How Criminals Plan Them – Introduction

- Technology is a "double-edged sword" as it can be used for both good and bad purposes.
- People with the tendency to cause damages or carrying out illegal activities will use It for bad purpose.
- Computers and tools available in IT are also used as either target of offense.
- In today's world of Internet and computer networks, a criminal activity can be carried out across national borders.
- Chapter1 provided an overview of *hacking*, *cyber terrorism*, *network intrusions*, *password sniffing*, *computer viruses*, etc. They are the most commonly occurring crimes that target the computer.
- Cybercriminal use the World Wide Web and Internet to an optimum level for all illegal activities to store data, contacts, account information, etc.
- The criminals take advantage of the widespread lack of awareness about cybercrimes and cyberlaws among the people who are constantly using the IT infrastructure for official and personal purposes.
- People who commit cyber crimes are known as "Crackers" (Box2.1).

Box2.1|Hackers, Crackers and Phreakers
Hacker: A hacker is a person with a strong interest in computers who enjoys learning and experimenting with them. Hackers are usually very talented, smart people who understand Computers better than others. The term is often confused with cracker that defines someone who Breaks into computers (refertoBox2.2).
Brute force hacking: I t is a technique used to find passwords or encryption keys. Brute force Hacking involves trying every possible combination of letters, numbers, etc., until the code is broken.
Cracker: A cracker is a person who breaks into computers. Crackers should not be confused with hackers. The term "cracker" is usually connected to computer criminals. Some of their Crimes include vandalism, theft and snooping in unauthorized areas.
Cracking: It is the act of breaking into computers. Cracking is a popular, growing subject on the
Internet. Many sites are devoted to supplying crackers with programs that allow them to crack computers. Some of these programs contain dictionaries for guessing passwords. Others are used to break into phone lines (called" phreaking").These sites usually display warnings such as "These files are illegal; we are not responsible for what you do with them."
Cracker tools: These are programs used to break into computers. Cracker tools are widely distributed on the Internet. They include password crackers, Trojans, viruses, war dialers and worms.
Phreaking: This is the notorious art of breaking into phone or other communication systems. Phreaking sites on the Internet are popular among crackers and other criminals.
War dialer: It is program that automatically dials phone numbers looking for computers on the other end. It catalogs numbers so that the hackers can call back and try to break in.

- An attacker would look to exploit the vulnerabilities in the networks, most often so because the networks are not adequately protected.
- The categories of vulnerabilities that hackers typically search for are the following:
  1. Inadequate border protection (border as in the sense of network periphery);
  2. Remote access servers(RASs) with weak access controls;
  3. Application servers with well-known exploits;
  4. Misconfigured systems and systems with default configurations.
- To help the reader understand the network attack scenario, Fig.2.2 illustrates a small network highlighting specific occurrences of several vulnerabilities described above.

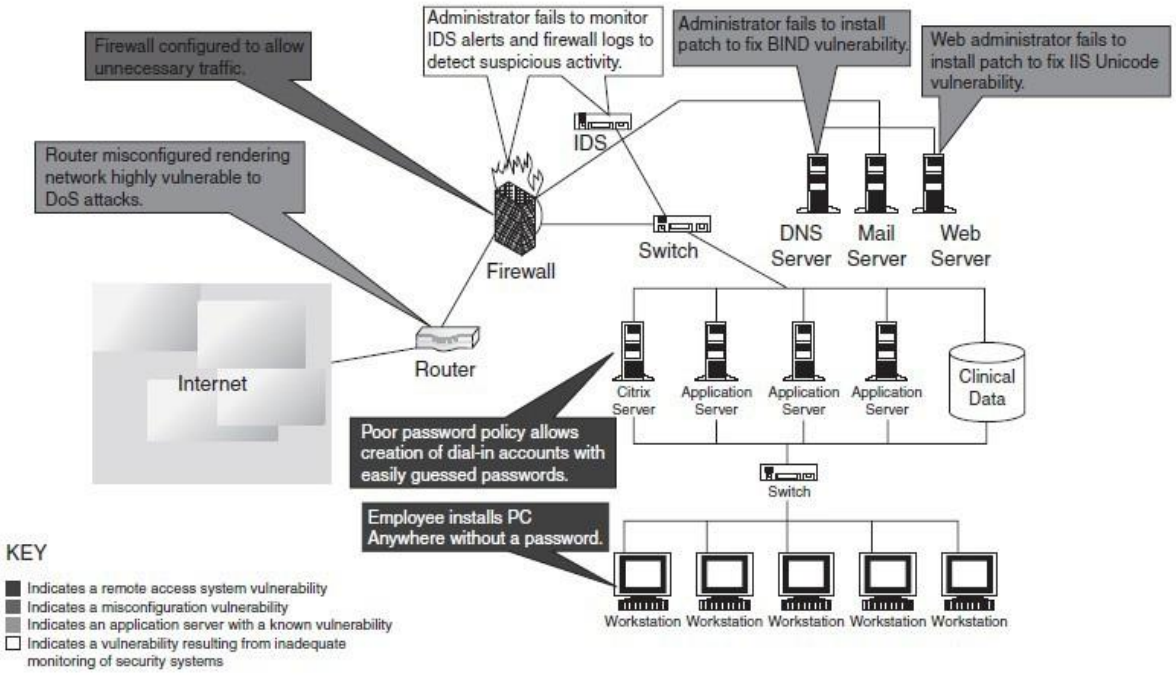


Figure 2.2 | Network vulnerabilities – sample network.
Source: Nina Godbole (2009), *Information Systems Security: Security Management, Metrics, Frameworks and Best Practices* (Fig. 11.6), Wiley India.

Box2.2|WhatColorisYourHatintheSecurityWorld?

A ***black hat*** is also called a "cracker" or "dark side hacker." Such a person is a malicious or **criminal hacker**. Typically, the term "cracker" is used within the security industry. However, the general public uses the term hacker to refer to the same thing. In computer terminology, the meaning of "hacker" can be much broader. The name comes from the opposite of "white hat hackers."

A ***white hat hacker*** is considered an ***ethical hacke*****r**. In the realm of IT, a " white hat hacker" is a person who is ethically opposed to the abuse of computer systems. It is said that the term is derived from American western movies, where the protagonist typically wore a white cow boy hat and the antagonist typically wore a black one. As a simplified explanation, a "white hat" generally focuses on securing IT systems, whereas a "black hat" (the opposite) would like to break into them, so this sounds like an age-old game of a thief and a police.

A ***brown hat hacker*** is one who thinks before acting or committing a malice or non- malice deed. *A grey hat* commonly refers to a hacker who releases information about any exploits or security holes he/she finds openly to the public. He/she does so without concern for how the information is used in the end (whether for patching or exploiting).

2.1.1Categories of Cyber crime

Cyber crime can be categorized based on the following:

1. The target of the crime and

2. Whether the crime occurs as a single even series of events.

- Cyber crime can be targeted against individuals (**persons**), assets (**property**) and / or **Organizations** (government, business and social).
  1. **Crimes targeted at individuals:** The goal is to exploit human weakness such as greed and naivety. These crimes include financial frauds, sale of non-existent or stolen items, child pornography (explainedinSection1.5.13,Chapter 1), copy right violation, harassment, etc. with the development in the IT and the Internet; thus, criminals have a new tool that allows them to expand the pool of potential victims. However, this also makes difficult to trace and apprehend the criminals.
  2. **Crimes targeted at property:** This includes stealing mobile devices such as cell phone, laptops, personal digital assistant (PDAs), and removable medias (CDs and pen drives); transmitting harmful programs that can disrupt functions of the systems and / or can wipe out data from hard disk, and can create the malfunctioning of the attached devices in the system such as modem, CD drive, etc.
  3. **Crimes targeted at organizations:** Cyber terrorism is one of the distinct crimes against organizations /governments. Attackers (individuals or groups of individuals)use computer tools and the Internet to usually terrorize the citizens of a particular country by stealing the private information, and also to damage the programs and files or plant programs to get control of the network and / or system (seeBox2.3).

4. **Single event of cybercrime:** It is the single event from the perspective of the victim. For example, unknowingly open an attachment that may contain virus that will infect the system (PC / laptop). This is known as hacking or fraud.
5. **Series of events:** This involves attacker interacting with the victims repetitively. For example, attacker interacts with the victim on the phone and / or via chat rooms to establish relationship first and then they exploit that relationship to commit the sexual assault.

Box2.3|Patriot Hacking

Patriot hacking [1] also known as ***Digital Warfare***, is a form of vigilante computer systems' cracking done by individuals or groups (usually citizens or support country) against a real or perceived threat. Traditionally, Western countries, that is, developing countries, attempts to launch attacks on their perceived enemies.

Although patriot hacking is declared as illegal in the US, however, it is reserved only for government agencies [i.e., Central Intelligence Agency (CIA) and National Security Agency (NSA)]as a legitimate form of attack and defense. Federal Bureau of Investigation (FBI) raised the concern about rise in cyber attacks like website defacements (explained in Box1.4, Chapter1)and denial-of-service attacks (DoS–refer to Section 4.9, Chapter4),which adds as fuel into increase in international tension and gets mirror edit into the online world.

After the war in Iraq in 2003, it is getting popular in the North America, Western Europe and Israel. These are countries that have the greatest threat to Islamic terrorism and it's a forementioned digital version.

The People's Republic of China is allegedly making attacks upon the computer networks of the US and the UK .Refer to Box5.15 in Chapter 5. For detailed information visit www.patriothacking.com

How Criminals Plan the Attacks

- Criminals use many methods and tools to locate the vulnerabilities of their target.
- The target can be an individual and/or an organization.
- Criminals plan passive and active attacks
- **Active attacks** are usually used to alter the system (i.e., computer network) where as **passive attacks** attempt to gain information about the target.
- **Active attacks** may affect the availability, integrity and authenticity of data where as **passive attacks** lead to violation of confidentiality.

The following phases are involved in planning cybercrime:
1. Reconnaissance (information gathering) is the first phase and is treated as **passive attacks.**
2. Scanning and scrutinizing the gathered information for the validity of the information as well as to identify the existing vulnerabilities.
3. Launching an attack (gaining and maintaining the system access).

Reconnaissance

- The literal meaning of "Reconnaissance" is *an act of* ***finding something or somebody*** (*especially to gain information about an enemy or potential enemy*).
- In the world of "hacking," reconnaissance phase begins with "*Foot printing*"–this is the preparation toward pre- attack phase, and involves accumulating data about the target's environment and computer architecture to find ways to intrude into that environment.
- Foot printing gives an overview about system vulnerabilities and provides a judgment about possible exploitation of those vulnerabilities.
- The objective of this preparatory phase is to understand the system, its networking ports and services, and any other aspects of its security that are needful for launching the attack.
- Thus, an attacker attempts to gather information in two phases: passive and active attacks. Let us understand these two phases.

Passive Attacks

- A passive attack involves gathering information about a target without his/her (individual's or company's) knowledge.
- It can be as simple as watching a building to identify what time employees enter the building premises.
- However, it is usually done using Internet searches or by Googling (i.e., searching the required information with the help of search engine Google) an individual or company to gain information.
  1. Google or Yahoo search: People search to locate information about employees.
  2. Surfing online community groups like Orkut / Facebook will prove useful to gain the information about an individual.
  3. Organization's website may provide a personnel directory or information about key employees, for example, contact details, E-Mail address, etc. These can be used in a social engineering attack to reach the target(seeSection2.3).
  4. Blogs, news groups, press releases, etc. are generally used as the mediums to gain information about the company or employees.

5. Going through the job postings in particular job profiles for technical persons can provide information about type of technology, that is, servers or infrastructure devices a company may be using on its network.

Active Attacks

- An active attack involves probing the network to discover individual hosts to confirm the information (IP addresses, operating system type and version, and services on the network) gathered in the passive attack phase.
- It involves the risk of detection and is also called "*Rattling the door knobs*" or "*Active reconnaissance*."
- Active reconnaissance can provide confirmation to an attacker about security measures in place (e.g., whether the front door is locked?), but the process can also increase the chance of being caught or raise a suspicion.

Scanning and Scrutinizing Gathered Information

- Scanning is a key step to examine intelligently while gathering information about the target. The objectives of scanning are as follows:
  1. Port scanning: Identify open / close ports and services. RefertoBox2.5.
  2. Network scanning: Understand IP Addresses and related information about the computer network systems.
  3. Vulnerability scanning: Understand the existing weaknesses in the system.

Attack (Gaining and Maintaining the System Access)

- After the scanning and enumeration, the attack is launched using the following steps:
  1. Crack the password.
  2. Exploit the privileges.
  3. Execute the malicious commands / applications.
  4. Hide the files (If required).
  5. Cover the tracks–delete the access logs, so that there is no trail illicit activity.

Social Engineering

- Social engineering is the "technique to influence" and "persuasion to deceive" people to obtain the information or perform some action.
- Social engineers exploit the natural tendency of a person to trust social engineers' word, rather than exploiting computer security holes.
- It is generally agreed that people are the weak link in security and this principle makes social engineering possible.
- A social engineer usually uses telecommunication (i.e., telephone and /or cell phone) or Internet to get them to do something that is against the security practices and/or policies of the organization.
- Social engineering involves gaining sensitive information or unauthorized access privileges by building inappropriate trust relationships with insiders.
- It is an art of exploiting the trust of people, which is not doubted while speaking in a normal manner.
- The goal of a social engineer is to fool someone into providing valuable information or access to that information.
- Social engineer studies the human behavior so that people will help because of the desire to be helpful, the attitude to trust people, and the fear of getting into trouble.
- The sign of truly successful social engineers is that they receive information without any suspicion.
- A simple example is calling a user and pretending to be someone from the service desk working on a network issue; the attacker then proceeds to ask questions about what the user is working on, what file shares he /she uses, what his/her password is, and so on…
  (see Box 2.6).

Box2.6| Social Engineering Example
Mr. Joshi: Hello? **The Caller:** Hello, Mr.Joshi. This is Geeta Thomas from Tech Support. Due to some disk space constraints on the file server, we will be moving few users' home directories to another disk. This activity will be performed tonight at 8:00 p.m. Your account will be a part of this move and will be unavailable temporarily.
Mr. Joshi: Ohh… okay. I will be at my home by then, anyway. **Caller:** Great!!! Please ensure to log off before you leave office. We just need to check a couple of things. What is your username?
Mr.J oshi: User name is " p joshi. "None of my files will be lost in the move, right? **Caller:** No sir. But we will have to check your account to ensure the same. What is the password of that account?
Mr.Joshi: My pass word is"ABCD1965,"all characters in uppercase. **Caller:** Ok, Mr.J oshi. Thank you for your cooperation. We will ensure that all the files are there.
Mr.Joshi: Thank you. Bye. **Caller:** Bye and have a niceday.

Classification of Social Engineering

Human-Based Social Engineering

- Human-based social engineering refers to person-to-person interaction to get the required / desired information.
- An example is calling the help desk and trying to find out a password.

1. **Impersonating an employee or valid user:**
   - "Impersonation" is perhaps the greatest technique used by social engineers to deceive people.
   - Social engineers " take advantage" of the fact that most people are basically help ful, so it seems harmless to tell someone who appears to be lost where the computer room is located, or to let someone into the building who "forgot" his/her badge, etc., or pretending to be an employee or valid user on the system.
2. **Posing as an important user:**
   - The attacker pretends to be an important user– for example, a Chief Executive Officer (CEO) or high-level manager who needs immediate assistance to gain access to a system.
   - The attacker uses intimidation so that a lower-level employee such as a help- desk worker will help him/her in gaining access to the system. Most of the low- level employees will not ask any question to someone who appears to be in a position of authority.
3. **Using a third person:**
   - An attacker pretends to have permission from an authorized source to use a system. This trick is useful when the supposed authorized personnel is on vacation or cannot be contacted for verification.
4. **Calling technical support:**
   - Calling the technical support for assistance is a classic social engineering example.
   - Help-desk and technical support personnel are trained to help users, which makes them good prey for social engineering attacks.
5. **Shoulder surfing:**
   - It is a technique of gathering information such as usernames and passwords by watching over a person's shoulder while he/she logs into the system, thereby helping an attacker to gain access to the system.
6. **Dump sterdiving:**
   - It involves **looking in the trash for information written on pieces of paper or computer printouts**.
   - This is a typical North American term; it is used to describe the practice of rummaging through commercial or residential trash to find useful free items that have been discarded.
   - It is also called dumpstering, binning, trashing, garbing or garbage gleaning.
   - "Scavenging" is another term to describe these habits.
   - In the UK, the practice is referred to as "binning" or "skipping" and the person doing it is a "binner" or a"skipper."

Computer-Based Social Engineering

- Computer-based social engineering refers to an attempt made to get the required / desired information by using computer software/Internet.
- For example, sending **fake E-Mail to the user** and asking him / her to re-enter a password in a webpage to confirm it.

1. Fake E-Mails:

- The attacker sends fake E-Mails (seeBox2.7) to users in such that the user finds it as a real e-mail.
- This activity is also called "Phishing".
- It is an attempt to attract the Internet users (netizens) to reveal their personal information, such a s**usernames, passwords** and **credit card details** by impersonating as a trustworthy and legitimate organization or an individual.
- Banks, financial institutes and payment gateways are the common targets.
- Phishing is typically carried out through E-Mails or instant messaging and often directs users to enter details at a website, usually designed by the attacker with abiding the look and feel of the original website.
- Thus, Phishing is also an example of social engineering techniques used to fool netizens.
- The term "Phishing" has been evolved from the analogy that Internet scammers are using E-Mails attract to *fish* for passwords and financial data from the sea of Internet users (i.e.,netizens).
- The term was coined in 1996 by hackers who were stealing AOL Internet accounts by scamming passwords without the knowledge of AOL users.
- As hackers have a tendency of replacing "f" with "ph," the term "Phishing" came into being.

2. E-Mail attachments:

- E-mail attachments are used to send malicious code to a victim's system, which will automatically (e.g., key logger utility to capture passwords) get executed.
- Viruses, Trojans ,and worms can be included cleverly into the attachments to entice a victim to open the attachment.

3. Pop-up windows:

- Pop-up windows are also used, in a similar manner to E-Mail attachments. Pop-up windows with special offers or free stuff can encourage a user to unintentionally install malicious software.

Cyber stalking

- The dictionary meaning of "stalking" is an "*actor process of following prey stealthily– Trying to approach somebody or something.*"
- Cyber stalking has been defined as the use of information and communications technology, particularly the Internet, by an individual or group of individuals to **harass another individual, group of individuals, or organization**.
- The behavior includes false accusations, monitoring, transmission of threats, ID theft, damage to data or equipment, solicitation of minors for sexual purposes, and gathering information for harassment purposes.
- Cyber stalking refers to the use of Internet and/or other electronic communications devices to stalk another person.
- **It involves harassing or threatening behavior that an individual will conduct repeatedly**, for example, following a person, visiting a person's home and/or at business place, making phone calls, leaving written messages, or vandalizing against the person's property. As the Internet has become an integral part of our personal and professional lives, cyberstalkers take advantage of ease of communication and an increased access to personal information available with a few mouse clicks or keystrokes.

Types of Stalkers

There are primarily two types of stalkers.

1. **Online stalkers:**
   - They aim to start the interaction with the victim directly with the help of the Internet.
   - E-Mail and chat rooms are the most popular communication medium to get connected with the victim, rather than using traditional instrumentation like telephone/ cell phone.
   - The stalker makes sure that the victim recognizes the attack attempted on him/her.
   - The stalker can make use of a third party to harass the victim.

2. **Offline stalkers:**
   - The stalker may begin the attack using traditional methods such as following the victim, watching the daily routine of the victim, etc.
   - Searching on message boards/news groups, personal websites, and people finding services or websites are most common ways to gather information about the victim using the Internet.
   - The victim is not aware that the Internet has been used to perpetuate an attack against them.

Cases Reported on Cyber stalking

- The majority of cyber stalkers are men and the majority of their victim's are women.
- Some cases also have been reported where women act as cyber stalkers and men as the victims as well as cases of same-sex cyber stalking.
- In many cases, the cyber stalker and the victim hold a prior relationship, and the cyber stalking begins when the victim attempts to break off the relationship, for example, ex-lover, ex-spouse, boss/ subordinate, and neighbor.
- However, the real so have been many instances of cyber stalking by strangers.

How Stalking Works?

It is seen that stalking works in the following ways:

1. Personal information gathering about the victim: Name; family background; contact details such as cell phone and telephone numbers (of residence as well as office); address of residence as well as of the office; E-Mail address; date of birth, etc.
2. Establish a contact with victim through telephone / cell phone. Once the contact is established, the stalker may make calls to the victim to threaten / harass.
3. Stalkers will almost always establish a contact with the victims through E-Mail. The letters may have the tone of loving, threatening or can be sexually explicit. The stalker may use multiple names while contacting the victim.
4. Some stalkers keep on sending repeated E-Mails asking for various kinds of favors or threaten the victim.
5. The stalker may post the victim's personal information on any website related to illicit services such as sex-workers' services or dating services, posing as if the victim has posted the information and invite the people to call the victim on the given contact details (telephone numbers/cell phone numbers/E-Mail address) to have sexual services. The stalker will use bad and / or offensive / attractive language to invite the interested persons.
6. Whosoever comes across the information, start calling the victim on the given contact details (telephone/cell phone nos), asking for sexual services or relationships.
7. Some stalkers subscribe / register the E-Mail account of the victim to in numerable pornographic and sexsites, because of which victim will start receiving such kind of unsolicited E- Mails.

Real-Life Incident of Cyber stalking

Case Study
The Indian police have registered first case of cyber stalking in Delhi– the brief account of the case has been mentioned here. To maintain confidentiality and privacy of the entities involved,
• Mrs.Joshi received almost 40 calls in 3 days mostly at odd hours from as far away as Kuwait, Cochin, Bombay, and Ahmadabad.
• The said call screated in the personal life destroying mental peace of Mrs.Joshi who decided to register a complaint with Delhi Police.
• A person was using her ID to chat over the Internet at the web sitewww.mirc.com, mostly in the Delhi channel for four consecutive days.
• This person was chatting on the Internet, using her name and giving her address, talking in obscene language.
• The same person was also deliberately giving her telephone number to other chatters encouraging them to call Mrs. Joshi at odd hours.
• This was the first time when a case of cyber stalking was registered.
• Cyber stalking does not have a standard definition but it can be defined to mean threatening, unwarranted behavior, or advances directed by one person toward another Person using Internet and other forms of online communication channels as medium.

Box2.8 |Cyber bullying

The National Crime Prevention Council defines *Cyber bullying* as "when the Internet, cell phones or other devices are used to send or post text or images intended to hurt or embarrass another person."

www.StopCyberbullying.org, an expert organization dedicated to Internet safety, security, and privacy defines cyber bullying as "a situation when a child, tween, or teen is repeatedly 'tormented, threatened, harassed, humiliated, embarrassed, or otherwise targeted' by another child, tween, or teen using text messaging, E-Mail, instant messaging, or any other type of digital technology."

The practice of cyber bullying is not limited to children and, while the behavior is identified by the same definition in adults, the distinction in age groups is referred to as cyber stalking or cyber harassment when perpetrated by adults toward adults.[4] *Source:* http://en.wikipedia.org/wiki/Cyber-bullying(2April2009).

Cyber café and Cyber crimes

- In February 2009, Nielsen survey on the profile of cyber cafes users in India, it was found that90% of the audience, across eight cities and 3,500 cafes, were male and in the age group of 15–35 years; 52% were graduates and postgraduates, though almost over 50% were students.
- Hence, it is extremely important to understand the IT security and governance practiced in the cyber cafes.
- In the past several years, many instances have been reported in India, where cyber cafes are known to be used for either real or false terrorist communication.
- Cybercrimes such as stealing of bank passwords and subsequent fraudulent withdrawal of money have also happened through cyber cafes.
- Cyber cafes have also been used regularly for sending obscene emails to harass people.
- Public computers, usually referred to the systems, available in cyber cafes, hold two types of risks.
- **First**, we do not know what programs are installed on the computer–that is, risk of malicious programs such as *keyloggers* or *Spyware*, which maybe running at the background that can capture the keystrokes to know the passwords and other confidential information and/or monitor the browsing behavior.
- **Second**, over-the-shoulder surfing can enable others to find out your passwords. Therefore, one has to be extremely careful about protecting his/her privacy on such systems, as one does not know who will use the computer after him/her.
- **Indian Information Technology Act (ITA) 2000** does not define cyber cafes and interprets cyber cafes as "network service providers" referred to under the Section79, which imposed on them a responsibility for "due diligence" failing which they would be liable for the offenses committed in their network.
- Cyber criminals prefer cyber cafes to carry out their activities.
- The criminals tend to identify one particular personal computer (PC) to prepare it for their use.
- Cyber criminals can either install malicious programs such as key logger s and/or Spyware or launch an attack on the target.
- Cyber criminals will visit these cafés at a particular time and on the prescribed frequency, may be alternate day or twice a week.
- A recent survey conducted in one of the metropolitan cities in India reveals the following facts:

  1. Pirated software(s) such as OS, browser, office automation software(s)(e.g., Microsoft Office) are installed in all the computers.

  2. Antivirus software is found to be not updated to the latest patch and / or antivirus signature.

  3. Several cyber cafes had installed the software called "Deep Freeze" for protecting the computers from prospective malware attacks. **Deep Freeze** can wipe out the details of all activities carried out on the computer when one clicks on the "restart" button. Such practices present challenges to the police or crime investigators when they visit the cyber cafes to pickup clues after the Internet Service Provider (ISP) points to a particular IP address from where a threat mail was probably sent or an online Phishing attack was carried out, to retrieve logged files.

  4. Annual maintenance contract(AMC) found to be not in a place for servicing the computers; hence, hard disks for all the computers are not formatted unless the computer is

down. Not having the AMC is a risk from cybercrime perspective because a cyber criminal can install a Malicious Code on a computer and conduct criminal activities without any interruption.

5. Pornographic websites and other similar websites with indecent contents are not blocked.

6. Cyber café owners have very less awareness about IT Security and IT Governance.

7. Government/ISPs/State Police (cyber cell wing) do not seem to provide IT Governance guidelines to cyber café owners.

8. Cyber café association or State Police (cyber cell wing) do not seem to conduct periodic visits to cyber cafes – one of the cyber cafe owners whom we interviewed expressed a view that the police will not visit a cyber cafe unless criminal activity is registered by filing an First Information Report (FIR).Cyber café owners feel that police either have a very little knowledge about the technical aspects involved in cyber crimes and / or about conceptual understanding of IT security. There are thousands of cyber cafes across India.

In the event that a central agency takes up the responsibility for monitoring cyber cafes, an individual should take care while visiting and / or operating from cyber cafe.

Here area few tips for safety and security while using the computer in a cyber cafe:

1. Always logout:
2. Stay with The computer:
3. Clear history and temporary files:
4. Be alert:
5. Avoid online financial transactions:
6. Change passwords:
7. Use Virtual keyboard:
8. Security warnings:

Botnets: The Fuel for Cybercrime

Botnet

- The dictionary meaning of Botis

"(*computing*) *an automated program for doing some particular task, often over a network*."

- Botnet is a term used for collection of software Robots, or Bots, that run autonomously and automatically.
- The term is often associated with malicious software but can also refer to the network of computers using distributed computing software.
- In simple terms, a Bot is simply an automated computer program One can gain the control of computer by infecting them with a virus or other Malicious Code that gives the access.
- Computer system may be a part of a Botnet even though it appears to be operating normally.
- Botnets are often used to conduct a range of activities, from distributing Spam and viruses to conducting denial-of-service(DoS) attacks
- A Botnet (also called as zombie network) is a network of computers infected with a malicious program that allows cybercriminals to control the infected machines remotely without the users' knowledge.
- "*Zombie networks*" have become a source of income for entire groups of cyber criminals.

- The invariably low cost of maintaining a Botnet and the ever diminishing degree of knowledge required to manage one are conducive to the growth in popularity and, consequently, the number of Botnets.
- If someone wants to start a "business" and has no programming skills, there are plenty of "Bot for sale" offers on forums.
- 'Encryption of these programs' code can also be ordered in the same way to protect them from detection by antivirus tools.
- Another option is to steal an existing Botnet. Figure 2.8 explain show Botnets create business.
- One can reduce the chances of becoming part of a Bot by limiting access into the system.
- Leaving your Internet connection ON and unprotected is just like leaving the front door of the house wide open.

One can ensure following to secure the system:

1. Use antivirus and anti-Spyware software and keep it up-to-date:
2. Set the OS to download and install security patches automatically:
3. Use a firewall to protect the system from hacking attacks while it is connected on the Internet: A firewall is a software and / or hardware that is designed to block unauthorized access while permitting authorized communications.
4. Disconnect from the Internet when you are away from your computer:
5. Downloading the freeware only from websites that are known and trust worthy:
6. Check regularly the folders in the mailbox–"sent items" or "outgoing"–for those messages you did not send:
7. Take an immediate action if your system is infected:

Box2.9|Technical Terms
Malware: It is malicious *software*, designed to damage a computer system without the owner's informed consent. Viruses and worms are the examples of malware.
Adware: It is *advertising-supported software*, which automatically plays, displays, or downloads advertisements to a computer after the software is installed on it or while the application is being used. Few Spywares are classified as Adware.
Spam: It means unsolicited or undesired E-Mail messages
Spam indexing: It is also known as search Spam or search engine Spam. It involves a number of methods, such as repeating unrelated phrases, to manipulate the relevancy or prominence of resources indexed by a search engine in a manner inconsistent with the purpose of the indexing system.
DDoS: Distributed denial-of-service attack (DDoS) occurs when multiple systems flood the bandwidth or resources of a targeted system, usually one or more web servers. These systems are compromised by attackers using a variety of methods

Attack Vector

- **An "attack vector" is a path**, which an attacker can gain access to a computer or to a network server to deliver a payload or malicious outcome.
- **Attack vectors** enable attackers to exploit system vulnerabilities, including the human element.
- **Attack vectors** include viruses, E-Mail attachments, web pages, pop-up windows, instant messages, chat rooms, and deception. All of these methods involve programming (or, in a few cases, hardware), except deception, in which a human operator is fooled into removing or weakening system defenses.
- To some extent, firewalls and antivirus software can block attack vectors.
- However, no protection method is totally attack-proof.
- A defense method that is effective today may not remain so for long because attackers are constantly updating attack vectors, and seeking new ones, in their quest to gain unauthorized access to computers and servers. Refer to Box2.10.
- The most common malicious payloads are viruses (which can function as their own attack vectors), Trojan Horses, worms, and Spyware.
- If an attack vector is thought of as a guided missile, its payload can be compared to the war head in the tip of the missile.
- In the technical terms, *payload* is the necessary data being carried within a packet or other transmission unit – in this scenario (i.e., attack vector) payload means the malicious activity that the attack performs.
- From the technical perspective, payload does not include the "overhead" data required to get the packet to its destination. Payload may depend on the following point of view: "What constitutes it?" To a communications layer that needs some of the overhead data to do its job, the payload is sometimes considered to include that part of the overhead data that this layer handles.

The attack vectors described here are how most of the mare launched.

1. Attack by E-Mail: The content is either embedded in the message or linked to by the message. Sometimes attacks combine the two vectors, so that if the message does not get you, the attachment will. Spam is almost always carrier for scams, fraud, dirty tricks, or malicious action of some kind. Any link that offers something "free" or tempting is a suspect.

2. Attachments (and other files): Malicious attachments install malicious computer code. The code could be a virus, TrojanHorse, Spyware, or any other kind of malware. Attachments attempt to install their pay load as soon as you open them.

3. Attack by deception: Deception is aimed at the user/operator as a vulnerable entry point. It is not just malicious computer code that one needs to monitor. Fraud, scams, and to some extent Spam, not to mention viruses, worms and such require the unwitting cooperation of the computer's operator to succeed. Social engineering are other forms of deception that are often an attack vector too.

4. Hackers: Hackers/crackers are a formidable attack vector because, unlike ordinary Malicious Code, people are flexible and they can improvise. Hackers/crackers use a variety of hacking too ls, heuristics, Cyber offenses: How and social engineering to gain access to computers and online accounts. They often install a Trojan horse to commandeer the computer for their own use.

5. Heedless guests (attack by webpage): Counterfeit websites are used to extract personal information. Such websites look very much like the genuine websites they imitate. One may think he/she is doing business with someone you trust. However, he/she is really giving their personal information, like address, credit card number, and expiration date. They are often used in conjunction with Spam, which gets you there in the first place. Pop-up WebPages may install Spyware, Adware or Trojans.

6. Attack of the worms: Many worms are delivered as E-Mail attachments, but network worms use holes in network protocols directly. Any remote access service, like file sharing, is likely to be vulnerable to this sort of worm. In most cases, a firewall will block system worms. Many of these system worms install Trojan Horses.

7. Malicious macros: Microsoft Word and Microsoft Excel are some of the examples that allow macros. A macro does something like automating a spreadsheet, for example. Macros can also be used for malicious purposes. All Internet services like instant messaging, Internet Relay Chart (IRC), and P2P file-sharing networks rely on cozy connections between the computer and the other computers on the Internet. If one is using P2P software then his/her system is more vulnerable to hostile exploits.

8. Foist ware (sneak ware): Foist ware is the software that **adds hidden components** to the system with cunning nature. Spyware is the most common form of foist ware. Foist ware is partial- legal software bundled with some attractive software. Sneak software often hijacks your browser and diverts you to some "revenue opportunity" that the foist ware has setup.

9. Viruses: These are malicious computer codes that hitch ride and make the payload. Nowadays, virus vectors include E-Mail attachments, downloaded files, worms, etc.

Box2.10|Zero-Day Attack

A zero-day (or zero-hour) attack[17] is a computer threat which attempts to exploit computer application vulnerabilities that are unknown to anybody in the world (i.e., undisclosed to the software vendor and software users) and/or for which no patch (i.e., security fix) is available .Zero-day exploits are used or shared by attackers before the software vendor knows about the vulnerability.

Sometimes software vendors discover the vulnerability but developing a patch can take time. Alternatively, software vendors can also hold releasing the patch reason to avoid the flooding the customers with numerous individual updates. A "zero- day" attack is launched just on or before the first or "zeroth" day of vendor awareness, reason being the vendor should not get any opportunity to communicate / distribute a security fix to user such software. If the vulnerability is not particularly dangerous, software vendors prefer to hold until multiple updates (i.e., security fixes commonly known as patches) are collected and then release them to get her as a package. Malware writers are able to exploit zero- day vulnerabilities through several different attack vectors.

Zero-day emergency response team (ZERT): This is a group of software engineers who work to release non-vendor patches for zero-day exploits. Nevada is attempting to provide support with the Zero day Project at www.zerodayproject.com, which purports to provide information on upcoming attacks and provide support to vulnerable systems. Also visit the web link http://www.isotf.org / zert to get more information about it.

Cloud Computing

- The growing popularity of cloud computing and virtualization among organizations have made it possible, the next target of cybercriminals.
- Cloud computing services, while offering considerable benefits and cost savings, move servers outside the organizations security perimeter, which make it easier for cybercriminals to attack these systems.
- Cloud computing is Internet ("cloud")- based development and use of computer technology ("computing").
- The term cloud is used as a metaphor for the Internet, based on the cloud drawing used to depict the Internet in computer networks.
- Cloud computing is a term used for hosted services delivered over the Internet.

A cloud service has three distinct characteristics which differentiate it from traditional hosting:
1. It is sold on demand – typically by the minute or the hour;
2. It is elastic in terms of usage – a user can have as much or as little of a service as he/she want sat any given time;
3. The service is fully managed by the provider – a user just needs PC and Internet connection. Significant innovations into distributed computing and virtualization as well as improved access speed over the Internet have generated a great demand for cloud computing.

Why Cloud Computing?

The cloud computing has following advantages.
1. Applications and data can be accessed from anywhere at any time. Data may not be held on a hard drive on one user's computer.
2. It could bring hardware costs down. One would need the Internet connection.
3. Organizations do not have to buy a set of software or software licenses for every employee and the organizations could pay a metered fee to a cloud computing company.
4. Organizations do not have to rent a physical space to store servers and databases. Servers and digital storage devices take up space. Cloud computing gives the option of storing data on someone else's hardware, thereby removing the need for physical space on the front end.
5. Organizations would be able to save money on IT support because organizations will have to ensure about the desktop (i.e., a client) and continuous Internet connectivity instead of servers and other hardware. The cloud computing services can be either private or public.

Types of Services

Services provided by cloud computing are as follows:
1. Infrastructure-as-a-service (IaaS): It is like Amazon Web Services that provide **virtual servers** with unique IP addresses and **blocks of storage** on demand. Customers benefit from an Application Programmable Interface (API) from which they can control their servers. As customers can pay for exactly the amount of service they use, like for electricity or water, this service is also called utility computing.
2. Platform-as-a-service (PaaS): It is a set of software and development tools hosted on the provider's servers. Developers can create applications using the provider's APIs. **Google Apps** is one of the most famous PaaS providers. Developers should take notice that there are not any interoperability standards; therefore, some providers may not allow you to take your application and put it on another platform.

3. Software-as-a-service (SaaS): It is the broadest market. In this case, the provider allows the customer only to use its applications. The **software interacts with the user through a user interface**. These applications can be anything from Web-based E-Mail to applications such as Twitter or Last.fm.

Cyber crime and Cloud Computing

- Nowadays, prime area of the risk in cloud computing is protection of user data. Although cloud computing is an emerging field, the idea has been evolved over few years.
- Risk associated with cloud computing environment are as follows

1.Elevated use raccess	Any data processed outside the organization brings With it an inherent level of risk
2.Regulatory compliance	Cloud computing service providers are notable and/or not willing to undergo external assessments.
3.Location of the data	User doesn't know where the data is stored or in Which country it is hosted.
4.Segregation of data	Data of one organization is scattered indifferent locations
5.Recovery of the data	Incase of any disaster, availability of the services And data is critical.
6.Information security violation reports	Due to complex IT environment and several customers logging in and logging out of the hosts, It becomes difficult to trace inappropriate and/or Illegal activity
7.Long-term viability	In case of any major change in the cloud computing service provider(e.g., acquisition and merger, partnership breakage).

Module 4: Phishing and Identity Theft

Phishing and Identity Theft: Introduction, methods of phishing, phishing, phishing techniques, spear phishing, types of phishing scams, phishing toolkits and spy phishing, counter measures, Identity Theft Textbook:1 Chapter 5 (5.1. to 5.3)

Learning Objectives

- 1. Learn about Phishing and its related techniques
- 2. Understand different methods of Phishing
- 3. Get an overview about 3P's of Cybercrime
- Phishing, Pharming, Phoraging
- 4. What is spear phishing? How to avoid being victim of this ?
- 5. Overview of whaling
- 6. Learn about identity (ID) theft and understand ID theft as a major threat to businesses.
- 7. Understand "Myths and Facts" about ID theft.
- 8. Understand different types of ID thefts
- 9. Learn about different techniques of ID theft.
- 10. Understand about countermeasures for ID theft.

4.1. Introduction

- Phishing is a one of the methods towards enticing netizens to reveal their personal information that can be used for identity theft.
- ID theft involves unauthorized access to personal data.
- Section 66C of the IT Act states that "whosoever fraudulently dishonestly make use of the electronics signature, password or any unique identification features of any other person→ shall be punished with imprisonment of three years. And shall also be liable for fine which extend to one lakh rupees."
- Section 66D of the IT Act states that "whoever, by means for any communication device or computer resource cheats by personation, shall be punished with imprisonment of either description for a term which may extend up to three years and also liable for fine up to which extend to one lakh rupees."
- Phishing is a social engineering tactics to trick users into revealing confidential information.

Statistics about Phishing

- Phishing map available on www.avira.com
- Virtual lab monitors the evolution of E-mail Phishing across the globe.
- The graphical illustrations available on www.m86security.com

→ Monitors origin from where Phishing E-mail are sent.

→Facebook, HSBC *(Holdings plc is a British multinational universal bank and financial services holding company),* PayPal and Bank of America →targeted organization.

→US, India and China are → Targeted Countries.

3. Phishing attacks are monitored on a daily basis and displayed on www.phishtank.com

4. According to May 2009 Phishing Monthly Report compiled by Symantec Security Response Anti -Fraud Team

→ Total 3,650 non-English Phishing websites were recorded in the month of May 2009.

→ Phishing URLs are categorized based on the top-level domains (TLDs). The most used TLD in Phishing websites during the month of May 2009 were ".com, ".net and ".org" comprising 50%, 9% and 5%, respectively.

Phishing Activity Trends Report of Q4-2009 published by Anti-Phishing Working Group (APWG,) states the Phishing attack trends and statistics for the quarter. It is important to note that:

Financial organizations, payment services and auction websites are ranked as the most targeted industry.

Port 80 [HTTP] is found to be the most popular port in use followed by Port 443 [S-HTTP] and Port 8080 (WEB SERVER) among all the phishing attacks.

APWG (Anti-Phishing Working Group)

1. Explain the functions of Anti-phishing Working Group (04M)

- www. antiphishing.org, is an international consortium, founded in 2003 by David Jevans
- to bring security products and services companies, law enforcement agencies, government agencies, trade association, regional international treaty organizations and communications companies together, who are affected by Phishing attacks.
- APWG has more than 3,200+ members from more than 1,700 organizations and agencies across the globe.
- To name a few, member organizations are leading security companies such as BitDefender, Symantec, McAfee, VeriSign and IronKey.
- ING Group, VISA, Mastercard and the American Bankers Association are the members from financial industry.
- APWG is focused on eliminating identity theft that results from the growing attacks/scams of Phishing and E-Mail Spoofing.
- APWG provides a platform to discuss Phishing issues, define the scope Phishing problem in terms of costs and share information about best practices to these attacks/scams.

a).What is Phishing? Explain with examples.
b). Define the term Phishing with respect to Wikipedia, Webopedia and TechEncyclopedia.

4.2 Phishing

Wikipedia:

- It is the criminally fraudulent process of attempting to acquire sensitive information such as usernames, passwords and credit card details by masquerading as a trustworthy entity in an electronic communication

Webopedia:

- It is an act of sending an E-Mail to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for ID theft.
- The E-Mail directs the user to visit a website where they are asked to update personal information, such as passwords and credit card, social security and bank account numbers that the legitimate organization already has.
- The website, however, is bogus and set up only to steal the user's information

Tech Encyclopedia: It is a scam to steal valuable information such as credit card and social security numbers (SSN), user IDs and passwords.

- It is also known as "brand Spoofing."
- An official-looking E-Mail is sent to potential victims pretending to be from their bank or retail establishment.
- E-Mails can be sent to people on selected lists or any list, expecting that some percentage of recipients will actually have an account with the organization.
- Is a type of deception designed to steal your identity.
- Here the phisher tries to get the user to disclose the personal information → such as credit card numbers, passwords, account data or other information's.
- Email is the popular medium of Phishing attack and such E-Mails are also called as Spams; however not all E-mails are spam E-Mails.
- Types of E-Mails → Spam E-Mails and hoax E-Mails

Spam E-Mails and hoax E-Mails

- Spam E-Mails → Junk E-Mails
- Identical messages sent to numerous recipients.
- Grown since 1990, → Botnet network of virus infected computers are used to send 80% of spam emails.
- Types→ 1. **Unsolicited bulk E-Mails (UBE)**→ email sent to large quantities

  2. **Unsolicited Commercial E-Mail (UCE)**→ for commercial purpose such as advertising.

SPAMBOTS (UBE)

- Automated computer program and/or a script developed, mostly into "C" programing language to send Spam mails.

- SPAMBOTS gather the E-Mail addresses from the internet to build mailing list to send UE.
- These are called as web crawlers, as they gather E-mail addresses from numerous websites, chatroom conversations, newsgroups and special interest group (SIG) postings.
- → It scans for two things a) hyperlinks b) E-Mail addresses.
- The term SPAMBOT is also sometimes Used with reference to a program designed to prevent spam to reach the subscribers of an Internet service provider (ISP).
- Such programs are called E-Mail blockers and/or filters.

CAN-SPAM Act

- The CAN-SPAM Act of 2003 (15 U.S.C. 7701, et seq., Public Law No. 108-187, was S.877 of the 108th US Congress).
- United States' first national standards for the sending of commercial E-Mail and requires the Federal Trade Commission (FTC) to enforce its provisions.
- Controlling the Assault of Non-Solicited Pornography and Marketing Act of 2003.
- The CAN-SPAM Act is commonly referred to as the "You-Can-Spam" Act because the bill explicitly legalizes most E-Mail Spam.
- In particular, it does not require E-Mailers to get permission before they send marketing messages.
- It also prevents states from enacting stronger anti-Spam protections, and prohibits individuals who receive Spam from suing spammers.

a). Differentiate between Spam and Hoax mails

Spam E-Mails popular medium of Phishers to scam users

- 1. **HSBC, Santander, Common Wealth Bank**→ International bank having large customer base, phishers dive deep in such ocean to attempt to hook the fish.
- 2. **eBay**→ auction site often mimicked to gain personal information
- 3. **Amazon** →I t was the top brand to be exploited by phishers till July 2009.
- 4. **Facebook** → Netizens, who liked to be on the most popular social networking sites such as Facebook, are always subject to threats within Facebook as well as through E-Mails.

Tactics used by Phishers to attack the common people using E-Mails asking for valuable information about himself/herself or to verify the details

- 1. **Names of legitimate organizations:**

Instead of creating a phony company from scratch, the phisher micht use a legitimate company's name and incorporate the look and feel of its website (i.e., including the color scheme and graphics) into the Spam E-Mail.

2. **From a real employee:**
   Real name of an official, who actually works for the organization, will appear in the "from" line or the text of the message (or both). This way, if a user contacts the organization to confirm whether "Rajeev Arora" truly is "Vice President of Marketing" then the user gets a positive response and feels assured.

-

- **3. URLs that look right:**
- The E-Mail might contain a URL (i.e., weblink) which seems to be legitimate website wherein user can enter the information the phisher would like to steal.
- However, in reality the website will be a quickly cobbled copycat -a spoofed" website that looks like the real thing, that is, legitimate website. In some cases, the link might lead to selected pages of a legitimate website- such as the real company's actual privacy policy or legal disclaimer.
- **4. Urgent messages:**
- Creating a fear to trigger a response is very common in Phishing attacks – the E-Mails warn that failure to respond will result in no longer having access to the account or E-Mails might claim that organization has detected suspicious activity in the users' account or that organization is implementing new privacy software for ID theft solutions.

Here are a few examples of phrases used to entice the user to take the action.

- **1. Verity your account:**
- The organization will never ask the user to send passwords, login names, permanent account numbers (PANs) or SSNs and other personal information through E-Mail.
- For example, if you receive an E-Mail message from Microsoft asking you to update your credit card Information, do not respond without any confirmation with Microsoft authorities- this is a perfect example of Phishing attack.
- **2. You have won the lottery:**
- The lottery scam is a common Phishing scam known as advanced fee fraud. One of the most common forms of advanced fee fraud is a message that claims that you have won a large sum of money, or that a person will pay you a large sum of money for little or no work your part.
- The lottery scam often includes references to big companies, for example, Microsoft.
- There is no Microsoft lottery. It is observed that most of the phished E-Mails display the agencies/companies situated in Great Britain and hence it is extremely important for netizens to confirm/verify the authenticity of such E-Mails before sending any response.
  If " any-Mail is received displaying "You have won the lottery in Great Britain," confirm it on www.gamblingcommission.gov.uk
- If any E-Mail is received displaying your selection for any job into Great Britain, confirm/verify the details of the organization on www.companieshouse.gov.uk or on http://www.upmystreet. com/local/uk.html

- **3. If you don't respond within 48 hours, your account will be closed**
- These messages convey a sense of urgency so that you will respond immediately without thinking. A Phishing E-Mail message might even claim that your response is required because your account might have been compromised

Let us understand the ways to reduce the amount of Spam E-Mails we receive

- 1. Share personal Email address with limited people and/or on public websites-the more exposed to the public, the more Spam E-Mails will be received.
- 2. Never reply or open any Spam E-Mails. Any spam E-Mails that are opened or replied to inform the phishers not only about your existence but also about validity of your E-Mail address.
- 3. Disguise the E-Mail address on public website or groups by spelling out the sign "@" and the DOT for example, RajeevATgmailDOTcom. This usually prohibits

phishers to catch valid E-Mail addresses while gathering E-Mail addresses through programs.

- 4Use alternate E-Mail addresses to register for any personal or shopping website. Never ever use business E-Mail addresses for these sites but rather use E-mail addresses that are free from Yahoo, Hotmail or Gmail.
- 5. Do not forward any E-Mails from unknown recipients.
- 6.Make a habit to preview an E-Mail (an option available in an E-Mail program) before opening it.
- 7. Never use E-Mail address as the screen name in chat groups or rooms.
- 8. Never respond to a Spam E-Mail asking to remove your E-Mail address from the mailing distribution list. More often it confirms to the phishers that your E-Mail address is active.

Hoax Mails

- These are deliberate attempt to deceive or trick a user into believing or accepting that something 1s real. when the hoaxer (the person or group creating the hoax) knows it is false.
- Hoax E-Mails may or may not be Spam E-Mails.
- www.breakthechain.org: This website contains a huge database of chain E-Mails.
- www.hoaxbusters.org: excellent website containing a large database of common Internet hoaxes.
- It contains information about all the scams.
- I maintained by Computer Incident Advisory Capability, Which is the division of US department of energy. Eg., "Breaking news"→ Info→" Barack Obama refused to be the president of the US → E-mail Signature as CNN

4.2.1 Methods of Phishing.

Explain four types of methods used by the phishers to reveal personal information on Internet

1. Dragnet 2. Road-and-reel 3. Lobsterpot 4. Gillnet

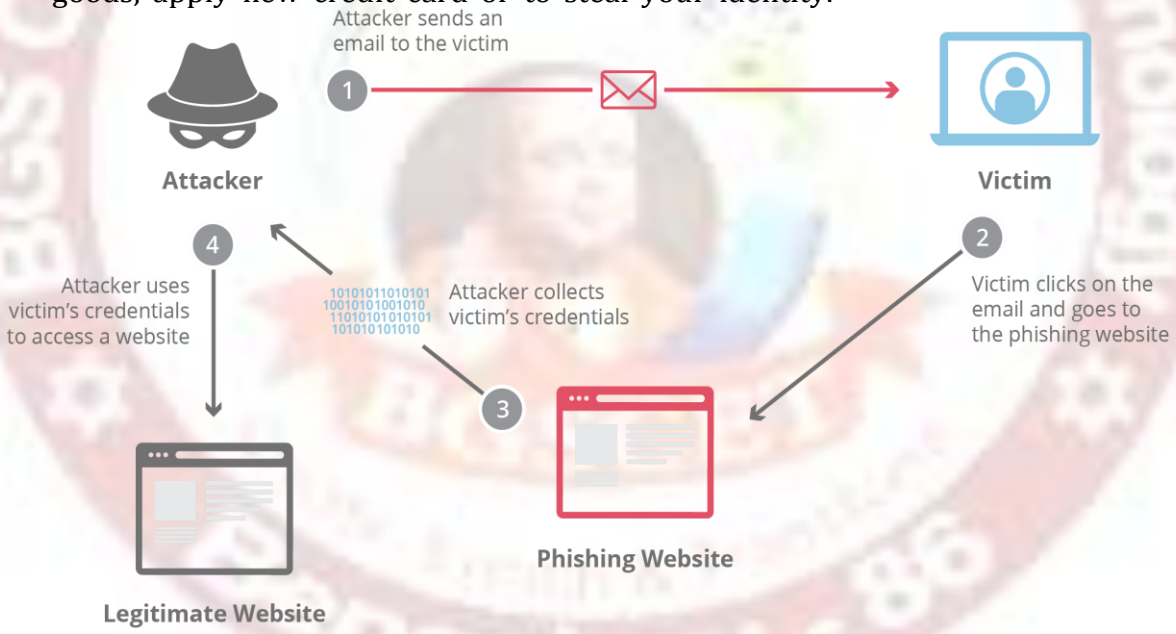
1. Dragnet

- A method involves the use of spammed E-Mails, bearing falsified corporate identification (ne.., corporate names, logos and Customers of trademarks), which are addressed to a large group of people (a particular financial institution or members of a particular auction site) to web- sites or pop-up windows with Similarly falsified identification.
- Dragnet phishers do not identify specific prospective victims in advance.
- Instead, they rely on false information included in an E-Mail to trigger an immediate response by victims-typically, clicking on links in the body of the E-Mail to take the victims to the websites or pop- up windows where they are requested to enter bank or credit card account data or other personal data.

2. Road-and-reel

- In this method, phishers identify specific prospective victims in advance, and convey false information to them to prompt their disclosure of personal and financial data.
- For example, on the phony webpage, availability of similar item for a better price (i.e., cheaper price) is displayed which the victims may be searching for and upon visiting the webpage, victims were asked for personal information such as name, bank account numbers and passwords, before confirming that the "sale" and the information is available to the phisher easily.

- **3. Lobsterpot**
- This method focuses upon use of spoofed websites.
- It consists of creating of bogus/ phony websites, similar to legitimate corporate ones, targeting a narrowly defined class of victims, which is likely to seek out.
- These attacks are also known as "content injection Phishing."
- Here the phisher places a weblink into an E-Mail message to make it look more legitimate and actually takes the victim to a phony scam site, which appears as legitimate website similar to official site. These fake sites are spoofed websites.
- Ones the netizens is into the one of these spoofed sites, he/she might willingly send personal information to the con artist. Then they use your information to purchase goods, apply new credit card or to steal your identity.



4. Gillnet

- This technique relies far less on social engineering techniques and phishers introduce Malicious Code into E-Mails and websites.
- They can, for example, misuse browser functionality by injecting hostile content into another site's pop-up window.
- Merely by opening a particular E-Mail or browsing a particular website, netizens may have a Trojan Horse introduced into their systems.
- In some cases, the Malicious Code will change settings in user's systems so that users who want to visit legitimate banking websites will be redirected to a look-alike Phishing site.

- In other cases, the malicious code will record user's keystrokes and passwords when they visit legitimate banking sites, then they transmit those data to phisher for later illegal access to user's financial accounts.

Box 1:

Explain the following attack against the legitimate website.
a) Website Spoofing
b) XSS-Cross site Scripting
c) XSRF- Cross scripting Request Forgery

Website Spoofing (attack launched on legitimate Webpage)

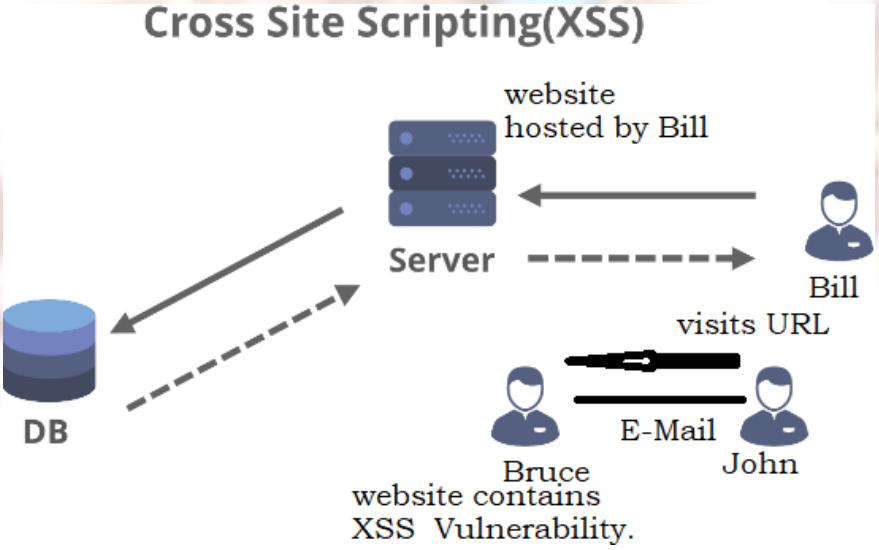
It is an act of creating a website, as a hoax, with the intention of misleading readers that the website has been created by a different person or organization.

Normally, the website will adopt the design of the target website and it sometimes has a similar URL.

XSS (Cross Site Scripting) (attack launched on legitimate Webpage)

Cross-site scripting (XSS): XSS is a type of computer security vulnerability typically found in web applications that enable malicious attacker to inject client-side script into webpage viewed by other users.

An exploited cross-site scripting vulnerability can be Used by attackers to bypass access controls Such as the same origin policy.



XSRF Cross-site request forgery (attack launched on legitimate Webpage)

CSRF is also known as a one-click attack or session riding (abbreviated as CSRF or XSRF) and is a type of malicious exploit of a website where by unauthorized commands are transmitted from a user that the website trusts.

Unlike cross-site scripting (XSS), which exploits the trust a user has on a particular site, CSRF exploits the trust that a site has in a user's browser.

Phishing vis-à-vis Spoofing

- 1. Phishing is used to get the victim to reveal valuable (or at times invaluable) information about him/her. Phishers would use Spoofing to create a fake E-Mail.
- 2. Spoofing is not intended to steal information but to actually make the victim do something for phishers.
- 3. Phishing may, at times, require Spoofing to entice the victim into revealing the information about Spoofing does not always necessarily result in Phishing someone else's account

The Combined Attack - Phishing and Spoofing

- Phisher sends an E-Mail, during Income Tax return fling period, from an official looking IT (Income Tax) account which is spoofed.
- The E-Mail would contain URL to download a new tax form that was recently issued.
- Once the victim clicks the URL a "virus cum Trojan Horse" is downloaded to the victim's system.
- The IT Form may seem official, but like a Trojan Horse, the payload has already been delivered.
- The virus lies in wait, logging the actions of the victim.
- Once the victim inputs certain keywords, like bank names, credit card names, social networking websites and so forth, it logs the site and the passwords used.
- Those results are flagged and sent to the phisher.
- The virus could then gather the user's E-Mail contacts and send a fake E-Mail to them as well, containing the virus.
- The phisher now has gained the required personal information as well as virus was sent, downloaded and spread to entice other netizens.

4.2.2. Phishing Techniques [UFWFSP]

Discuss the various techniques used by Phishers to launch Phishing attacks
OR
Discuss the different Phishing techniques?

- 1. URL (weblink) Manipulation
- 2. Filter Evasion
- 3. Website Forgery
- 4. Flash Phishing
- 5. Social Phishing
- 6. Phone Phishing

1. URL (weblink) manipulation

- URLs are the weblinks (i.e., Internet addresses) that direct the netizens/users to a specific website.
- In Phishing attack, these URLs are usually supplied as misspelled, for example, instead of www.abcbank.com, URL is provided as www.abcbank1.com.
- Phishers use Lobsterpot method of Phishing and make the difference of one or two letters in the URLs, which is ignored by netizens.
- This makes a big difference and it directs users to a fake/bogus website or a webpage.

Homograph Attack

- It is used by Phisher to attack on Internationalized Domain Name (IDN) to deceive the netizens by redirecting them on the phony website which look like the original website.
- ASCII has several characters and/or pairs of characters which look alike,
- Eg. 0 and "O". "l" (L lower case) and I("i" alphabet in uppercase) [GOOGLE.COM can be registered as G00GLE.COM]
- Microsoft.com or/rnicrosoft.com
- Phisher could create and register a domain name which appears almost identical to an existing domain and takes netizens to the Phony websites.
- Phisher could easily record password or account details though spoofed websites, while passing traffic through the original websites.

2. Filter Evasion

- This technique use graphics (i.e., images) instead of text to obviate from netting such E-Mails by anti-Phishing filters. Normally, these filters are inbuilt into the web browsers. For example,
- Internet Explorer version 7 has inbuilt "Microsoft phishing filter." One can enable it during the installation or it can be enabled post-installation. It is important to note that it is not enabled by default.
- Firefox 2.0 and above has inbuilt "Google Phishing filter." duly licensed from Google. It is enabled by default.
- The Opera Phishing filter is dubbed Opera Fraud Protection and is included in version 9.5+.

3.Website forgery

- In this technique the phisher directs the netizens to the website designed and developed by him, to login into the website, by altering the browser address bar through JavaScript commands.
- As the netizen logs into the fake/bogus website, phisher gets the confidential information very easily.
- Another technique used is known as "cloaked" URL-domain forwarding and/or inserting control characters into the URL while concealing the weblink address of the real website.

4. Flash Phishing

- Anti-Phishing toolbars are installed/enabled to help checking the webpage content for signs of Phishing, but have limitations that they do not analyse flash objects at all.
- Phishers use it to emulate the legitimate website.
- Netizens believe that the website is "clean" and is a real website because anti-Phishing toolbar is unable to detect it.

5. Social Phishing

- Phishers entice the netizens to reveal sensitive data by other means and it works in a systematic manner.
- Phisher sends a mail as if it is sent by a bank asking to call them back because there was a security breach.
- The victim calls the bank on the phone numbers displayed in the mail.
- The phone number provided in the mail is a false number and the victim gets redirected to the phisher.
- Phisher speaks with the victim in the similar fashion/style as a bank employee, asking to verify that the victim is the customer of the bank. For example, "Sir, we need to make sure that you are indeed our customer. Could you please supply your credit card information so that I can verify your identity".
- Phisher gets the required details swimmingly.

6. Phone Phishing

- Phisher can use a fake caller ID data to make it appear that the call is received from a trusted organization to entice the users to reveal their personal information such as account numbers and passwords.
- Mishing- Mobile Phishing attacks (Vishing and Smishing)

Innovative Phishing Attack Launched through Android Market

- Android: It is an open-source operating system (OS) for mobile phones and is based on Linux Kernel.
- Its popular due to the release of Google's Nexus One Phone.
- Its Market is as popular as iPhone App Store. →22,000 applications available
- https://news.spoftpedia.co → a malware writer succeeded to list a rogue Phishing application called 09Droid on the Android Market website.
- It found shell for mobile application, but later came to know that its being used to steal Online Banking credentials.
- Travsi Credit Union (TCU) issued an alert to all consumers regarding this malware injection through 09Droid.→Application was stealing financial information of consumers.

4.2.3 Spear Phishing

What is spear Phishing? Explain with examples. **OR** What is Whaling? Explain the difference between Whaling and Spear Phishing.

- It is method of sending a Phishing message to a particular organization to gain organizational information for more targeted social engineering.

- Spear phishers send E-Mail that appears genuine to all the employees or members within a certain company, government agency, organization or group.
- The message might look like as if it has come from your employer, or from a colleague who might send an E-Mail message to everyone in the company it could include requests for usernames or passwords.
- Unfortunately, through the modus operandi of the Spear phishers, the E-Mail sender information has been faked or spoofed.
- While traditional Phishing scams are designed to steal information from individuals, Spear Phishing scams work to gain access to a company's entire computer system.
- It you respond with a username or password, or if you click on the links or open the attachments in a Spear Phishing E-Mail, pop-up window or website, then you might become a victim of ID theft and you might put your employer or group at risk.
- Spear Phishing also describes scams that target people who use a certain product or website.
- Scam artists use any information they can to personalize a Phishing scam to as specific a group as possible.
- Thus, "Spear Phishing is a targeted E-Mail attack that a scammer sends only to people within a small group, such as a company".
- The E-Mail message might appear to be genuine, but if you respond to it, you might put yourself and your employer at risk.
- You can help avoiding Spear Phishing scams by using some of the same techniques you have already used to help avoid standard Phishing scams

Whaling

- It is a Specific from of Phishing and/or Spear Phishing.
- Targeting executives from the top management in the organizations, in private companies.
- The objective is to swindle the executive into revealing confidential information.
- E-Mails sent here are designed to masquerade as a critical business E-Mail sent from a legitimate business authority.
- It has falsified industry wide concern and is meant to be tailored for executives.
- Whaling Phisher have forged official looking FBI subpoena E-mails. And claimed that manager needs to click a link and install special software to view subpoena.
- In 2008 FBI 20,000 corporate CEO were attacked. More than 2000 people clicked on the whaling link. Linked software was a keylogger that secretly recorded the CEO passwords and forwarded those passwords to the Phisher men.

Avoiding Spear Phishing Scams

1. Never reveal personal or financial information in a response to an E-Mail request, no matter who appears to have sent it.
2. If you receive an E-Mail message that appears suspicious, call the person or organization listed in the From line before you respond or open any attached files.
3. Never click links in an E-Mail message that requests personal or financial information. Enter the web address into your browser window instead
4. Report any E-Mail that you suspect might be a Spear Phishing campaign within your company.
5. You can use the phisher filter-it scans and helps identify suspicious websites, and provides up-to the hour updates and report about known phishing sites.

4.2.4. Types of Phishing Scams

Explain the different types of Phishing scams.
OR
Discuss various types of Phishing Scams. (10M)

1. **Deceptive Phishing→**
   - Phishing scams started by broadcasting deceptive E-Mail messages with objective of ID theft.
   - E-Mails are broadcasted to a wide group of netizens asking about the need to verify banking account information/system failure requiring users to re-enter their personal information.
   - The netizens easily get enticed and reveal their information by responding to these E-Mails and/or clicking on weblinks or signing onto a fake website designed by the phisher.
2. **Malware-based Phishing→**
   - It refers to scams that involve running Malicious Code on the netizens system.
   - Malware can be launched as an E-Mail attachment or as a downloadable file from a website or by exploiting known security vulnerabilities.
   - For example, small and medium businesses are always found to be ignorant to keep their operating systems (OS) antivirus software up to date with latest patch updates released by vendors.
3. **Keyloggers→**
   - A small integrity program to steal information sends to phisher, keylogger log, to the phisher through the Internet.
   - The keyloggers can also be embedded into netizen's browser as a small utility program which can start automatically when the browser is opened or can be embedded into system holes as device drivers.
4. **Session hijacking →**
   - It is an attack in which netizens' activities are monitored until they establish their bonafide credentials by signing into their account or begin the transaction and at that point the Malicious Code takes over and comport unauthorized actions such as *transferring funds without netizen's knowledge*.
5. **In-session Phishing→** another parallel session in the same browser.:
   - It is a Phishing attack based upon one web browsing session being able to detect the presence of another session (such as visit to an online banking website) on the same web browser and then a pop-up window is launched that pretends to be opened from the targeted session
6. **Web Trojans→**
   - Pops up to collect netizen's credentials and transmit them to the phisher while netizens are attempting to log in. Such pop-ups are usually invisible
7. **Pharming→** I
   - It is a new threat evolved with a goal to steal online identity of the netizens and Pharming
   - Is known as one of the "P" in cybercrime
   - In Pharming, following two techniques are used:
   - **Hosts file poisoning:**
   - The most popular operating system (OS) in the world is Windows and It has "host names" in their "hosts" file.

- A simple text file was used in web address during early days of the Internet. (before DNS)
- Phisher used to "poison" the host file to redirect the netizen to a fake/bogus Website, designed and developed by the phisher, which will "look alike the original website, to Steal the netizen's personal information easily.
- **DNS-based Phishing:**
- Phisher tampers with a DNS so that requests for URLs or name service return a fake address and subsequently netizens are directed to a fake site.
- Netizens usually are unaware that they are entering their personal confidential information in a website controlled by phishers and probably not even in the same country as the legitimate website.
- DNS-based Phishing is also known as DNS hijacking.
- Along with this attack Click Fraud is an advanced form of technique evolved to conduct Phishing scams.

8. System configuration attacks:

- Phisher intrude into netizens system to modify settings for malicious purposes.
- For example, URLs saved under favourites in the browser De modified to redirect the netizen to a fake/bogus "look alike" websites (i.e., URL for a of a bank can be changed from "www.xyzbank.com to www.xyzbanc.com.).

9. Data theft →

- Critical and confidential data getting stolen is one of the biggest concerns in the modern times.
- As more information resides on the corporate a servers and the web attackers have a boom time because taking away/copying information in electronic form is easy.
- Unsecured systems are often found to be inappropriately maintained from cybersecurity perspective.
- When such system is connected, the web servers can launch an attack with numerous methods and techniques. Data theft is used in business espionage.

10. Content injection Phishing:

- In these types of scams, phisher replaces the part of the content of a legitimate website with false content.

11. Man-in-the middle Phishing:

- Phisher is positioned himself in between the netizens and legitimate website or system.
- Phisher records the input being provided by the netizen but continues to pass it on to the web server so that netizens transactions are nor affected.

12. Search engine Phishing:

- It occurs when phishers create websites with attractive sounding offers (often found too good to be true) and have them indexed legitimately with search engines.
- Netizens find websites during their normal course of search for products or services and are trapped to reveal their personal information.
- For example, phishers set up fake/ bogus banking websites displaying an offer of lower credit costs or better interest rates than other banks offer of lower credit costs or better interest rates than other banks.

13. SSL certificate Phishing:

- Phishing is an advanced type of scam. Phishers target web servers with SSL certificates to create a duplicitous website with fraudulent webpages displaying familiar "lock" icon.
- It is important to note that, in such types of scams, SSL certificates are always found to be legitimate as they match the URL of the fake pages that are mimicking the target brands but in reality, had no connection to these brands displayed.
- It is difficult to recognize such websites; however, smart netizens can detect such deception after reviewing the certificate and/or whether the website has been secured with an extended validation SSL certificate.

Three P's of Cybercrime -Phishing, Pharming & Phoraging

- **Pharming:** It is an attack aiming to redirect a website traffic to another bogus websites.
- Pharming is a neologism based on farming + Phishing.
- Concern for businesses hosting E-Commerce and Online banking websites.
- Here attacker cracks vulnerability in an ISP, DNS server and hijacks the domain name of a commercial site.
- **Phoraging:** It is defined as a process of collecting data from many different online sources to build up the identity of someone with the ultimate aim of committing the identity theft.
- It is information diving-searching for information.
- Now a days looking for matrimonial sites, social networking sites for professional to reveal personal information.
- **Advanced Form of Phishing- Tabnapping or Tabjacking**
- Tabs are web browser tabs.
- Browser Tabs that are not in use are called as napping.
- Most often netizens work with multiple tabs, open with multiple web browsing sessions on each one. Its takes hour together time.
- Phishers have identified a way to invade the browser tabs and change it to a page designed to steal information.
- If a page is ideal for a particular time period, and then phisher redirects the victim to a phished webpage.
- Phisher judge the idle webpages based on mouse movement, scroll bar movement and keystrokes.
- Websites from banking/financial institutes as well as popular sites like Gmail, Facebook, Instagram, WhatsApp are the primary targets.

DNS Hijacking (session hijacking)

- **DNS Hijacking:** It is also known as DNS redirection and it is the practice of redirecting the resolution of Domain Name Server (DNS) names to rogue DNS servers.
- An illegal change to a DNS server directs URL to a different website.
- In some cases, new websites URL may have done one different letter in the name that might go unnoticed. The bogus website might offer similar and/or competing products for sale.
- DNS is used to interpret domain names such as www. <domainname>.com into an IP address. The IP address consists of numbers such as xxx.xx.xxx.x (192.60.168.1) that give a domain a unique identification

- It is used by attacker with malicious intent who redirect or hijack the DNS addresses to bogus DNS servers for the purpose of injecting malware into your PC, Promoting Phishing scams, advertising on high traffic website and other criminal related activity.
- DNS hijacker use Trojan to exchange the legitimate DNS server assignment by the ISP with a manual DNS server assignment from a bogus DNS server.
- When netizens visit the reputable websites with legitimate domain names, they are automatically hijacked to a malicious website that is disguised as the legitimate one.
- Switch from the legitimate DNS server to bogus DNS server goes unnoticed by both the netizens and the legitimate website owner.
- This opens up the malicious website to perform any criminal act that the phisher wishes because the netizens thinks that they are in the real website.

Click Fraud (session hijacking)

- It is a type of Internet crime that occurs in pay-per-click online advertising when a person automated script or computer program imitates a legitimate user of a web browser clicking on an advertisement (ad) for the purpose of generating a charge per click without having actual interest in the target of the ad's link.
- Click Fraud is the subject of some controversy and increasing litigation because of the advertising networks being a key beneficiary of the fraud.
- It is an illegal practice that occurs when individuals click on a website click through advertisements to increase the payable number of clicks.
- Illegal click can be performed by clicking the Advertising hyperlinks or by using automated software or online Bots that are programmed to click these banner ads and pay per click text ad links.
- Research has indicated that Click Fraud is perpetrated by individuals who use Click Fraud to increase their own personal banner ad revenues and also by companies who use Click Fraud as a way to deplete a competitor's advertising budget.
- Visit the weblinks mentioned below to explore more on Click Fraud:
- 1. Exposing Click Fraud: http://news.cnet.com/Exposing-click-fraud/2100-1024 3-5273078
- 2.The dark side of online advertising. http://www.businessweek.com/magazine/content/06_40/b4003001.html

SEO (Search Engine Optimization) Attacks Beware While Searching through Search Engines

- SEO is the practice of maximizing the volume or quality of traffic to a website from search engines Techniques used for Black hat SEO attacks
- Techniques used for Black hat SEO attacks

1. Fake antivirus
2. SEO page
3. SEO poisoning
4. Black hat SEO kits

Distributed Phishing Attack (DPA)

- It is an advanced form of Phishing attack that works as per victim's personalization of the location of sites collecting credentials and a covert transmission of credential to a hidden coordination centre run by the phisher.
- Here a large number of fraudulent web hosts are used for each set of lured E-Mails.

4.2.5 Phishing toolkits and Spy phishing

Explain Phishing Toolkits with examples.

A Phishing toolkit is a set of scripts/programs that allows a phisher to automatically set up Phishing websites that spoof the legitimate websites of different brands including the graphics displayed on these websites.

These developed by individual or groups and sold for money.

Phisher use hypertext pre-processor (PHP) to develop the phishing kits.

These are Do-It Yourself Phishing kits-information sent to recipients other than the authors of Phishing kits) other than the intended users.

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- These are Do-It Yourself Phishing kits-information sent to recipients other than the authors of Phishing kits) other than the intended users.
- Rock Phish: It is a Phishing toolkit popular in the hacking community since 2005. It allows non-techies to launch Phishing attacks.
- The kit allows a single website with multiple DNS name to host a variety of phished webpages, covering numerous organizations and institutes
- Xrenoder Traojan Spyware: It resets the homepage and/or the search settings to point to other websites usually for commercial purposes or porn traffic.
- Cpanel Google: It is a Trojan Spyware that modifies the DNS entry in the host's file to point to its own website.
- If Google gets redirected to its website, a netizen may end up having a version of a website prepared by the phisher.

4.2.6 Phishing countermeasures

What are countermeasures to prevent malicious attacks. (06M)

1. The countermeasures will prevent malicious attacks that phisher may target to gain the unauthorized access to the system to steal the relevant personal information about the victim, from the system.
2. It is always challenging to recognize/Judge the legitimacy of a website while Googling (i.e., surfing on the Internet) and find it more intriguing while downloading any attachment from that particular website.

3. explained in Table 4.1
4. Table 4.1 How to avoid being victim of Phishing attack

SL. NO.	Security Measures
1	Keep antivirus up to date
2	Do not click on hyperlinks in E-Mails
3	Take advantage of anti-Spam software
4	Verify https (SSL)[secure Socket layer]
	Use anti-Spyware software
6	Get educated
7	Use the Microsoft Baseline Security Analyzer (MBSA)
8	Firewall
9	Use backup system images
10	Do not enter sensitive or financial information into pop-up windows
11	Secure the hosts file
12	Protect against DNS Pharming attacks

How to Judge/Recognize Legitimate Websites

- ScanSafe (www.scansafe.com) was the first company in the world to after web security. Scandoo (www.Scandoo.com) scans all search results' to protect the user from visiting false websites (i.e., websites that spread malicious viruses or Spyware as well as protecting the user from viewing offensive content).
- Presently this Site is nor available as improvements for add-on features based on users' feedback is underway.
- MCAfee Site Advisor software (www.siteddvisor.com) is a free web security plug-in that provides the user with red, yellow and green website security ratings based on the search results.
- These ratings are based on tests conducted by McAfee after looking for all kinds of threats such as to name a few Phishing sites, E-Commerce vulnerabilities, browser exploits, etc.

SPS (Sanitizing Proxy System) Algorithm to Thwart Phishing Attacks

- Phishing attack comprised two phases: a) attraction and b) acquisition
- Characteristics of SPS:

1. Two-level filtering
2. Flexibility of the rule set

3. Simplicity of the filtering algorithm
4. Accountability of HTTP response sanitizing
5. Robustness against both misbehavior of novice users and evasion techniques

Explain the flowchart of Phishing attacks.

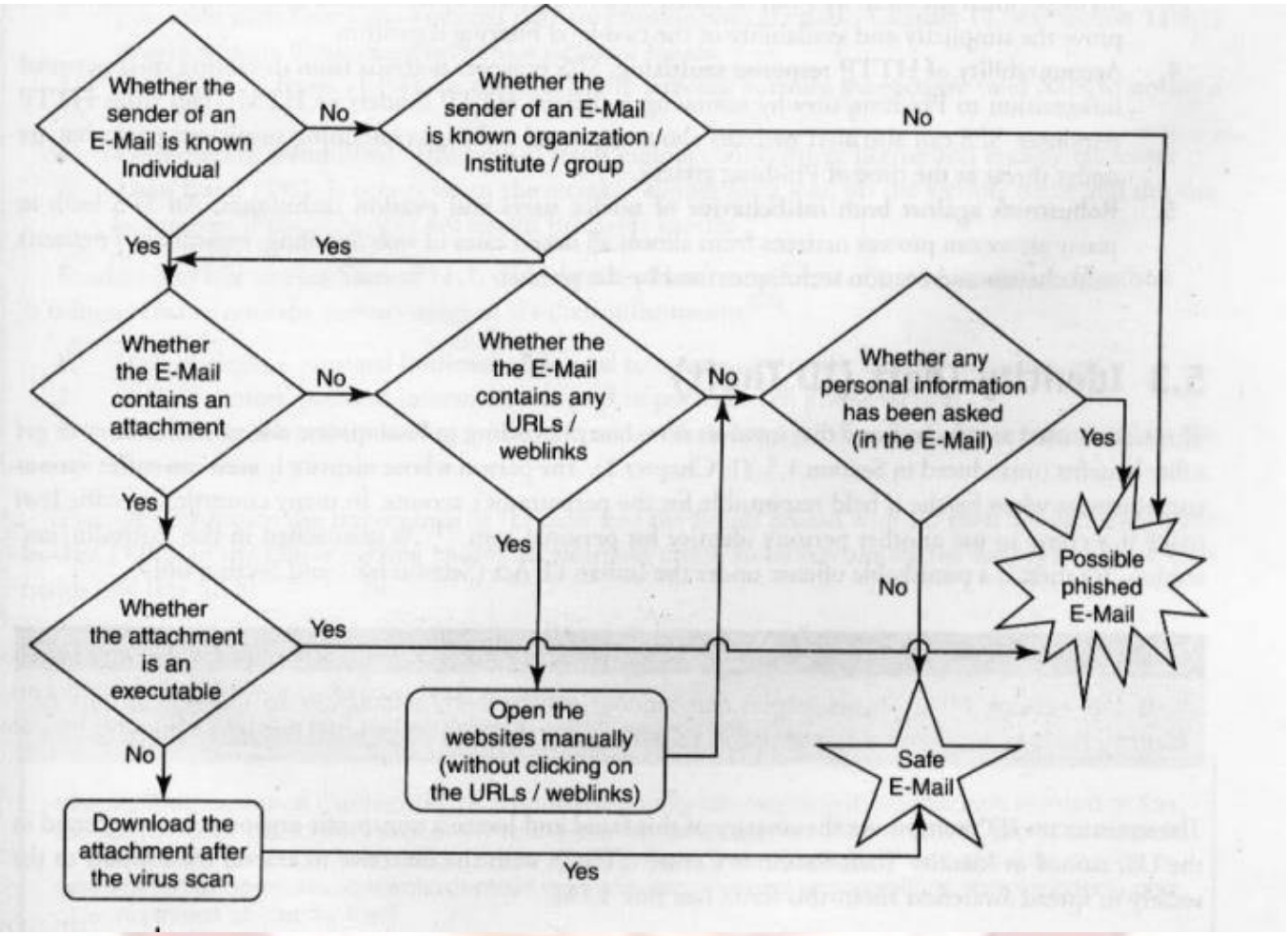

Fig: Phishing Attack flow chart

4.3 Identity Theft

What is identity theft? Explain with examples. (08M)
How can information be classified? (06M)
What are the different techniques of Identity theft?(08M)

- It happens when someone uses your personally identifying information. Like your name, social security number, or credit card number, without your permission to commit fraud or other crimes.

- OR
- This term is used to refer to fraud that involves someone pretending to be someone else to steal money or get other benefits.
- ID theft is a punishable offense under the Indian IT Act (Section 66C and Section 60D)
- The statistics on ID theft proves the severity of this fraud and hence a non-profit organization was found in the US, named as Identity Theft Resource Center (ITRC), with the objective to extend the society to spread awareness about this fraud

FTC→ Mentioned the Prime Frauds

- Credit card fraud (26%): The highest rated fraud that can occur is when someone acquires the victims credit card number and uses it to make a purchase.
- Bank fraud (17%): Besides credit card fraud, cheque theft and Automatic Teller Machines (ATM) pass code theft have been reported that are possible with ID theft.
- Employment fraud (12%): In this fraud, the attacker borrows the victim's valid SSN to obtain a
- job.
- Government fraud (9%): This type of fraud includes SSN, driver license and income tax fraud.
- Loan fraud (5%): It occurs when the attacker applies for a loan on the victim's name and this can
- Occur even if the SSN does not match the name exactly.

Identity Theft Information

- 66% of victim's personal information is used to open a new credit account in their name.
- 28% of victim's personal information is used to purchase cell phone service.
- 12% of victims end up having warrants issued in their name for financial crimes committed by the identity thief.

Identity Theft Resource Center (ITRC)

- Identity Theft Resource Center (ITRC) is a non-profit, nationally respected organization situated at San Diego, CA USA dedicated exclusively to the prevention of identity theft.
- The ITRC provides support to the society for public education about identity theft.
- The organization also provides advice to governmental agencies, law enforcement agencies and business organizations about evolving and growing threat of identity theft.

Myth	Fact
There's no way to protect yourself from identity theft	The risk of identity theft can be minimized by taking preventive measures.
Identity theft is only a financial crime	Other identity theft also available and are dangerous, medical ID theft of Personal medical record, for false insurance claims.
It's my bank's fault if I become a victim of identity theft	Majority identity theft begins elsewhere, PI may be stolen from lost or stolen wallet, check book, credit or debit card (low tech tool) High tech tool, hacking, Phishing, skimming)
It is safe to give your personal information over the phone if your caller ID confirms that it is your bank	Caller ID Spoofing can be done, don't give any information to any one.
Checking your credit report periodically or using a credit monitoring service is all you need to do to protect yourself from identity theft.	One can get free credit report in the US from each of the credit bureaus from www.AnnualCreditReport.com
My personal contact information (mailing address, telephone number, E-Mail address, etc.) is not valuable to an identity thief.	Any information that could be used by a thief to impersonate you should be protected.
Shredding my mail and other personal documents will keep me safe.	Shredding documents that contain personal information before you throw them away is a great way to protect yourself from "dumpster diving," which occurs when attackers search the trash for personal information.
I don't use the Internet, so my personal information is not exposed online.	Your personal information appears in more places than you might realize whether its your medical records, a job application or a school emergency contact form. Many of these records are kept in electronic databases and transmitted online.
Social networking is safe.	They can be dangerous when it comes to your identity..

	privacy controls offered by most of these sites, and use common sense.
It is not safe to shop or bank online	Like social networking, shopping and banking online are safe as long as you use common sense and make good choices about where and how you do it. Observe the webpage is legitimate.

4.3.1. Personally Identifiable Information (PII)

The fraudster always has an eye on the information which can be used to uniquely identify, contact or locate a single person or can be used with other sources to uniquely identity a single individual. PII has four common variants based on personal, personally, identifiable and identifying.

The fraudsters attempts to steal the elements mentioned below, which can express the purpose of distinguishing individual identity :

1. Full name,
2. National identification number (e.g., SSN
3. Telephone num
4. driver's license number;
5. credit card numbers;
6. digital identity (e.g., E-Mail address, online account ID and password);
7. birth date/birth day;
8. birthplace;
9. face and fingerprints.

Identify an Individual.

- 1. First or last name;
- 2. age;
- 3. country, state or city of residence;
- 4. gender;
- 5. name of the school/college/workplace
- 6. job position, grades and/or salary;
- 7. criminal record.

Classification of Information can be of two types namely:

Non-classified information

1. Public information (public record)
2. Personal information (addresses, telephone numbers, E-mail addresses)
3. Routine business information
4. Private Information (SSN, credit card numbers and other financial information.

5. Confidential business information (sales plans, patentable innovation, new product plans)

Classified information

- **Confidential**→ Information about strength of armed forces and Technical Information about weapons
- **Secret** →National security policy, military plans or Intelligence operations
- **Top Secret**→ Damage national security, vital defence plans and cryptographic Intelligence system

4.3.2 Types of Identity Theft

What are the different types of Identity theft?

- 1. Financial Identity Theft
- 2. Criminal Identity Theft
- 3. Identity Cloning
- 4. Business Identity Theft
- 5. Medical Identity Theft
- 6. Synthetic Identity Theft
- 7. Child Identity Theft

Financial Identity Theft

- In total, 25 types of financial ID thefts are investigated by the US Secret Service.
- Financial identity occurs when a fraudster makes a use of someone else's identifying details, such as name, SSN and bank account details, to commit fraud that is detrimental to a victims finances.

Criminal Identity Theft

- It involves taking over someone else's identity to commit a crime such as enter into a country, get special Permits, hide one's own identity or commit acts of terrorism. These criminal activities can include:
- 1 Computer and cybercrimes;
- 2. organized crime;
- 3. drug traffickings
- alien smugglings
- 5. money laundering.

Identity Cloning

- Identity cloning may be the scariest variation of all ID theft.

- Instead of stealing the personal information for financial gain or committing crimes in the victims name, identity clones compromise the victims life by actually living and working as the victim.
- ID clones may even pay bills regularly, get engaged and married, and start a family.
- In summary, identity cloning is the act of a fraudster living a natural and usual life similar to a victim's life, may be at a different location.

Business Identity Theft

- Bust-out" is one of the schemes fraudsters use to steal business identity; it is paid less importance n
- parison with individual's ID theft
- A fraudster rents a space in the same building as victims office
- A fraudster rents a space in the same building as victims office
- Hence, it is extremely important to protect business sensitive information (BSI) to avoid any further scams.

Medical Identity Theft

- India is known for medical tourism.
- Thousands of tourists visit India every year, getting their medical problems attended (surgeries, total health check-up Kerala massage etc.,)
- Because of Good Quality and Reasonable in Price in medical services.
- protected health information (PHI).
- The stolen information can be used by the fraudster or sold in the black market to people who "need them.

Synthetic Identity Theft

- This is an advanced form of ID theft in the ID theft world.
- The fraudster will take parts of personal information from many victims and combine them.
- The new identity is not any specific person, but all the victims can be affected when it is used.

Child Identity Theft

- Parents might sometimes steal their children's identity to open credit card accounts, utility accounts, bank accounts and even to take out loans or secure leases because their own credit history is insufficient or too damaged to open such accounts.

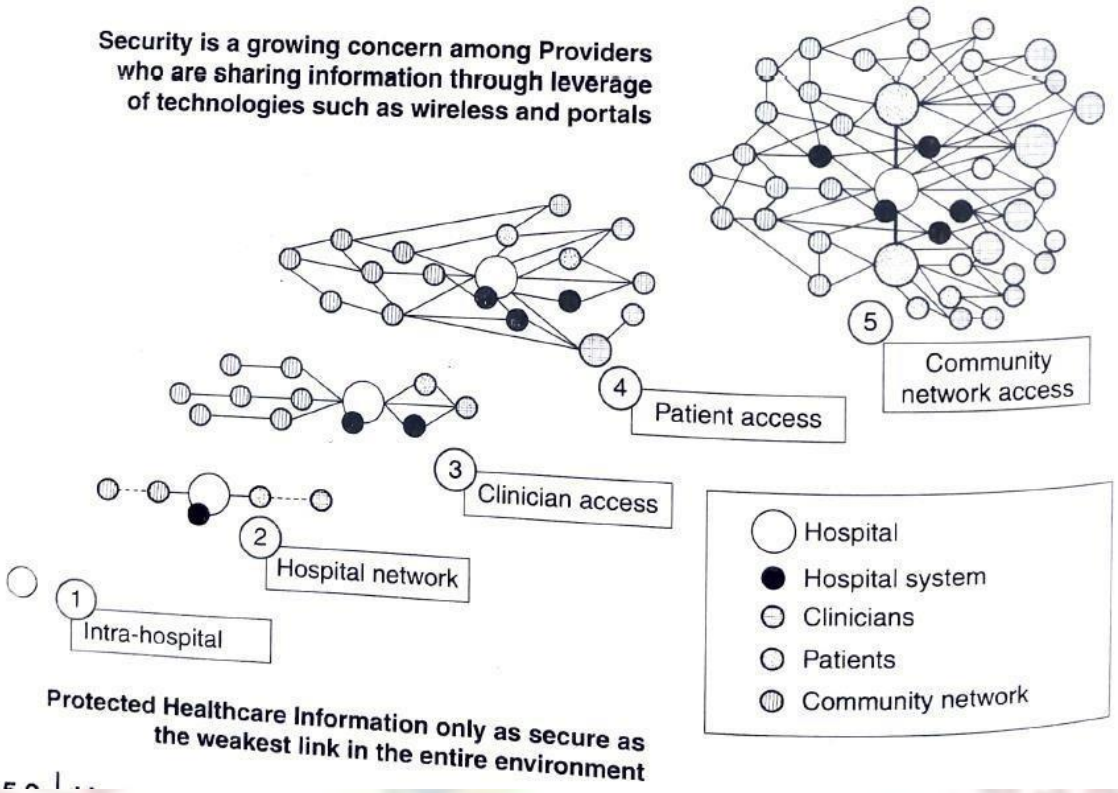

Fig. Medical domain interconnected entities

4.3.3 Techniques of ID Theft

Human-based methods

- **Direct access to information:** People who have earned a certain degree of trust (ex., house cleaners, babysitters, nurse, friends or roommates) can obtain legitimate access to a business or residence to steal information.
- **Dumpster diving:**
- Retrieving documents from trash bins is very common and is called dumpster diving.
- **Theft of a purse or wallet:** Wallet often contains bank credit cards, debit cards, driving licence medical insurance identity card and what not.
- Pickpockets work on the street as well as in public transport and exercise rooms to steal the wallets and in turn sell the personal information.
- **Mail theft and rerouting:**
- It is easy to steal the postal mails from mailboxes, which has poor security mechanism and all the documents available to the fraudster are free of charge, for example, Bank Mail (credit cards and account statements), administrative forms or partially completed credit offers.
- The fraudster can use your name and other information that may prove to be harmful for an individual in the near future.
- Therefore, return items to the sender or request a change of address.

- **Shoulder surfing:** People who loiter around in the public facilities such as in the cybercafes, near ATMs and telephone booths can keep an eye to grab the personal details.
- **False or disguised ATM (skimming"):** Just as it is possible to imitate a bank ATM, it is also possible to install miniaturized equipment on a valid ATM.
- This equipment (a copier) captures the card information, using which, duplicate card can be made and personal identification number (PIN) can be obtained by stealing the camera films.
- **Dishonest or mistreated employees:** An employee or partner with access to the personal files, salary information, insurance files or bank information can gather all sorts of confidential information and can use it to provide sufficient damage.
- **Telemarketing and fake telephone calls:** This is an effective method for collecting information from unsuspecting people. The caller who makes a "cold call" (supposedly from a bank) asks the victim to verify account information immediately on the phone, often without m explanation or verification. This attack is known as Vishing.

Computer-based technique

These techniques are attempts made by the attacker to exploit the vulnerabilities within existing processes and/or systems.

- **Backup theft:** In addition to stealing equipment from private buildings, attackers also strike public facilities such as transport areas, hotels and recreation centres. They carefully analyse stolen equipment or backups to recover the data.

- **Hacking unauthorized access to systems and database theft:** Besides stealing the equipment and/or hardware criminals attempt to compromise information systems with various tools, techniques and methods to gain unauthorized access to download the required information.
- **Phishing:** It is an attack that attempts to steal money or identity by getting victim to reveal personal information.
- **Pharming:** It is a scamming practice in which malicious code is installed on a personal computer or server misdirecting users to fraudulent websites without their knowledge or consent. User will input information unknowingly.

4.3.4 Identity Theft: Countermeasures

How to prevent being a victim of Identity theft?

- Identity Theft is growing day-by-day
- We need to keep the credit card and PIN safely
- Always Vigilant and take optimum care towards protecting the self-identity

SL. NO	Security Measures
1	Monitor your credit closely
2	Keep records of your financial data and transactions
3	Install security software
4	Use an updated Web browser
5	Be wary of E-Mail attachments and links in both E-Mail and instant messages.
6	Store sensitive data securely
7	Shred documents
8	Protect your PII
9	Stay alert to the latest scams

4.3.5 How to Efface Your Online Identity

- Protect identity is important for netizens, by erasing the footprint on the internet.

SL.NO	How to protect/efface your online identity
1	www.giantmatrix.com
2	www.privacyeraser.com
3	www.reputationdetender.com
4	www.suicidemachine.org
5	www.seppukoo.comm

Question Bank

Subject: Introduction to Cyber Security **Class:** AI and ML/AIDS/CSD

Subject code: BETCK105I/205I **Faculty:** Mrs. Jyothi R

Course Outcomes

CO1: Interpret the cybercrime terminologies
CO2: Analyze Cyber offenses and Botnets
CO3: Illustrate Tools and Methods used on Cybercrime
CO4: Analyze Phishing and Identity Theft
CO5: Justify the need of computer forensics

Module 4: Phishing and Identity Theft: Introduction, methods of phishing, phishing, phishing techniques, spear phishing, types of phishing scams, phishing toolkits and spy phishing, counter measures, Identity Theft Textbook:1 Chapter 5 (5.1. to 5.3)

Sl. No.	Questions	CO	BT
1	Explain the functions of Anti-phishing Working Group	CO4	L2
2	Explain the statistics that prove phishing is a dangerous enemy among all the methods/techniques.	CO4	L2
3	What is Phishing? Explain with examples.	CO4	L2
4	a). Define the term Phishing with respect to Wikipedia, Webopedia and TechEncyclopedia. b). Differentiate between Spam and Hoax mails	CO4	L2
5	i). What are the different methods of Phishing attacks? Explain in details. OR Explain four types of methods used by the phishers to reveal personal information on Internet ii) Explain the following attack against the legitimate website. a) Website Spoofing b) XSS-Cross site Scripting c) XSRF- Cross scripting Request Forgery	CO4	L2
6	Discuss the different Phishing techniques? OR Discuss the various techniques used by Phishers to launch Phishing attacks	CO4	L2
7	What is spear Phishing? Explain with examples.	CO4	L2
8	What is Whaling? Explain the difference between Whaling and Spear Phishing	CO4	L2
9	Explain the different types of Phishing scams. OR Discuss various types of Phishing Scams.	CO4	L2
10	Explain Phishing Toolkits with examples.	CO4	L2
11	What are countermeasures to prevent malicious attacks	CO4	L3
12	Explain the flowchart of Phishing attacks.	CO4	L2
13	What is identity theft? Explain with examples.	CO4	L2

14	How can information be classified	CO4	L2
15	What are the different techniques of Identity theft?	CO4	L2
16	What are the different types of Identity theft?	CO4	L2
17	How to prevent being a victim of Identity theft?	CO4	L2