```c
/* LEITURA DE PASSWORD, SEM ECOAR CARACTER LIDO */

#include <termios.h>
#include <unistd.h>
#include <string.h>

#define MAX_PASSWD_LEN 20

int main(void)
{
 struct termios term, oldterm;
 int i;
 char pass[MAX_PASSWD_LEN+1], ch, echo = '*';

 write(STDOUT_FILENO, "\nPassword? ", 11);

 tcgetattr(STDIN_FILENO, &oldterm);
 term = oldterm;
 term.c_lflag &= ~(ECHO | ECHOE | ECHOK | ECHONL | ICANON);
 tcsetattr(STDIN_FILENO, TCSAFLUSH, &term);

 i=0;
 while (i < MAX_PASSWD_LEN && read(STDIN_FILENO, &ch, 1) &&
        ch != '\n') {
  pass[i++] = ch;
  write(STDOUT_FILENO, &echo, 1);
 }
 pass[i] = 0;

 tcsetattr(STDIN_FILENO, TCSANOW, &oldterm);

 write(STDOUT_FILENO, "\n\nPassword: ", 12);
 write(STDOUT_FILENO, pass, strlen(pass));
 write(STDOUT_FILENO, "\n", 1);

 return 0;
}

/* RESULTADOS DE EXECUÇÃO:
pinguim> readpass

Password? *****

Password: 12345
pinguim> readpass

Password? ********************

Password: 12345678901234567890          <- atingiu 20 caracteres
```

```c
/* COPIA FICHEIRO */
/* USO: copy source destination */

#include <stdio.h>
#include <unistd.h>
#include <fcntl.h>
#include <errno.h>

#define BUFFER_SIZE 512

int main(int argc, char *argv[])
{
 int fd1, fd2, nr, nw;
 unsigned char buffer[BUFFER_SIZE];

 if (argc != 3) {
  printf("Usage: %s <source> <destination>\n", argv[0]);
  return 1;
 }
 fd1 = open(argv[1], O_RDONLY);
 if (fd1 == -1) {
  perror(argv[1]);
  return 2;
 }
 fd2 = open(argv[2], O_WRONLY | O_CREAT | O_EXCL, 0644);
 if (fd2 == -1) {
  perror(argv[2]);
  close(fd1);
  return 3;
 }
 while ((nr = read(fd1, buffer, BUFFER_SIZE)) > 0)
  if ((nw = write(fd2, buffer, nr)) <= 0 || nw != nr) {
   perror(argv[2]);
   close(fd1);
   close(fd2);
   return 4;
  }
  close(fd1);
  close(fd2);
  return 0;
}
```

```c
/* COPIA FICHEIRO p/ECRAN OU p/OUTRO FICHEIRO */
/* USO:
   - MOSTRAR NO ÉCRAN --------> copy source
   - COPIAR P/OUTRO FICHEIRO -> copy source destination
*/

#include <stdio.h>
#include <unistd.h>
#include <fcntl.h>
#include <errno.h>

#define BUFFER_SIZE 512

int main(int argc, char *argv[])
{
 int fd1, fd2, nr, nw;
 unsigned char buffer[BUFFER_SIZE];

 if ((argc != 2) && (argc != 3)) {
  printf("Usage: %s <source>  OR  %s <source> <destination>\n",
          argv[0], argv[0]);
  return 1;
 }
 fd1 = open(argv[1], O_RDONLY);
 if (fd1 == -1) {
  perror(argv[1]);
  return 2;
 }
 if (argc == 3) {
  fd2 = open(argv[2], O_WRONLY | O_CREAT | O_EXCL, 0644);
  if (fd2 == -1) {
   perror(argv[2]);
   close(fd1);
   return 3;
  }
  dup2(fd2,STDOUT_FILENO);
 }
 while ((nr = read(fd1, buffer, BUFFER_SIZE)) > 0)
  if ((nw = write(STDOUT_FILENO, buffer, nr)) <= 0 || nw != nr) {
   perror(argv[2]);
   close(fd1);
   close(fd2);
   return 4;
  }
  close(fd1);
  if (argc == 3)
   close(fd2);
  return 0;
}
```

```c
/* LISTAR FICHEIROS REGULARES DE UM DIRECTÓRIO */
/* USO: listdir dirname */

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

int main(int argc, char *argv[])
{
 DIR *dir;
 int line;
 struct dirent *dentry;
 struct stat stat_entry;

 if (argc != 2) {
  printf("Usage: %s <dir_path>\n", argv[0]);
  return 1;
 }
 if ((dir = opendir(argv[1])) == NULL) {
  perror(argv[1]);
  return 2;
 }

 chdir(argv[1]);

 printf("Ficheiros regulares do directorio '%s'\n", argv[1]);
 line = 1;
 while ((dentry = readdir(dir)) != NULL) {
  stat(dentry->d_name, &stat_entry);
  if (S_ISREG(stat_entry.st_mode)) {
   printf("%-25s%12d%3d\n", dentry->d_name,
          (int)stat_entry.st_size,(int)stat_entry.st_nlink);
   if (line++ % 20 == 0) {
     printf("Press <enter> to continue");
     getchar();
   }
  }
 }
 return 0;
}
```

```
/* RESULTADO DE EXECUÇÃO:

pinguim> listdir .
Ficheiros regulares do directorio '.'
p1.c                                754  1
p2.c                                795  1
p3.c                                940  1
p4a.c                               909  1
p4b.c                              1050  1
p1                                11307  1
p2                                11484  1
p4a                               11739  1
p4b                               11934  1
p2.txt                              795  1
p3                                11596  1
p3.txt                              940  1
p1a.c                               810  1
p1a                               11308  1
pinguim> ln p2.txt p2link
pinguim> listdir .
Ficheiros regulares do directorio '.'
p1.c                                754  1
p2.c                                795  1
p3.c                                940  1
p4a.c                               909  1
p4b.c                              1050  1
p1                                11307  1
p2                                11484  1
p4a                               11739  1
p4b                               11934  1
p2.txt                              795  2         <--- NOTAR
p3                                11596  1
p3.txt                              940  1
p1a.c                               810  1
p1a                               11308  1
p2link                              795  2         <--- NOTAR
pinguim>
*/
```

```c
/* LISTAR FICHEIROS REGULARES E SUB-DIRECTÓRIOS DE UM DIRECTÓRIO */
/* USO: listdir2 dirname */

#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <dirent.h>
#include <sys/stat.h>
#include <errno.h>

int main(int argc, char *argv[])
{
 DIR *dirp;
 struct dirent *direntp;
 struct stat stat_buf;
 char *str;
 char name[200];

 if (argc != 2)
 {
  fprintf( stderr, "Usage: %s dir_name\n", argv[0]);
  exit(1);
 }

 if ((dirp = opendir( argv[1])) == NULL)
 {
  perror(argv[1]);
  exit(2);
 }

 while ((direntp = readdir( dirp)) != NULL)
 {
  sprintf(name,"%s/%s",argv[1],direntp->d_name); // <----- NOTAR
                         // alternativa a chdir(); ex: anterior
  if (lstat(name, &stat_buf)==-1)   // testar com stat()
  {
   perror("lstat ERROR");
   exit(3);
  }
  //      printf("%10d - ",(int) stat_buf.st_ino);
  if (S_ISREG(stat_buf.st_mode)) str = "regular";
  else if (S_ISDIR(stat_buf.st_mode)) str = "directory";
  else str = "other";
  printf("%-25s - %s\n", direntp->d_name, str);
 }

 closedir(dirp);
 exit(0);
}
```

```
/* RESULTADOS :


pinguim> gcc listdir2.c -o listdir2 -Wall     <--- programa que usa lstat()
pinguim> listdir2 ..

pinguim> ls .. -lai
total 36
 768201 drwxrwxr-x    7 ... ...   4096 Sep 26 23:47 .
 670454 drwxrwxr-x    6 ... ...   4096 Sep 21 23:12 ..
 198097 drwxrwxr-x    2 ... ...   4096 Sep 26 22:09 d1
 198121 drwxrwxr-x    3 ... ...   4096 Sep 26 22:16 d2
 165546 drwxrwxr-x    2 ... ...   4096 Sep 26 22:23 examples
 768210 -rw-rw-r--    1 ... ...   3329 Sep 26 22:24 ln.txt
 654158 drwxrwxr-x    2 ... ...   4096 Sep 26 23:49 probs_01
 768202 drwxrwxr-x    2 ... ...   4096 Sep 26 17:02 probs_02
 198122 -rw-------    2 ... ...    912 Sep 26 17:03 t1.c                 <---HARD LINK
 768211 lrwxrwxrwx    1 ... ...     11 Sep 26 23:47 t2.c -> d2/f2_1.txt   <---SYMBOLIC LINK

pinguim> listdir2 ..
.                          - directory
..                         - directory
t1.c                       - regular
probs_02                   - directory
d1                         - directory
d2                         - directory
examples                   - directory
ln.txt                     - regular
probs_01                   - directory
t2.c                       - other        <--- NOTAR




pinguim> gcc listdir2.c -o listdir2-Wall    <---  usando stat(), em vez de lstat()

pinguim> listdir2 ..
.                          - directory
..                         - directory
t1.c                       - regular     <--- NOTAR
probs_02                   - directory
d1                         - directory
d2                         - directory
examples                   - directory
ln.txt                     - regular
probs_01                   - directory
t2.c                       - regular     <--- NOTAR: o fich. apontado, d2/f2_1.txt, é "regular"

pinguim>


*/
```

HARD LINKS & SYMBOLIC LINKS

```
pinguim> ls
d1  d2  Probs_01  Probs_02

pinguim> ls -lai
total 24
 768201 drwxrwxr-x    6   ... ...   4096 Sep 26 22:07 .
 670454 drwxrwxr-x    6   ... ...   4096 Sep 21 23:12 ..
 198097 drwxrwxr-x    2   ... ...   4096 Sep 26 22:09 d1
 198121 drwxrwxr-x    3   ... ...   4096 Sep 26 22:16 d2
 654158 drwxrwxr-x    2   ... ...   4096 Sep 26 17:01 Probs_01
 768202 drwxrwxr-x    2   ... ...   4096 Sep 26 17:02 Probs_02

pinguim> ls d1 -lai
total 20
 198097 drwxrwxr-x    2   ... ...   4096 Sep 26 22:09 .
 768201 drwxrwxr-x    6   ... ...   4096 Sep 26 22:07 ..
 198122 -rw-------    1   ... ...    912 Sep 26 17:03 p1_1.c
 198123 -rw-------    1   ... ...    795 Sep 26 17:03 p1_2.c
 198124 -rw-------    1   ... ...    956 Sep 26 17:03 p1_3.c

pinguim> ls d2 -lai
total 20
 198121 drwxrwxr-x    3   ... ...   4096 Sep 26 22:16 .
 768201 drwxrwxr-x    6   ... ...   4096 Sep 26 22:07 ..
  51524 drwxrwxr-x    2   ... ...   4096 Sep 26 22:18 d2_1
 198127 -rw-------    1   ... ...    912 Sep 26 17:07 f2_1.txt
 198128 -rw-------    1   ... ...    795 Sep 26 17:07 f2_2.txt
```

```
pinguim> ln d1/p1_1.c t1.c

pinguim> ln -s d2/f2_2.txt t2.txt

pinguim> ls -lai
total 28
 768201 drwxrwxr-x    6   ... ...   4096 Sep 26 22:21 .
 670454 drwxrwxr-x    6   ... ...   4096 Sep 21 23:12 ..
 198097 drwxrwxr-x    2   ... ...   4096 Sep 26 22:09 d1
 198121 drwxrwxr-x    3   ... ...   4096 Sep 26 22:16 d2
 654158 drwxrwxr-x    2   ... ...   4096 Sep 26 17:01 Probs_01
 768202 drwxrwxr-x    2   .....   4096 Sep 26 17:02 Probs_02
 198122 -rw-------    2   ... ...    912 Sep 26 17:03 t1.c
 768210 lrwxrwxrwx    1   ... ...     11 Sep 26 22:21 t2.txt -> d2/f2_2.txt

pinguim> ls d1 -lai
total 20
 198097 drwxrwxr-x    2   ... ...   4096 Sep 26 22:09 .
 768201 drwxrwxr-x    6   ... ...   4096 Sep 26 22:21 ..
 198122 -rw-------    2   ... ...    912 Sep 26 17:03 p1_1.c
 198123 -rw-------    1   ... ...    795 Sep 26 17:03 p1_2.c
 198124 -rw-------    1   ... ...    956 Sep 26 17:03 p1_3.c

pinguim> ls d2 -lai
total 20
 198121 drwxrwxr-x    3   ... ...   4096 Sep 26 22:16 .
 768201 drwxrwxr-x    6   ... ...   4096 Sep 26 22:21 ..
  51524 drwxrwxr-x    2   ... ...   4096 Sep 26 22:18 d2_1
 198127 -rw-------    1   ... ...    912 Sep 26 17:07 f2_1.txt
 198128 -rw-------    1   ... ...    795 Sep 26 17:07 f2_2.txt

pinguim> rm t1.c
pinguim> rm t2.txt

pinguim> ls -lai
total 24
 768201 drwxrwxr-x    6   ... ...   4096 Sep 26 22:22 .
 670454 drwxrwxr-x    6   ... ...   4096 Sep 21 23:12 ..
 198097 drwxrwxr-x    2   ... ...   4096 Sep 26 22:09 d1
 198121 drwxrwxr-x    3   ... ...   4096 Sep 26 22:16 d2
 654158 drwxrwxr-x    2   ... ...   4096 Sep 26 17:01 Probs_01
 768202 drwxrwxr-x    2   ... ...   4096 Sep 26 17:02 Probs_02
[jsilva@tintin 2005-06]$
```