# 3.Info about my system

***Operating system:*** Ubuntu 20.04.4 LTS

## *Kernel Modules:*

snd_usb_audio,snd_usbmidi_lib,rfcomm,ccm,cmac,algif_hash,algif_skcipher,af_alg,bnep,nls_iso8859_1,snd_sof_pci_intel_icl,sndsof_intel_hda_common,soundwire_intel,soundwire_generic_allocation,soundwire_cadence,snd_sof_intel_hda,snd_sof_pci,snd_sof_xtensa_dsp,snd_sof,snd_soc_hdac_hda,snd_hda_ext_core,snd_soc_acpi_intel_match,snd_soc_acpi,soundwire_bus,snd_soc_core,snd_compress,ac97_bus,snd_pcm_dmaengine,snd_hda_codec_hdmi,snd_hda_codec_realtek,uvcvideo,snd_hda_codec_generic,ledtrig_audio,videobuf2_vmalloc,intel_tcc_cooling,x86_pkg_temp_thermal,intel_powerclamp,videobuf2_memops,snd_hda_intel,videobuf2_v4l2,kvm_intel,videobuf2_common,iwlmvm,kvm,rtsx_usb_ms,snd_intel_dspcfg,btusb,snd_intel_sdw_acpi,btrtl,videodev,mac80211,snd_hda_codec,mei_hdcp,libarc4,crct10dif_pclmul,ghash_clmulni_intel,intel_rapl_msr,memstick,snd_hda_core,mc,btbcm,btintel,aesni_intel,i915,snd_hwdep,snd_pcm,snd_seq_midi,snd_seq_midi_event,snd_rawmidi,crypto_simd,cryptd,rapl,snd_seq,joydev,iwlwifi,bluetooth,intel_cstate,ecdh_generic,ecc,drm_kms_helper,snd_seq_device,snd_timer,cec,snd,rc_core,hid_multitouch,input_leds,8250_dw,serio_raw,i2c_algo_bit,efi_pstore,soundcore,fb_sys_fops,syscopyarea,sysfillrect,sysimgblt,mei_me,mei,processor_thermal_device,cfg80211,processor_thermal_rfim,processor_thermal_mbox,processor_thermal_rapl,asus_nb_wmi,intel_rapl_common,wmi_bmof,intel_soc_dts_iosf,mac_hid,int3400_thermal,int3403_thermal,acpi_thermal_rel,int340x_thermal_zone,acpi_pad,acpi_tad,sch_fq_codel,coretemp,ipmi_devintf,ipmi_msghandler,msr,parport_pc,ppdev,lp,drm,parport,ip_tables,x_tables,autofs4,rtsx_usb_sdmmc,rtsx_usb,spi_pxa2xx_platform,mfd_aaeon,dw_dmac,asus_wmi,hid_generic,dw_dmac_core,sparse_keymap,crc32_pclmul,i2c_i801,i2c_smbus,ahci,libahci,intel_lpss_pci,intel_lpss,xhci_pci,idma64,xhci_pci_renesas,wmi,i2c_hid_acpi,i2c_hid,hid,video,pinctrl_icelake

***File Systems*** squashfs, ext4, tmpfs, devtmpfs and vfat

***Processor*** Intel(R) Core(TM) i3-1005G1 CPU @ 1.20GHz

***Memory*** 3823MB*(1878 used)*

## *PCI Devices*

| | |
|---|---|
| Host bridge | Intel Corporation Device 8a02 (rev 03) |
| VGA compatible controller | Intel Corporation Device 8a56 (rev 07) (prog-if 00 [VGA controller]) |
| Signal processing controller | Intel Corporation Device 8a03 (rev 03) |
| USB controller | Intel Corporation Ice Lake-LP USB 3.1 xHCI Host Controller (rev 30) (prog-if 30 [XHCI]) |
| RAM memory | Intel Corporation Device 34ef (rev 30) |
| Network controller | Intel Corporation Killer Wi-Fi 6 AX1650i 160MHz Wireless Network Adapter (201NGW) (rev 30) |

## *USB Devices*

Linux Foundation 3.0 root hub,IMC Networks USB2.0 VGA UVC WebCam,Realtek Semiconductor Corp. RTS5129 Card Reader Controller,Intel Corp,Linux Foundation 2.0 root hub

## *Battery* BAT0

## *Sensors* Temperature sensor, Voltage sensor and Fingerprint reader

## *Storage* ATA TOSHIBA MQ04ABF1--- 1 TB HDD

## *DMI*

| | |
|---|---|
| **Product** | |
| Name | VivoBook_ASUSLaptop X509JA_X509JA |
| Family | VivoBook |
| Vendor | ASUSTeK COMPUTER INC. (SEAGATE, www.seagate.com) |
| Version | 1.0 |
| **BIOS** | |
| Date | 06/11/2021 |
| Vendor | American Megatrends Inc. (American Megatrends, www.ami.com) |
| Version | X509JA.308 |
| **Board** | |
| Name | X509JA |
| Vendor | ASUSTeK COMPUTER INC. (SEAGATE, www.seagate.com) |
| Version | 1.0 |
| Serial Number | (Not available; Perhaps try running HardInfo as root.) |
| Asset Tag | ATN12345678901234567 |
| **Chassis** | |
| Vendor | ASUSTeK COMPUTER INC. (SEAGATE, www.seagate.com) |
| Type | [10] Notebook |
| Version | 1.0 |
| Serial Number | (Not available; Perhaps try running HardInfo as root.) |
| Asset Tag | No Asset Tag |

## Benchmark Score of CPU

**CPU Blowfish**: 2.98 **CPU CryptoHash:** 450.47 **CPU Fibonacci**: 0.51

**CPU N-Queens**: 5.51 **CPU Zlib**: 0.80 **FPU FFT**: 1.34 **FPU Raytracing:** 1.37

**GPU Drawing**: 8716.84

assembly code : # function description i.e., asm2.

<+0> : push ebp.

# New stack frame within the calle having permission to pass parameters.

<+1> : mov ebp, esp.

# move esp to the ebp
esp = ebp.

<+3> : sub. esp, 0x10

# reserving 16 byte on stack to store local variables in function.

<+6> : mov eax, DWORD PTR [ebp+0xC]

# Moving 2nd parameter which is at [ebp+0xC] to the eax register.

<+9> : mov DWORD PTR [ebp-0x4], eax.

# storing value in eax into local variable int b1 b1 = b

<+12> : mov eax, DWORD PTR [ebp+0x8]

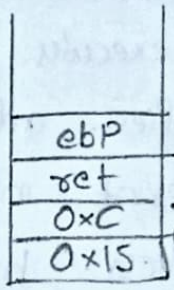
# Moving 1st parameter which is in [ebp+0x8] to the eax register

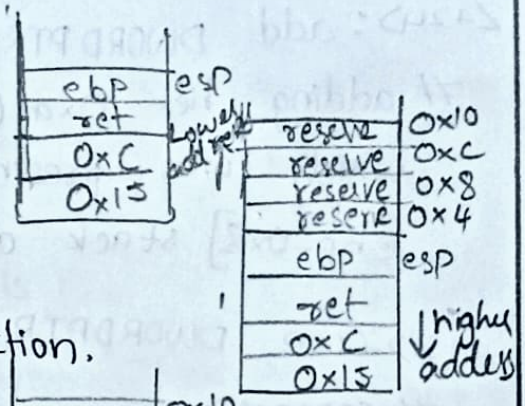
<+15> : mov DWORD PTR [ebp-0x8], eax

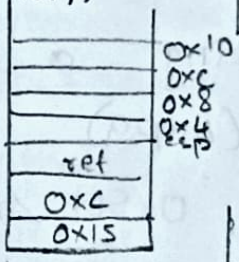
# moving value in eax register. into variable int a1 a1 = a, which is in [ebp-0x8]

<+18> : jmp 0x50C <asm2+31>

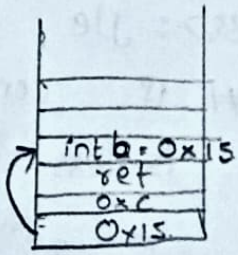
# jumps to address <asm2+31> i.e., goes to the while condition.

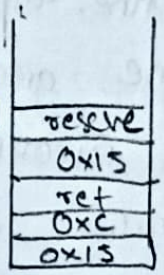


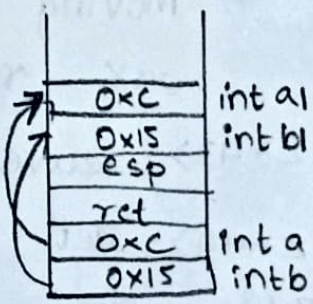




eax = 0x15



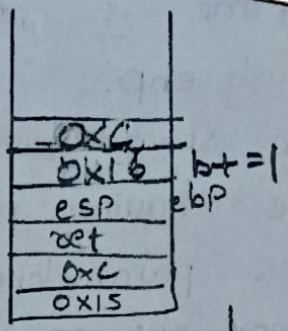

eax = 0xC




# Here int a, int b parameters
a1 = a
b1 = b.

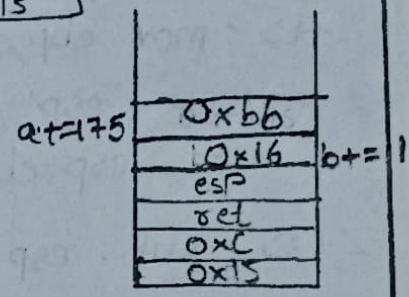
<+20>: add DWORD PTR [ebp-0x4], 0x1

# this line executes only when condition in 31 satisifies. adding hex1 to the value present in [ebp-0x4] stack address b+=1




<+24>: add DWORD PTR [ebp-0x8], 0xaf

# adding hex 0xaf(175) to the value which was present in the [ebp-0x8] stack address i.e., a+=175.




<+31>: cmp DWORDPTR [ebp-0x8], 0xa3d3.

# comparing a value with hexa 0xa3d3(41939).

# This loops runs untill a > 41939.

<+38>: jle 0x501 <asm2+20>

# if comparison b/w [ebp-0x8] and 0xa3d3 is less that is a <= 41939, it moves to 20th line, till this process runs untill a become greater than 41939.

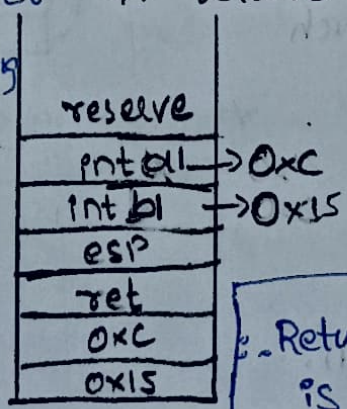
<+40> mov eax, DWORD PTR [ebp-0x4]

# moving value in [ebp-0x4] into eax register.

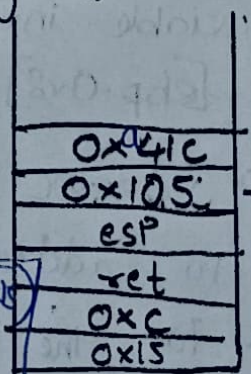
<+43>: leave. # ending the loop.

<+44>: ret # returns value in eax register.

Before entering loop




After the loop.




→ this is the return value.

- Return value of (0xC, 0x15) is 0x105

(2)

(1) On running "./qs.out", we see that the executable file which was in binary format, doesn't show any thing

(2) for that purpose we need to run command i.e., "file qs.out" in terminal, we get information regarding qs.out

we see that output is like

qs.out : ELF 64-bit LSB shared object, x86-64, version 1 (SYSV), dynamically linked, interpreter ./lib64-amd64_2.27-3ubuntu1_i386.ld. for GNU/LINUX 4.4.0.

here interpreter is shown as

"./lib64-amd64_2.27-3ubuntu1_i386.ld"

(3) Now check interpreter is correct or not, by running the command "ldd qs.out" in terminal we got in terminal as. interpreter is wrong, correct interpreter is "./lib64/ld-linux-x86-64.so.2"

(4) To correct this, we need to use patchelf.

we enter a command as

"patchelf --set-interpreter ./lib64/ld-linux-x86-64.so.2 qs.out"

It corrects the interpreter.

(5) Again run "file qs.out", to check patch is correct or not

Now, on running the executable, we get the required output

Sol :- we can infer some basic information from the a5.out file that is ELF header & file data

ELF header contains overview of the binary file i.e.)

ELF Header :

Magic : 7f 45 4C 46 02 01 01 00 00 00 00 00 00 00

class : ELF64

Data : 2's complement, little endian

Version : 1 (current)

OS/ABI : Unix - System V

Entry point address : 0x1040

size of the header = 64 (bytes)

size of program headers : 56 "

size of section header : 64 bytes.

Number of section headers : 16.

* Binary file is in 2's complement and little Endian