

Write a c/c++ program to implement copy one directory

Target

1. Write a c/c++ program
2. To implement copy one directory and it's subdiretories
3. GCC
4. IDE 集成开发环境
5. Test directory: (从www.kernel.org下载最新的linux内核linux-5.19.10.tar.xz)
 1. <https://cdn.kernel.org/pub/linux/kernel/v5.x/linux-5.19.10.tar.xz>
 2. extract linux-5.19.10.tar.xz to linux-5.19.10 directory,
 3. and copy linux-5.19.10 directory to linux-5.19.10bak directory
6. Verify that the directory copy is correct

Tools

Install GCC Software Collection

```
sudo apt-get install build-essential
```

How to use GCC

- [gcc and make](#)

IDE

1. (推荐)Code::Blocks

```
sudo apt-get install codeblocks
```

2. (试用版或购买激活码)JetBrains CLion

```
sudo snap install clion --classic
```

md5

```
md5sum fileA fileB
```

get the total time of program execution

```
$ time pwd
/mnt/test2linux

real    0m0.000s
user    0m0.000s
sys 0m0.000s

$ time tar xvjf linux-5.19.10.tar.xz

real    0m28.554s
user    0m7.738s
sys 0m3.554s
```

structure of directory

```
struct dirent
{
    ino_t d_ino; //d_ino 此目录进入点的inode
    off_t d_off; //d_off 目录文件开头至此目录进入点的位移
    signed short int d_reclen; //d_reclen _name 的长度，不包含NULL 字符
    unsigned char d_type; //d_type d_name 所指的文件类型 d_name 文件名
    char d_name[256];
};

opendir()
readdir()
closedir()
```

How to do

write a c program to implement copy one directory and it's subdirectories, and the program also verifies the result

1. Example of traverse one directory

```
#include <dirent.h>
#include <unistd.h>
#include <stdlib.h>

int main()
{
    DIR * dir;
    struct dirent * ptr;
    /*open dir*/
    dir = opendir("/home");
    /*read dir entry*/
    while((ptr = readdir(dir)) != NULL)
    {
        printf("d_name : %s", ptr->d_name);
        if (ptr->d_type==DT_DIR){
            printf("\tDir");
        }
        printf("\n");
    }
}
```

```
    /*close dir*/  
    closedir(dir);  
    exit(0);  
}
```

Compiling:

```
gcc    listdir.c  -o listdir  
./listdir
```