

## Problem Set 2: Recursive Filesystem Exploration with Hard Linked Directory Loop Detection

Program Name = walkfs: walk file system

Screenshot showing layout of current directory called `root`. It was from within `root` that the program `walkfs` was invoked for several tests demonstrating the functionality of the program.

```
Terminal
george@george-Vostro-1400 ~/Desktop/ECE460/PS2/root $ ls -iRh .
.:
556000 _A  556001 _B  556002 _C  556003 _D

./ _A:
532517 a1  556143 A1  532516 a2  556145 A2  532518 a3  542942 a4_symlink

./ _A/A1:
543099 a11  556151 A11  543100 a12

./ _A/A1/A11:
543153 a111  543175 a112_symlink

./ _A/A2:
543084 a21

./ _B:
532530 b1  556146 B1  532533 b2  542938 b3_symlink

./ _B/B1:
543089 b11  543105 b12

./ _C:
534519 c1  534521 c2  532055 c4

./ _D:
534528 d1  556147 D1  556149 D2  543030 d2_symlink  556150 D3  543032 d3_symlink

./ _D/D1:
543126 d11

./ _D/D2:
543129 d21

./ _D/D3:
543130 d31
george@george-Vostro-1400 ~/Desktop/ECE460/PS2/root $
```

The following screenshot shows walkfs begin run with Valgrind's memory leak detection tool. The path was `root`. The layout of `root` was shown in the above screenshot. No options were used in this invocation of walkfs. All of the subdirectories are opened and their metadata are printed in the following order:

```
dev_number/ino_number file_type_perms num_links user group size last_mod_time path
-->link_content (if any)
```

Valgrind reports that in this execution, no memory was leaked

```
Terminal
./walkfs root/
==4074== Memcheck, a memory error detector
==4074== Copyright (C) 2002-2013, and GNU GPL'd, by Julian Seward et al.
==4074== Using Valgrind-3.10.0.SVN and LibVEX; rerun with -h for copyright info
==4074== Command: ./walkfs root/
==4074==
04006/556003 drwxr-xr-x 5 george george 4096 Wed Sep 23 16:10:00 2015 root/_D
04006/534528 -rw-r--r-- 1 george george 11 Mon Sep 21 18:09:26 2015 root/_D/d1
04006/556150 drwxr-xr-x 2 george george 4096 Wed Sep 23 16:10:42 2015 root/_D/D3
04006/543130 -rw-r--r-- 1 george george 0 Wed Sep 23 16:10:42 2015 root/_D/D3/d31
04006/543032 lrwxrwxrwx 1 george george 10 Wed Sep 23 15:54:50 2015 root/_D/d3_symlink --> root/_A/a1
04006/556147 drwxr-xr-x 2 george george 4096 Wed Sep 23 16:10:22 2015 root/_D/D1
04006/543126 -rw-r--r-- 1 george george 0 Wed Sep 23 16:10:22 2015 root/_D/D1/d11
04006/556149 drwxr-xr-x 2 george george 4096 Wed Sep 23 16:10:35 2015 root/_D/D2
04006/543129 -rw-r--r-- 1 george george 0 Wed Sep 23 16:10:35 2015 root/_D/D2/d21
04006/543030 lrwxrwxrwx 1 george george 10 Wed Sep 23 15:54:16 2015 root/_D/d2_symlink --> root/_B/b2
04006/556001 drwxr-xr-x 3 george george 4096 Wed Sep 23 16:09:14 2015 root/_B
04006/542938 lrwxrwxrwx 1 george george 10 Wed Sep 23 15:57:29 2015 root/_B/b3_symlink --> root/_A/a1
04006/556146 drwxr-xr-x 2 george george 4096 Wed Sep 23 16:09:38 2015 root/_B/B1
04006/543105 -rw-r--r-- 1 george george 0 Wed Sep 23 16:09:38 2015 root/_B/B1/b12
04006/543089 -rw-r--r-- 1 george george 0 Wed Sep 23 16:09:38 2015 root/_B/B1/b11
04006/532530 -rw-r--r-- 1 george george 42 Mon Sep 21 18:42:11 2015 root/_B/b1
04006/532533 -rw-r--r-- 1 george george 11 Mon Sep 21 18:09:26 2015 root/_B/b2
04006/556002 drwxr-xr-x 2 george george 4096 Tue Sep 22 19:41:02 2015 root/_C
04006/532055 -rw-r--r-- 1 george george 0 Tue Sep 22 19:40:08 2015 root/_C/c4
04006/534519 -rw-r--r-- 1 george george 11 Mon Sep 21 18:09:26 2015 root/_C/c1
04006/534521 -rw-r--r-- 1 george george 11 Mon Sep 21 18:09:26 2015 root/_C/c2
04006/556000 drwxr-xr-x 4 george george 4096 Wed Sep 23 16:06:58 2015 root/_A
04006/542942 lrwxrwxrwx 1 george george 10 Wed Sep 23 15:58:31 2015 root/_A/a4_symlink --> root/_C/c2
04006/556143 drwxr-xr-x 3 george george 4096 Wed Sep 23 16:15:20 2015 root/_A/A1
04006/543100 -rw-r--r-- 1 george george 0 Wed Sep 23 16:07:25 2015 root/_A/A1/a12
04006/556151 drwxr-xr-x 2 george george 4096 Wed Sep 23 16:25:01 2015 root/_A/A1/A11
04006/543153 -rw-r--r-- 1 george george 0 Wed Sep 23 16:15:51 2015 root/_A/A1/A11/a111
04006/543175 lrwxrwxrwx 1 george george 5 Wed Sep 23 16:25:01 2015 root/_A/A1/A11/a112_symlink --> _C/c4
04006/543099 -rw-r--r-- 1 george george 0 Wed Sep 23 16:07:25 2015 root/_A/A1/a11
04006/532516 -rw-r--r-- 1 root george 11 Mon Sep 21 18:09:26 2015 root/_A/a2
04006/532517 -rw-r--r-- 1 root george 51 Mon Sep 21 18:13:48 2015 root/_A/a1
04006/556145 drwxr-xr-x 2 george george 4096 Wed Sep 23 16:08:40 2015 root/_A/A2
04006/543084 -rw-r--r-- 1 george george 0 Wed Sep 23 16:08:40 2015 root/_A/A2/a21
04006/532518 -rw-r--r-- 1 george george 11 Mon Sep 21 18:09:26 2015 root/_A/a3
==4074==
==4074== HEAP SUMMARY:
==4074== in use at exit: 0 bytes in 0 blocks
==4074== total heap usage: 458 allocs, 458 frees, 451,863 bytes allocated
==4074==
==4074== All heap blocks were freed -- no leaks are possible
==4074==
==4074== For counts of detected and suppressed errors, rerun with: -v
==4074== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
```

The following screenshot shows walkfs with the `-u` option. Only those nodes owned by root were printed. The first time, `-u` was given with the username. The second time, `-u` was given with the uid.

```
Terminal
george@george-Vostro-1400 ~/Desktop/ECE460/PS2 $ sudo chown root root/_A/A1/A11/a111
george@george-Vostro-1400 ~/Desktop/ECE460/PS2 $ sudo chown root root/_D/D1/d11
george@george-Vostro-1400 ~/Desktop/ECE460/PS2 $ ./walkfs -u 0 root
04006/543126 -rw-r--r-- 1 root george 0 Wed Sep 23 16:10:22 2015 root/_D/D1/d11
04006/543153 -rw-r--r-- 1 root george 0 Wed Sep 23 16:15:51 2015 root/_A/A1/A11/a111
04006/532516 -rw-r--r-- 1 root george 11 Mon Sep 21 18:09:26 2015 root/_A/a2
04006/532517 -rw-r--r-- 1 root george 51 Mon Sep 21 18:13:48 2015 root/_A/a1
george@george-Vostro-1400 ~/Desktop/ECE460/PS2 $ ./walkfs -u root root
04006/543126 -rw-r--r-- 1 root george 0 Wed Sep 23 16:10:22 2015 root/_D/D1/d11
04006/543153 -rw-r--r-- 1 root george 0 Wed Sep 23 16:15:51 2015 root/_A/A1/A11/a111
04006/532516 -rw-r--r-- 1 root george 11 Mon Sep 21 18:09:26 2015 root/_A/a2
04006/532517 -rw-r--r-- 1 root george 51 Mon Sep 21 18:13:48 2015 root/_A/a1
```



Show me all files owned by user with uid 1000 (george)

```
Terminal
george@george-Vostro-1400 ~/Desktop/ECE460/PS2 $ ./walkfs -u 1000 root
04006/556003 drwxr-xr-x 5 george george 4096 Wed Sep 23 16:10:00 2015 root/ _D
04006/534528 -rw-r--r-- 1 george george 11 Mon Sep 21 18:09:26 2015 root/ _D/d1
04006/556150 drwxr-xr-x 2 george george 4096 Wed Sep 23 16:10:42 2015 root/ _D/D3
04006/543130 -rw-r--r-- 1 george george 0 Wed Sep 23 16:10:42 2015 root/ _D/D3/d31
04006/543032 lrwxrwxrwx 1 george george 10 Wed Sep 23 15:54:50 2015 root/ _D/d3_symlink --> root/ _A/a1
04006/556147 drwxr-xr-x 2 george george 4096 Wed Sep 23 16:10:22 2015 root/ _D/D1
04006/556149 drwxr-xr-x 2 george george 4096 Wed Sep 23 16:10:35 2015 root/ _D/D2
04006/543129 -rw-r--r-- 1 george george 0 Wed Sep 23 16:10:35 2015 root/ _D/D2/d21
04006/543030 lrwxrwxrwx 1 george george 10 Wed Sep 23 15:54:16 2015 root/ _D/d2_symlink --> root/ _B/b2
04006/556001 drwxr-xr-x 3 george george 4096 Wed Sep 23 16:09:14 2015 root/ _B
04006/542938 lrwxrwxrwx 1 george george 10 Wed Sep 23 15:57:29 2015 root/ _B/b3_symlink --> root/ _A/a1
04006/556146 drwxr-xr-x 2 george george 4096 Wed Sep 23 16:09:38 2015 root/ _B/B1
04006/543105 -rw-r--r-- 1 george george 0 Wed Sep 23 16:09:38 2015 root/ _B/B1/b12
04006/543089 -rw-r--r-- 1 george george 0 Wed Sep 23 16:09:38 2015 root/ _B/B1/b11
04006/532530 -rw-r--r-- 1 george george 42 Mon Sep 21 18:42:11 2015 root/ _B/b1
04006/532533 -rw-r--r-- 1 george george 11 Mon Sep 21 18:09:26 2015 root/ _B/b2
04006/556002 drwxr-xr-x 2 george george 4096 Tue Sep 22 19:41:02 2015 root/ _C
04006/532055 -rw-r--r-- 1 george george 0 Tue Sep 22 19:40:08 2015 root/ _C/c4
04006/534519 -rw-r--r-- 1 george george 11 Mon Sep 21 18:09:26 2015 root/ _C/c1
04006/534521 -rw-r--r-- 1 george george 11 Mon Sep 21 18:09:26 2015 root/ _C/c2
04006/556000 drwxr-xr-x 4 george george 4096 Wed Sep 23 16:06:58 2015 root/ _A
04006/542942 lrwxrwxrwx 1 george george 10 Wed Sep 23 15:58:31 2015 root/ _A/a4_symlink --> root/ _C/c2
04006/556143 drwxr-xr-x 3 george george 4096 Wed Sep 23 16:15:20 2015 root/ _A/A1
04006/543100 -rw-r--r-- 1 george george 0 Wed Sep 23 16:07:25 2015 root/ _A/A1/a12
04006/556151 drwxr-xr-x 2 george george 4096 Wed Sep 23 16:25:01 2015 root/ _A/A1/A11
04006/543175 lrwxrwxrwx 1 george george 5 Wed Sep 23 16:25:01 2015 root/ _A/A1/A11/a112_symlink --> _C/c4
04006/543099 -rw-r--r-- 1 george george 0 Wed Sep 23 16:07:25 2015 root/ _A/A1/a11
04006/556145 drwxr-xr-x 2 george george 4096 Wed Sep 23 16:08:40 2015 root/ _A/A2
04006/543084 -rw-r--r-- 1 george george 0 Wed Sep 23 16:08:40 2015 root/ _A/A2/a21
04006/532518 -rw-r--r-- 1 george george 11 Mon Sep 21 18:09:26 2015 root/ _A/a3
george@george-Vostro-1400 ~/Desktop/ECE460/PS2 $
```

Show me all files that are less than a day old

```
Terminal
george@george-Vostro-1400 ~/Desktop/ECE460/PS2 $ ./walkfs -m -86400 root
04006/556003 drwxr-xr-x 5 george george 4096 Wed Sep 23 16:10:00 2015 root/ _D
04006/556150 drwxr-xr-x 2 george george 4096 Wed Sep 23 16:10:42 2015 root/ _D/D3
04006/543130 -rw-r--r-- 1 george george 0 Wed Sep 23 16:10:42 2015 root/ _D/D3/d31
04006/543032 lrwxrwxrwx 1 george george 10 Wed Sep 23 15:54:50 2015 root/ _D/d3_symlink --> root/ _A/a1
04006/556147 drwxr-xr-x 2 george george 4096 Wed Sep 23 16:10:22 2015 root/ _D/D1
04006/543126 -rw-r--r-- 1 root george 0 Wed Sep 23 16:10:22 2015 root/ _D/D1/d11
04006/556149 drwxr-xr-x 2 george george 4096 Wed Sep 23 16:10:35 2015 root/ _D/D2
04006/543129 -rw-r--r-- 1 george george 0 Wed Sep 23 16:10:35 2015 root/ _D/D2/d21
04006/543030 lrwxrwxrwx 1 george george 10 Wed Sep 23 15:54:16 2015 root/ _D/d2_symlink --> root/ _B/b2
04006/556001 drwxr-xr-x 3 george george 4096 Wed Sep 23 16:09:14 2015 root/ _B
04006/542938 lrwxrwxrwx 1 george george 10 Wed Sep 23 15:57:29 2015 root/ _B/b3_symlink --> root/ _A/a1
04006/556146 drwxr-xr-x 2 george george 4096 Wed Sep 23 16:09:38 2015 root/ _B/B1
04006/543105 -rw-r--r-- 1 george george 0 Wed Sep 23 16:09:38 2015 root/ _B/B1/b12
04006/543089 -rw-r--r-- 1 george george 0 Wed Sep 23 16:09:38 2015 root/ _B/B1/b11
04006/556002 drwxr-xr-x 2 george george 4096 Tue Sep 22 19:41:02 2015 root/ _C
04006/532055 -rw-r--r-- 1 george george 0 Tue Sep 22 19:40:08 2015 root/ _C/c4
04006/556000 drwxr-xr-x 4 george george 4096 Wed Sep 23 16:06:58 2015 root/ _A
04006/542942 lrwxrwxrwx 1 george george 10 Wed Sep 23 15:58:31 2015 root/ _A/a4_symlink --> root/ _C/c2
04006/556143 drwxr-xr-x 3 george george 4096 Wed Sep 23 16:15:20 2015 root/ _A/A1
04006/543100 -rw-r--r-- 1 george george 0 Wed Sep 23 16:07:25 2015 root/ _A/A1/a12
04006/556151 drwxr-xr-x 2 george george 4096 Wed Sep 23 16:25:01 2015 root/ _A/A1/A11
04006/543153 -rw-r--r-- 1 root george 0 Wed Sep 23 16:15:51 2015 root/ _A/A1/A11/a111
04006/543175 lrwxrwxrwx 1 george george 5 Wed Sep 23 16:25:01 2015 root/ _A/A1/A11/a112_symlink --> _C/c4
04006/543099 -rw-r--r-- 1 george george 0 Wed Sep 23 16:07:25 2015 root/ _A/A1/a11
04006/556145 drwxr-xr-x 2 george george 4096 Wed Sep 23 16:08:40 2015 root/ _A/A2
04006/543084 -rw-r--r-- 1 george george 0 Wed Sep 23 16:08:40 2015 root/ _A/A2/a21
george@george-Vostro-1400 ~/Desktop/ECE460/PS2 $
```

Show me all files less than a day old owned by root

```
Terminal
george@george-Vostro-1400 ~/Desktop/ECE460/PS2 $ ./walkfs -u 0 -m -86400 root
04006/543126 -rw-r--r-- 1 root george 0 Wed Sep 23 16:10:22 2015 root/ _D/D1/d11
04006/543153 -rw-r--r-- 1 root george 0 Wed Sep 23 16:15:51 2015 root/ _A/A1/A11/a111
george@george-Vostro-1400 ~/Desktop/ECE460/PS2 $
```

Now make a new directory in root called mnt and mount evilfs.img on it. Then show me all files owned by george older than a day and stay within the initial volume. Next, show me all files owned by root older than a day and stay within the initial volume

```
Terminal
george@george-Vostro-1400 ~/Desktop/ECE460/PS2 $ mkdir root/mnt
george@george-Vostro-1400 ~/Desktop/ECE460/PS2 $ sudo mount -o loop ~/Desktop/evilfs.img root/mnt
[sudo] password for george:
george@george-Vostro-1400 ~/Desktop/ECE460/PS2 $ ./walkfs -u george -m 86400 -x root
04006/534528 -rw-r--r-- 1 george george 11 Mon Sep 21 18:09:26 2015 root/_D/d1
04006/532530 -rw-r--r-- 1 george george 42 Mon Sep 21 18:42:11 2015 root/_B/b1
04006/532533 -rw-r--r-- 1 george george 11 Mon Sep 21 18:09:26 2015 root/_B/b2
04006/534519 -rw-r--r-- 1 george george 11 Mon Sep 21 18:09:26 2015 root/_C/c1
04006/534521 -rw-r--r-- 1 george george 11 Mon Sep 21 18:09:26 2015 root/_C/c2
04006/532518 -rw-r--r-- 1 george george 11 Mon Sep 21 18:09:26 2015 root/_A/a3
note: not crossing mount point at root/mnt
george@george-Vostro-1400 ~/Desktop/ECE460/PS2 $ ./walkfs -u root -m 86400 -x root
04006/532516 -rw-r--r-- 1 root george 11 Mon Sep 21 18:09:26 2015 root/_A/a2
04006/532517 -rw-r--r-- 1 root george 51 Mon Sep 21 18:13:48 2015 root/_A/a1
note: not crossing mount point at root/mnt
george@george-Vostro-1400 ~/Desktop/ECE460/PS2 $
```

Show me all files owned by george modified within half a day whose links successfully resolve to root/\_A/a1. Make sure to stay within the starting volume

```
george@george-Vostro-1400 ~/Desktop/ECE460/PS2 $ ./walkfs -u george -m -43200 -x -l root/_A/a1 root
04006/543032 lrwxrwxrwx 1 george george 10 Wed Sep 23 15:54:50 2015 root/_D/d3_symlink --> root/_A/a1
04006/542938 lrwxrwxrwx 1 george george 10 Wed Sep 23 15:57:29 2015 root/_B/b3_symlink --> root/_A/a1
note: not crossing mount point at root/mnt
george@george-Vostro-1400 ~/Desktop/ECE460/PS2 $
```

Show me all files owned by george modified within half a day whose links successfully resolve to root/\_A/a2. Make sure to stay within the starting volume.

```
Terminal
george@george-Vostro-1400 ~/Desktop/ECE460/PS2 $ ./walkfs -u george -m -43200 -x -l root/_A/a2 root
note: not crossing mount point at root/mnt
george@george-Vostro-1400 ~/Desktop/ECE460/PS2 $
```

The loop detection feature was implemented and matched the output given in the course website (with 2 exceptions)

1. My output is not sorted
2. I was not able to successfully obtain the inode information for the “weird file” located at the relative path:  
/root/mnt/D/type\_13

The output below was copied and pasted from Terminal since a screen shot would not capture its entirety:

```
./walkfs root/mnt
==5353== Memcheck, a memory error detector
==5353== Copyright (C) 2002-2013, and GNU GPL'd, by Julian Seward et al.
==5353== Using Valgrind-3.10.0.SVN and LibVEX; rerun with -h for copyright info
==5353== Command: ./walkfs root/mnt
==5353==
03400/4097 drwxr-xr-x 4 root root 1024 Mon Jan 30 18:25:20 2012 root/mnt/C
03400/4100 -rw-r--r-- 1 root root 10 Mon Jan 30 18:25:21 2012 root/mnt/C/3
03400/4098 drwxr-xr-x 4 root root 1024 Mon Jan 30 18:45:34 2012 root/mnt/C/1
03400/4103 drwxr-xr-x 2 root root 1024 Mon Jan 30 18:45:34 2012 root/mnt/C/1/z
03400/8195 drwxr-xr-x 5 root root 1024 Mon Jan 30 18:45:05 2012 root/mnt/C/1/z/3001
03400/8196 drwxr-xr-x 3 root root 1024 Mon Jan 30 18:45:16 2012 root/mnt/C/1/z/3001/c
03400/8193 drwxr-xr-x 4 root root 1024 Mon Jan 30 18:44:59 2012
root/mnt/C/1/z/3001/c/1002
03400/8194 -rw-r--r-- 1 root root 12 Mon Jan 30 18:25:50 2012
root/mnt/C/1/z/3001/c/1002/101
03400/8195 drwxr-xr-x 5 root root 1024 Mon Jan 30 18:45:05 2012
root/mnt/C/1/z/3001/c/1002/102
Not traversing root/mnt/C/1/z/3001/c/1002/102 w. dev=03400 ino=8195 : previously seen as root/mnt/C/1/z/3001
03400/8198 drwxr-xr-x 2 root root 1024 Mon Jan 30 18:45:16 2012
root/mnt/C/1/z/3001/c/1001
```

```

03400/8197 drwxr-xr-x 2 root root 1024 Mon Jan 30 18:45:05 2012 root/mnt/C/1/z/3001/d
03400/4098 drwxr-xr-x 4 root root 1024 Mon Jan 30 18:45:34 2012
root/mnt/C/1/z/3001/d/2001
Not traversing root/mnt/C/1/z/3001/d/2001 w. dev=03400 ino=4098 : previously seen as root/mnt/C/1
03400/4102 -rw-r--r-- 1 root root 10 Mon Jan 30 18:25:30 2012 root/mnt/C/1/b
03400/4101 -rw-r--r-- 1 root root 10 Mon Jan 30 18:25:27 2012 root/mnt/C/1/a
03400/4099 -rw-r--r-- 1 libuuid dialout 10 Mon Jan 30 18:25:18 2012 root/mnt/C/2
03400/4097 drwxr-xr-x 4 root root 1024 Mon Jan 30 18:25:20 2012 root/mnt/A
03400/4100 -rw-r--r-- 1 root root 10 Mon Jan 30 18:25:21 2012 root/mnt/A/3
03400/4098 drwxr-xr-x 4 root root 1024 Mon Jan 30 18:45:34 2012 root/mnt/A/1
03400/4103 drwxr-xr-x 2 root root 1024 Mon Jan 30 18:45:34 2012 root/mnt/A/1/z
03400/8195 drwxr-xr-x 5 root root 1024 Mon Jan 30 18:45:05 2012 root/mnt/A/1/z/3001
03400/8196 drwxr-xr-x 3 root root 1024 Mon Jan 30 18:45:16 2012 root/mnt/A/1/z/3001/c
03400/8193 drwxr-xr-x 4 root root 1024 Mon Jan 30 18:44:59 2012
root/mnt/A/1/z/3001/c/1002
03400/8194 -rw-r--r-- 1 root root 12 Mon Jan 30 18:25:50 2012
root/mnt/A/1/z/3001/c/1002/101
03400/8195 drwxr-xr-x 5 root root 1024 Mon Jan 30 18:45:05 2012
root/mnt/A/1/z/3001/c/1002/102
Not traversing root/mnt/A/1/z/3001/c/1002/102 w. dev=03400 ino=8195 : previously seen as root/mnt/A/1/z/3001
03400/8198 drwxr-xr-x 2 root root 1024 Mon Jan 30 18:45:16 2012
root/mnt/A/1/z/3001/c/1001
03400/8197 drwxr-xr-x 2 root root 1024 Mon Jan 30 18:45:05 2012 root/mnt/A/1/z/3001/d
03400/4098 drwxr-xr-x 4 root root 1024 Mon Jan 30 18:45:34 2012
root/mnt/A/1/z/3001/d/2001
Not traversing root/mnt/A/1/z/3001/d/2001 w. dev=03400 ino=4098 : previously seen as root/mnt/A/1
03400/4102 -rw-r--r-- 1 root root 10 Mon Jan 30 18:25:30 2012 root/mnt/A/1/b
03400/4101 -rw-r--r-- 1 root root 10 Mon Jan 30 18:25:27 2012 root/mnt/A/1/a
03400/4099 -rw-r--r-- 1 libuuid dialout 10 Mon Jan 30 18:25:18 2012 root/mnt/A/2
03400/ 11 drwx----- 2 root root 12288 Mon Jan 30 18:24:56 2012 root/mnt/lost+found
03400/12289 drwxr-xr-x 2 root root 1024 Tue Sep 8 18:47:37 2015 root/mnt/D
03400/12294 lrwxrwxrwx 1 root root 12 Tue Sep 8 01:50:44 2015 root/mnt/D/symlink
--> ../../B/./101
walkfs: Cannot lstat file root/mnt/D/type_13 w. ino=12293: Input/output error
03400/12292 prw-r--r-- 1 root root 0 Tue Sep 8 01:34:11 2015 root/mnt/D/npipe
03400/12290 crw-r--r-- 1 root root 0x01F20 Tue Sep 8 01:33:41 2015 root/mnt/D/cdev
03400/12291 brw-r--r-- 1 root root 0x0140A Tue Sep 8 01:33:53 2015 root/mnt/D/bdev
03400/8193 drwxr-xr-x 4 root root 1024 Mon Jan 30 18:44:59 2012 root/mnt/B
03400/8194 -rw-r--r-- 1 root root 12 Mon Jan 30 18:25:50 2012 root/mnt/B/101
03400/8195 drwxr-xr-x 5 root root 1024 Mon Jan 30 18:45:05 2012 root/mnt/B/102
03400/8196 drwxr-xr-x 3 root root 1024 Mon Jan 30 18:45:16 2012 root/mnt/B/102/c
03400/8193 drwxr-xr-x 4 root root 1024 Mon Jan 30 18:44:59 2012 root/mnt/B/102/c/1002
Not traversing root/mnt/B/102/c/1002 w. dev=03400 ino=8193 : previously seen as root/mnt/B
03400/8198 drwxr-xr-x 2 root root 1024 Mon Jan 30 18:45:16 2012 root/mnt/B/102/c/1001
03400/8197 drwxr-xr-x 2 root root 1024 Mon Jan 30 18:45:05 2012 root/mnt/B/102/d
03400/4098 drwxr-xr-x 4 root root 1024 Mon Jan 30 18:45:34 2012 root/mnt/B/102/d/2001
03400/4103 drwxr-xr-x 2 root root 1024 Mon Jan 30 18:45:34 2012 root/mnt/B/102/d/2001/z
03400/8195 drwxr-xr-x 5 root root 1024 Mon Jan 30 18:45:05 2012
root/mnt/B/102/d/2001/z/3001
Not traversing root/mnt/B/102/d/2001/z/3001 w. dev=03400 ino=8195 : previously seen as root/mnt/B/102
03400/4102 -rw-r--r-- 1 root root 10 Mon Jan 30 18:25:30 2012 root/mnt/B/102/d/2001/b
03400/4101 -rw-r--r-- 1 root root 10 Mon Jan 30 18:25:27 2012 root/mnt/B/102/d/2001/a
==5353==
==5353== HEAP SUMMARY:
==5353== in use at exit: 0 bytes in 0 blocks
==5353== total heap usage: 598 allocs, 598 frees, 931,285 bytes allocated
==5353==
==5353== All heap blocks were freed -- no leaks are possible
==5353==
==5353== For counts of detected and suppressed errors, rerun with: -v
==5353== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)

```