

ASSIGNMENT:4

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SECTION:A

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Q: Generate different C programs that induce a segmentation fault error, select these examples of your choice, and employ the GDB utility for debugging on Linux.

Seg.c

```
#include <stdio.h>
```

```
int main() {
```

```
    int *ptr = NULL; // Pointing to NULL, accessing it will cause segmentation fault
```

```
    int result = 0;
```

```
    for (int i = 0; i < 100; i++) {
```

```
        result += ptr[i]; // Addition operation (will cause segmentation fault)
```

```
        result -= ptr[i]; // Subtraction operation (will cause segmentation fault)
```

```

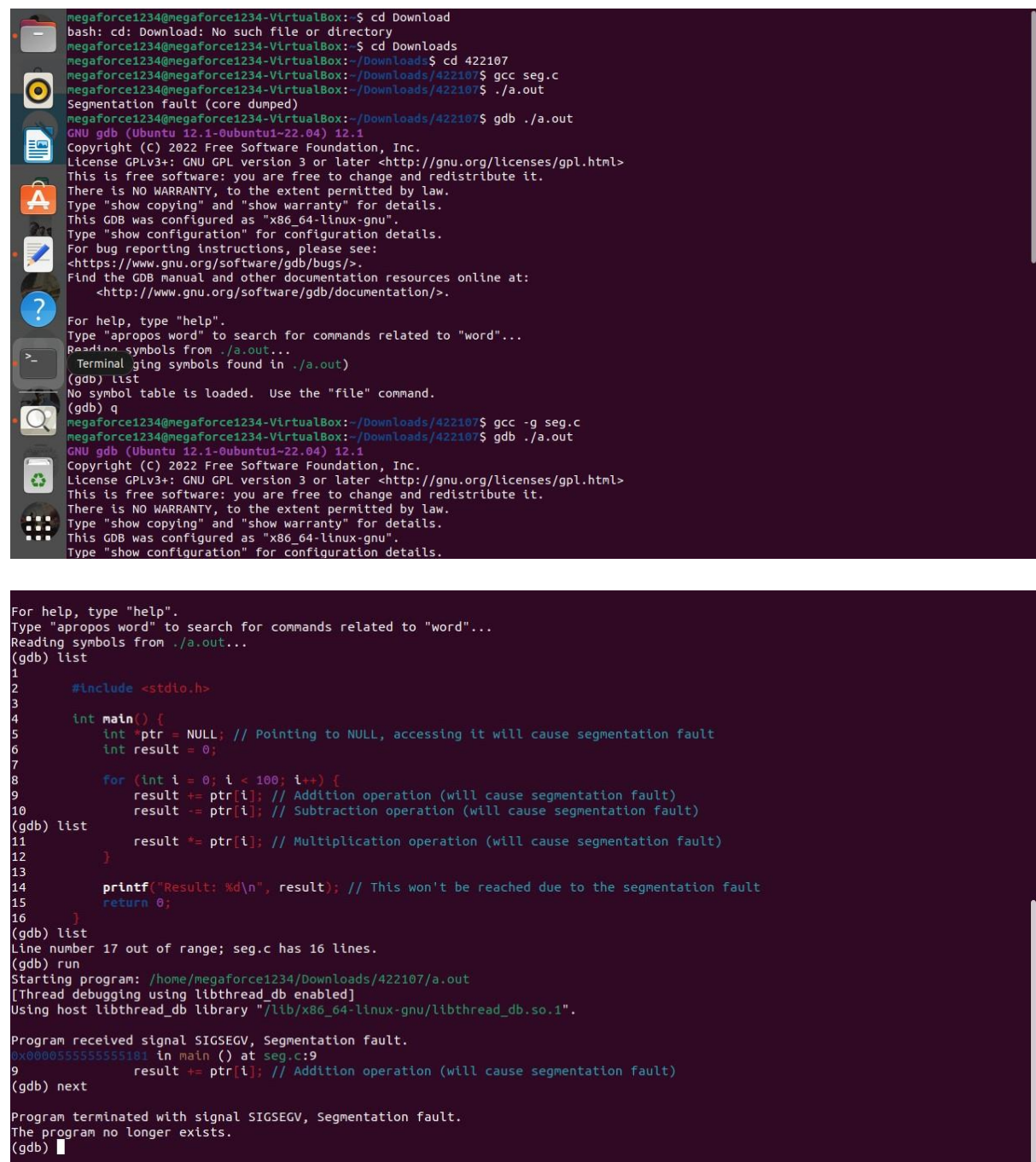
    result *= ptr[i]; // Multiplication operation (will cause segmentation fault)
}

printf("Result: %d\n", result); // This won't be reached due to the segmentation fault

return 0;
}

```

Output:



```

megaforce1234@megaforce1234-VirtualBox:~$ cd Download
bash: cd: Download: No such file or directory
megaforce1234@megaforce1234-VirtualBox:~$ cd Downloads
megaforce1234@megaforce1234-VirtualBox:~/Downloads$ cd 422107
megaforce1234@megaforce1234-VirtualBox:~/Downloads/422107$ gcc seg.c
megaforce1234@megaforce1234-VirtualBox:~/Downloads/422107$ ./a.out
Segmentation fault (core dumped)
megaforce1234@megaforce1234-VirtualBox:~/Downloads/422107$ gdb ./a.out
GNU gdb (Ubuntu 12.1-0ubuntu1~22.04) 12.1
Copyright (C) 2022 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
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-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<https://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
<http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from ./a.out...
(gdb) list
No symbol table is loaded. Use the "file" command.
(gdb) q
megaforce1234@megaforce1234-VirtualBox:~/Downloads/422107$ gcc -g seg.c
megaforce1234@megaforce1234-VirtualBox:~/Downloads/422107$ gdb ./a.out
GNU gdb (Ubuntu 12.1-0ubuntu1~22.04) 12.1
Copyright (C) 2022 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
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-linux-gnu".
Type "show configuration" for configuration details.

For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from ./a.out...
(gdb) list
1
2     #include <stdio.h>
3
4     int main() {
5         int *ptr = NULL; // Pointing to NULL, accessing it will cause segmentation fault
6         int result = 0;
7
8         for (int i = 0; i < 100; i++) {
9             result += ptr[i]; // Addition operation (will cause segmentation fault)
10            result -= ptr[i]; // Subtraction operation (will cause segmentation fault)
(gdb) list
11            result *= ptr[i]; // Multiplication operation (will cause segmentation fault)
12        }
13
14        printf("Result: %d\n", result); // This won't be reached due to the segmentation fault
15        return 0;
16    }
(gdb) list
Line number 17 out of range; seg.c has 16 lines.
(gdb) run
Starting program: /home/megaforce1234/Downloads/422107/a.out
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".

Program received signal SIGSEGV, Segmentation fault.
0x0000555555555101 in main () at seg.c:9
9         result += ptr[i]; // Addition operation (will cause segmentation fault)
(gdb) next

Program terminated with signal SIGSEGV, Segmentation fault.
The program no longer exists.
(gdb)

```

