

```
Applications Places System 54°F Sun Oct 12, 7:52 PM
Terminal
File Edit View Search Terminal Help
bash-4.1$ ./dictstat dict data
apple 1 0 0
bash-4.1$ ./dictstat dict data
apple 1 0 0
bash-4.1$ vim dictstat.c
bash-4.1$ make
gcc -ansi -pedantic -Wall -g -o dictstat dictstat.c
dictstat.c: In function 'readDict':
dictstat.c:58: error: 'else' without a previous 'if'
make: *** [dictstat] Error 1
bash-4.1$ vim dictstat.c
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gcc -ansi -pedantic -Wall -g -o dictstat dictstat.c
bash-4.1$ ./dictstat dict data
app 0 0 1
apple 1 0 0
bash-4.1$ vim dictstat.c
bash-4.1$ make
gcc -ansi -pedantic -Wall -g -o dictstat dictstat.c
dictstat.c: In function 'createNode':
dictstat.c:34: warning: 'node' is used uninitialized in this function
bash-4.1$ gdb dictstat
GNU gdb (GDB) Red Hat Enterprise Linux (7.2-64.el6.5.2)
Copyright (C) 2010 Free Software Foundation, Inc.
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This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law. Type "show copying"
and "show warranty" for details.
This GDB was configured as "x86_64-redhat-linux-gnu".
For bug reporting instructions, please see:
<http://www.gnu.org/software/gdb/bugs/>...
Reading symbols from ./autofs/lab/1lab_users/jes390/Desktop/Assignment1/dictstat...done.
(gdb) run dict data
Starting program: ./autofs/lab/1lab_users/jes390/Desktop/Assignment1/dictstat dict data

Program received signal SIGSEGV, Segmentation fault.
0x000000004007ec in createNode () at dictstat.c:34
34      node->EQ = false;
(gdb) info registers
rax      0x1      1
rbx      0x0      0
rcx      0x6025e0 6301152
rdx      0x0      0
rsi      0x4      4
rdi      0x602010 6299664
rsp      0x7ffffffc3b0 0x7ffffffc3b0
rbp      0x7ffffffc3b0 0x7ffffffc3b0
r8       0x7ffffffd0ee8 140737351880424
r9       0x1      1
r10      0x150     336
r11      0x7ffffffc3b0 140737340646464
r12      0x400640 4195904
r13      0x7ffffffe580 140737488348544
r14      0x0      0
r15      0x0      0
rip      0x4007ec 0x4007ec <createNode+0>
eflags   0x10200  [ RF IF RF ]
cs       0x33     51
ss       0x2b     43
ds       0x0      0
es       0x0      0
fs       0x0      0
gs       0x0      0
(gdb) 
```

BIG O Notation

The struct I used is a trie structure. Variables are defined as 'n' words and 'm' characters. It takes $O(n*m)$ time referencing to the amount of characters that are being used in this structure.

We search the words, which takes 'm' times. For every 'm' words we do 'n' counts for each character making it $O(n*m)$

To add words to the structure we go character by character starting from the root node and traversing down for every unique character the structure sees. If we come across a character that already exists as a child node we set our pointers equal to that node rather than creating a new one. Once the structure is built we look through our data file and find the words and compare them to our dictionary file by looking at the trie structure and DFSing it. I update the occurrence prefix and superWord by updating as I DFS. Memory is at most $O(n*m)$ because of the malloc size of the nodes which holds the words and characters.

GDB

For GDB I had a segmentation failure. A seg fault is an error with compiling because my program was trying to access a piece of memory that didnt exist. To fix

this I used GDB on the dictstat file and I run the program and used break points to find out what my data looks like at certain points of my code. I used info registers command to see where in my register the data was. I didn't see it there so I knew I needed to malloc some piece of memory and I found my error

Challenges

The biggest challenge I faced during this project was learning the syntax for c90. Its very specific so when I got warnings I was confused on how to actually fix them. Using online resources taught me a lot about C programming