

## Lab 4 - File System

**1. Write a program to find the inode number of an existing file in a directory. Take the input as a filename and print the inode number of the file.**

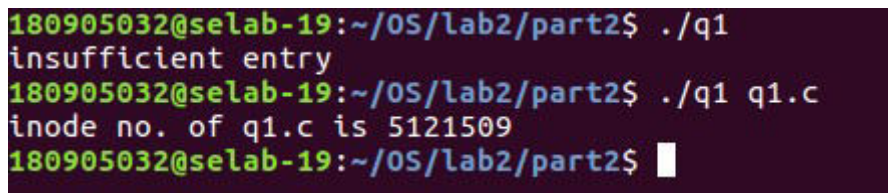
**Code:**

```
#include <stdio.h>
#include <stdlib.h>
#include <sys/types.h>
#include <sys/stat.h>
#include <errno.h>
#include <unistd.h>

int main(int argc, char const *argv[])
{
    struct stat buf;
    if(argc<2){
        printf("insufficient entry\n");
        exit(1);
    }
    if(stat(argv[1],&buf)==-1){
        printf("error creating stat\n");
        exit(1);
    }
    printf("inode no. of %s is %ld\n",argv[1],buf.st_ino);

    return 0;
}
```

**O/P:**



```
180905032@selab-19:~/OS/lab2/part2$ ./q1
insufficient entry
180905032@selab-19:~/OS/lab2/part2$ ./q1 q1.c
inode no. of q1.c is 5121509
180905032@selab-19:~/OS/lab2/part2$
```

**2. Write a program to print out the complete stat structure of a file.**

**Code:**

```
#include <stdio.h>
#include <stdlib.h>
#include <sys/types.h>
#include <sys/stat.h>
#include <errno.h>
```

```

#include <time.h>

int main(int argc, char const *argv[])
{
    struct stat buf;
    if(argc<2){
        printf("insufficient entry\n");
        exit(1);
    }
    if(stat(argv[1],&buf)==-1){
        perror("fstat");
        exit(1);
    }

    printf("For the file %s struct stat is printed:\n\n",argv[1]);

    printf("-> ID of device is %ld\n",buf.st_dev);
    printf("-> inode no. %ld\n",buf.st_ino);
    printf("-> Permissions : %d\n",buf.st_mode);
    printf("-> No. of hard links : %ld\n",buf.st_nlink);
    printf("-> User id of owner : %d\n",buf.st_uid);
    printf("-> Group id of owner : %d\n",buf.st_gid);
    printf("-> Device id(special file) : %ld\n",buf.st_rdev);
    printf("-> Total size : %ld\n",buf.st_size);
    printf("-> Blocksize : %ld\n",buf.st_blksize);
    printf("-> No. of blocks : %ld\n",buf.st_blocks);
    printf("-> Last Access Time: %ld : %s\n",buf.st_atime,ctime(&(buf.st_atime)));
    printf("-> Last Modification Time: %ld : %s\n",buf.st_mtime,ctime(&(buf.st_mtime)));
    printf("-> Last Status Change Time: %ld : %s\n",buf.st_ctime,ctime(&(buf.st_ctime)));

    return 0;
}

```

**O/P:**

```

180905032@selab-19:~/OS/lab2/part2$ cc -o q2 q2.c
180905032@selab-19:~/OS/lab2/part2$ ./q2 q1.c
For the file q1.c struct stat is printed:

-> ID of device is 2054
-> inode no. 5121509
-> Permissions : 33204
-> No. of hard links : 1
-> User id of owner : 1006
-> Group id of owner : 1006
-> Device id(special file) : 0
-> Total size : 391
-> Blocksize : 4096
-> No. of blocks : 8
-> Last Access Time: 1607762334 : Sat Dec 12 14:08:54 2020

-> Last Modification Time: 1607762417 : Sat Dec 12 14:10:17 2020

-> Last Status Change Time: 1607762417 : Sat Dec 12 14:10:17 2020

180905032@selab-19:~/OS/lab2/part2$ █

```

**3. Write a program to create a new hard link to an existing file and unlink the same. Accept the old path as input and print the newpath.**

**Code:**

```
#include <stdio.h>
#include <stdlib.h>
#include <sys/types.h>
#include <sys/stat.h>
#include <errno.h>
#include <unistd.h>

int main(int argc, char const *argv[])
{
    int ret;

    if(argc<2){
        printf("insufficient entry\n");
        exit(1);
    }
    printf("before link\n");
    system("ls -il");

    ret = link(argv[1], "./newhardlink");
    if(ret){
        perror("link");
        exit(1);
    }

    printf("after link\n");
    system("ls -il");

    ret=unlink("./newhardlink");

    if(ret){
        perror("unlink");
        exit(1);
    }

    printf("unlinked new path\n");
    system("ls -il");

    return 0;
}
```

**O/P:**

```

180905032@selab-19:~/05/lab2/part2$ ./q3 ./q1.c
before link
total 132
5121555 -rw-rw-r-- 1 180905032 180905032 8872 Dec 12 14:08 q1
5121509 -rw-rw-r-- 1 180905032 180905032 391 Dec 12 14:10 q1.c
5122553 -rw-rw-r-- 1 180905032 180905032 20111 Dec 12 14:09 q1.png
5121497 -rw-rw-r-- 1 180905032 180905032 8976 Dec 12 14:30 q2
5122679 -rw-rw-r-- 1 180905032 180905032 1147 Dec 12 14:29 q2.c
5116990 -rw-rw-r-- 1 180905032 180905032 59958 Dec 12 14:30 q2.png
5121542 -rw-rw-r-- 1 180905032 180905032 8840 Dec 12 15:40 q3
5121830 -rw-rw-r-- 1 180905032 180905032 605 Dec 12 15:40 q3.c
5122682 -rw-rw-r-- 1 180905032 180905032 515 Dec 12 14:50 q4.c
after link
total 136
5121509 -rw-rw-r-- 2 180905032 180905032 391 Dec 12 14:10 newhardlink
5121555 -rw-rw-r-- 1 180905032 180905032 8872 Dec 12 14:08 q1
5121509 -rw-rw-r-- 2 180905032 180905032 391 Dec 12 14:10 q1.c
5122553 -rw-rw-r-- 1 180905032 180905032 20111 Dec 12 14:09 q1.png
5121497 -rw-rw-r-- 1 180905032 180905032 8976 Dec 12 14:30 q2
5122679 -rw-rw-r-- 1 180905032 180905032 1147 Dec 12 14:29 q2.c
5116990 -rw-rw-r-- 1 180905032 180905032 59958 Dec 12 14:30 q2.png
5121542 -rw-rw-r-- 1 180905032 180905032 8840 Dec 12 15:40 q3
5121830 -rw-rw-r-- 1 180905032 180905032 605 Dec 12 15:40 q3.c
5122682 -rw-rw-r-- 1 180905032 180905032 515 Dec 12 14:50 q4.c
unlinked new path
total 132
5121555 -rw-rw-r-- 1 180905032 180905032 8872 Dec 12 14:08 q1
5121509 -rw-rw-r-- 1 180905032 180905032 391 Dec 12 14:10 q1.c
5122553 -rw-rw-r-- 1 180905032 180905032 20111 Dec 12 14:09 q1.png
5121497 -rw-rw-r-- 1 180905032 180905032 8976 Dec 12 14:30 q2
5122679 -rw-rw-r-- 1 180905032 180905032 1147 Dec 12 14:29 q2.c
5116990 -rw-rw-r-- 1 180905032 180905032 59958 Dec 12 14:30 q2.png
5121542 -rw-rw-r-- 1 180905032 180905032 8840 Dec 12 15:40 q3
5121830 -rw-rw-r-- 1 180905032 180905032 605 Dec 12 15:40 q3.c
5122682 -rw-rw-r-- 1 180905032 180905032 515 Dec 12 14:50 q4.c
180905032@selab-19:~/05/lab2/part2$

```

**4. Write a program to create a new soft link to an existing file and unlink the same. Accept the old path as input and print the newpath.**

**Code:**

```

#include <stdio.h>
#include <stdlib.h>
#include <sys/types.h>
#include <sys/stat.h>
#include <errno.h>
#include <unistd.h>

int main(int argc, char const *argv[])
{
    int ret;

    if(argc<2){
        printf("insufficient entry\n");
        exit(1);
    }
    printf("before link\n");
    system("ls -il");
    ret = symlink(argv[1], "./softlink");
    if(ret){
        perror("symlink");
        exit(1);
    }
    printf("after link\n");
    system("ls -il");
}

```

```

ret=unlink("./softlink");

if(ret){
    perror("unlink");
    exit(1);
}

printf("unlinked new path\n");
system("ls -il");

return 0;
}

```

**O/P:**

```

180905032@selab-19:~/OS/lab2/part2$ cc -o q4 q4.c
180905032@selab-19:~/OS/lab2/part2$ ./q4 ./q1.c
before link
total 272
5121555 -rwxrwxr-x 1 180905032 180905032 8872 Dec 12 14:08 q1
5121509 -rw-rw-r-- 1 180905032 180905032 391 Dec 12 14:10 q1.c
5122553 -rw-rw-r-- 1 180905032 180905032 20111 Dec 12 14:09 q1.png
5121497 -rwxrwxr-x 1 180905032 180905032 8976 Dec 12 14:30 q2
5122679 -rw-rw-r-- 1 180905032 180905032 1147 Dec 12 14:29 q2.c
5116990 -rw-rw-r-- 1 180905032 180905032 59958 Dec 12 14:30 q2.png
5121542 -rwxrwxr-x 1 180905032 180905032 8840 Dec 12 15:40 q3
5121830 -rw-rw-r-- 1 180905032 180905032 605 Dec 12 15:40 q3.c
5123047 -rw-rw-r-- 1 180905032 180905032 129073 Dec 12 15:41 q3.png
5122713 -rwxrwxr-x 1 180905032 180905032 8856 Dec 12 15:43 q4
5122682 -rw-rw-r-- 1 180905032 180905032 597 Dec 12 15:43 q4.c
after link
total 272
5121555 -rwxrwxr-x 1 180905032 180905032 8872 Dec 12 14:08 q1
5121509 -rw-rw-r-- 1 180905032 180905032 391 Dec 12 14:10 q1.c
5122553 -rw-rw-r-- 1 180905032 180905032 20111 Dec 12 14:09 q1.png
5121497 -rwxrwxr-x 1 180905032 180905032 8976 Dec 12 14:30 q2
5122679 -rw-rw-r-- 1 180905032 180905032 1147 Dec 12 14:29 q2.c
5116990 -rw-rw-r-- 1 180905032 180905032 59958 Dec 12 14:30 q2.png
5121542 -rwxrwxr-x 1 180905032 180905032 8840 Dec 12 15:40 q3
5121830 -rw-rw-r-- 1 180905032 180905032 605 Dec 12 15:40 q3.c
5123047 -rw-rw-r-- 1 180905032 180905032 129073 Dec 12 15:41 q3.png
5122713 -rwxrwxr-x 1 180905032 180905032 8856 Dec 12 15:43 q4
5122682 -rw-rw-r-- 1 180905032 180905032 597 Dec 12 15:43 q4.c
5122979 lrwxrwxrwx 1 180905032 180905032 6 Dec 12 15:43 softlink -> ./q1.c
unlinked new path
total 272
5121555 -rwxrwxr-x 1 180905032 180905032 8872 Dec 12 14:08 q1
5121509 -rw-rw-r-- 1 180905032 180905032 391 Dec 12 14:10 q1.c
5122553 -rw-rw-r-- 1 180905032 180905032 20111 Dec 12 14:09 q1.png
5121497 -rwxrwxr-x 1 180905032 180905032 8976 Dec 12 14:30 q2
5122679 -rw-rw-r-- 1 180905032 180905032 1147 Dec 12 14:29 q2.c
5116990 -rw-rw-r-- 1 180905032 180905032 59958 Dec 12 14:30 q2.png
5121542 -rwxrwxr-x 1 180905032 180905032 8840 Dec 12 15:40 q3
5121830 -rw-rw-r-- 1 180905032 180905032 605 Dec 12 15:40 q3.c
5123047 -rw-rw-r-- 1 180905032 180905032 129073 Dec 12 15:41 q3.png
5122713 -rwxrwxr-x 1 180905032 180905032 8856 Dec 12 15:43 q4
5122682 -rw-rw-r-- 1 180905032 180905032 597 Dec 12 15:43 q4.c
180905032@selab-19:~/OS/lab2/part2$

```