Programming Assignment № 6

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Programming assignment six

1. File Suffix

```c
#include <stdio.h>
#include <dirent.h>
#include <string.h>

int main(int argc, char *argv[])
{
  struct dirent
      *directory_entry;

  DIR *directory_to_open;

  if(argc<3)
  {
    fprintf(stderr, "ERROR\r\nUsage: ./PROGRAM_NAME <directory_name> <.extention>\n");
    return 1;
  }

  directory_to_open = opendir (argv[1]);
  if(directory_to_open == NULL)
  {
    fprintf(stderr, "ERROR\r\nCannot open directory '%s'\nDoes it exist?\r\n",argv[1]);
    return 1;
  }

  while ((directory_entry = readdir(directory_to_open)) != NULL)
  {
    if(strstr(directory_entry->d_name,argv[2])!=NULL)
    {
      printf("\t%s\r\n", directory_entry -> d_name);
    }
  }
  closedir(directory_to_open);
  return 0;
```

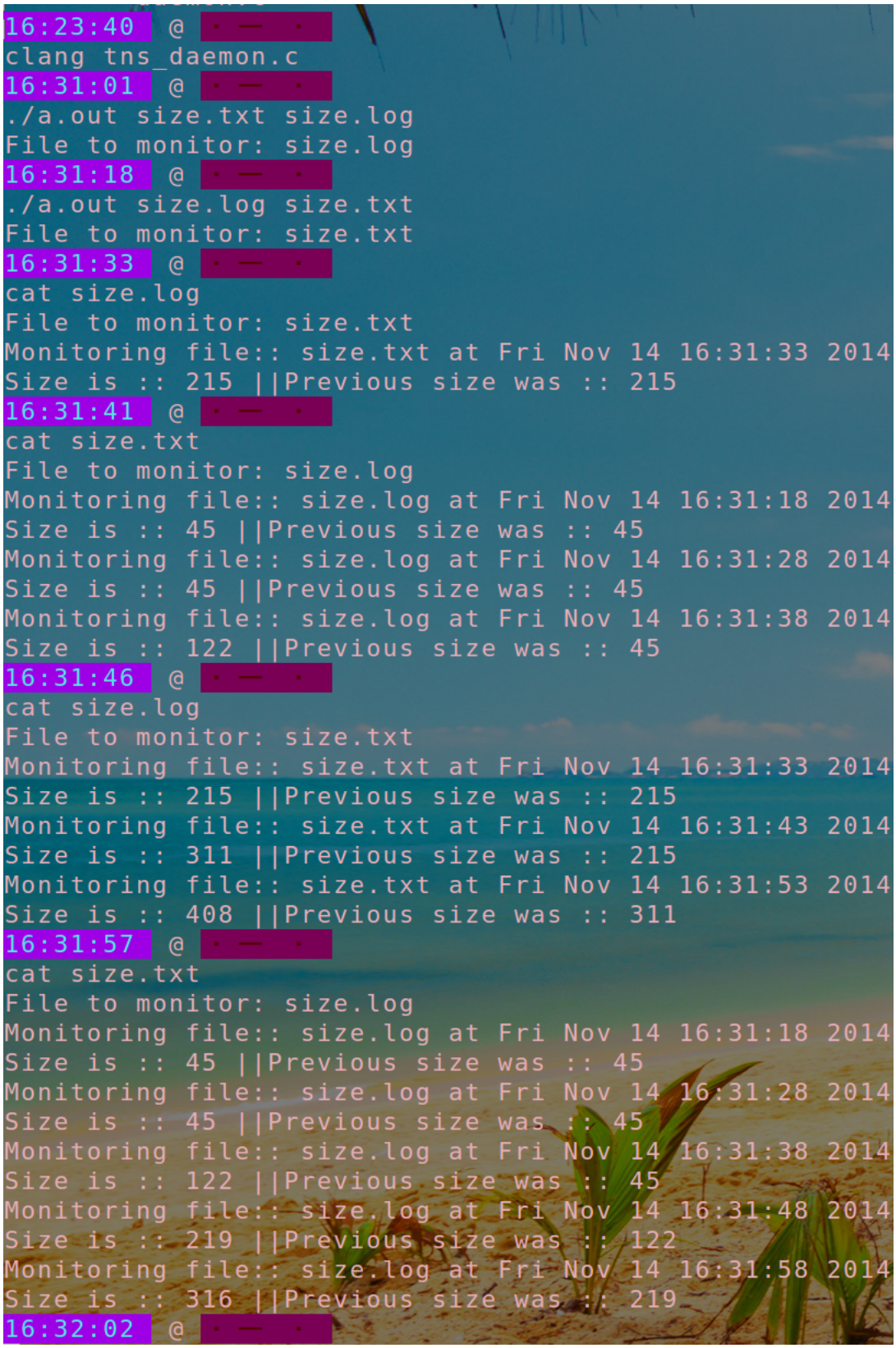
```
34
35 }
```

2. Daemon

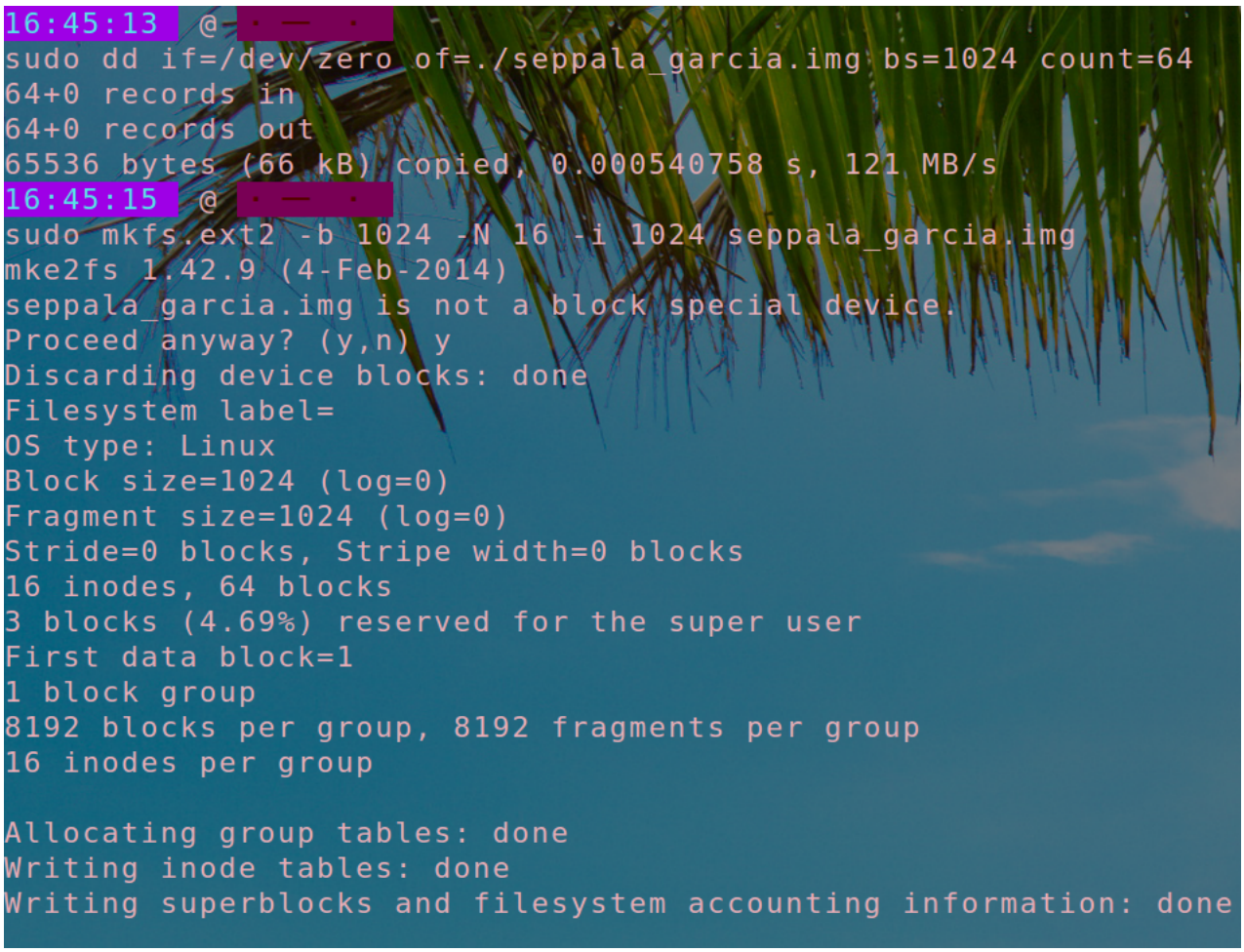
```c
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <signal.h>
#include <fcntl.h>
#include <time.h>
#include <sys/types.h>
#include <sys/stat.h>
#include <syslog.h>

long daemon_init(char* logfile_to_write_to, char* file_to_monitor,
    char* daemon_name)
{
    if(!daemon_name)
        daemon_name = "TEST_DAEMON";
    if(!file_to_monitor)
        exit(-1);
    if(!logfile_to_write_to)
        exit(-1);

    pid_t pid;
    /* Fork off the parent process */
    pid = fork();

    /* An error occurred */
    if (pid < 0)
        exit(-1);
    /* Success: Let the parent terminate */
    if (pid > 0)
        exit(EXIT_SUCCESS);
    /* On success: The child process becomes session leader */
    if (setsid() < 0)
        exit(-1);
    /* Catch, ignore and handle signals */
```

```
34      //TODO: Implement a working signal handler */
35      signal(SIGCHLD, SIG_IGN);
36      signal(SIGHUP, SIG_IGN);
37
38      /* Fork off for the second time*/
39      pid = fork();
40
41      /* An error occurred */
42      if (pid < 0)
43          exit(-1);
44      /* Success: Let the parent terminate */
45      if (pid > 0)
46          exit(EXIT_SUCCESS);
47
48      /* Set new file permissions */
49      umask(0);
50
51      printf("File to monitor: %s\n",file_to_monitor);
52      int new_in = open(file_to_monitor, O_CREAT | O_RDONLY);
53      dup2(new_in, 0);
54      close(new_in);
55
56      if((freopen(logfile_to_write_to,"w+", stdout))==NULL)
57          return -1;      //fd=1
58
59      /* Open the log file */
60      openlog(daemon_name, LOG_PID, LOG_DAEMON);
61
62      printf("File to monitor: %s\n",file_to_monitor);
63
64      fseek(stdin, 0, SEEK_END);
65      long starting_file_size = ftell(stdin) - 1;
66
67
68      return(starting_file_size);
69  }
70
71  /*######################
72   *#Time Print Function #
73   *######################*/
74
75  long Print_String(char* file_name, long previous_size)
76  {
77      /* This function gets the time of day
78       * and prints out a file that has been passed
79       * to it. Then it measures how big the file is
80       * in bytes and prints out the two. */
```

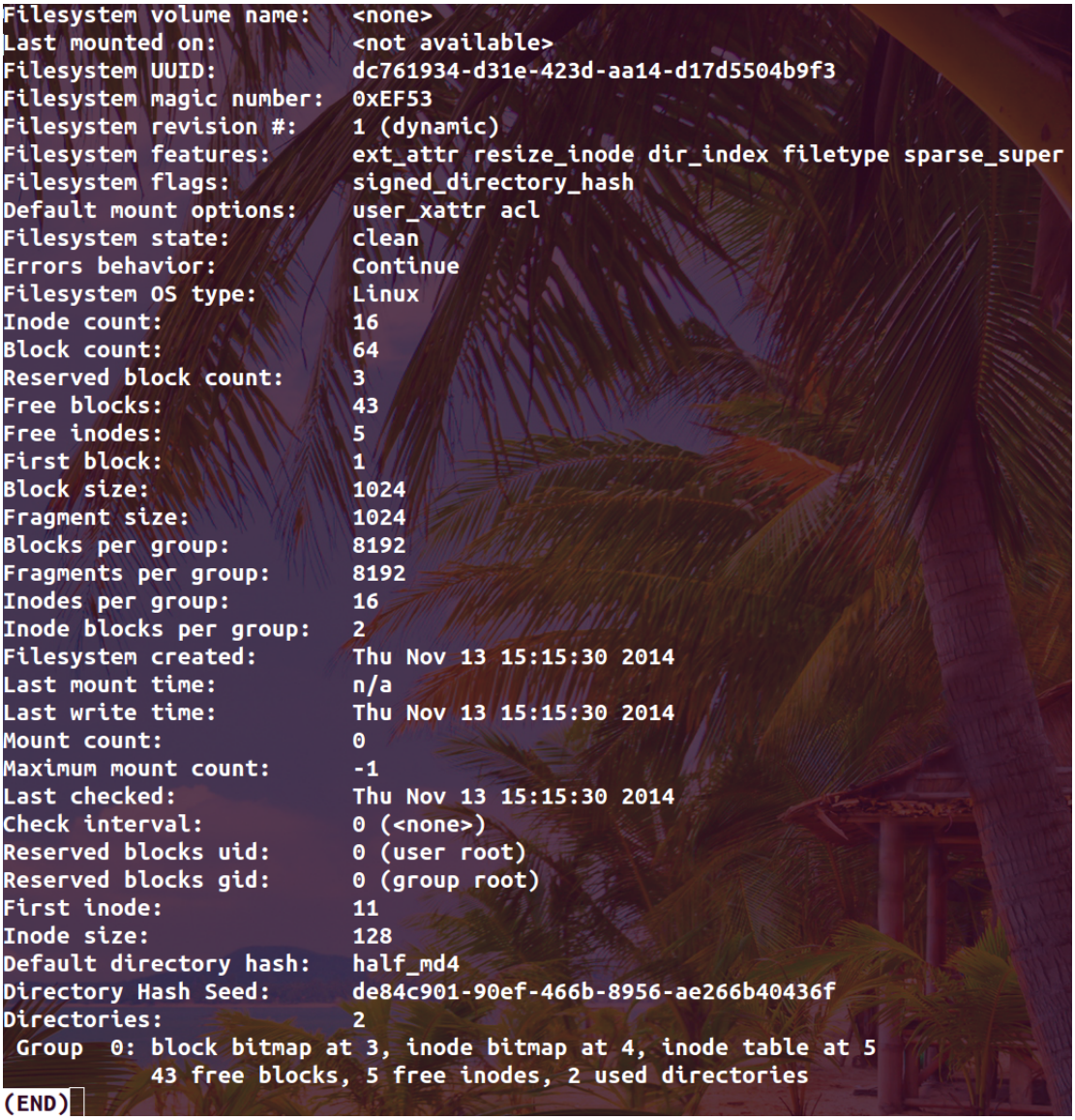
```
81      time_t rawtime;
82      struct tm * timeinfo;
83      time (&rawtime);
84      timeinfo = localtime (&rawtime);
85
86      long file_size;
87      printf( "Monitoring file:: %s at %s", file_name, asctime(timeinfo↩
            ));
88      fseek(stdin, 0, SEEK_END);
89      file_size = ftell(stdin) - 1;
90      printf("Size is :: %ld ||", file_size);
91      printf("Previous size was :: %ld\n",previous_size);
92
93      return(file_size);
94  }
95
96
97  int main(int argv, char* argc[])
98  {
99      long file_size;
100     if((file_size=(daemon_init(argc[1],argc[2],argc[3])))==-1)
101     {
102         fprintf(stderr, "Error setting up daemon.\r\n\
103                 Please run with <Log_File> <File_To_Watch> {OPTIONAL}↩
                        <Daemon_Name>\r\n");
104         return EXIT_FAILURE;
105     }
106
107     for(int execute_time = 0; execute_time <= 180; execute_time++)
108     {
109         if((execute_time%10)==0)
110             file_size = Print_String(argc[2], file_size);
111         fflush(stdout);
112         sleep(1);
113     }
114     printf("\nDone monitoring file, goodbye.\n");
115     syslog (LOG_NOTICE, "DAEMON_TEST_KILLED");
116     closelog();
117
118     return EXIT_SUCCESS;
119 }
```


16:23:40 @ · — ·
clang tns_daemon.c
16:31:01 @ · — ·
./a.out size.txt size.log
File to monitor: size.log
16:31:18 @ · — ·
./a.out size.log size.txt
File to monitor: size.txt
16:31:33 @ · — ·
cat size.log
File to monitor: size.txt
Monitoring file:: size.txt at Fri Nov 14 16:31:33 2014
Size is :: 215 ||Previous size was :: 215
16:31:41 @ · — ·
cat size.txt
File to monitor: size.log
Monitoring file:: size.log at Fri Nov 14 16:31:18 2014
Size is :: 45 ||Previous size was :: 45
Monitoring file:: size.log at Fri Nov 14 16:31:28 2014
Size is :: 45 ||Previous size was :: 45
Monitoring file:: size.log at Fri Nov 14 16:31:38 2014
Size is :: 122 ||Previous size was :: 45
16:31:46 @ · — ·
cat size.log
File to monitor: size.txt
Monitoring file:: size.txt at Fri Nov 14 16:31:33 2014
Size is :: 215 ||Previous size was :: 215
Monitoring file:: size.txt at Fri Nov 14 16:31:43 2014
Size is :: 311 ||Previous size was :: 215
Monitoring file:: size.txt at Fri Nov 14 16:31:53 2014
Size is :: 408 ||Previous size was :: 311
16:31:57 @ · — ·
cat size.txt
File to monitor: size.log
Monitoring file:: size.log at Fri Nov 14 16:31:18 2014
Size is :: 45 ||Previous size was :: 45
Monitoring file:: size.log at Fri Nov 14 16:31:28 2014
Size is :: 45 ||Previous size was :: 45
Monitoring file:: size.log at Fri Nov 14 16:31:38 2014
Size is :: 122 ||Previous size was :: 45
Monitoring file:: size.log at Fri Nov 14 16:31:48 2014
Size is :: 219 ||Previous size was :: 122
Monitoring file:: size.log at Fri Nov 14 16:31:58 2014
Size is :: 316 ||Previous size was :: 219
16:32:02 @ · — ·

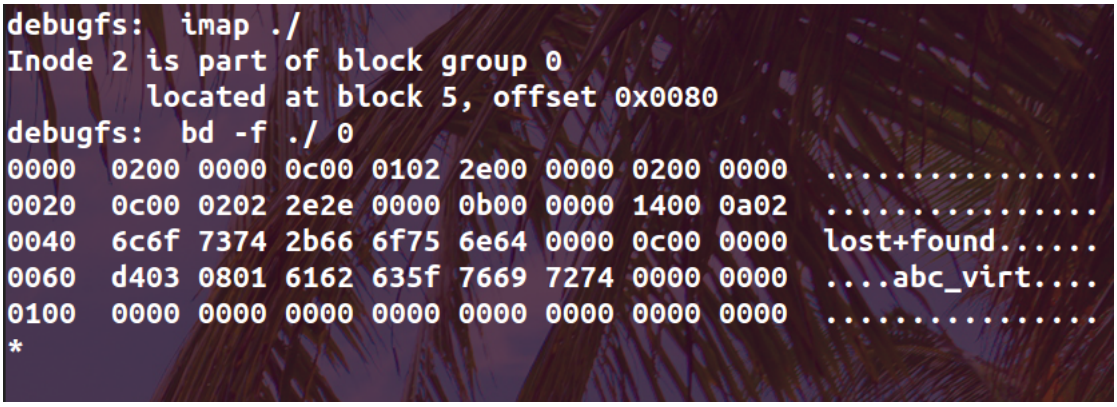
3. File Image


16:45:13 @
sudo dd if=/dev/zero of=./seppala_garcia.img bs=1024 count=64
64+0 records in
64+0 records out
65536 bytes (66 kB) copied, 0.000540758 s, 121 MB/s
16:45:15 @
sudo mkfs.ext2 -b 1024 -N 16 -i 1024 seppala_garcia.img
mke2fs 1.42.9 (4-Feb-2014)
seppala_garcia.img is not a block special device.
Proceed anyway? (y,n) y
Discarding device blocks: done
Filesystem label=
OS type: Linux
Block size=1024 (log=0)
Fragment size=1024 (log=0)
Stride=0 blocks, Stripe width=0 blocks
16 inodes, 64 blocks
3 blocks (4.69%) reserved for the super user
First data block=1
1 block group
8192 blocks per group, 8192 fragments per group
16 inodes per group
Allocating group tables: done
Writing inode tables: done
Writing superblocks and filesystem accounting information: done

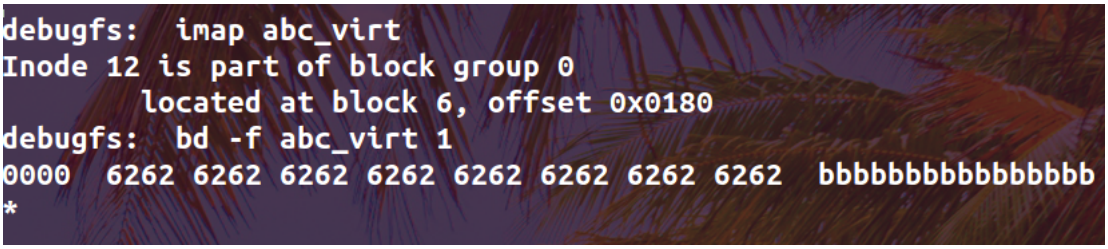
(a) File system specs



(b) Root Directory



(c) ABC's



(d) Making Directories

Each timer a new directory is created is uses an inode. When the file system is created it only has 5 open inodes, since we created it with 16. Writing the 'abc' file uses a node. Thus we have 4 inodes left. Each time a directory is made it will use a inode as well. Once these are used, we will have no inodes left to create any new files.