Exercise 1 - Modified code is in ex1.c file

Exercise 2 -

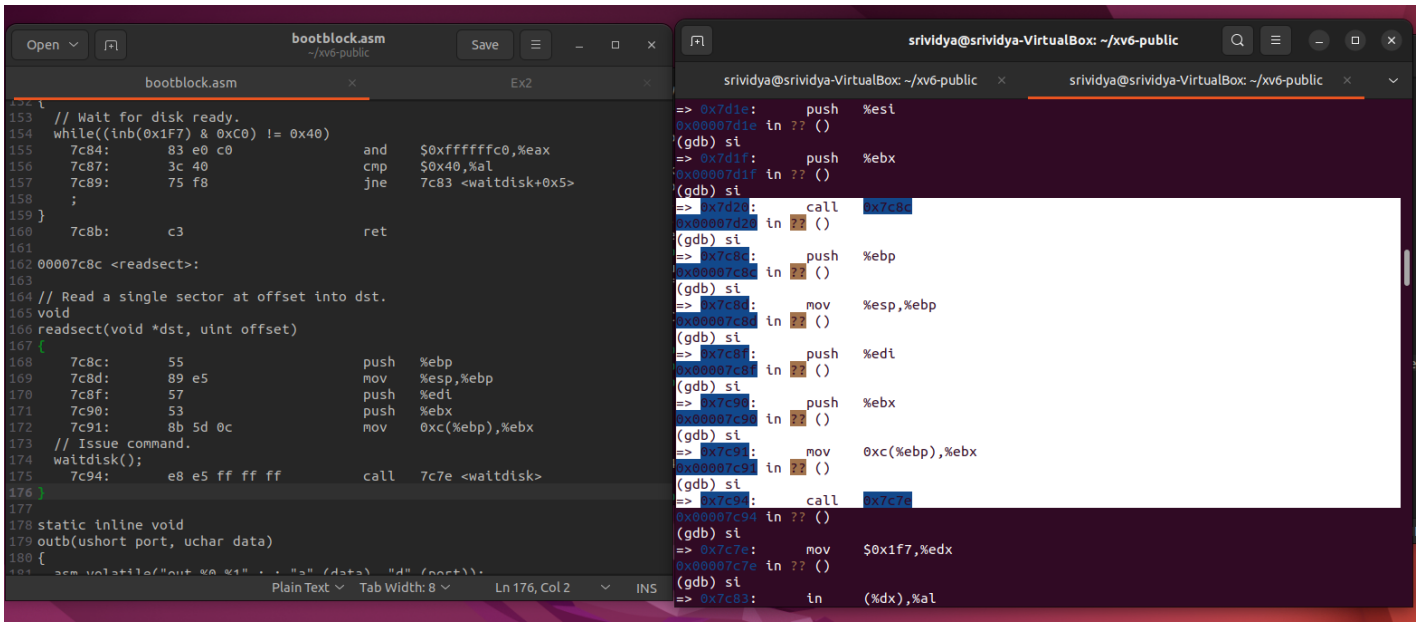
```
srividya@srividya-VirtualBox: ~/xv6-public
srividya@srividya-VirtualBox: ~/xv6-public    srividya@srividya-VirtualBox: ~/xv6-public
The target architecture is set to "i8086".
[f000:fff0]    0xffff0: ljmp   $0x3630,$0xf000e05b
0x0000fff0 in ?? ()
+ symbol-file kernel
warning: A handler for the OS ABI "GNU/Linux" is not built into this configuration
of GDB.  Attempting to continue with the default i8086 settings.

(gdb) si
[f000:e05b]    0xfe05b: cmpw   $0xffc8,%cs:(%esi)
0x0000e05b in ?? ()
(gdb) si
[f000:e062]    0xfe062: jne    0xd241d0b0
0x0000e062 in ?? ()
(gdb) si
[f000:e066]    0xfe066: xor    %edx,%edx
0x0000e066 in ?? ()
(gdb) si
[f000:e068]    0xfe068: mov    %edx,%ss
0x0000e068 in ?? ()
(gdb) si
[f000:e06a]    0xfe06a: mov    $0x7000,%sp
0x0000e06a in ?? ()
(gdb) si
[f000:e070]    0xfe070: mov    $0xfc1c,%dx
0x0000e070 in ?? ()
(gdb) si
[f000:e076]    0xfe076: jmp    0x5576cf2d
0x0000e076 in ?? ()
(gdb) si
[f000:cf2b]    0xfcf2b: cli
0x0000cf2b in ?? ()
```

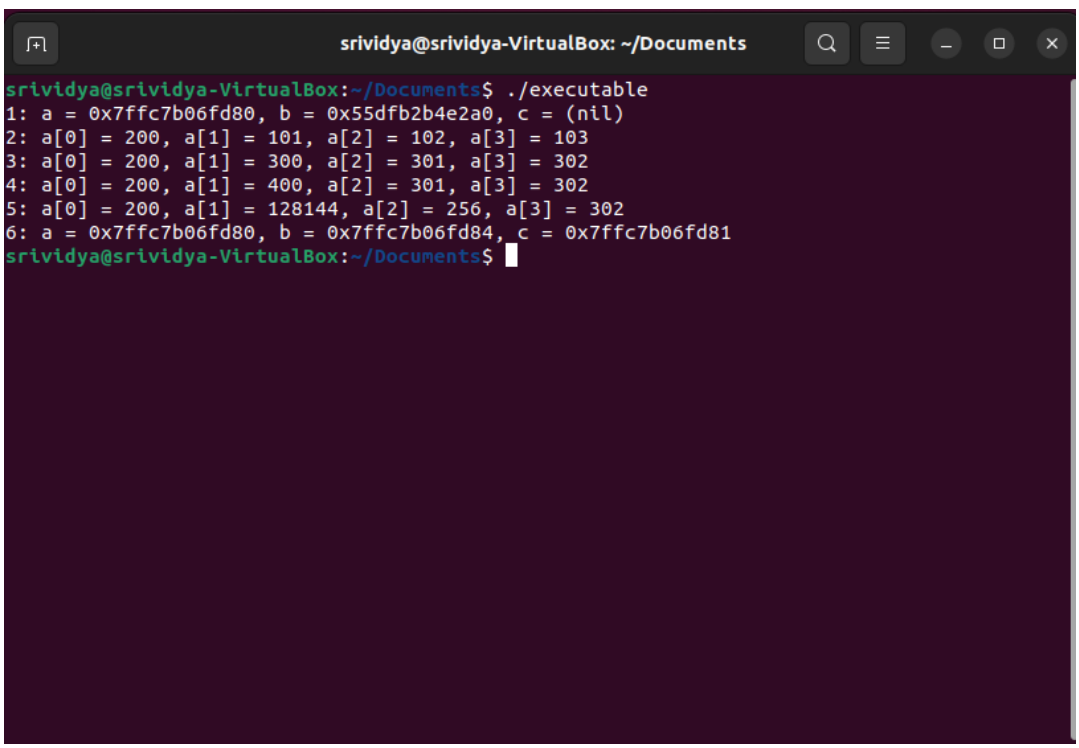
The BIOS when loaded jumps backwards from 0xf000:fff0 to 0xf000:0xe05b. It then set up an interrupt descriptor table and initializes various devices such as the VGA display.

Exercise 3 -

readsect() assembly instructions:



Exercise 4 -



Line 1:

a, b, c are pointers to integer variables. a is allocated 16 bytes of memory on the stack. b is allocated 16 bytes of memory on the heap. Pointer c stores some junk pointer since it is declared but uninitialized.

Line 2:

In the line 15 **for loop** changes the value of integers in array to 100, 101, 102, 103. The line **"c=a"** makes the pointer c point to the same integer as a. So when c[0] is assigned 200 it changes the first element in array a because c is just another name for array a.

Line 3:
c[1]=300; - Changes a[1] to 300 as c is an alias for a.
*(c+2)=301; - Another way of saying c[2]=301. a[2] is set to 301.
3[c]=302; -Another way of saying c[3]=302. a[3] is set to 302.

Line 4:
c=c+1; - This makes c point to the location of a[1]
*c=400; - This changes a[1] to 400

Line 5:
c = (int *) ((char *) c + 1); - The hexadecimal value of the address stored in pointer c increases by only 1 since we typecast it to a character pointer before incrementing it. This is because the size of a character type data in C is 1 byte. The pointer c is then typecast back into an integer type. At the end of this c points to a segment of 4 bytes beginning from the second byte of a[1] and ending at the first byte of a[2].
The contents of a[2] and a[3] at this point look as follows.
a[2]=400 a[3]=301
10010000 10000000 00000000 00000000 00101101 10000000 00000000 00000000
After *c=500 it changes to:
a[2]=128144 a[3]=256
10010000 11110100 00000001 00000000 00000000 10000000 00000000 00000000

Line 6:
b=(int*)a+1; - Increases hexadecimal address value by 4.
c = (int *) ((char *) a + 1); - Increases hexadecimal address value by only 1

Exercise 5 -
1- Changed link address from 0x7c00 to 0x7c10.
2- The make clean was then executed and the makefile was executed again.
3- The code stops working after the line at 0x7c2c and jumps to 0xfe05b. It gets into an infinite loop after execution of a few instructions.

```
(gdb)
[   0:7c2c] => 0x7c2c:          ljmp     $0xb866,$0x87c41
0x00007c2c in ?? ()
(gdb)
[f000:e05b]   0xfe05b:          cmpw   $0xffc8,%cs:(%esi)
0x0000e05b in ?? ()
```

Exercise 6 -

The point BIOS enter bootloader

srividya@srividya-VirtualBox: ~/xv6-public

srividya@srividya-VirtualBox: ~/xv6-public srividya@srividya-VirtualBox: ~/xv6-public

```
d by your `auto-load safe-path' set to "$debugdir:$datadir/auto-load".
To enable execution of this file add
        add-auto-load-safe-path /home/srividya/xv6-public/.gdbinit
line to your configuration file "/home/srividya/.config/gdb/gdbinit".
To completely disable this security protection add
        set auto-load safe-path /
line to your configuration file "/home/srividya/.config/gdb/gdbinit".
For more information about this security protection see the
"Auto-loading safe path" section in the GDB manual.  E.g., run from the shell:
        info "(gdb)Auto-loading safe path"
(gdb) source .gdbinit
+ target remote localhost:26000
warning: No executable has been specified and target does not support
determining executable automatically.  Try using the "file" command.
The target architecture is set to "i8086".
[f000:fff0]    0xffff0: ljmp   $0x3630,$0xf000e05b
0x0000fff0 in ?? ()
+ symbol-file kernel
warning: A handler for the OS ABI "GNU/Linux" is not built into this configurati
on
of GDB.  Attempting to continue with the default i8086 settings.

(gdb) x/8x 0x00100000
0x100000:       0x00000000      0x00000000      0x00000000      0x00000000
0x100010:       0x00000000      0x00000000      0x00000000      0x00000000
(gdb)
```