Kevin Cendana
Spring 202
CSC 154

CSC 154 Lab 06-1

Task 1

1)

I started by getting Apache up and running on my Ubuntu VM, like setting up my own little corner of the internet.

```
Get:22 http://us.archive.ubuntu.com/ubuntu jammy-updates/multiverse i386 Package
s [6,028 B]
Get:23 http://us.archive.ubuntu.com/ubuntu jammy-updates/multiverse Translation-
en [12.0 kB]
Fetched 12.2 MB in 6s (2,204 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
236 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@ubuntu:/# apt update -y
Hit:1 http://us.archive.ubuntu.com/ubuntu jammy InRelease
Hit:2 http://us.archive.ubuntu.com/ubuntu jammy-updates InRelease
Hit:3 http://us.archive.ubuntu.com/ubuntu jammy-backports InRelease
Hit:4 http://security.ubuntu.com/ubuntu jammy-security InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
236 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@ubuntu:/#
```

```
Enabling site 000-default.
Created symlink /etc/systemd/system/multi-user.target.wants/apache2.service → /l
ib/systemd/system/apache2.service.
Created symlink /etc/systemd/system/multi-user.target.wants/apache-htcacheclean.
service → /lib/systemd/system/apache-htcacheclean.service.
Processing triggers for ufw (0.36.1-4ubuntu0.1) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for libc-bin (2.35-0ubuntu3.1) ...
root@ubuntu:/#
```

```
root@ubuntu:/# systemctl start apache2
root@ubuntu:/# systemctl start apache2
```

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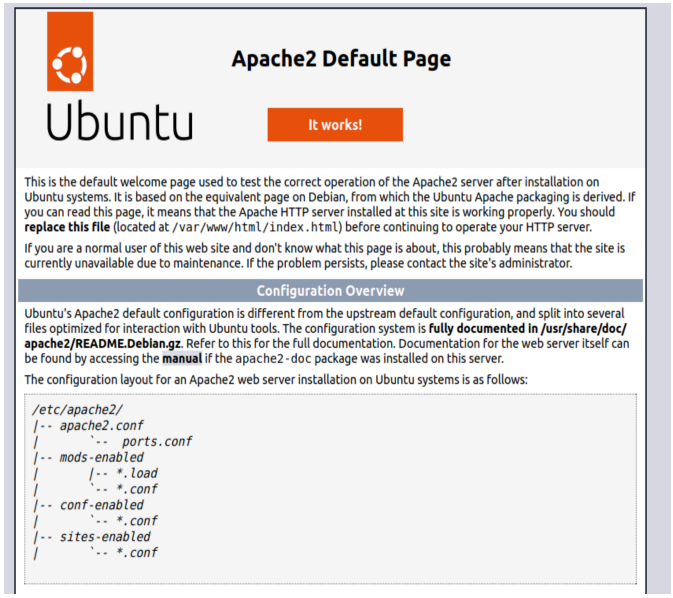

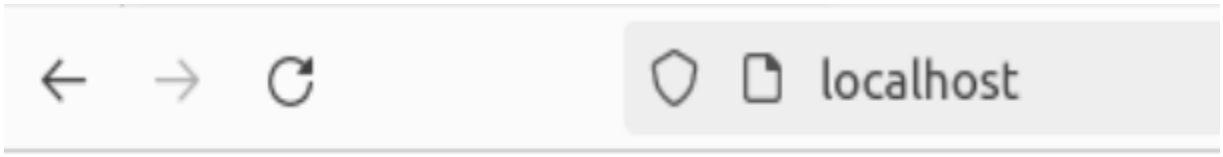

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2)
Added self signed TLS certificate for security.

```
Considering dependency mime for ssl:
Module mime already enabled
Considering dependency socache_shmcb for ssl:
Enabling module socache_shmcb.
Enabling module ssl.
See /usr/share/doc/apache2/README.Debian.gz on how to configure SSL and create
elf-signed certificates.
To activate the new configuration, you need to run:
  systemctl restart apache2
root@ubuntu:/# a2enmod ssl
Considering dependency setenvif for ssl:
Module setenvif already enabled
Considering dependency mime for ssl:
Module mime already enabled
Considering dependency socache_shmcb for ssl:
```

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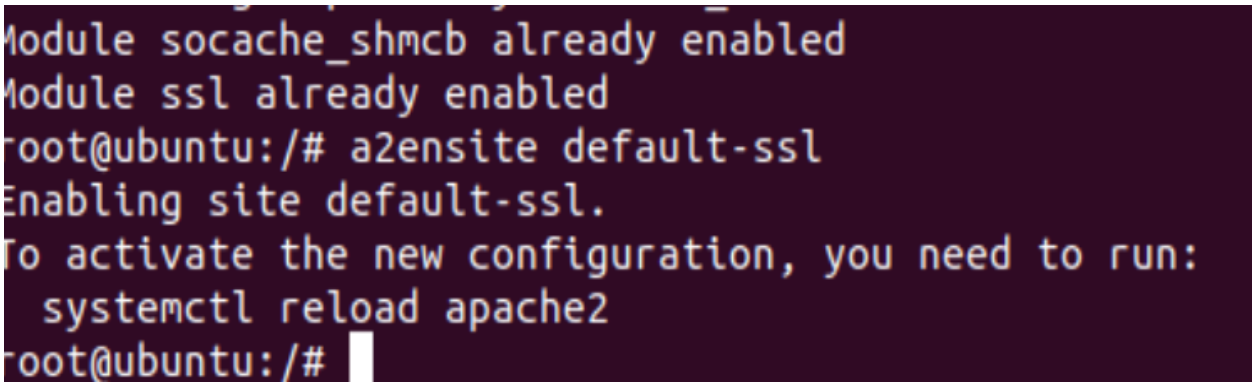

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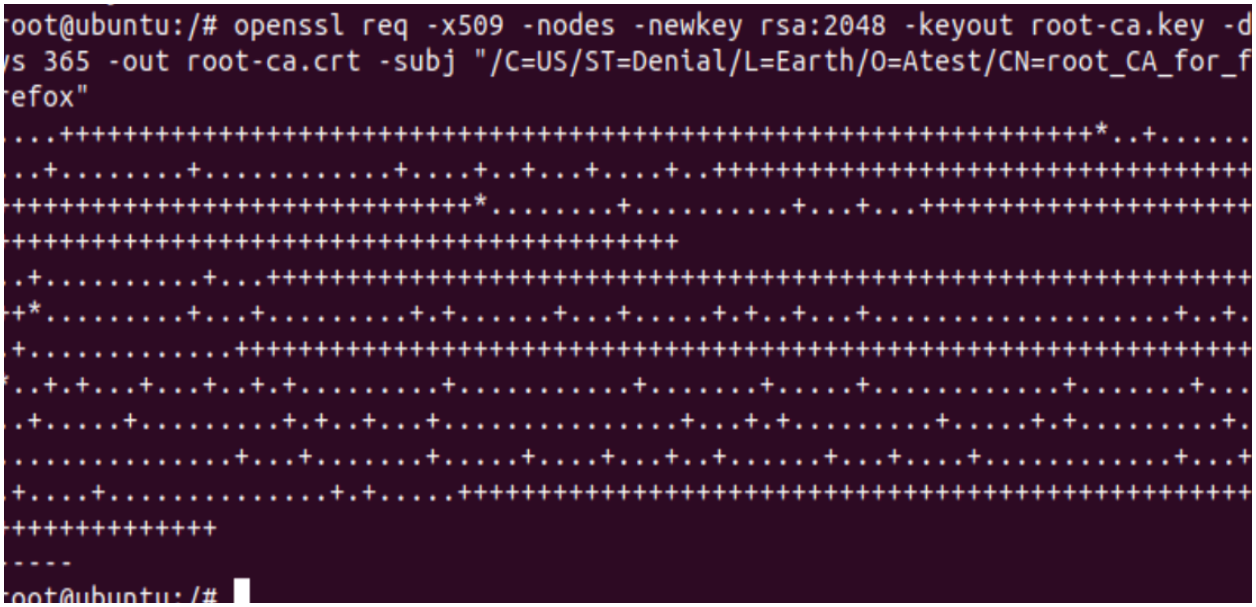

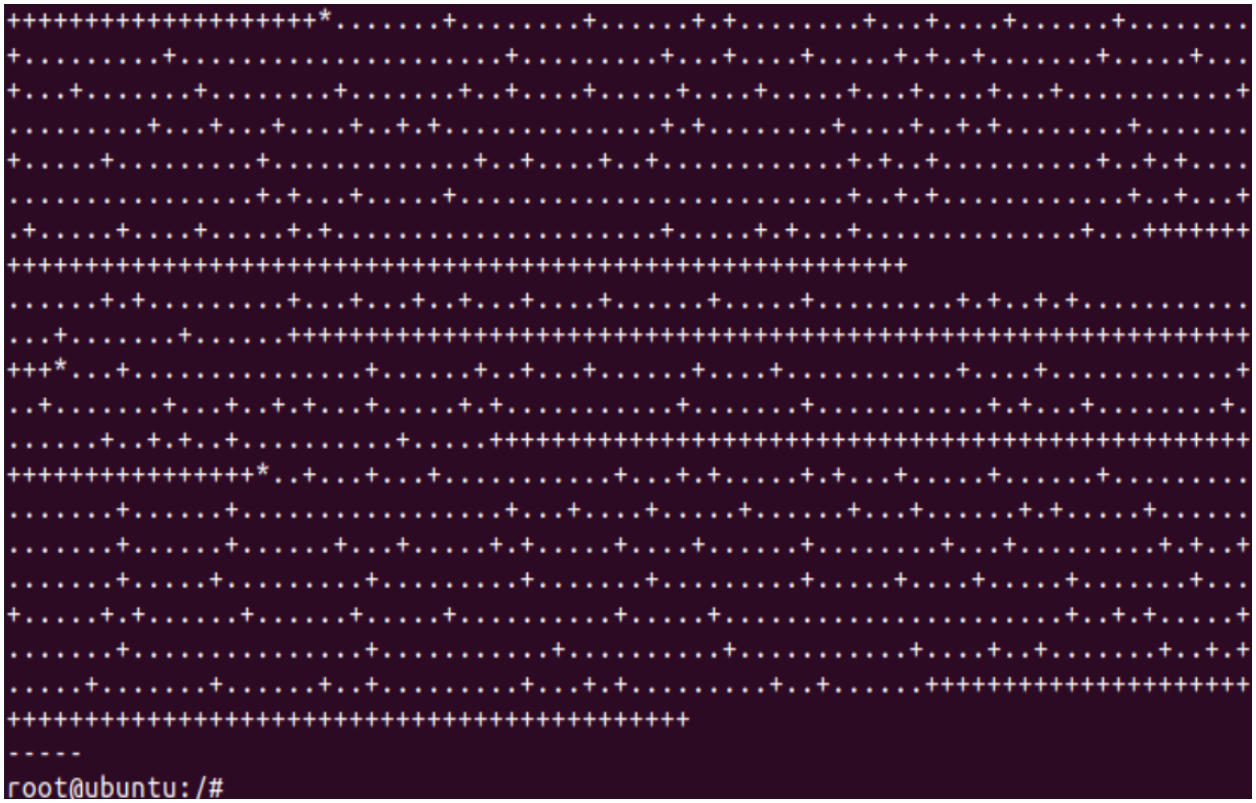

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```
root@ubuntu:/# openssl x509 -req -CA root-ca.crt -CAkey root-ca.key -in server.c
sr -out server.crt -days 365 -
CAcreateserial -extfile <(printf "subjectAltName = DNS:localhost\nauthorityKeyI
entifier =
keyid,issuer\nbasicConstraints = CA:FALSE\nkeyUsage = digitalSignature,
keyEncipherment\nextendedKeyUsage=serverAuth")
Certificate request self-signature ok
subject=C = US, ST = Denial, L = Earth, O = Dis, CN = anything_but_whitespace
CAcreateserial: command not found
root@ubuntu:/# openssl x509 -req -CA root-ca.crt -CAkey root-ca.key -in server.c
sr -out server.crt -days 365 -CAcreateserial -extfile <(printf "subjectAltName =
 DNS:localhost\nauthorityKeyIdentifier = keyid,issuer\nbasicConstraints = CA:FA
SE\nkeyUsage = digitalSignature, keyEncipherment\nextendedKeyUsage=serverAuth")
Certificate request self-signature ok
subject=C = US, ST = Denial, L = Earth, O = Dis, CN = anything_but_whitespace
```

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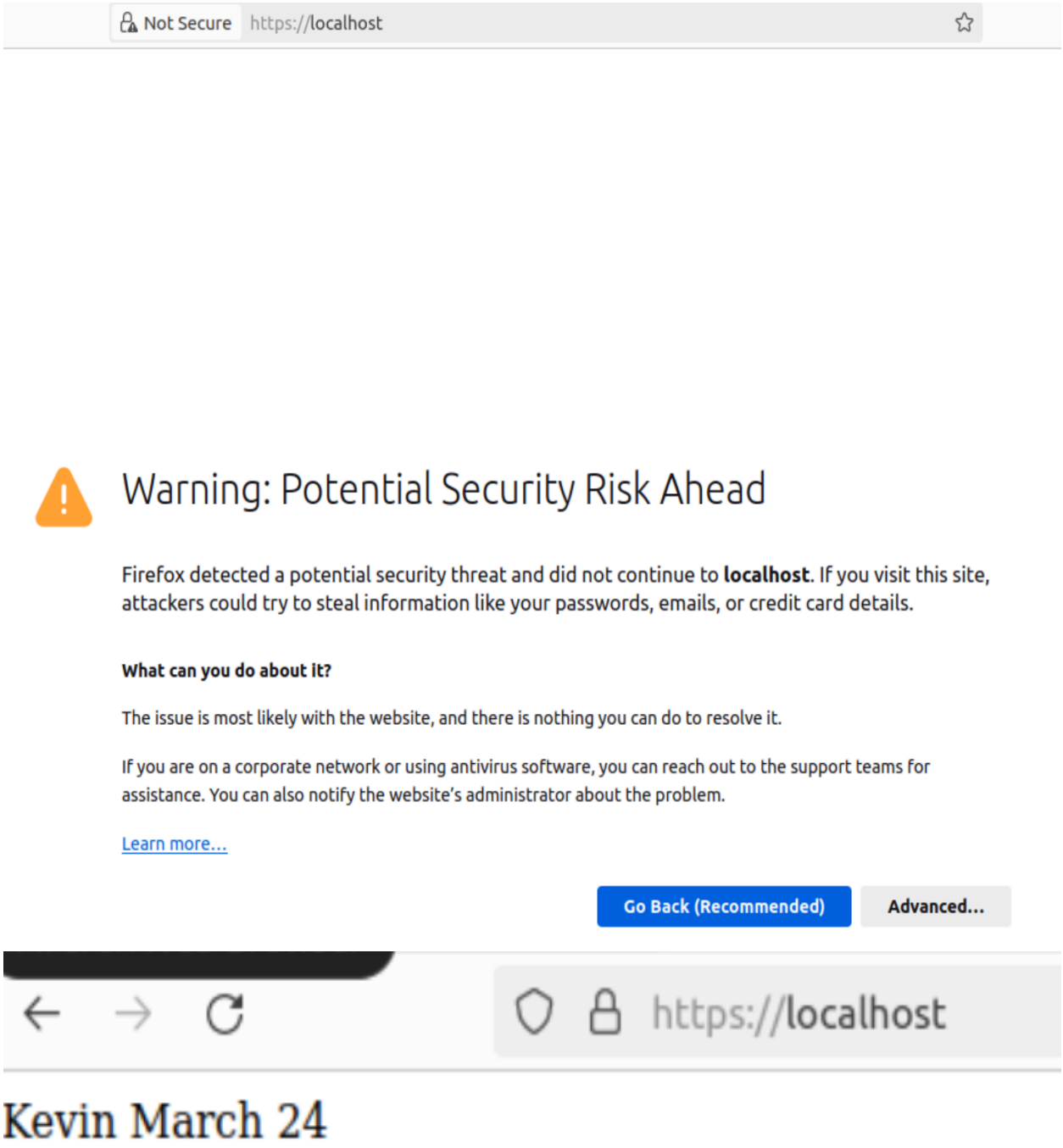

3)

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Installed ModSecurity to block any potential intruders.

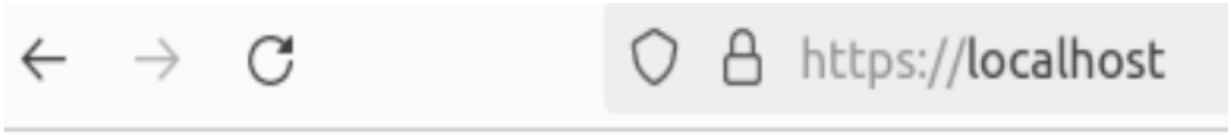
```
Unpacking liblua5.1-0:amd64 (5.1.5-8.1build4) ...
Selecting previously unselected package libapache2-mod-security2.
Preparing to unpack .../libapache2-mod-security2_2.9.5-1_amd64.deb .
Unpacking libapache2-mod-security2 (2.9.5-1) ...
Selecting previously unselected package modsecurity-crs.
Preparing to unpack .../modsecurity-crs_3.3.2-1_all.deb ...
Unpacking modsecurity-crs (3.3.2-1) ...
Setting up modsecurity-crs (3.3.2-1) ...
Setting up liblua5.1-0:amd64 (5.1.5-8.1build4) ...
Setting up libapache2-mod-security2 (2.9.5-1) ...
apache2_invoke: Enable module security2
Processing triggers for libc-bin (2.35-0ubuntu3.1) ...
root@ubuntu:/#
```

```
root@ubuntu:/# mv /etc/modsecurity/modsecurity.conf-recommended /etc/modsecurity
/modsecurity.conf
root@ubuntu:/#
```

```
root@ubuntu:/# sed -i 's/SecRuleEngine DetectionOnly/SecRuleEngine On/g' /etc/m
dsecurity/modsecurity.conf
root@ubuntu:/#
```

```
root@ubuntu:/# systemctl restart apache2
root@ubuntu:/#
```

4)
Tested the new security by trying to bypass it with a hack attempt, which failed (successfully!)



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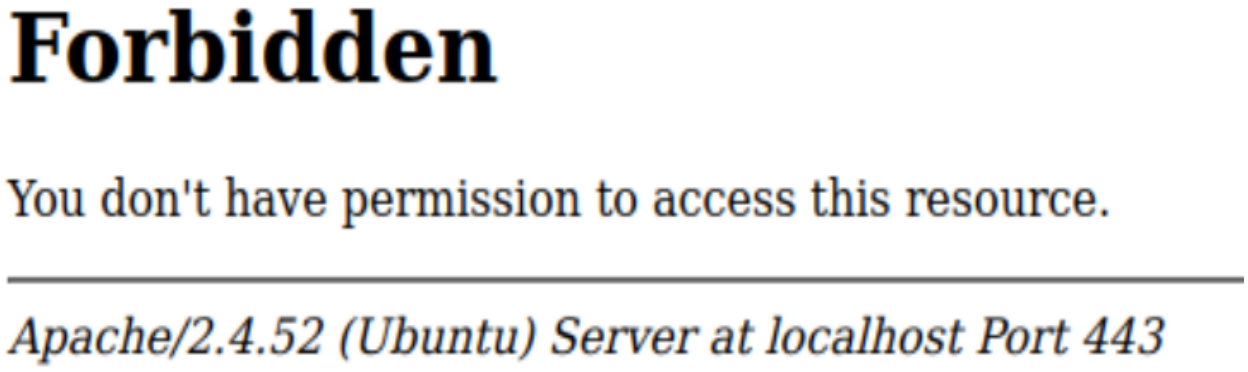

Task 2
1)
Downloaded DVNA, a purposely vulnerable app, so we can learn how to address the issues.

```
Fetched 4,147 kB in 1s (3,194 kB/s)
git clone Selecting previously unselected package liberror-perl.
(Reading database ... 227479 files and directories currently installed
Preparing to unpack .../liberror-perl_0.17029-1_all.deb ...
Unpacking liberror-perl (0.17029-1) ...
Selecting previously unselected package git-man.
Preparing to unpack .../git-man_1%3a2.34.1-1ubuntu1.10_all.deb ...
Unpacking git-man (1:2.34.1-1ubuntu1.10) ...
Selecting previously unselected package git.
Preparing to unpack .../git_1%3a2.34.1-1ubuntu1.10_amd64.deb ...
Unpacking git (1:2.34.1-1ubuntu1.10) ...
Setting up liberror-perl (0.17029-1) ...
Setting up git-man (1:2.34.1-1ubuntu1.10) ...
Setting up git (1:2.34.1-1ubuntu1.10) ...
Processing triggers for man-db (2.10.2-1) ...
root@ubuntu:/# git clone https://github.com/appsecco/dvna
Cloning into 'dvna'...
remote: Enumerating objects: 645, done.
remote: Counting objects: 100% (6/6), done.
remote: Compressing objects: 100% (6/6), done.
remote: Total 645 (delta 1), reused 2 (delta 0), pack-reused 639
Receiving objects: 100% (645/645), 3.18 MiB | 2.83 MiB/s, done.
Resolving deltas: 100% (279/279), done.
root@ubuntu:/#
```

2)
Downloaded Snyk to help diagnose any possible vulnerabilities.

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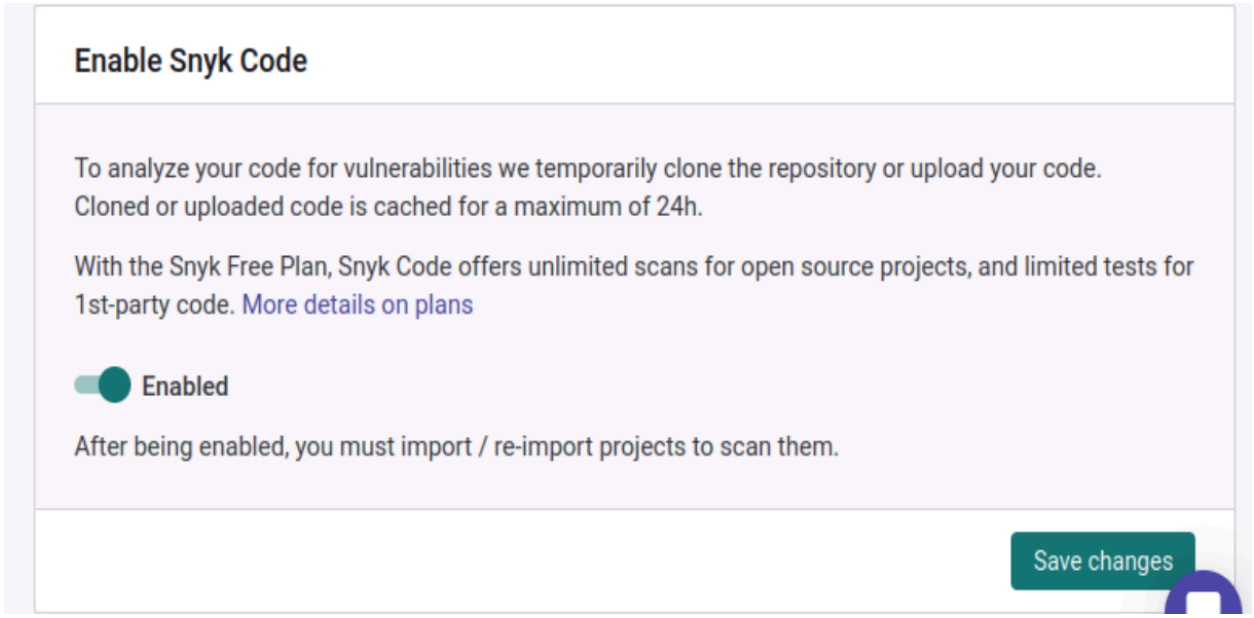

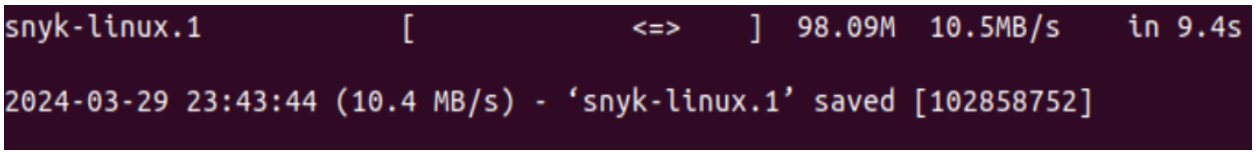

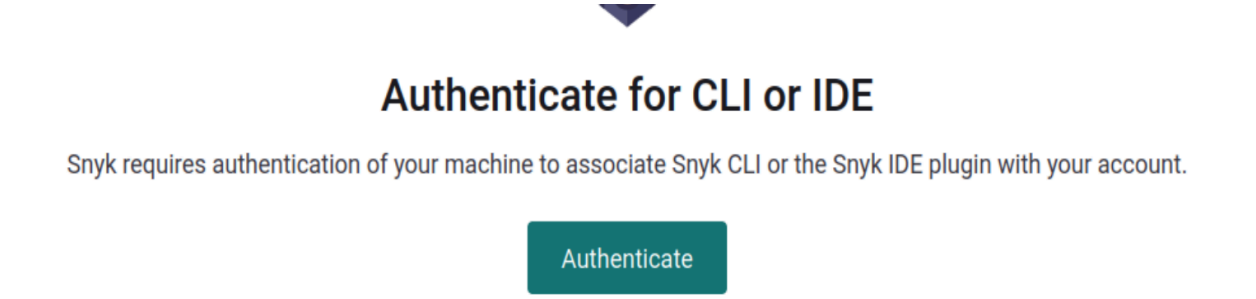

3)
Ran an SCA scan with Snyk to find out if there were any known vulnerabilities in the app's components.

4) Conducted SAST scan to dig deeper into the code, looking for potential security flaws.

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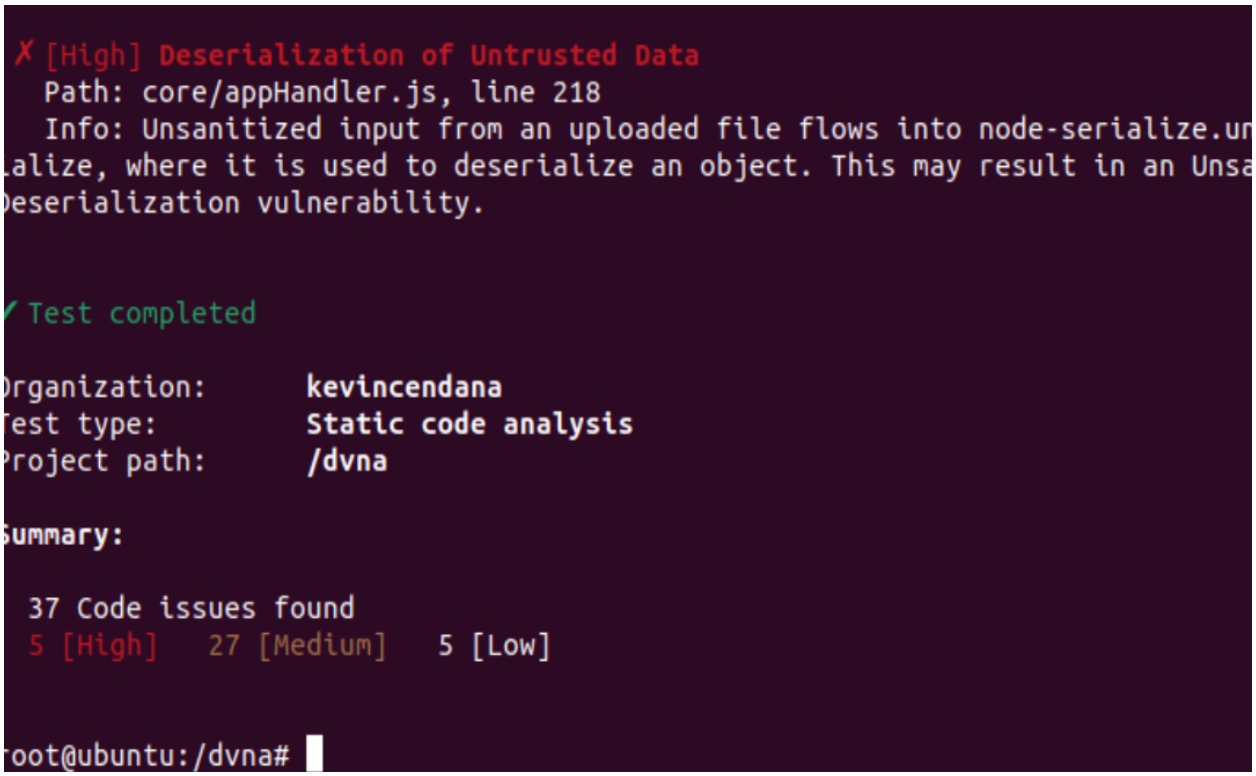
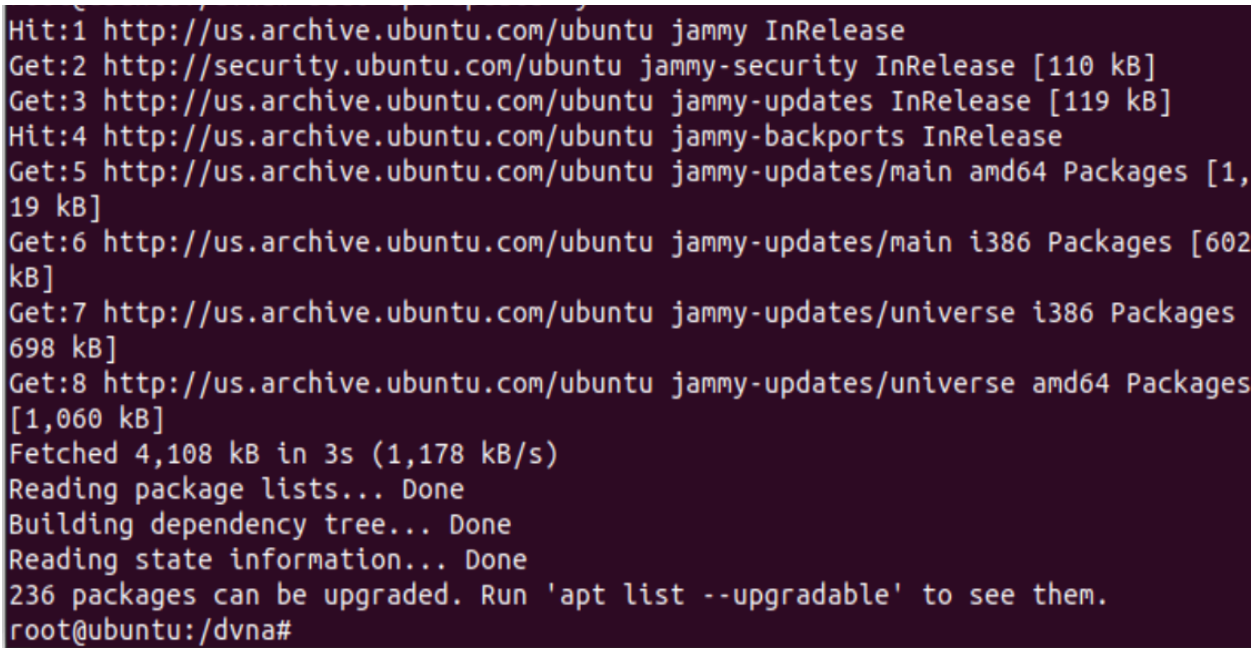


Task 3

1) Got Docker set up and ran DVNA app running in a container to mess around with safely.



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```
Selecting previously unselected package ubuntu-fan.
Preparing to unpack .../5-ubuntu-fan_0.12.16_all.deb ...
Unpacking ubuntu-fan (0.12.16) ...
Setting up runc (1.1.7-0ubuntu1~22.04.2) ...
Setting up bridge-utils (1.7-1ubuntu3) ...
Setting up pigz (2.6-1) ...
Setting up containerd (1.7.2-0ubuntu1~22.04.1) ...
Created symlink /etc/systemd/system/multi-user.target.wants/containerd.servic
 /lib/systemd/system/containerd.service.
Setting up ubuntu-fan (0.12.16) ...
Created symlink /etc/systemd/system/multi-user.target.wants/ubuntu-fan.servic
 /lib/systemd/system/ubuntu-fan.service.
Setting up docker.io (24.0.5-0ubuntu1~22.04.1) ...
Adding group `docker' (GID 138) ...
rash
Created symlink /etc/systemd/system/multi-user.target.wants/docker.service →
b/systemd/system/docker.service.
Created symlink /etc/systemd/system/sockets.target.wants/docker.socket → /lib
stemd/system/docker.socket.
Processing triggers for man-db (2.10.2-1) ...
root@ubuntu:/dvna#
```

```
root@ubuntu:/dvna# sudo usermod -aG docker $USER
root@ubuntu:/dvna#
```

2) Ran Dastardly to scan the DVNA app while it was running, for any vulnerabilities.

```
eadbf8312262: Pull complete
cf528b18b6ce: Pull complete
075c4f074e90: Pull complete
d0562d9451f1: Pull complete
48671e1607ad: Pull complete
4879e9b180ec: Pull complete
4bcad28e8244: Pull complete
Digest: sha256:2657051b73ac8f879d3a3b419b4618d98e4596a0fe27f8e91582c403541ef1b0
Status: Downloaded newer image for appsecco/dvna:sqlite
b451e56bd1460b2dbce9ec757b3007b6c01cf3cf43d512f0a854bdeec2acdbc6
root@ubuntu:/dvna#
```

3)

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```
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state U
oup default qlen 1000
    link/ether 08:00:27:c3:66:fc brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0
       valid_lft 572sec preferred_lft 572sec
    inet6 fe80::d970:dce9:be36:adb1/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
3: docker0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state U
oup default
    link/ether 02:42:0d:3e:9f:b5 brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.1/16 brd 172.17.255.255 scope global docker0
       valid_lft forever preferred_lft forever
    inet6 fe80::42:dff:fe3e:9fb5/64 scope link
       valid_lft forever preferred_lft forever
5: vethc70bfcd@if4: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue
ter docker0 state UP group default
    link/ether 9a:27:d6:f5:52:8c brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet6 fe80::9827:d6ff:fef5:528c/64 scope link
       valid_lft forever preferred_lft forever
root@ubuntu:/dvna#
```

```
inet 10.0.2.15/24 brd 10.0.2.255 scope global dynamic noprefixroute enp0s3
   valid_lft 572sec preferred_lft 572sec
```