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[redacted]

CSC 440 Midterm Project

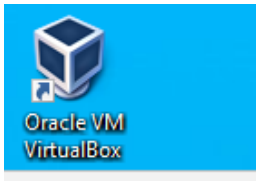
Introduction:

The objectives for this midterm project is to learn how to install a virtual machine on personal device/laptop computer, learn how to install a Linux OS on a virtual machine, and learn how to compile, configure, and customize a Linux kernel.

Description:

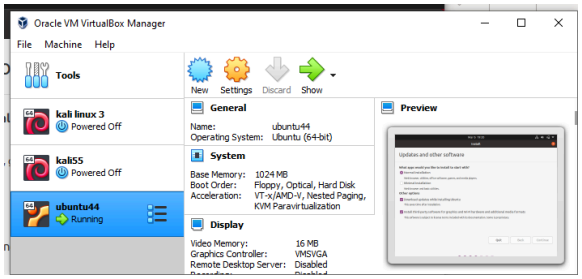
Part I:

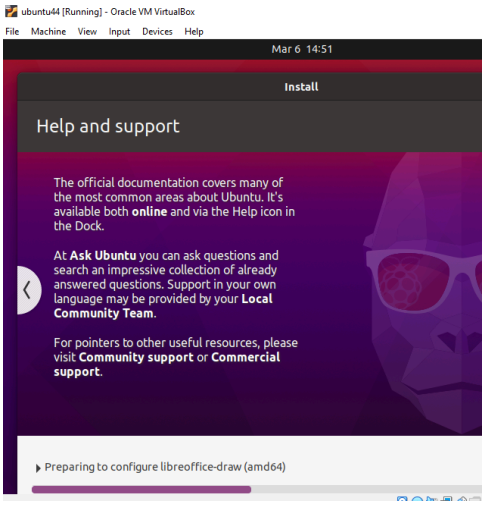
I already had a Virtual machine installed onto my device due to having Topics In security with Professor Anjum last semester. (ORACLE VM)



Part II:

Downloading/installing Ubuntu

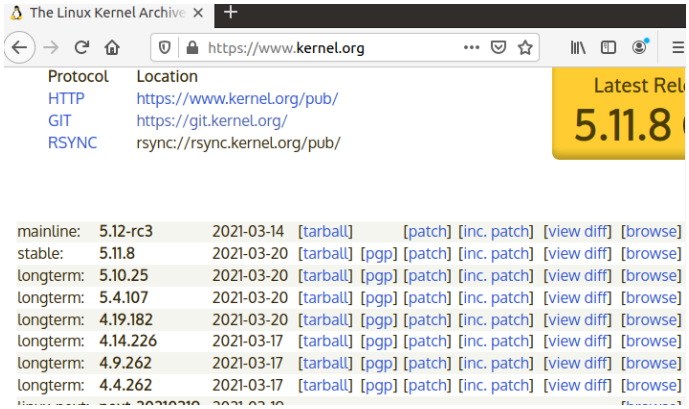




Part III:

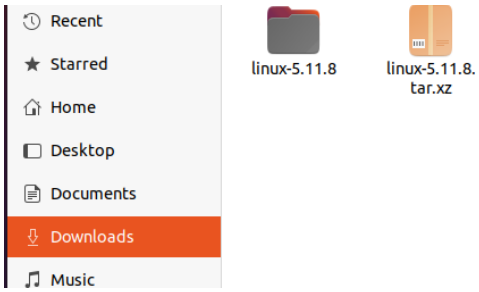
Install packages:

```
jaleel@jaleel-VirtualBox:~$ sudo apt-get install git fakeroot build-essential n
curses-dev xz-utils libssl-dev bc
```



Extracting source:

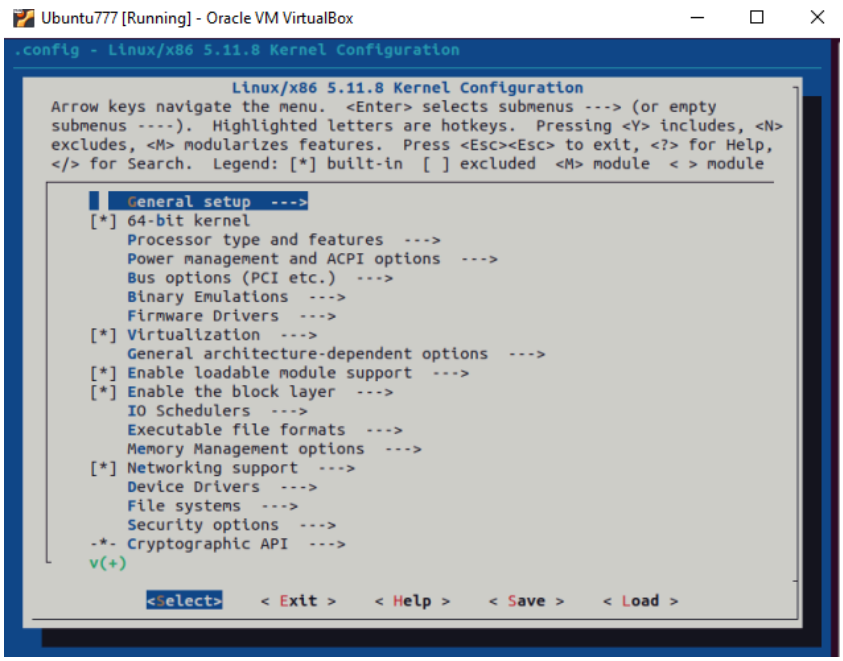
```
aleel@jaleel-VirtualBox:~/Downloads$ tar xf linux-5.11.8.tar.xz
```



Configure:

```
jaleel@jaleel-VirtualBox:~/Downloads/linux-5.11.8$ cp /boot/config-$(uname -r)
.config
```

```
.config
jaleel@jaleel-VirtualBox:~/Downloads/linux-5.11.8$ make menuconfig
  HOSTCC  scripts/basic/fixdep
```



Save configuration as “.config” then exited.

Compile:

```
jaleel@jaleel-VirtualBox:~/Downloads/linux-5.11.8$ sudo make -j 4
[sudo] password for jaleel:
```

```
  CHK     kernel/kheaders_data.tar.xz
jaleel@jaleel-VirtualBox:~/Downloads/linux-5.11.8$ sudo make modules_install -j
 4
```

```
jaleel@jaleel-VirtualBox:~/Downloads/linux-5.11.8$ sudo make install -j 4
```

```
CC      arch/x86/kernel/i8253.o
CC      kernel/dma.o
CC      arch/x86/kernel/hw_breakpoint.o
CC      arch/x86/kernel/tsc.o
CC      kernel/smp.o
CC      arch/x86/kernel/tsc_msr.o
CC      kernel/uid16.o
CC      arch/x86/kernel/io_delay.o
CC      kernel/module.o
CC      arch/x86/kernel/rtc.o
CC      kernel/module_signing.o
CC      arch/x86/kernel/pci-iommu_table.o
AS [M]  arch/x86/kvm/vmx/vmenter.o
CC [M]  arch/x86/kvm/vmx/pmu_intel.o
CC      arch/x86/kernel/resource.o
AS      arch/x86/kernel/irqflags.o
CC      arch/x86/kernel/static_call.o
CC [M]  arch/x86/kvm/vmx/vmcs12.o
CC      arch/x86/kernel/process.o
CC      kernel/module_signature.o
CC [M]  arch/x86/kvm/vmx/evmcs.o
CC      kernel/kallsyms.o
CC [M]  arch/x86/kvm/vmx/nested.o
CC [M]  arch/x86/kvm/vmx/posted_intr.o
CC      arch/x86/kernel/ptrace.o
CC      kernel/acct.o
CC [M]  arch/x86/kvm/svm/svm.o
CC      kernel/crash_core.o
CC      arch/x86/kernel/tls.o
CC      arch/x86/kernel/step.o
CC      kernel/kexec_core.o
CC      arch/x86/kernel/tboot.o
CC      arch/x86/kernel/i8237.o
```

Update:

```
  CC [M]  kernel/kheaders.o
jaleel@jaleel-VirtualBox:~/Downloads/linux-5.11.8$ sudo update-initramfs -c -k 5.11.8
[sudo] password for jaleel:
update-initramfs: Generating /boot/initrd.img-5.11.8
depmod: WARNING: could not open modules.builtin at /lib/modules/5.11.8: No such file or
 directory
cat: /var/tmp/mkinitramfs_RBWPYM/lib/modules/5.11.8/modules.builtin: No such file or di
rectory
```

```
jaleel@jaleel-VirtualBox:~/Downloads/linux-5.11.8$ sudo update-grub
Sourcing file `/etc/default/grub'
Sourcing file `/etc/default/grub.d/init-select.cfg'
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-5.8.0-45-generic
Found initrd image: /boot/initrd.img-5.8.0-45-generic
Found linux image: /boot/vmlinuz-5.8.0-25-generic
Found initrd image: /boot/initrd.img-5.8.0-25-generic
Found memtest86+ image: /boot/memtest86+.elf
Found memtest86+ image: /boot/memtest86+.bin
done
jaleel@jaleel-VirtualBox:~/Downloads/linux-5.11.8$
```

Conclusion:

In conclusion, I was able to learn how to install a Linux OS onto the VM and compile, configure, and customize a Linux kernel. I was also able to learn additional Linux commands and tools within this process of the project, and to gain knowledge through resources (either provided or researched resources).