c   ex_user.c  ex_write.c      user.dat       바탕화면   템플릿
psc@psc-virtual-machine:~$ cat ex_lseek.c
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <fcntl.h>
#include <unistd.h>
#include <sys/stat.h>
#include <sys/types.h>

#define PERMS 0644
#define MAX_BUF_SIZE 32

int main(void) {
    int fd = 0;
    char * pathName ="./mymsg.txt";

    ssize_t wSize = 0;

    char msg[MAX_BUF_SIZE + 1] = "Bonjour!";

    fd = open(pathName, O_RDWR);
    if(fd == -1) {
        perror("open() error!");
        exit(-1);
    }

    lseek(fd, (off_t)0, SEEK_END);

    wSize = write(fd, (char *)msg, strlen(msg));
    if (wSize == -1) {
        perror("write() error!");
        exit(-2);
    }

    printf("fd: %d, wSize: %ld \n", fd, wSize);

    close(fd);

    return 0;
}
psc@psc-virtual-machine:~$ ./ex_lseek
fd: 3, wSize: 8
psc@psc-virtual-machine:~$
```