

Experiment 3

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Task 1

c1.c

```
#include <stdio.h>

int main(int argc, char* argv[])
{
    char buf[1024] = { 0 };
    FILE* fp = fopen(argv[1], "r");

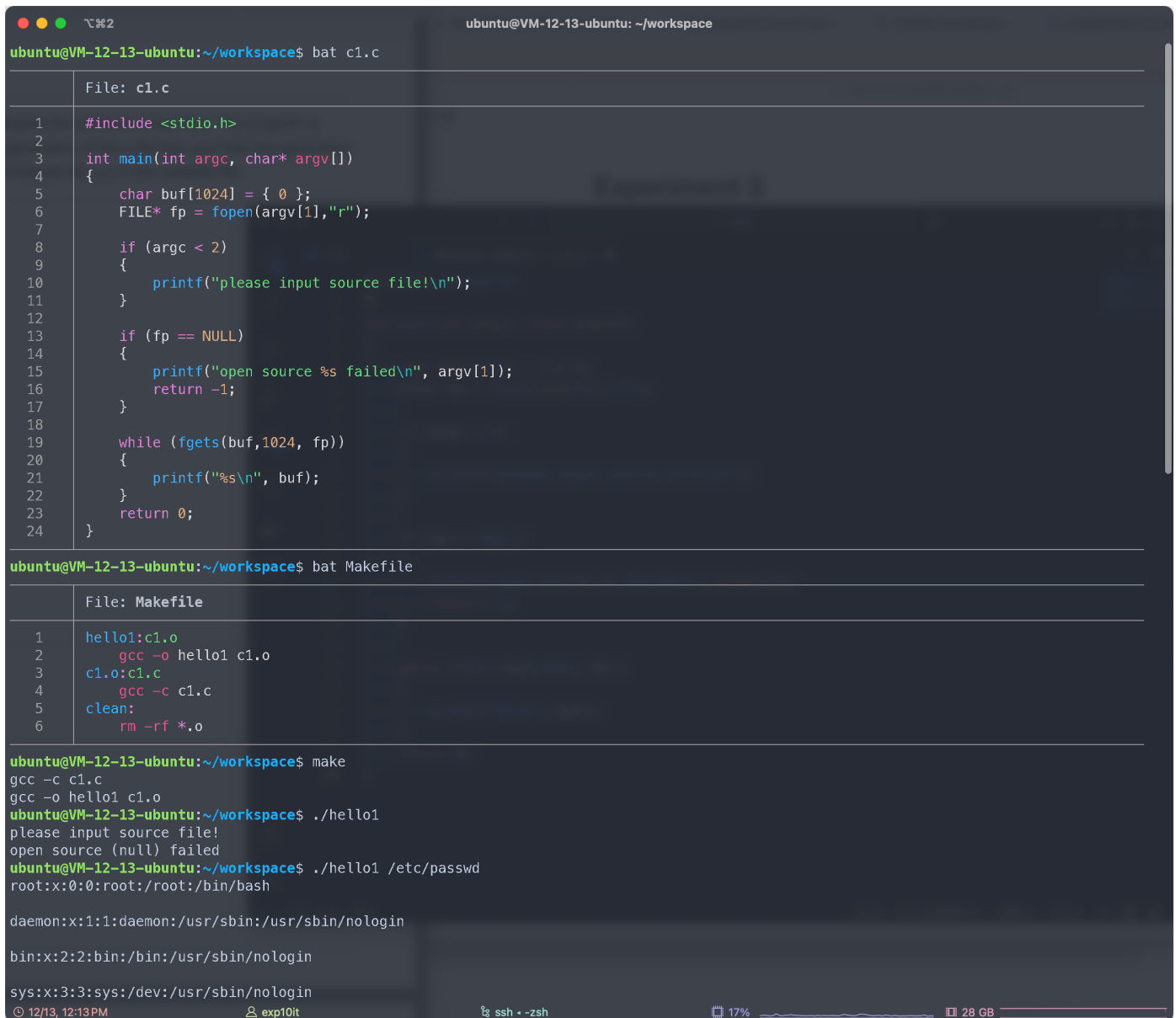
    if (argc < 2)
    {
        printf("please input source file!\n");
    }

    if (fp == NULL)
    {
        printf("open source %s failed\n", argv[1]);
        return -1;
    }

    while (fgets(buf, 1024, fp))
    {
        printf("%s\n", buf);
    }
    return 0;
}
```

Makefile

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



The terminal screenshot shows a user working in a VM named 'ubuntu@VM-12-13-ubuntu' at the directory '~/workspace'. The user runs 'bat c1.c' to view the source code of 'c1.c'. The code is a C program that takes a filename as an argument, opens it, and prints its contents line by line. If the file is not found, it prints an error message. The user then runs 'bat Makefile' to view the build rules. The Makefile defines targets for 'hello1:c1.o', 'c1.o:c1.c', and a 'clean' target. Finally, the user runs 'make', which compiles the program. The output shows the compilation steps and the execution of the resulting 'hello1' binary. The binary prompts for a source file, and the user enters '/etc/passwd'. The output shows the contents of the file, including user information for 'root' and 'daemon'.

```
ubuntu@VM-12-13-ubuntu: ~/workspace
ubuntu@VM-12-13-ubuntu:~/workspace$ bat c1.c
File: c1.c
1  #include <stdio.h>
2
3  int main(int argc, char* argv[])
4  {
5      char buf[1024] = { 0 };
6      FILE* fp = fopen(argv[1], "r");
7
8      if (argc < 2)
9      {
10         printf("please input source file!\n");
11     }
12
13     if (fp == NULL)
14     {
15         printf("open source %s failed\n", argv[1]);
16         return -1;
17     }
18
19     while (fgets(buf, 1024, fp))
20     {
21         printf("%s\n", buf);
22     }
23     return 0;
24 }
ubuntu@VM-12-13-ubuntu:~/workspace$ bat Makefile
File: Makefile
1  hello1:c1.o
2      gcc -o hello1 c1.o
3  c1.o:c1.c
4      gcc -c c1.c
5  clean:
6      rm -rf *.o
ubuntu@VM-12-13-ubuntu:~/workspace$ make
gcc -c c1.c
gcc -o hello1 c1.o
ubuntu@VM-12-13-ubuntu:~/workspace$ ./hello1
please input source file!
open source (null) failed
ubuntu@VM-12-13-ubuntu:~/workspace$ ./hello1 /etc/passwd
root:x:0:0:root:/root:/bin/bash

daemon:x:1:1:daemon:/usr/sbin:/usr/sbin/nologin

bin:x:2:2:bin:/bin:/usr/sbin/nologin

sys:x:3:3:sys:/dev:/usr/sbin/nologin
© 12/13, 12:13 PM    exp10it    ssh - zsh    17%    28 GB
```

Task 2

c2.c

```
#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");
    }

    while ((direntp = readdir(dirp)) != NULL)
        printf("%s\n", direntp->d_name);

    closedir(dirp);
}
```

Makefile

```
hello2:c2.o
    gcc -o hello1 c2.o
c2.o:c2.c
    gcc -c c2.c
clean:
    rm -rf *.o
```

```
ubuntu@VM-12-13-ubuntu: ~/workspace
ubuntu@VM-12-13-ubuntu:~/workspace$ bat c2.c

File: c2.c
1  #include <stdio.h>
2  #include <dirent.h>
3  #include <sys/types.h>
4
5  int main(int argc, char* argv[])
6  {
7
8      DIR* dirp;
9      struct dirent* direntp;
10
11     if ((dirp = opendir(argv[1])) == NULL) {
12         printf("error\n");
13     }
14
15     while ((direntp = readdir(dirp)) != NULL)
16         printf("%s\n", direntp->d_name);
17
18     closedir(dirp);
19 }

ubuntu@VM-12-13-ubuntu:~/workspace$ bat Makefile

File: Makefile
1  hello2:c2.o
2      gcc -o hello1 c2.o
3  c2.o:c2.c
4      gcc -c c2.c
5  clean:
6      rm -rf *.o

ubuntu@VM-12-13-ubuntu:~/workspace$ make
gcc -o hello1 c2.o
ubuntu@VM-12-13-ubuntu:~/workspace$ ./hello1 .
hello1
c2.c
Makefile
.
c2.o
..
ubuntu@VM-12-13-ubuntu:~/workspace$ _
```

Task 3

```
#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;
}
```

Makefile

```
hello3:c3.o
    gcc -o hello1 c3.o
c3.o:c3.c
    gcc -c c3.c
clean:
    rm -rf *.o
```

```
ubuntu@VM-12-13-ubuntu: ~/workspace
ubuntu@VM-12-13-ubuntu:~/workspace$ bat c3.c
File: c3.c
1 #include <stdio.h>
2 #include <stdlib.h>
3 #include <unistd.h>
4
5 int main()
6 {
7     char buf[1024] = {0};
8     char buf2[1024]={0};
9
10    getcwd(buf, 1024);
11    printf("%s\n", buf);
12
13    if(chdir("/home")<0)
14    {
15        printf("error\n");
16    }
17    else
18    {
19        printf("success\n");
20    }
21
22    getcwd(buf2,1024);
23    printf("%s\n",buf2);
24
25    return 0;
26 }
ubuntu@VM-12-13-ubuntu:~/workspace$ bat Makefile
File: Makefile
1 hello3:c3.o
2 gcc -o hello1 c3.o
3 c3.o:c3.c
4 gcc -c c3.c
5 clean:
6 rm -rf *.
ubuntu@VM-12-13-ubuntu:~/workspace$ make
gcc -c c3.c
gcc -o hello1 c3.o
ubuntu@VM-12-13-ubuntu:~/workspace$ ./hello1
/home/ubuntu/workspace
success
/home
ubuntu@VM-12-13-ubuntu:~/workspace$
```

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