Unit-IV

- **Cyber Security: Organizational Implications**
- **Cyber Crime and Cyber Terrorism**

Topics to be discussed

- **Part - 1 Organizational Implications**
1. Introduction
2. cost of cybercrimes and IPR issues
3. web threats for organizations
4. security and privacy implications
5. social media marketing: security risks and perils for organization

- **Part – 2 Cybercrime and Cyber terrorism:**
6. intellectual property in the cyberspace
7. the ethical dimension of cybercrimes
8. mindset and skills of hackers and other cyber criminals

1. Introduction

- Cyber attacks can occur from sources such that local, remote, domestic or foreign

- Attacks can be launched by an individual or a group of people.

- For example-

    -case of fraudulent, withdrawal of money from banks through online banking

- There are number of security breaches like Records Compromised, Data breaches due to insiders

- *Security Breach* is defined as unauthorized acquisition of data that compromises

    -security, confidentiality and integrity of **PI (***personal information***)** maintained by any organization.

1. Introduction (cont..)

- What is an insider threat?
- "the misuse or destruction of sensitive or confidential information, as well as IT equipment that houses this data by employees, contractors and other "trusted" individuals."
- **There are 3 types of insiders**
  - -A malicious insider
  - -A careless insider
  - -A tricked insider
- Cybercrimes do not happen on their own or in isolation. They take place due to weakness of cyber security practices and "privacy" which may get impacted when cybercrime happens.

4 Key dimensions of Privacy
1. **Information/data privacy**
2. **Personal Privacy**
3. **Communication privacy**
4. **Territorial privacy**

1. Introduction (cont..)

Key challenges from emerging new information threats to organizations

- Industrial espionage

- IP-Based Blocking

- IP-Based "cloaking"- process of a web server delivering a specific web page based on the visitors IP address

- Cyberterrorism

- Confidential Information Leakage

Introduction- Security Threats- Paradigm Shift
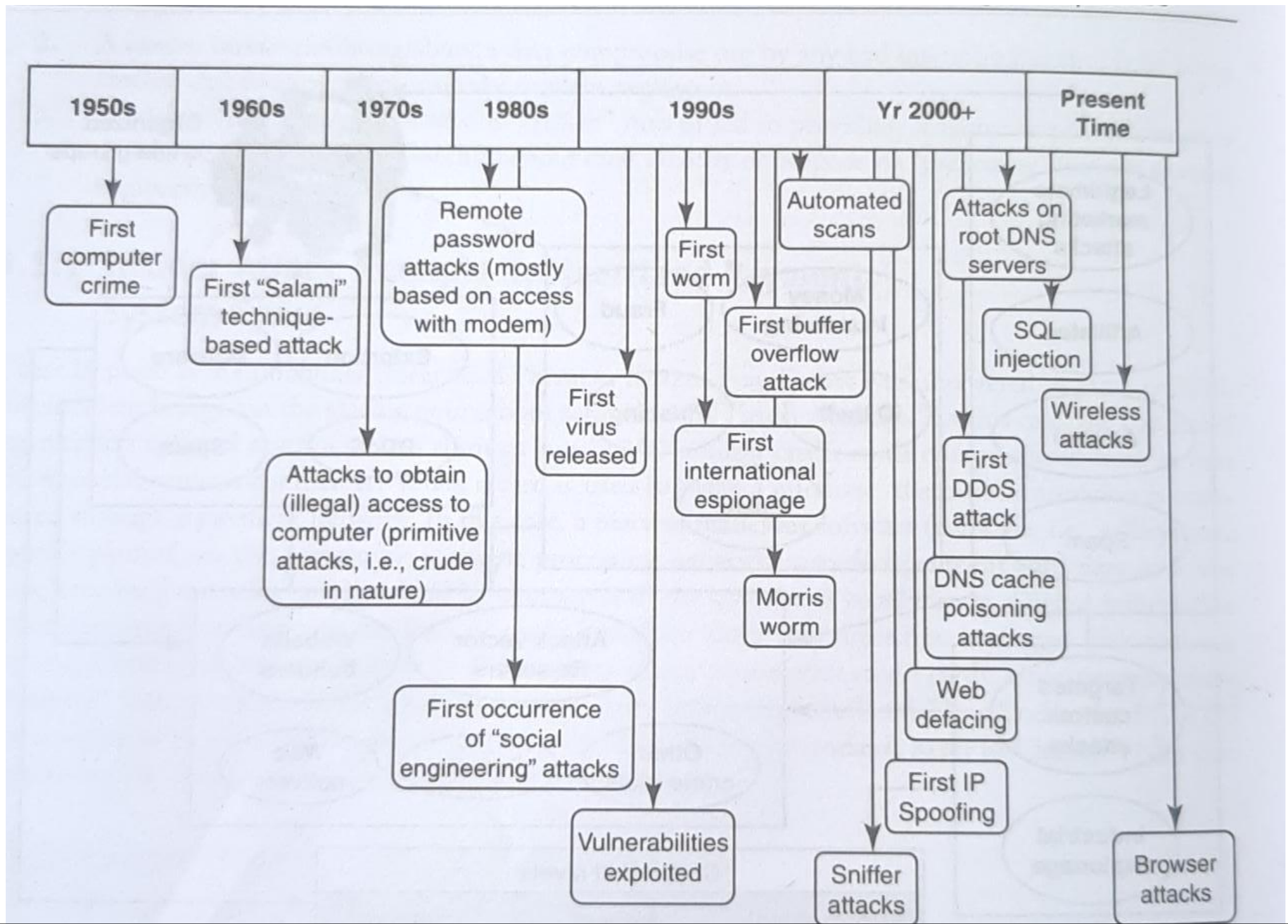
2. Cost of Cybercrimes and IPR Issues: Lessons for Organization
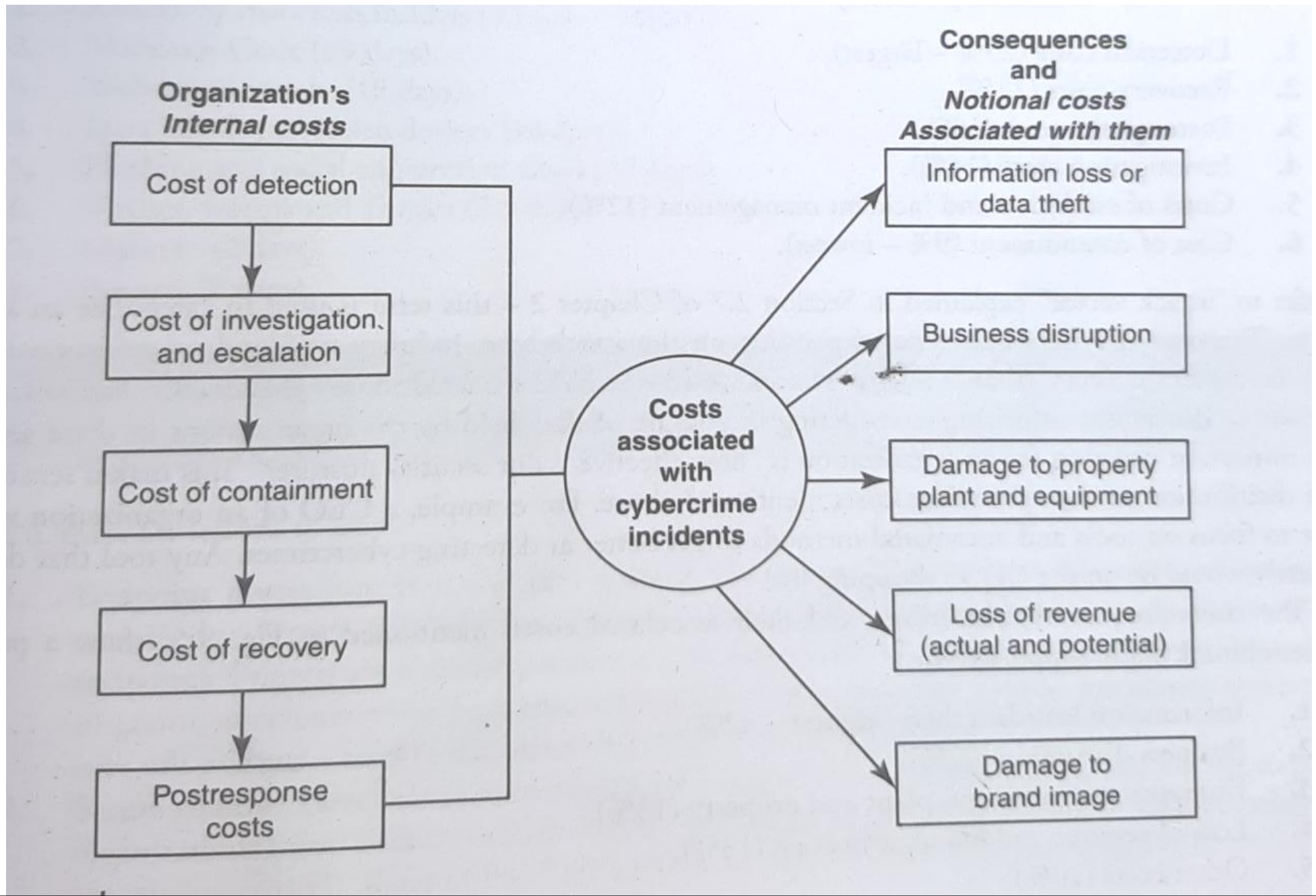
Internal Costs Associated with Cybersecurity Incidents

1. Detection Cost (25%-largest)
2. Recovery cost (21%)
3. Post response cost (19%)
4. Investigation cost (14%)
5. Cost of escalation and incident management (12%)
6. Cost of containment (9%)

Consequences of cybercrimes and their associated cost

1. Information loss (highest - 42%)
2. Business disruption (22%)
3. Damages to equipment, plant and property (13%)
4. Loss of revenue and brand tarnishing (13%)
5. Other costs (10%)

Lessons to learn From different types of attacks on any organization

1. **Endpoint protection-** end devices security

2. **Secure coding-** protecting from malicious code

3. **HR check-** checking personnel background

4. **Access control-** Implant access privileges and controls

   for accessing confidential data

5. **Importance of security governance-** policies,

   procedures and their effective implementation

# Organizational Implications of software piracy

- Software piracy is a major threat to any organization.

- It leads to an attack due to unresolved security leaks in the existing software.

- Security patches are required for keeping a device safe.

Most of the times employees use the pirated versions of software because

1. They are cheaper and more readily available.

2. Many other people uses the pirated software anyways.

3. Latest versions are available faster when pirated software is used.

3. Web threats for Organizations: The Evils and Perils

1. Employee **time wasted** on Internet surfing

2. Enforcing **policy usage** in the organization

    i.   Statement of policy by senior management

    ii. Organizational policies

    iii. Functional Policies

    iv. Mandatory standards (Baseline)

    v.   Recommended standards

    vi. Detailed procedures
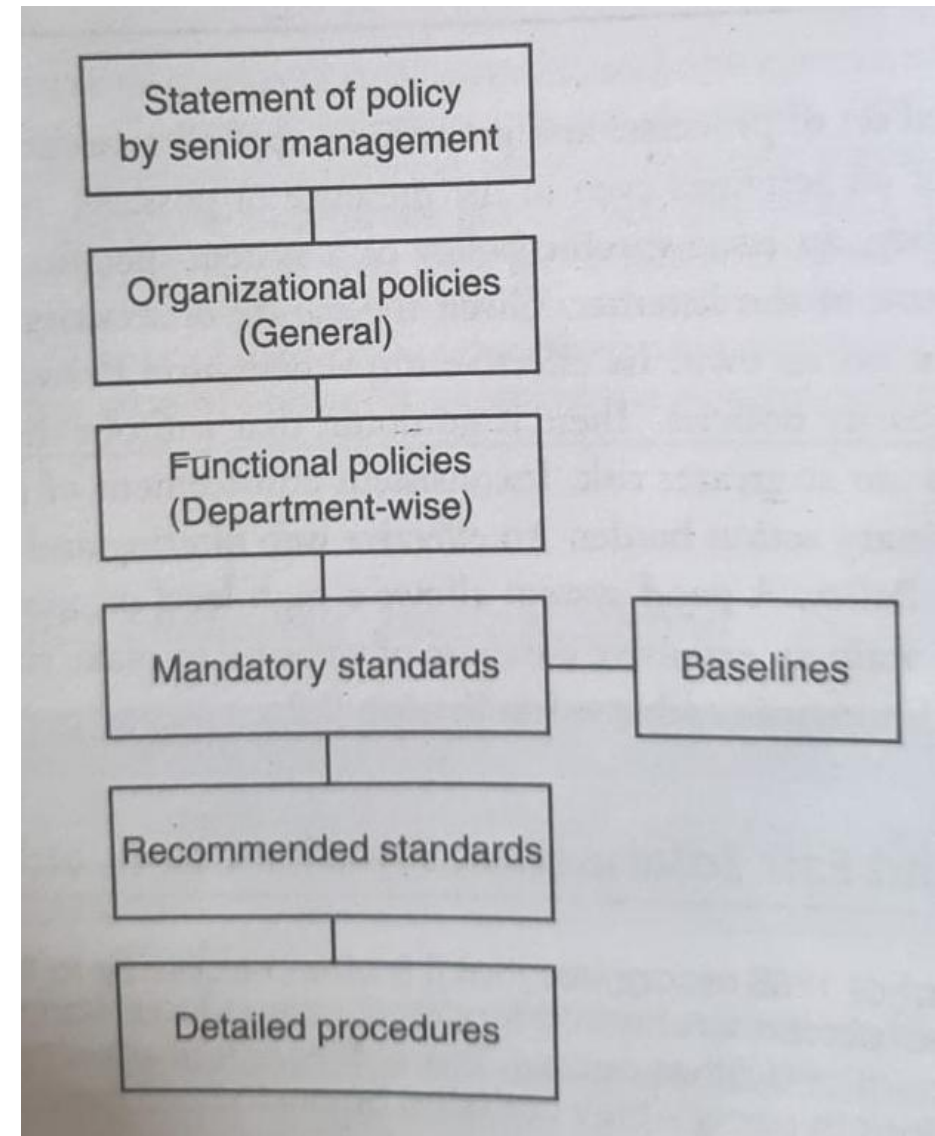
3. Web threats for Organizations: The Evils and Perils (Contd..)

3. Monitoring and **controlling employees' internet surfing**

4. **Keeping security patches** and virus signatures up to date

5. **Surviving** in the era of legal risks

6. **Bandwidth wastage issues**

7. **Mobile worker** pose **security** challenges

8. **Challenges in controlling access** to web applications

9. The **bane of malware**

10. The **need for protecting multiple offices** and locations

4. Security and Privacy Implications from Cloud Computing

- If you store the data in the cloud, how the vendor will encrypt the data?

- Who will own the liability in case of data breach?

- What about user authentication?

User Sphere

Data is stored on user's desktops, laptops, mobile phones, RFID chips etc.

Vendor's responsibility is to provid e access to this data and to monitor that no misuse occurs.

Top challenges are:

- What data is transferred from client to a data recipient?

- Is the use involved in the transfer?

-Is the user aware of remote and or local application storing data on his system?

Recipient Sphere

Data lies with recipients: servers and databases of network providers, service providers or other parties with whom data recipient shares the data.

Organization has to minimize the privacy risk by ensuring unwanted exposure of personal data not to happen.

Top Challenges:

- What data is being shred by data recipient with other parties?

- Is personal data is properly secured?

-Are there any secondary use of data that may not be foreseen by the user?

Joint Sphere

Data lies with web service provider's servers and databases. This is the in-between sphere where it is not clear to whom does the data belong: to the users (data owners / data senders) or to the recipient.

Top Challenge:

- Is the user fully aware of his/her data is used and can he/she control this?

5. Social Media Marketing: Security risks and Perils for Organizations

1. Facebook is used by 37% of the organizations

2. Linkdin is used by 36% of the organizations

3. Twitter is used by 36% of the organizations

4. YouTube is used by 22% of the organizations

5. MySpace is used by 6% of the organizations

6. Understanding Social Media Marketing

Following are the **reasons to promote the social media** marketing

1. To reach larger target audience

2. To **increase traffic to their website** coming from other social media websites by using Blogs and social/business networking

3. To **reap other potential revenue benefits** and to minimize advertising costs.

4. To build credibility by participating in relevant product promotion forums and responding to potential customers' questions immediately.

5. To collect potential customer profiles.

Some other tools

- Twitter is used with higher priority to reach out to maximum marketers in the technology space and monitor the space.

- LinkedIn is used to connect with and create a community of top executives.

- Facebook as the social group or social community tool to drive more traffic to spread awareness about websense.

- Wikipedia is used for brand building and driving traffic.

Best Practices for Social Media Marketing

- Organization-wide information system security policy

- Configuration/change control and management

- Risk assessment and management

- Standardized software configuration that satisfy the information system security policy

- Security awareness and training

- Contingency planning, continuity of operations and disaster recovery planning

- Certification and accreditation

Social computing and the associated challenges for organizations

- Social networking, Social media marketing and social computing are not unrelated concepts.

- Due to readily available information people will stop questioning the reliability and authentication of the information.

INTELLECTUAL PROPERTY IN CYBERSPACE

INTELLECTUAL PROPERTY

- In common use, property is simply 'one's own thing' and refers to the relationship between individuals and the objects which they see as being their own to dispense with as they see fit.

- Property is often conceptualized as the rights of 'ownership' as defined in law

- *Private property* is that which belongs to an individual;

- *Public property* is that which belongs to a community collectively or a State.

- The term *intellectual property* reflects the idea that this subject matter is the product of the mind or the intellect, and that intellectual property rights may be protected at law in the same way as any other form of property.

- Intellectual property laws are territorial such that the registration or enforcement of IP rights must be pursued separately in each jurisdiction of interest.

- There are various kinds of tools of protection that come under the umbrella term 'intellectual property'.

Important among intellectual property tools are the following:

1. Copyrights

2. Trademarks

3. Patents

4. Geographical Indications

5. Layout Designs of Integrated Circuits

6. Trade Secrets

7. Industrial Designs

Copyright (Basic Concept)

☐ Copyright is a right given by law to the creators of literary, dramatic, musical and artistic works and producers of cinematograph films and sound recordings to do or authorize the doing of certain acts with regard to their creations.

☐ It is a kind of protection against unauthorized use or misuse of a work, but for a limited duration.

☐ Generally the rights include the rights of authorship, reproduction, distribution, communication to the public, broadcasting, adaptation and translation.

☐ In India, copyright is governed by the Copyright Act-1957, the Copyright Rules-1958 and the International Copyright Order-1999.

➤ Copyright Act provides the basic law so far as copyrights are concerned,

➤ Copyright Rules contain the rules and regulations as well as various procedures

➤ International Copyright Order extends copyright protection to works of nationals of specified foreign countries.
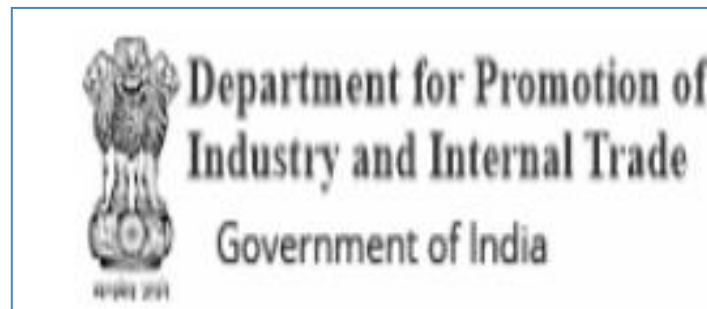
Rights Included in the term 'Copyright'

☐ Copyright is a bundle of rights and this bundle can be broadly classified into two categories, viz.

1. economic rights

2. moral rights.

Economic rights allow right owners to derive financial reward from the use of their works by others.

Moral rights allow authors and creators to take certain actions to preserve and protect their link with their work.

Copyright → Economic rights

☐ Economic rights→ Within the limitations set by the copyright

law the owner of the copyright may make all public use of the

work conditional on payment of remuneration.

(a) Right of Reproduction

(b) Right to Issue Copies of a Work

(c) Rights of Public Performance

(d) Right of Communication to the Public

(e) Adaptation Right

(f) Translation Right

Copyright→ Moral rights

According to Berne Convention, requires its members to grant authors the following rights:

1. the right of **attribution of authorship**;

2. the **right against false attribution** of authorship; and.

3. the right of **integrity of authorship** (i.e. the right to keep your work free from derogatory treatment).

Moral rights are only accorded to individual authors and in many national laws they remain with the authors even after the authors have transferred their economic rights.

Infringement of Copyright and Remedies There of

Any copying or duplication, adaptation, translation, public performance, communication to the public or broadcast done without the authorization of the copyright owner, or even where any work has been licensed or assigned, any violation of the conditions of the licence or assignment constitutes copyright infringement.

Limitations/Exceptions to Copyright

□ The rights granted by copyright are exclusive in nature. This exclusivity is sometimes criticised as monopoly in favour of the right owners. Therefore, in order to balance these opposing private and public interests the legislature provides the remedy in the form of drawing limitations/exceptions to copyright.

Limitations/Exceptions to Copyright Law

✓Exceptions allow for the use of a work without requesting permission from the copyright holder and potentially paying fees.

✓ 3 major exceptions to the copyright law that are commonly used by educators:
1. **fair use,**
2. **face-to-face instruction, and**
3. **virtual instruction**.

Fair use : Allows limited use of copyrighted material without permission from the copyright holder for purposes such as **criticism, parody, news reporting, research and scholarship, and teaching**.

Registration of Copyright

- The Copyright Act provides for registration of works. However, the registration under the Act is voluntary and not obligatory.

International Nature of Copyright Protection

- Copyrights are national in nature.
  - This means that your rights are recognized by your national laws and extend to the territorial limits of your country.

TRADEMARKS

☐ It's a distinctive sign of some kind which is used by a business to uniquely identify itself and its products and services to consumers, and to distinguish the business and its products or services from those of other businesses.

☐ Conventionally, a trademark comprises a name, word, phrase, logo, symbol, design, image, or a combination of two or more of these elements.

☐ The essential function of a trademark is to exclusively identify the commercial source or origin of products or services thereby facilitating identification of products and services which meet the expectations of consumers as to q uality and other characteristics.

Fundamental concepts

☐ The essential function of a trademark is to exclusively identify the commercial source or origin of products or services, so a trademark, properly called, *indicates source* or serves as a *badge of origin*.

☐ In other words, trademarks serve to identify a particular business as the source of goods or services.

☐ The use of a trademark in this way is known as *trademark use*. Certain exclusive rights attach to a registered mark.

The "Registered Trade mark"

Patent

☐ Inventions are protected by Patents. It is a legal monopoly granted to the owner of new invention, for a limited period of time. It can be granted for product as well as process.

Regulatory Framework: Primary legislations on Patents:

    1. The Indian Patents Act, 1970

    2. Patent Rules, 2003

• It regulates the grant, the operative period, revocation, and infringement of Patents.

• To keep with the requirements of TR IPS Agreement (Trade Related Aspects of Intellectual Property Rights) the

    a. Patents Act, 1970 was amended in 2005 and

    b. Patent Rules, 2003 were amended in 2006.

Conditions of Patentability

□ **Novelty** – a product or process to be patented should be new. It should not be already published or in use or part of the existing knowledge.

□ **Non-obviousness** – invention should not be obvious to the person skilled in the art to which invention relates.

Useful and capable of industrial application Rights of patentee

□ To exploit the Patent

□ To license the Patent to another

□ To assign Patent to another

□ Surrender the Patent

□ Sue for the infringement

LINKING:

☐ The interactive feature of the Internet's most popular information access tool, the World Wide Web, to hyperlink defines its very culture distinguishing it from any other communications medium.

☐ On the Internet, a link is a selectable connection from one word, picture, or information object to another.
Links usually appear as highlighted, underlined, otherwise prominent text or picture that can be selected by the user, resulting in the immediate delivery and view of another file

Linking is of two types:

□ **Surface linking:** When the home page of a site is linked it is the case of surface linking.

□ **Deep linking:** When a link bypasses the home page and goes straight to an internal page within the linked site it is the case of deep linking.

INLINING

☐ Inlining or 'In-line linking' enables a Web page to summon different elements from diverse pages or servers to create a new Web page.

☐ Instead of copying the elements to the composite page, the elements are linked in by "pulling in" graphic or image files from another site and displaying on the composite Web page.

☐ Thus, the composite page would consist of a series of links to other sites and servers.

☐ While browsing the composite page, the page directs the browser to get the pictures, graphics etc. from the original sources

Inlining and Indian Law

☐ As in linking one has to turn to section 51 read with section 14 of the Copyright Act, 1957 to test the legality of inlining.

☐ By virtue of section 14 and 51, reproducing any copyrighted work, issuing copies of the work to the public or communicating the work to the public could amount to copyright violation.

▫ The person who employs an inline link on his site is not causing any reproduction o the copyrighted content

FRAMING

- "Framing" is the process of allowing a user to view the contents of one website while it is framed by information from another site, similar to the "picture- in-picture" feature offered on some televisions.

- Framing may trigger a dispute under copyright and trademark law theories, because a framed site arguably alters the appearance of the content and creates the impression that its owner endorses or voluntarily chooses to associate with the framer.

P2P NETWORKING

☐ Peer-to-peer (P2P) is defined as two or more computers connected by software which enables the connected computers to transit files or data to other connected computers.

☐ In recent usage, P2P has come to describe applications in which users can use the Internet to exchange files with each other directly.

☐ The P2P connection means that it's a direct link, the file is being directly transferred from one computer to the other, it is not going through any mediating server.

☐ A P2P network does not have the notion of clients or servers, but only equal *peer* nodes that simultaneously function as both "clients" and "servers" to the other nodes on the network.
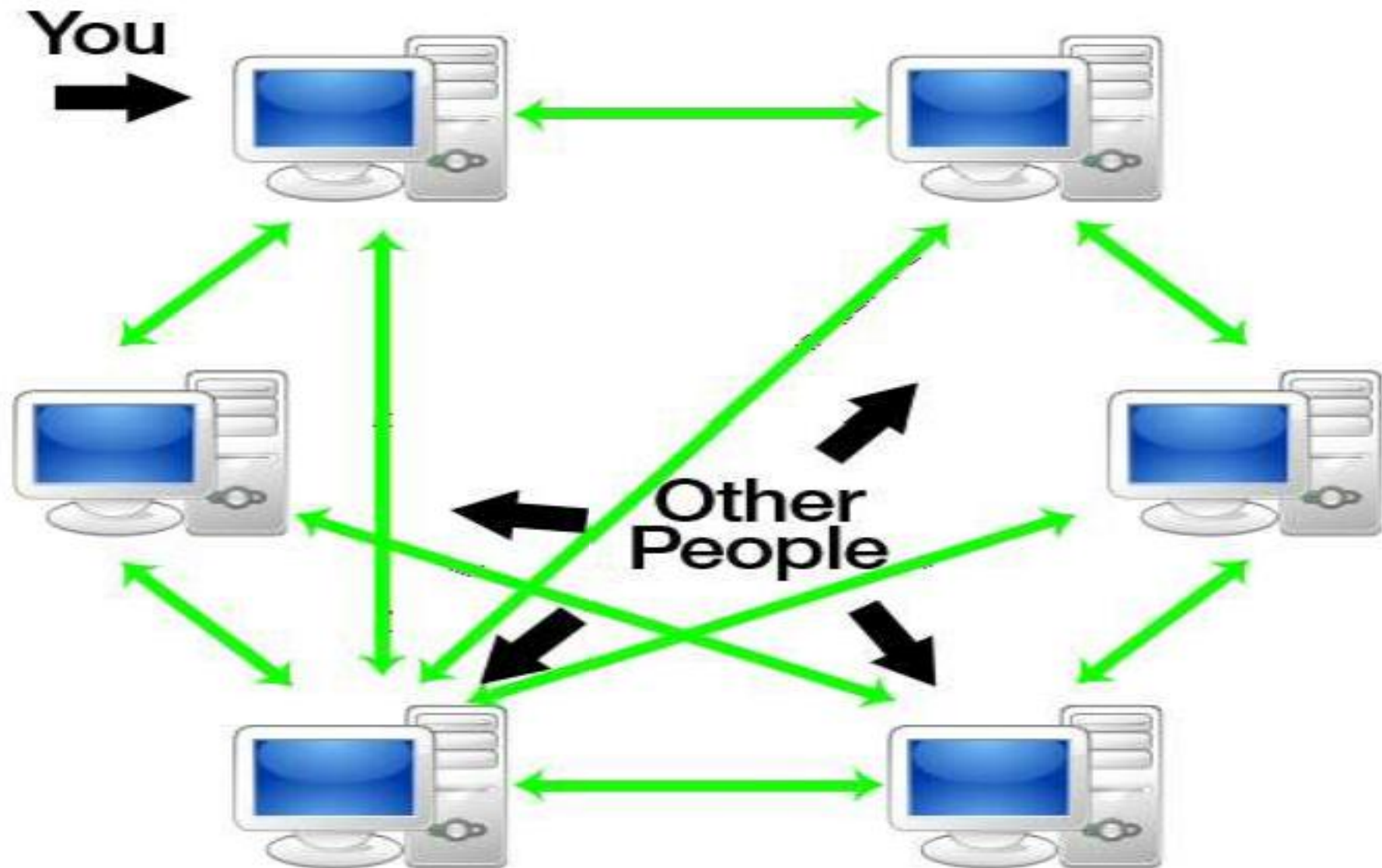
Fig: P2P Network Model

Domain Names

☐ Originally the purpose of Internet domain names was to locate a web site on the Internet.

☐ But in today's world the importance of domain names has gone much beyond web site location.

☐ They are used to identify the goods and services which a particular company is offering, be it online or offline. So, domain names serve the purpose of trademarks.

TYPES OF DOMAIN NAMES

☐ Every domain name ends in a top-level domain (TLD) name.

☐ TLD is the last part of a domain name; that is, the letters which foll the final 'dot' of any domain name.
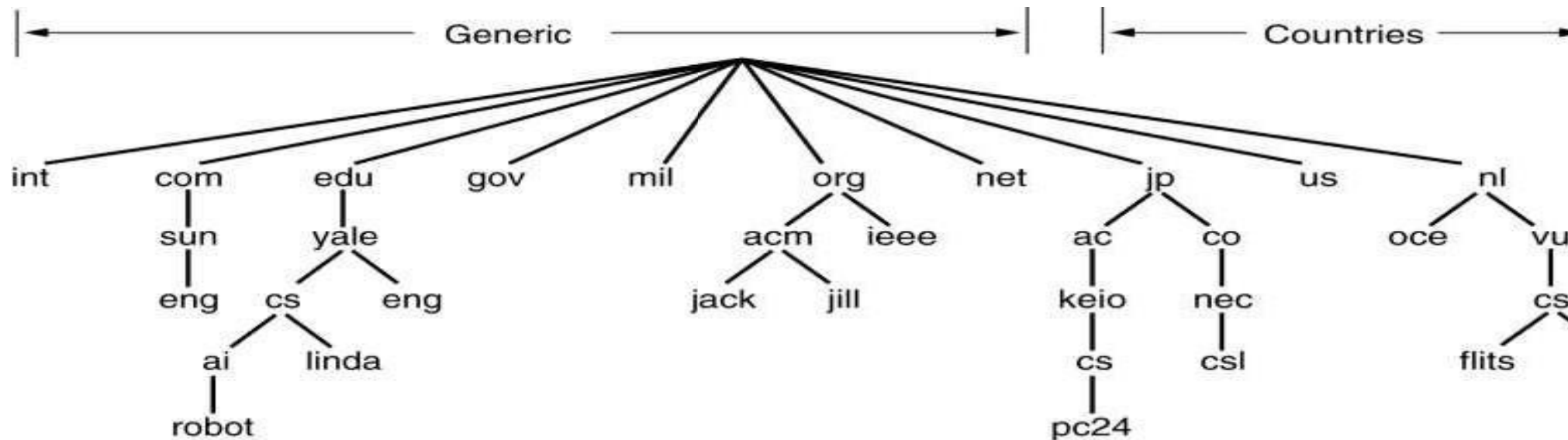
generic Top-level Domain (gTLD)

☐ A gTLD is a top-level domain used by a particular class of organization.

☐ These are three or more letters long, and are named for the type of organization that they represent (for example, .com for commercial organizations, .int for international organizations).

☐ But some of these gTLDs have become unrestricted, that means they no longer represent any particular type of organization and anyone could get a domain name under it.

- .com - for commercial organizations, but unrestricted
- .coop - for cooperatives
- .edu - for educational establishments
- .gov - for governments and their agencies in the U.S.A.
- .info - for informational sites, but unrestricted
- .int - for international organizations established by treaty
- .jobs - for employment-relat d sites
- .name - for families and individuals
- .net - originally for network infrastructures, now unrestricted
- .org - originally for organizations not clearly falling within the other gTLDs,

country code Top Level Domains (ccTLD)

☐ ccTLD is used and reserved for a country.

▫ These are two letters long, and most of them correspond to the ISO 3166-1 standard for country codes.

☐ The administration of a ccTLD is left to the specific country concerned and thus each ccTLD policy setting out the rules for allocating domains is distinct from the other

ISPs AND THEIR ROLE IN COMMUNICATION ON THE INTERNET

☐ ISP is an entity that connects people to the Internet and provides other allied services such as Web site building and hosting.

☐ An ISP has the equipment and the telecommunication line access required to have a point of presence on the Internet for the geographic area served.

☐ Various kinds of intermediaries are involved in delivering content online to end-users, as making a work available over the Internet will involve a chain of intermediaries.

ISP Liability under the Information Technology Act, 200

- In India the provisions relating to the ISPs are specifically legislated in the IT Act, 2000 where an Internet Service Provider is referred to as *Network service provider* and Explanation (a) to s. 79 defines it as:

- "Network service provider" means an intermediary. Intermediary again has been defined under section 2(w) as:

- "Intermediary" with respect to any particular electronic message means any person who *on behalf of another* person *receives stores* or *transmits* that message or provides any service with respect to that message.

Digital rights management (DRM)

☐ Digital rights management (DRM) is a systematic approach to copyright protection for digital media.

☐ The purpose of DRM is to preve to unauthorized redistribution of digital media and restrict the ways consumers can copy content they've purchased.

☐ DRM products were developed in response to the rapid increase in online piracy of commercially m rketed material, which proliferated through the widespread use of peer-to-peer file exchange programs.

☐ Typically DRM is implemented by embedding code that prevents copying, specifies a time period in which the content can be accessed or limits the number of devices the media can be installed on.

SEARCH ENGINES AND THEIR ABUSE:

□ Information and Internet are synonyms. It is difficult to conceive the gigantic quantum of information present on the Internet. It runs in many billions of pages and still growing.

□ According to some estimates the Internet is doubling its size every four months and with this increase in size comes a proportional increase in information.

□ Search engines have come to acquire a unique and important position on the overall Internet system.

□ They have become the presenters of information that is provided by others.

What are Search Engines?

☐ A **web search engine** is a software system that is designed to search for information on the World Wide Web.

☐ The search results are generally presented in a line of results often referred to as search engine results pages (SERPs).

☐ The information may be a mix of web pages, images,   and other types of files.

☐ Some search engines also mine data available

in databases or open directories. Unlike web directories, which are maintained only by human editors, search engines also maintain real-timeinformation by running an algorithm on a web crawler.

THE PROCESS: HOW A SEARCH ENGINE WORKS:
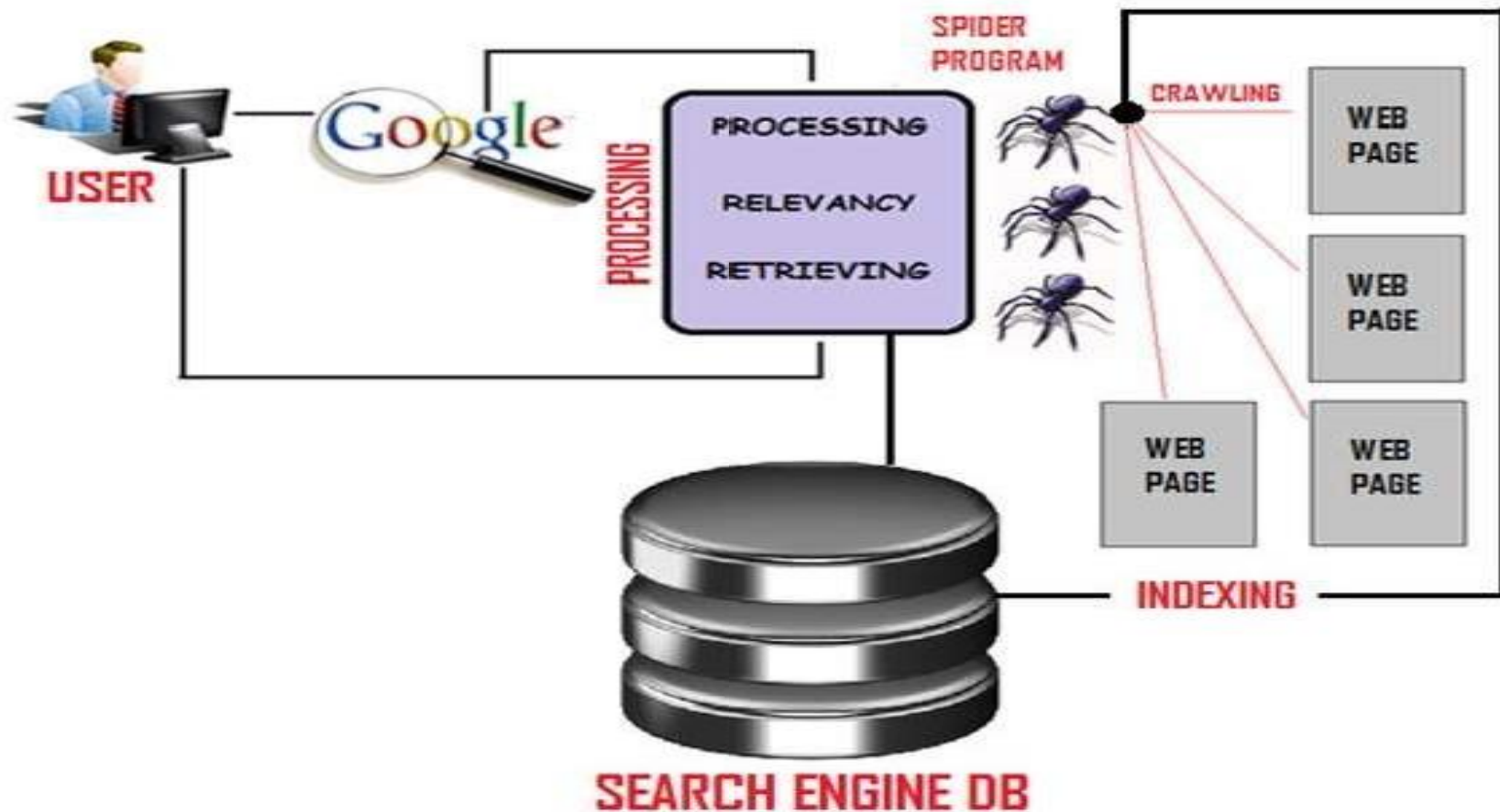
ABUSE OF THE PROCESS: SPAMDEXING

- Spamdexing, which is a word derived from "spam" and "indexing," refers to the practice of search engine spamming.

- It is a form of SEO spamming.

- SEO is an abbreviation for Search Engine Optimization, which is the art of having your website optimiz d, or attractive, to the major search engines for optimal indexing.

- Spamdexing is the practice of creating websites that will be illegitimately indexed with a high position in the search engines.

- Sometimes, spamdexing is used to try and manipulate a search engine's understanding of a category.

- Hidden or Invisible Text

    One way of fooling a search engine is to match certain keywords by making them the same colour as the background or by using a tiny font size or hiding them within the HTML code such as "no frame" sections.

- **Keyword Stuffing**

    Keyword stuffing is considered to be an unethical Search engine optimization technique. Keyword stuffing occurs when a web page is loaded with keywords in the content.

- **Meta Tag Stuffing**

    A meta tag is a coding statement in the Hypertext Markup Language (HTML) that describes some aspect of the contentsof a Web page

- **Cloaking**

    Cloaking is another search engine optimisation technique in which the content presented to the search engine crawler is different from that presented to the users' browser.

NON ORIGINAL DATABASES:

☐ Member states of WIPO have b en discussing the possible introduction of international protection of non-original databases which presently do not qualify for protection under copyright law.

☐ The originality requirement that a database must constitute an intellectual creation by reason of the selection or arrangement of its contents in order to enjoy copyright protection means that some databases are not prctected under copyright even if substantial investments have been made to produce them.

PROTECTION OF DATABASES THROUGH INTELLECTUAL PROPE
LAWS:

☐ The WIPO Diplomatic Conference on Certain Copyright and Neighboring Rights Questions held in December 1996, which adopted the WIPO Internet Treaties, had among its documents a Basic Proposal for the Substantive Provisions of the Treat on Intellectual Property in Respect of Databases to be considered by the Diplomatic Conference. Although agreement was not reached, the Conference adopted a Recommendation Concerning Databases.

☐ In 2002, at the request of the Standing Committee on Copyright and Related Rights (SCCR), the WIPO Secretariat commissioned six studies on the economic impact of international database protection on developing countries and countries in transition, and prepared a summary on existing legislation concerning intellectual property (IP) in non-original databases. These studies were discussed by the SCCR.

Ethical dimensions of cybercrime

- have many potential misuses / abuses of information and electronic communication that create privacy and security problems

- ethics:
  - a system of moral principles relatin   benefits and harms of particular actions to rightness and wrongness of motives and ends of them

- ethical behavior here not unique

- but do have some unique considerations
  - in scale of activities, in new types of entities

Ethical Hierarchy
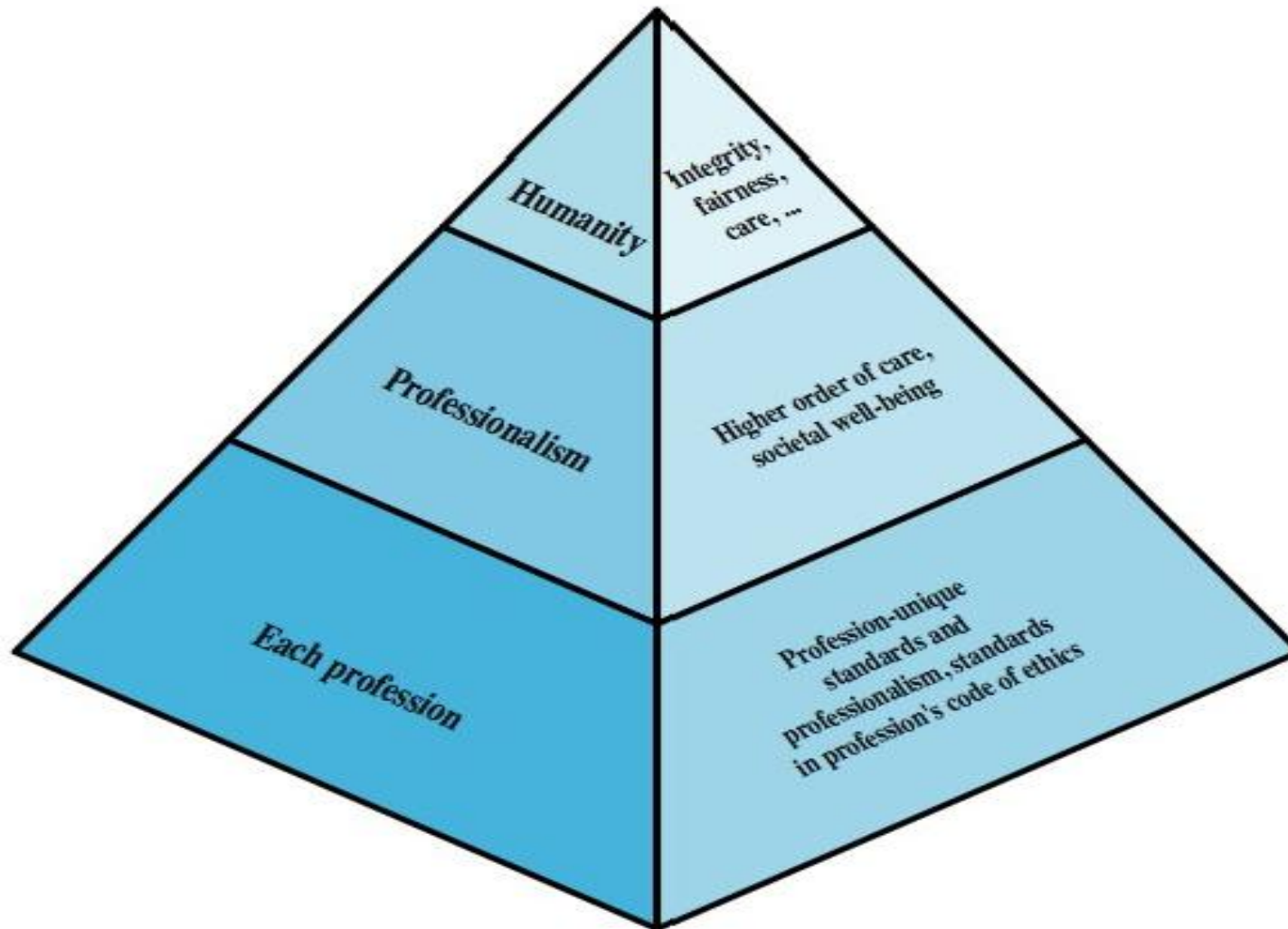
Ethical Issues Related to Computers and Info Systems

- some ethical issues from computer use:
  - repositories and processors of information
- producers of new forms and types of assets
- instruments of acts
- symbols of intimidation and deception

- those who understand / exploit technology, and have access permission, have power over these

- issue is balancing professional responsibilities with ethical or moral responsibilities

Ethical Question Examples

- whistle-blower
  - when professional ethical duty conflicts with loyalty to employer
  - e.g. inadequately tested software product
  - organizations and professional societies should provide alternative mechanisms

- potential conflict of interest
  - e.g. consultant has financial interest in vendor which should be revealed to client

Codes of Conduct

- ethics not precise laws or sets of facts

- many areas may present ethical ambiguity

- many professional societies have ethical codes of conduct which can:
  - be a positive stimulus and inst ll confidence
  - be educational
  - provide a measure of support
  - be a means of deterrence and discipline
  - enhance the profession's public image

Codes of Conduct

- see ACM, IEEE and AITP codes
- place emphasis on responsibility other people
- have some common themes:
  - dignity and worth of other people
  - personal integrity and honesty
  - responsibility for work
  - confidentiality of information
  - public safety, health, and welfare
  - participation in professional societies to improve standards of the profession
  - the notion that public knowledge and access to technology is equivalent to social power