

# Introduction to Ethical Hacking



**Module 1**

# 1. Information Security

**Module 1**



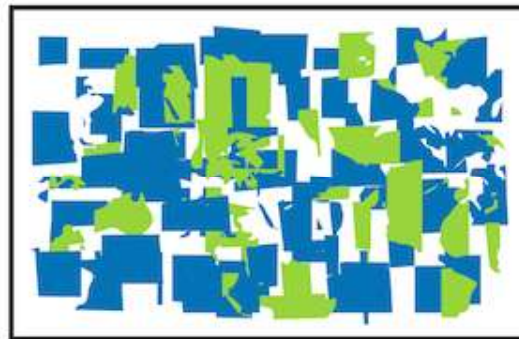
## What is Information?

- Meaningful form of data
- Can be called as processed data
- Data has no context, info does
- **Computer** is data
- **This is my computer** is information

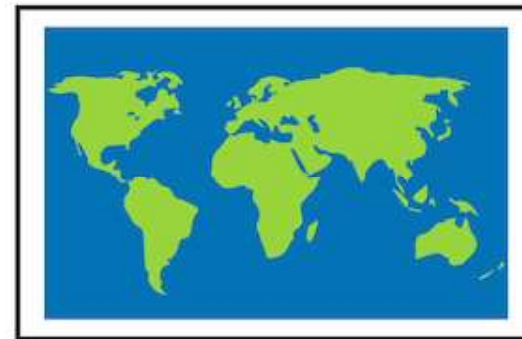


## What is Information?

**DATA**



**INFORMATION**





## What is Information Security?

- What will I do with your birthday?
- I can definitely do with your phone number
- Protecting information from unauthorized access
- Employing tools and policies
- IT IS THE BASIC NEED OF EVERYONE



## What is Information Security?

- Wonder how people have realized the sensitivity of information!
- **Enigma Machine** which was used by **Germans** to **encrypt warfare data**.
- What if someone is constantly watching you??
- Security is the quality of information
- Security is freedom
- Security is an asset



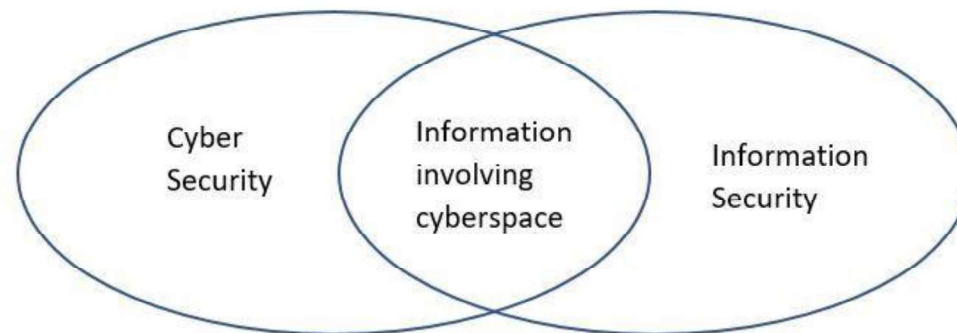
## What is Information Security?





## What is Information Security?

- Information is **everywhere**
- This is the **information age**
- Information **in digital systems** makes *cyber security*







## What is Information Security Threats?

- Threat is a **constant danger** to an **asset**
- It can be a **person, object** or an **event**
- Threats can be categorized and ranked



## What is Information Security Threats?

### Types of Threats

- *Inadvertent threats* (human failure)
- *Physical disasters* (natural disasters)
- *Technical failures* (hardware or software)
- *Deliberate acts* (hacking, espionage)



## Information Security does not deal with?

- Cyber **warfare**
- Information warfare
- **Negative impacts** of people on Internet (sexual abuse, cyber stalking, etc.)
- IoT security



**Information Security does not deal with?**

Then who deals with them?



## 2. Cyber Security

**Module 1**

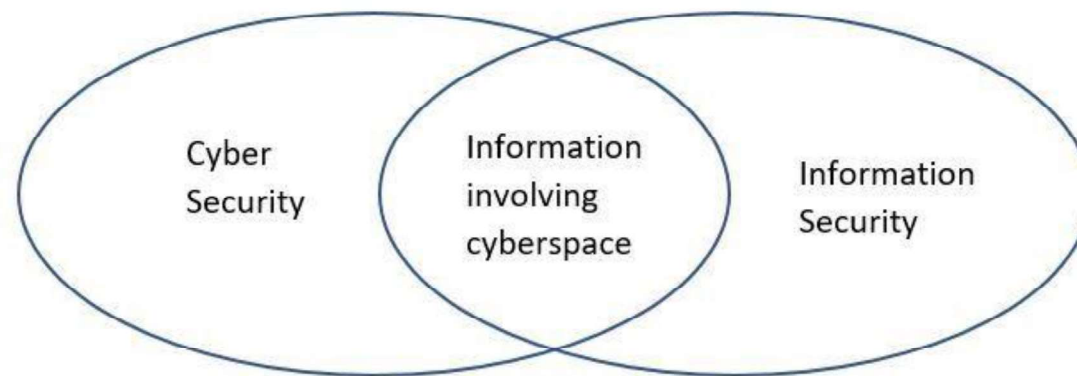


## What is Cyber Security?

- Protection of **cyber space** against **cyber threats** and **cyberspace** vulnerabilities
- Any threats to information via the cyber space
- Deals with **deliberate** acts
- **Doesn't** deal with **physical** and **personal** security
- Threats **via cyberspace**, not threats for Cyberspace



## What is Cyber Security?





# 3. Objectives of Cyber Security

**Module 1**





## Objectives of Cyber Security

- **Confidentiality:** No telling to unauthorized parties
- **Integrity:** Completeness and accuracy of data
- **Availability:** When needed, data is available



## Objectives of Cyber Security

- **Non-repudiation:** I should accept I sent you the message and you should accept you received it
- **Authenticity:** You should actually be who you tell you are



# 3. The **CIA** Triad

**Module 1**



## The CIA Triad





## Confidentiality

- Roughly but wider than **privacy**
- Sensitive data should **not reach wrong** people
- Sensitive data should **reach right** people

### Measures:

- Data encryption
- Authentication (maybe multi-factor)
- More sensitive, more physical



## Integrity

- Data should be consistent, trustworthy and accurate
- Data must not change in transit
- Most complex to implement

### Measures:

- Backups
- Cryptographic measures (checksums)
- Access control



## Availability

- Data should be **available** as and when needed
- Updated software and hardware
- Adequate system **capacity** and **bandwidth**

### Measures:

- Firewalls rules
- Patch management and disaster recovery
- Load balancers



# 4. What is Hacking?

**Module 1**





## What is Hacking?

- Hacking is a very wide term
- Introduced in the 1960s, the term “Hacker”, at MIT
- That time was of more hardcore programming
- Those were the most intelligent and advanced hackers
- All started by the end of 1960s, when *ARPANET* was founded by the US military.



## What is Hacking?

- There is **no standard definition** of hacking
- Media continues to add **false information** about hacking
- There are **good** hackers, and there are **bad**
- Bad ones need to be discussed, but not learnt
- Good ones are to be focused, the ***Ethical Hackers***



# WHO IS A HACKER?



## WHO IS A HACKER?

- Steal facebook password?
- Hack a wifi?
- A CS Student?
- Get me unlimited coins in the game?
- HACKS NASA WITH HTML?

A Terrorist?



## WHO IS A HACKER?






“Hacking has evolved from teenage mischief into a billion-dollar growth business.”



## WHO IS A HACKER?

- Using his/her skills and knowledge to gain **unauthorized** access to a software, computer, or a network
- Uses his/her **own tools** and **techniques**
- Is **NOT** always bad
- Can go to **prison**, or **earn** millions
- One of the **most risky professions** of them all



“ *The quieter you become, the  
more you are able to hear.*





# TYPES OF HACKERS



1

# WHITE HAT HACKERS

Security Professionals, hack with permissions





## White Hat Hacker

- The ethical hackers, **also break** into systems
- **Not to exploit** them, but to **help** management **fix** them
- The **same thrill**, same **swag**, but bonus **money** and **respect**
- Even work with **Government**, **cyber cells** and **police**



## White Hat Hacker





## White Hat Hacker





## White Hat Hacker



# 2

## BLACK HAT HACKERS

Criminals, highly destructive, penetrate to destroy and cause damage





## Black Hat Hacker

- That **typical** hacker you might have heard of
- Use **undisclosed** vulnerabilities, tools and exploits
- Just **randomly** hack systems to **create havoc**
- Or to **take revenge** or fulfil personal **desires**
- Most common desires: **Financial gain, spying, revenge**





## Black Hat Hacker



# 3

## GREY HAT HACKERS

Don't have permissions, but no  
malicious intent





## Grey Hat Hacker

- Not completely white, not completely black
- Hack without permissions and authorization, sometimes report
- Demand compensation/money for fix
- Whether to say illegal, totally depends on the victim party
- Don't actually have any professional gain



**Grey Hat Hacker**

No image to show!



# 5. What is Ethical Hacking?

**Module 1**



## Ethical Hacking

- Performed by a company or individual to help identify potential threats on a computer or network
- Search for any weak points that could be exploited by malicious hackers
- This information is then used by the organization to improve the system security
- Very underrated and criticized, especially in India



## Ethical Hacking

- It is way more wider than we think!
- HACKING IS HACKING, NO MATTER HOW YOU LOOK AT IT!!
- IF YOU HACK, YOU ARE A COMPUTER CRIMINAL OR CYBER CRIMINAL!!
- But actually, the **cyber space is more safer** as we see it because of ethical hackers



# WHO IS AN ETHICAL HACKER?





## WHO IS A ETHICAL HACKER?

- Security Professional
- Tests the security and identifies loopholes
- Creates reports and analysis
- Authorized with proper permissions
- Earns money and respect

# 6. Information Warfare

**Module 1**



## Information Warfare

- “Tactical and strategic use of information, to gain an advantage.”
- In the earlier days, information was more physical
- Groups of people involved, especially Government, to tackle enemies
- Countries spent millions in secret intelligence and spies
- Military used weapons and army power to send policy implementations



## Information Warfare

- Today, this warfare involves most of the digital media.
- It has become cyber warfare
- Government spends millions for IT infrastructure to attack, defend from attacks
- Now it mostly revolves around terrorism

### Common practices of cyber warfare:

- Using viruses and malwares
- Exploiting electronic communication systems and networks
- Stealing info via unauthorized access



# Information Warfare



TOP SECRET//SI//ORCON//NOFORN

Hotmail® Google skype paltalk.com YouTube AOL mail

facebook

YAHOO!

Apple

 (TS//SI//NF) **PRISM Collection Details** 

Current Providers

What Will You Receive in Collection (Surveillance and Stored Comms)?  
It varies by provider. In general:

- Microsoft (Hotmail, etc.)
- Google
- Yahoo!
- Facebook
- PalTalk
- YouTube
- Skype
- AOL
- Apple

- E-mail
- Chat – video, voice
- Videos
- Photos
- Stored data
- VoIP
- File transfers
- Video Conferencing
- Notifications of target activity – logins, etc.
- Online Social Networking details
- **Special Requests**

Complete list and details on PRISM web page:  
Go PRISMFAA

TOP SECRET//SI//ORCON//NOFORN



# 7. Need for Ethical Hackers

**Module 1**



## Need for Ethical Hackers

- There is a hack **attack** every **39 seconds**
- The average cost of a data breach in 2020 will exceed **\$150 million**
- Companies have spend **\$2 trillion** total in 2019
- \$6 trillion** is expected to be spent globally on cybersecurity by **2021**
- Cybersecurity jobs worldwide will reach **3.5 million by 2021**

**"Cybercrime is the greatest threat to every company in the world."**



## Need for Ethical Hackers

- Who will prevent **wastage** of this money?
- Who will help developers **fix** their **bugs** in **production**?
- Who will **stop** those **black hats** and their malicious activities to damage our cyberspace?
- Who will **ensure security** to the companies?
- Who will **ensure national** security?
- Who will help to keep the **cyber space safe** and **clean**?



# Careers in Ethical Hacking



**Module 1**



# CAREERS IN HACKING?



# 1,000,000

Ethical Hackers would be needed by 2020 in India



**5,80,000**

Average Salary

**2,50,000**

For a beginner/Fresher

**20,00,000+**

For a professional



**150,000\$**

Average Salary

**80,000\$**

For a beginner/Fresher

**250,000\$**

For a professional



# PROFESSIONAL CERTIFICATIONS



## TO BECOME AN ETHICAL HACKER?

### ■ Security

- ▷ Certified Ethical Hacker (CEH)
- ▷ Offensive Security Certified Professional (OSCP)
- ▷ CompTIA Security+, Pentest+
- ▷ GIAC Penetration Tester(GPEN)
- ▷ Certified Information Systems Security Professional (CISSP)



## TO BECOME AN ETHICAL HACKER?

### ■ Networking

- ▷ Cisco Certified Network Associate (CCNA)
- ▷ CompTIA Network+
- ▷ Cisco Certified Network Professional (CCNP)
- ▷ Cisco Certified Internetwork Expert (CCIE)
- ▷ AWS Certified Solutions Architect





## CAREERS IN ETHICAL HACKING

“If you are online, you are vulnerable.”





# IS HACKING ILLEGAL?



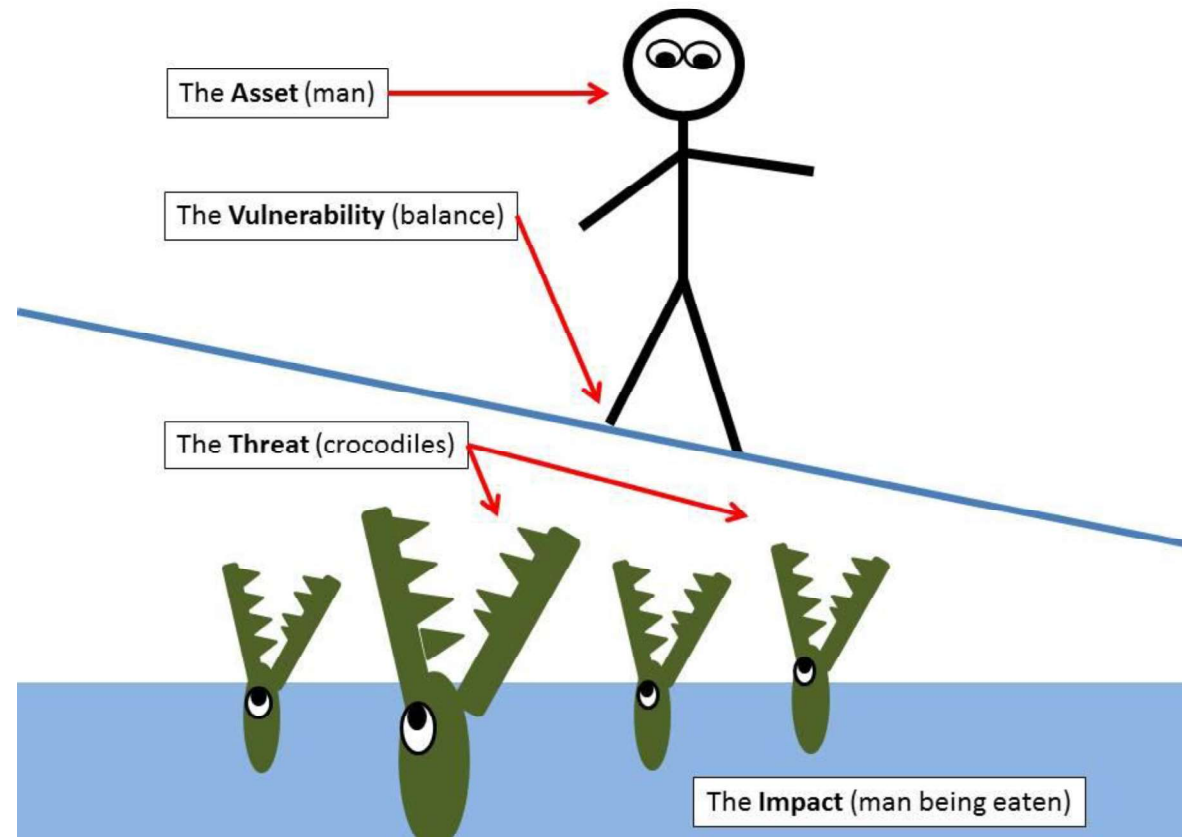
## IS HACKING ILLEGAL?

- Not always
- Ethical Hacking is completely LEGAL
- There is a huge need for ethical hackers
- Hack systems, earn money



## GENERAL TERMINOLOGIES

- **Vulnerability:** A **weakness** that can be **exploited**
- **Threat:** One **who exploits** a vulnerability
- **Risk:** **Damage caused** by exploiting the vulnerability
- **Asset:** Which needs to be **accessed after exploitation**
- **Bug:** **Error**, fault or **flaw** in a computer program that may cause unexpected behavior





## GENERAL TERMINOLOGIES

- **Hacker:** Gains access with or without malicious intent
- **Cracker:** Gains access to damage assets and cause harm, always malicious



## GENERAL TERMINOLOGIES

- **Infosec:** Information Security/Cyber Security/Data Security
- **Penetration Testing:** Testing and reporting the security loopholes
- **Vulnerability Assessment:** Testing and reporting the security loopholes, and tells how to fix them



## GENERAL TERMINOLOGIES

- **Cyber Espionage:** Spying on someone to gain illicit access to confidential information (large institutions)
- **Exploits:** Designed to cause unexpected behaviors that an attacker can take advantage of to perform harmful actions
- **Script Kiddie:** Newbies/noobs so called hackers without any skills
- **Zero-day:** Vulnerability not known to professionals only to be exploited by hackers





# TO BECOME AN ETHICAL HACKER?



**THE PROCESS IS EASY**

Learn

Code

Apply



## TO BECOME AN ETHICAL HACKER?

- Programming is important!
- Have a Hacker's mindset
- Be verbose, but don't talk much
- Logical thinking
- Don't learn it all, but know it all



## TO BECOME AN ETHICAL HACKER?

- **Computer Basics:** Hardware, Software, processing methodology
- **Web and Internet:** HTTP, DNS, Web Servers, FTP, SMTP
- **Networking:** TCP/IP, ARP, Devices, types, Routing and Switching
- **Operating Systems:** Linux (Kali, Parrot, Red Hat), Windows, Android, iOS, MAC



## TO BECOME AN ETHICAL HACKER?

### ■ Programming:

- ▷ Reverse Engineering- Assembly, C, C++
- ▷ Script Writing- Python, Ruby, Perl
- ▷ Web App Testing- JavaScript, PHP, SQL, JSP, Python
- ▷ Shell Scripting- Bash



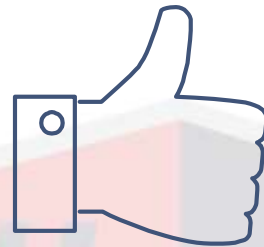
## TO BECOME AN ETHICAL HACKER?

- **OWASP Top 10**
- **GitHub**
- **Bug Bounty Programs**
- **Hacking Forums**
- **Stack**
- **Soft Skills**
- **PRACTICE, PRACTICE AND PRACTICE**



# HACKING

Is an art, practised through a creative mind.



# THANKS!

Any questions?

