

Experiment3 C programming experiment

Experimental purpose:

Further use the basic syntax of C programming language in Linux system, deepen the understanding of the knowledge.

(1) Task 1

(1) Write a C program that uses standard I/O libraries to display the contents of text files. The program is compiled and linked by the make tool, which requires the generation of the.o file first, and then the generation of the executable file, and the function of deleting the intermediate file (.o) in the makefile file.

```
#include <stdio.h>
int main(int argc, char* argv[])
{
    char buf[1024] = { 0 };
    FILE* fp = fopen(argv[1], "r");
    if (argc < 2)
    {
        printf("please input source file!\n");
    }
    if (fp == NULL)
    {
        printf("open source %s failed\n", argv[1]);
        return -1;
    }
    while (fgets(buf, 1024, fp))
    {
        printf("%s\n", buf);
    }
    return 0;
}
```

Make sure your filename is c1.c

We can use the following makefile.

```
hello1:c1.o
    gcc -o hello1 c1.o
c1.o:c1.c
    gcc -c c1.c
clean:
    rm -rf *.o
```

```
yebai@yebai:~/Linux/c1$ make
gcc -c c1.c
gcc -o hello1 c1.o
yebai@yebai:~/Linux/c1$ pwd
/home/yebai/Linux/c1
yebai@yebai:~/Linux/c1$ ./hello1 /home/yebai/Linux/c1/c1.c
```

```
int main(int argc, char* argv[]) {
    char buf[1024] = { 0 };

    // 检查是否输入了文件名参数
    if (argc < 2) {
        printf("please input source file!\n");
        return -1;
    }

    // 打开文件
    FILE* fp = fopen(argv[1], "r");
    if (fp == NULL) {
        printf("open source %s failed\n", argv[1]);
        return -1;
    }

    // 逐行读取文件内容并打印
    while (fgets(buf, sizeof(buf), fp)) {
        printf("%s", buf);
    }

    // 关闭文件
    fclose(fp);
    return 0;
}
```

```
yebai@yebai:~/Linux/c1$
```

(2) Task 2

(2) Write a C program that displays all the file names in the current directory. The program is compiled and linked by the make tool, which requires the generation of the.o file first, and then the generation of the executable file, and the function of deleting the intermediate file (.o) in the makefile file.

include <stdio.h>

include <dirent.h>

include <sys/types.h>

```
int main(int argc, char* argv[])
{
    DIR* dirp;
    struct dirent* direntp;
    if ((dirp = opendir(argv[1])) == NULL) {
        printf("error\n");
        // exit(1);
    }
    while ((direntp = readdir(dirp)) != NULL)
        printf("%s\n", direntp->d_name);
    closedir(dirp);
    // exit(0);
}
```

Make sure your filename is c2.c

We can use the following makefile.

```
hello2:c2.o
    gcc -o hello2 c2.o
c2.o:c2.c
    gcc -c c2.c
clean:
    rm -rf *.o
```

```
yebai@yebai:~/Linux/c2$ make
gcc -c c2.c
gcc -o hello2 c2.o
yebai@yebai:~/Linux/c2$ ./hello2 /home/yebai/Linux/c2
..
.
makefile
c2.o
hello2
c2.c
yebai@yebai:~/Linux/c2$
```

(3) Task 3

(3) Write a C program that changes the working directory of the current process. The program is compiled and linked by the make tool, which requires the generation of the.o file first, and then the generation of the executable file, and the function of deleting the intermediate file (.o) in the makefile file.

```
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
int main(){
    char buf[1024] = {0};

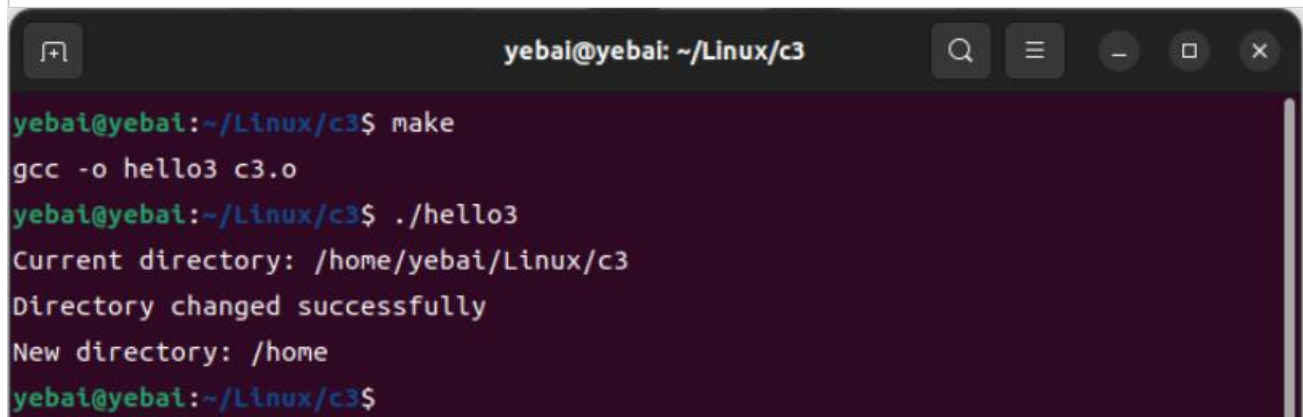
    char buf2[1024]={0};
    getcwd(buf, 1024);
    printf("%s\n", buf);

    if(chdir("/home")<0){
        printf("error\n");
    }
    else
    {
        printf("success\n");
    }
    getcwd(buf2,1024);
    printf("%s\n",buf2);
    return 0;
}
```

Make sure your filename is c3.c

We can use the following makefile.

```
hello3:c3.o
    gcc -o hello3 c3.o
c3.o:c3.c
    gcc -c c3.c
clean:
    rm -rf *.o
```



A terminal window titled 'yebai@yebai: ~/Linux/c3' showing the execution of the C program. The user runs 'make', which compiles 'c3.c' into 'hello3'. Then, the user runs './hello3', which outputs the current directory as '/home/yebai/Linux/c3' and then 'Directory changed successfully' and 'New directory: /home'. The prompt returns to 'yebai@yebai:~/Linux/c3\$'.

```
yebai@yebai:~/Linux/c3$ make
gcc -o hello3 c3.o
yebai@yebai:~/Linux/c3$ ./hello3
Current directory: /home/yebai/Linux/c3
Directory changed successfully
New directory: /home
yebai@yebai:~/Linux/c3$
```

