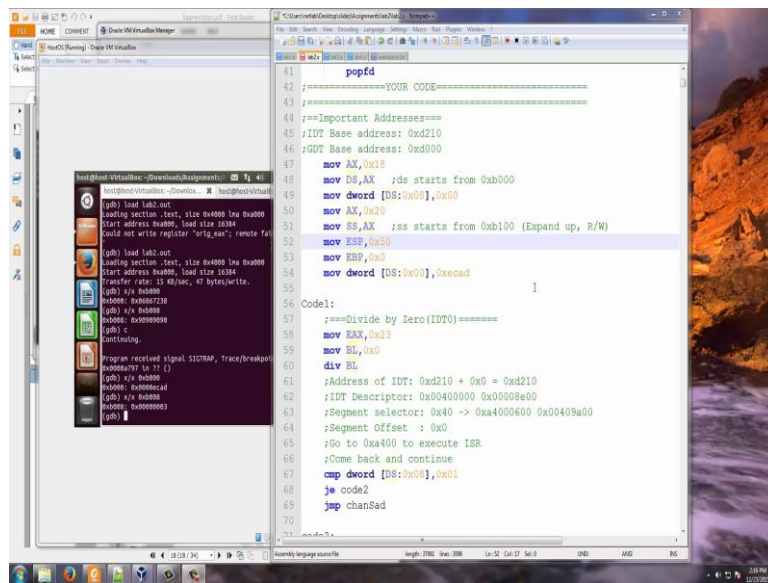


Information Security - II
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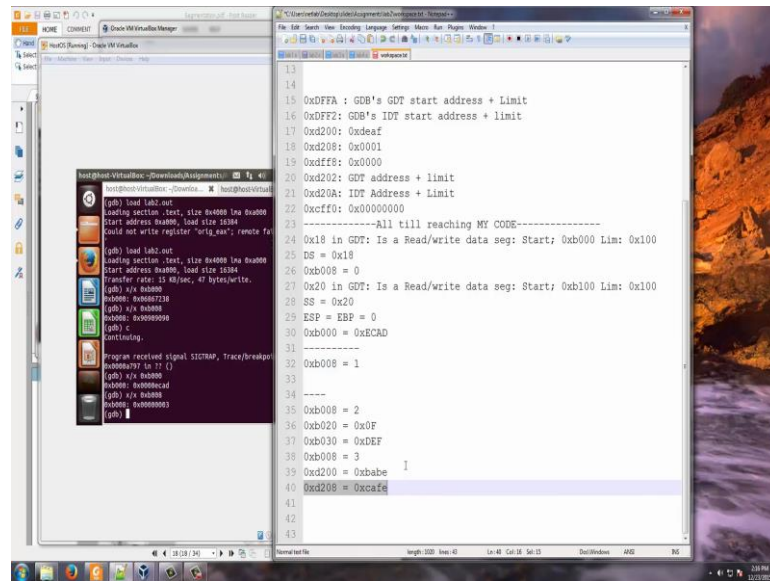
Lecture - 26
Lab2 Part 2 - Week 5

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So, in the previous demo, we find that the code did not work.

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The screenshot shows a debugger window with two panes. The left pane is the GDB console, and the right pane is the assembly view.

GDB Console Output:

```
(gdb) load lab2.out
Loading section .text, size 0x0001, offset 0x0000
Start address 0x0000, load size 28368
Could not write register "orig_eax", remote fa

(gdb) load lab2.out
Loading section .text, size 0x0001, offset 0x0000
Start address 0x0000, load size 28368
Transfer rate: 25 kB/sec, 47 bytes/write.
(gdb) i/x 0x0000
0x0000: 0x00007218
(gdb) i/x 0x0008
0x0008: 0x00000098
(gdb) c
Continuing.

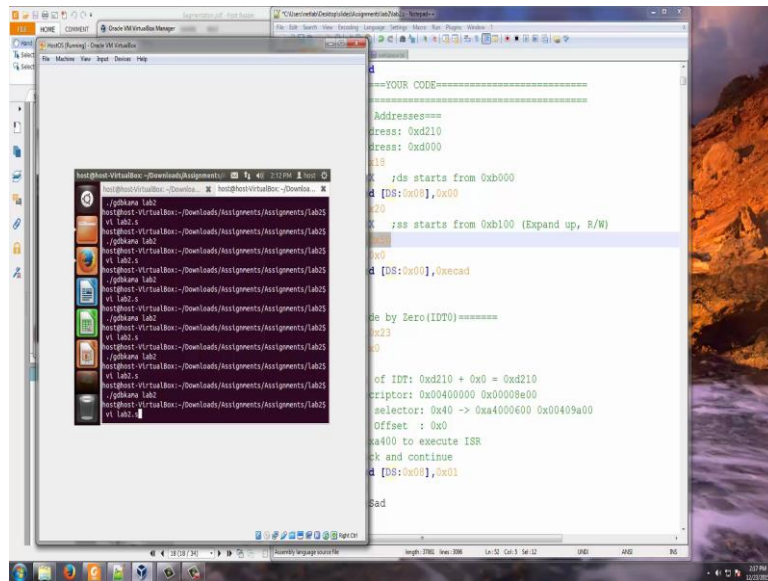
Program received signal SIGTRAP, Trace/Breakpoint
0x00007218 in ?? ()
(gdb) i/x 0x0000
0x0000: 0x00000098
(gdb) i/x 0x0008
0x0008: 0x00000093
(gdb) i
```

Assembly View:

```
13
14
15 0xdffa : GDB's GDT start address + Limit
16 0xdff2 : GDB's IDT start address + limit
17
18 0xd200: 0xdeadf
19 0xd208: 0x0001
20 0xd210: 0x0000
21 0xd202: GDT address + limit
22 0xd20a: IDT Address + limit
23 -----All till reaching MY CODE-----
24 0x18 in GDT: Is a Read/write data seg: Start: 0xb000 Lim: 0x100
25 DS = 0x18
26 0xb008 = 0
27 0x20 in GDT: Is a Read/write data seg: Start: 0xb100 Lim: 0x100
28 SS = 0x20
29 ESP = EBP = 0
30 0xb000 = 0xecad
31 -----
32 0xb008 = 1
33
34 ----
35 0xb008 = 2
36 0xb020 = 0x0f
37 0xb030 = 0xdef
38 0xb008 = 3
39 0xd200 = 0xbabe
40 0xd208 = 0xcafe
41
42
43
```

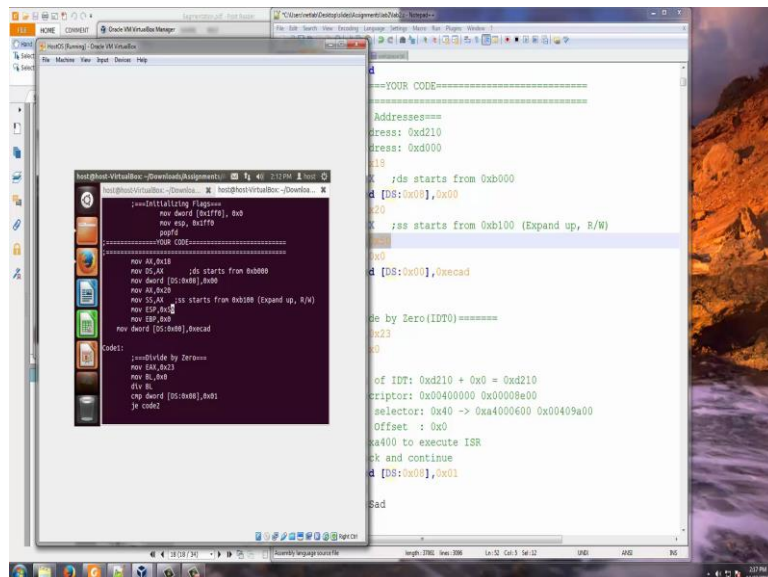
For example, if you have seen my b 1008 should have been 3 and my b 1000 should have been e cad and d200 as should be babe d208 should be c a f e all this did not happen. So, why it did not happen? So, let us go, just an exercise we had initialized stack pointer to 0 and it is a segment. When you try to push in then, if the stack pointer is 0 then, when you try to push, it basically gives us stack fault and that is why it was not able to and when we actually have an interrupt that stack is being pushed into and so essentially nothing could move in into the stack and that is the reason. Why the program did not work? Now, we go to line number 52 and make it 0 x 50.

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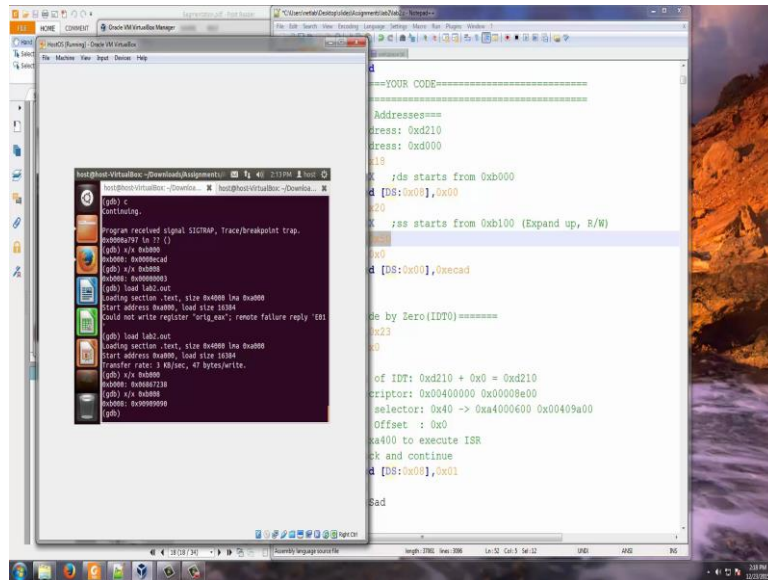
We will also see, in another window here, lab two dot s and go here and see that this is.

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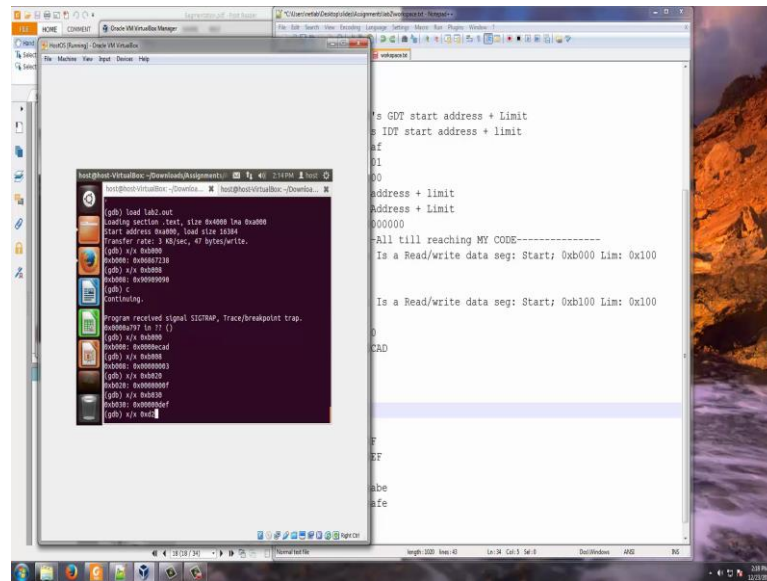
Go down to that particular line and you here see that your move sp comma 0 x 50. So, once you do this and compile this and then upload this here.

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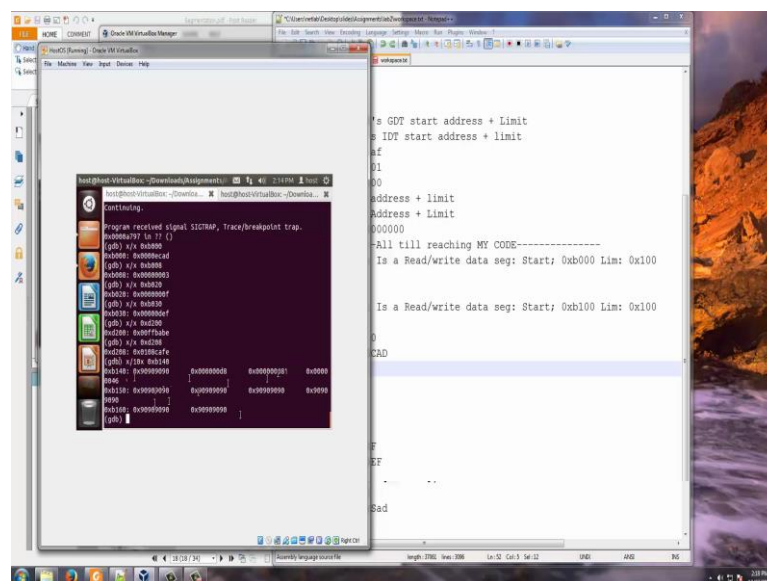
Now, let us go and check what is there in b 1000. There is some value and of course, all are null characters in b 1008.

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Now, we continue, now you see what is there in b 1000, it is c cad b 1008 it is 3. That is, what we wanted and we will check the other values also as we see here b 1020, b 1020. That is been f 30 is d e f 8 is 3 we have already checked.

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d200 is babe d208 cf. This basically worked and let us also now see where does this stack start. Essentially, the stack is starting at b 1100 and we are looking at a 50. So, let us see s slash 10 x, 0 x b 140. So, now, as you see here there as things that have been pushed here 46, 8, d 8. So, this was the code segment etcetera. So, the stack is now operational at v 150. So, the stack actually grows down. So, initially when we made esp as 0. It basically started growing down beyond b 1100 and essentially it became negative.

Now, I made esp as 50 it started working about 4 f and v 1 4 f. As you see here this is why the stack has been operational. So, what we have done in this assignment is we have created 3 faults, one is a hardware generated fault, divide by 0. The next one was an overflow; where there was an overflow created and then into instruction was executed to see the over flow and then there was software define in 31. The difference between the first and this last 2 was that when the interrupt service routine complete it is execution in the first case divided by it is 0. It came to the same instruction that created the fault. So, that we could actually rectify it but in the case of the other two it went it a next instruction that actually created the interrupt and this is very important to be noted.

So, interrupt service routines which can be potentially a big source of security vulnerability because, that actually causes multiple privilege changes as we will see in this subsequent assignment. But so, what we have done in this particular assignment is to basically demonstrate, how you write interrupt service routine. How you load the IDT's and how you configure this. So, what I suggest that is down the line, you please start generating more interrupts that you see in the Intel manual and then write some interesting interrupt service routines. Please note that the major part of a servicing device request comes from interrupt service routine. The device driver actually forms have measure component of the interrupt service routines. So, it is very important that you understand this particular assignment and I hope you have done so.

Thank you.