

lab4prob1 output

Please enter a command (exit to exit) ls -l

There are 2 tokens.

The tokens are:

ls

-l

total 336

```
-rw-rw-r-- 1 brandonfowler brandonfowler 146422 Oct  8 14:45 cscd340_f14_lab4.pdf
-rw-rw-r-- 1 brandonfowler brandonfowler   925 Oct  5 13:45 cscd340lab3prob1.c~
-rw-rw-r-- 1 brandonfowler brandonfowler  2069 Oct  7 19:38 cscd340lab3prob2.c~
-rw-rw-r-- 1 brandonfowler brandonfowler  2396 Oct  7 19:30 cscd340lab3prob3.c~
-rw-rw-r-- 1 brandonfowler brandonfowler 57168 Oct  9 19:24 cscd340lab4.odt
-rw-rw-r-- 1 brandonfowler brandonfowler  3785 Oct  9 19:26 cscd340lab4prob1.c
-rw-rw-r-- 1 brandonfowler brandonfowler  3747 Oct  9 18:13 cscd340lab4prob1.c~
-rw-rw-r-- 1 brandonfowler brandonfowler   385 Oct  8 17:59 cscd340lab4prob2.c
-rw-rw-r-- 1 brandonfowler brandonfowler  2973 Oct  9 19:14 cscd340lab4prob3.c
-rw-rw-r-- 1 brandonfowler brandonfowler  2938 Oct  9 18:15 cscd340lab4prob3.c~
-rw-rw-r-- 1 brandonfowler brandonfowler  3164 Oct  9 19:19 cscd340lab4prob4.c
-rw-rw-r-- 1 brandonfowler brandonfowler  3164 Oct  9 19:19 cscd340lab4prob4.c~
-rw-rw-r-- 1 brandonfowler brandonfowler    0 Oct  5 16:37 example~
-rw-rw-r-- 1 brandonfowler brandonfowler  1275 Oct  9 19:22 linkedList.c
-rw-rw-r-- 1 brandonfowler brandonfowler  1275 Oct  9 19:22 linkedList.c~
-rw-rw-r-- 1 brandonfowler brandonfowler   596 Oct  9 19:21 linkedList.h
-rw-rw-r-- 1 brandonfowler brandonfowler   602 Oct  9 19:21 linkedList.h~
-rw-r--r-- 1 brandonfowler brandonfowler   333 Oct  8 15:45 makefile
-rw-r--r-- 1 brandonfowler brandonfowler   283 Oct  5 13:23 makefile~
-rwxrwxr-x 1 brandonfowler brandonfowler 19185 Oct  9 19:26 prob1
-rwxrwxr-x 1 brandonfowler brandonfowler  9902 Oct  9 19:26 prob2
-rwxrwxr-x 1 brandonfowler brandonfowler 17204 Oct  9 19:26 prob3
-rwxrwxr-x 1 brandonfowler brandonfowler 17308 Oct  9 19:26 prob4
```

Please enter a command (exit to exit) ls

There are 1 tokens.

The tokens are:

ls

```
cscd340_f14_lab4.pdf cscd340lab4prob1.c~ example~ makefile~
cscd340lab3prob1.c~ cscd340lab4prob2.c linkedList.c prob1
cscd340lab3prob2.c~ cscd340lab4prob3.c linkedList.c~ prob2
cscd340lab3prob3.c~ cscd340lab4prob3.c~ linkedList.h prob3
cscd340lab4.odt cscd340lab4prob4.c linkedList.h~ prob4
cscd340lab4prob1.c cscd340lab4prob4.c~ makefile
```

Please enter a command (exit to exit) pwd

There are 1 tokens.

The tokens are:

pwd

/home/brandonfowler/Desktop

Please enter a command (exit to exit) print

1 ls -l

2 ls

3 pwd

4 print

Please enter a command (exit to exit) exit

valgrind lab4prob1

brandonfowler@Server-Ubuntu:~\$ valgrind ./prob1

valgrind: ./prob1: No such file or directory

```

brandonfowler@Server-Ubuntu:~$ cd Desktop
brandonfowler@Server-Ubuntu:~/Desktop$ valgrind ./prob1
valgrind: ./prob1: No such file or directory
brandonfowler@Server-Ubuntu:~/Desktop$ make prob1
gcc -g cscd340lab4prob1.c linkedList.c -o prob1
brandonfowler@Server-Ubuntu:~/Desktop$ valgrind ./prob1
==4152== Memcheck, a memory error detector
==4152== Copyright (C) 2002-2013, and GNU GPL'd, by Julian Seward et al.
==4152== Using Valgrind-3.10.0.SVN and LibVEX; rerun with -h for copyright info
==4152== Command: ./prob1
==4152==
Please enter a command (exit to exit) ls -l
There are 2 tokens.
The tokens are:
ls
-l
total 256
-rw-rw-r-- 1 brandonfowler brandonfowler 1121 Oct  2 15:02 binaryToTxt.c~
-rw-rw-r-- 1 brandonfowler brandonfowler 146422 Oct  8 14:44 cscd340_f14_lab4.pdf
-rw-rw-r-- 1 brandonfowler brandonfowler  876 Sep 26 19:39 cscd340_hw1.c~
-rw-rw-r-- 1 brandonfowler brandonfowler  262 Oct  1 19:14 cscd340_lab2sigs.c~
-rw-rw-r-- 1 brandonfowler brandonfowler  925 Oct  5 13:47 cscd340lab3prob1.c~
-rw-rw-r-- 1 brandonfowler brandonfowler 1887 Oct  3 16:49 cscd340lab3prob2.c~
-rw-rw-r-- 1 brandonfowler brandonfowler 2327 Oct  6 15:11 cscd340lab3prob3.c~
-rw-rw-r-- 1 brandonfowler brandonfowler 3719 Oct  8 17:17 cscd340lab4prob1.c
-rw-rw-r-- 1 brandonfowler brandonfowler 3719 Oct  8 17:16 cscd340lab4prob1.c~
-rw-rw-r-- 1 brandonfowler brandonfowler  557 Oct  8 14:45 cscd340lab4prob3.c
-rw-rw-r-- 1 brandonfowler brandonfowler   0 Oct  6 13:29 forkit~
-rw-rw-r-- 1 brandonfowler brandonfowler   0 Sep 26 14:32 input~
-rw-rw-r-- 1 brandonfowler brandonfowler  220 Sep 26 20:48 input.txt~
-rw-rw-r-- 1 brandonfowler brandonfowler 1239 Oct  8 16:06 linkedList.c
-rw-rw-r-- 1 brandonfowler brandonfowler 1485 Oct  8 16:05 linkedList.c~
-rw-rw-r-- 1 brandonfowler brandonfowler  600 Oct  8 15:45 linkedList.h
-rw-rw-r-- 1 brandonfowler brandonfowler  649 Sep 26 14:31 linkedList.h~
-rw-r--r-- 1 brandonfowler brandonfowler  333 Oct  8 15:45 makefile
-rw-r--r-- 1 brandonfowler brandonfowler  333 Oct  8 15:45 makefile~
-rw-rw-r-- 1 brandonfowler brandonfowler   53 Oct  1 16:28 myTextInput.txt~
-rwxrwxr-x 1 brandonfowler brandonfowler 19169 Oct  8 17:19 prob1
-rw-rw-r-- 1 brandonfowler brandonfowler 3480 Oct  1 17:22 syscallout.txt~
-rw-rw-r-- 1 brandonfowler brandonfowler  203 Oct  1 17:20 syscalls.c~
-rw-rw-r-- 1 brandonfowler brandonfowler  269 Oct  1 18:51 SysCalls.java~
-rw-rw-r-- 1 brandonfowler brandonfowler   0 Oct  1 17:16 test.txt~
-rw-rw-r-- 1 brandonfowler brandonfowler   27 Sep 26 21:18 to ask~
-rw-rw-r-- 1 brandonfowler brandonfowler  931 Oct  1 19:27 txtToBinary.c~
-rw-rw-r-- 1 brandonfowler brandonfowler 1390 Sep 26 20:21 utility.c~
Please enter a command (exit to exit) pwd
There are 1 tokens.
The tokens are:
pwd
/home/brandonfowler/Desktop
Please enter a command (exit to exit) print
1 ls -l
2 pwd
3 print
Please enter a command (exit to exit) exit
==4152==
==4152== HEAP SUMMARY:

```

```
==4152==    in use at exit: 0 bytes in 0 blocks
==4152== total heap usage: 18 allocs, 18 frees, 261 bytes allocated
==4152==
==4152== All heap blocks were freed -- no leaks are possible
==4152==
==4152== For counts of detected and suppressed errors, rerun with: -v
==4152== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
```

lab4prob2 output

```
brandonfowler@Server-Ubuntu:~/Desktop$ ls -l|wc -w
291
brandonfowler@Server-Ubuntu:~/Desktop$ ./prob2
291
```

lab4prob3 outputs

1.

Please enter a command (exit to exit) ls | sort -r

```
prob4
prob3
prob2
prob1
makefile~
makefile
linkedList.h~
linkedList.h
linkedList.c~
linkedList.c
example~
cscd340lab4prob4.c~
cscd340lab4prob4.c
cscd340lab4prob3.c~
cscd340lab4prob3.c
cscd340lab4prob2.c
cscd340lab4prob1.c~
cscd340lab4prob1.c
cscd340lab4.odt
cscd340lab3prob3.c~
cscd340lab3prob2.c~
cscd340lab3prob1.c~
cscd340_f14_lab4.pdf
```

2.

Please enter a command (exit to exit) ls -l | wc -w

```
209
```

3.

Please enter a command (exit to exit) pwd | wc -w

```
1
```

valgrinds lab4prob3

1.

```
brandonfowler@The-Console-Ubuntu:~/Desktop$ valgrind ./prob3
```

```
==4006== Memcheck, a memory error detector
```

```
==4006== Copyright (C) 2002-2013, and GNU GPL'd, by Julian Seward et al.
```

```
==4006== Using Valgrind-3.10.0.SVN and LibVEX; rerun with -h for copyright info
```

```
==4006== Command: ./prob3
```

```
==4006==
```

```
Please enter a command (exit to exit) ls -l | wc -w
```

```
209
```

2.

```
brandonfowler@The-Console-Ubuntu:~/Desktop$ valgrind ./prob3
==4160== Memcheck, a memory error detector
==4160== Copyright (C) 2002-2013, and GNU GPL'd, by Julian Seward et al.
==4160== Using Valgrind-3.10.0.SVN and LibVEX; rerun with -h for copyright info
==4160== Command: ./prob3
==4160==
Please enter a command (exit to exit) ls -l | moo
Invalid Post Pipe Command
==4160==
==4160== HEAP SUMMARY:
==4160==    in use at exit: 96 bytes in 5 blocks
==4160==   total heap usage: 7 allocs, 2 frees, 109 bytes allocated
==4160==
==4160== LEAK SUMMARY:
==4160==    definitely lost: 0 bytes in 0 blocks
==4160==    indirectly lost: 0 bytes in 0 blocks
==4160==    possibly lost: 0 bytes in 0 blocks
==4160==    still reachable: 96 bytes in 5 blocks
==4160==         suppressed: 0 bytes in 0 blocks
==4160== Rerun with --leak-check=full to see details of leaked memory
==4160==
==4160== For counts of detected and suppressed errors, rerun with: -v
==4160== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
```

lab4prob3 question

Since the process image of the prob3 program changes, valgrind loses track of it and doesn't give any information when valid commands are entered and successfully executed. When this is the case, the program is not leaking memory, because the entire process image is overwritten, which effectively reclaims memory. However, as obvious by my second valgrind output, when invalid commands are entered the memory is leaked. Since nothing can be done after the failed exec command, the program ends immediately and the memory is not reclaimed.

lab4prob4 output

```
brandonfowler@The-Console-Ubuntu:~/Desktop$ ./prob4
Please enter a command (exit to exit) ls | sort -r
prob4
prob3
prob2
prob1
makefile~
makefile
linkedList.h~
linkedList.h
linkedList.c~
linkedList.c
example~
cscd340lab4prob4.c~
cscd340lab4prob4.c
cscd340lab4prob3.c~
cscd340lab4prob3.c
cscd340lab4prob2.c
cscd340lab4prob1.c~
cscd340lab4prob1.c
cscd340lab4.odt
cscd340lab3prob3.c~
```

cscd340lab3prob2.c~

cscd340lab3prob1.c~

cscd340_f14_lab4.pdf

Please enter a command (exit to exit) pwd | wc -w

1

Please enter a command (exit to exit) ls -l | head

total 336

-rw-rw-r-- 1 brandonfowler brandonfowler 146422 Oct 8 14:45 cscd340_f14_lab4.pdf

-rw-rw-r-- 1 brandonfowler brandonfowler 925 Oct 5 13:45 cscd340lab3prob1.c~

-rw-rw-r-- 1 brandonfowler brandonfowler 2069 Oct 7 19:38 cscd340lab3prob2.c~

-rw-rw-r-- 1 brandonfowler brandonfowler 2396 Oct 7 19:30 cscd340lab3prob3.c~

-rw-rw-r-- 1 brandonfowler brandonfowler 55411 Oct 9 20:15 cscd340lab4.odt

-rw-rw-r-- 1 brandonfowler brandonfowler 3785 Oct 9 19:26 cscd340lab4prob1.c

-rw-rw-r-- 1 brandonfowler brandonfowler 3747 Oct 9 18:13 cscd340lab4prob1.c~

-rw-rw-r-- 1 brandonfowler brandonfowler 385 Oct 8 17:59 cscd340lab4prob2.c

-rw-rw-r-- 1 brandonfowler brandonfowler 2973 Oct 9 19:14 cscd340lab4prob3.c

Please enter a command (exit to exit) pwd

/home/brandonfowler/Desktop

Please enter a command (exit to exit) exit

valgrind lab4prob4

brandonfowler@The-Console-Ubuntu:~/Desktop\$ valgrind ./prob4

==4756== Memcheck, a memory error detector

==4756== Copyright (C) 2002-2013, and GNU GPL'd, by Julian Seward et al.

==4756== Using Valgrind-3.10.0.SVN and LibVEX; rerun with -h for copyright info

==4756== Command: ./prob4

==4756==

Please enter a command (exit to exit) ls -l | wc -w

209

Please enter a command (exit to exit) pwd

/home/brandonfowler/Desktop

Please enter a command (exit to exit) ls -l | sort -r

total 336

-rwxrwxr-x 1 brandonfowler brandonfowler 9902 Oct 9 20:30 prob2

-rwxrwxr-x 1 brandonfowler brandonfowler 19185 Oct 9 20:30 prob1

-rwxrwxr-x 1 brandonfowler brandonfowler 17667 Oct 9 20:30 prob4

-rwxrwxr-x 1 brandonfowler brandonfowler 17204 Oct 9 20:30 prob3

-rw-rw-r-- 1 brandonfowler brandonfowler 925 Oct 5 13:45 cscd340lab3prob1.c~

-rw-rw-r-- 1 brandonfowler brandonfowler 602 Oct 9 19:21 linkedList.h~

-rw-rw-r-- 1 brandonfowler brandonfowler 596 Oct 9 19:21 linkedList.h

-rw-rw-r-- 1 brandonfowler brandonfowler 55702 Oct 9 20:43 cscd340lab4.odt

-rw-rw-r-- 1 brandonfowler brandonfowler 385 Oct 8 17:59 cscd340lab4prob2.c

-rw-rw-r-- 1 brandonfowler brandonfowler 3785 Oct 9 19:26 cscd340lab4prob1.c

-rw-rw-r-- 1 brandonfowler brandonfowler 3747 Oct 9 18:13 cscd340lab4prob1.c~

-rw-rw-r-- 1 brandonfowler brandonfowler 3640 Oct 9 20:30 cscd340lab4prob4.c~

-rw-rw-r-- 1 brandonfowler brandonfowler 3640 Oct 9 20:30 cscd340lab4prob4.c

-rw-rw-r-- 1 brandonfowler brandonfowler 2973 Oct 9 19:14 cscd340lab4prob3.c

-rw-rw-r-- 1 brandonfowler brandonfowler 2938 Oct 9 18:15 cscd340lab4prob3.c~

-rw-rw-r-- 1 brandonfowler brandonfowler 2396 Oct 7 19:30 cscd340lab3prob3.c~

-rw-rw-r-- 1 brandonfowler brandonfowler 2069 Oct 7 19:38 cscd340lab3prob2.c~

-rw-rw-r-- 1 brandonfowler brandonfowler 146422 Oct 8 14:45 cscd340_f14_lab4.pdf

-rw-rw-r-- 1 brandonfowler brandonfowler 1275 Oct 9 19:22 linkedList.c~

-rw-rw-r-- 1 brandonfowler brandonfowler 1275 Oct 9 19:22 linkedList.c

-rw-rw-r-- 1 brandonfowler brandonfowler 0 Oct 5 16:37 example~

-rw-r--r-- 1 brandonfowler brandonfowler 333 Oct 8 15:45 makefile

-rw-r--r-- 1 brandonfowler brandonfowler 283 Oct 5 13:23 makefile~

Please enter a command (exit to exit) exit

```
==4756==  
==4756== HEAP SUMMARY:  
==4756==    in use at exit: 0 bytes in 0 blocks  
==4756== total heap usage: 18 allocs, 18 frees, 312 bytes allocated  
==4756==  
==4756== All heap blocks were freed -- no leaks are possible  
==4756==  
==4756== For counts of detected and suppressed errors, rerun with: -v  
==4756== ERROR SUMMARY: 0 errors from 0 contexts (suppressed: 0 from 0)
```