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**Department of Computer Engineering**

**Batch: \_\_\_ C3 \_\_\_      Roll No.:110 and 121**

**Experiment No. 10**

**Title:** Report writing on legal issues and ethics with respect to some case study.

**Objective:** Understanding ethical and legal aspects of technology.

**Expected Outcome of Experiment:**

CO	Outcome
CO5	Interpret legal and ethical issues in security

**Books/ Journals/ Websites referred:**

1. Security in Computing, 5th Edition
2. <https://www.acm.org/code-of-ethics>
3. <https://naarm.org.in/VirtualLearning/vlc/iprit.htm>
4. <https://www.bartleby.com/subject/engineering/computer-science/concepts/ethical-and-legal-issues#common-mistakes>



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**Abstract:**

The study of human controls applicable to computer security includes the legal system and ethics. The legal system has adapted quite well to computer technology by reusing some old forms of legal protection (copyrights and patents) and creating laws where no adequate ones existed (malicious access). Still, the courts are not a perfect form of protection for computer resources, for two reasons. First, the courts tend to be reactive instead of proactive. That is, we have to wait for a transgression to occur and then adjudicate it, rather than try to prevent it in the first place. Second, fixing a problem through the courts can be time consuming (sometimes taking years) and expensive; the latter characteristic prevents all but the wealthy from addressing most security issues. On the other hand, ethics has not had to change, because ethics is more situational and personal than the law. For example, the privacy of personal information is becoming an important part of computer security. And although technically this issue is just an aspect of confidentiality, practically it has a long history in both law and ethics.

Not always are conflicts resolved pleasantly. Some people will think that they have been treated unfairly, and some people do indeed act unfairly. In some countries, a citizen reacts to a wrongful act by going to court. The courts are seen as the ultimate arbiters and enforcers of fairness. But, as most lawyers will tell you, the courts' definition of fair may not coincide with yours. Even if you could be sure the courts would side with you, a legal battle can be emotionally draining. Our purpose in this section is not only to understand how the legal system helps protect computer security but also to know how and when to use the legal system wisely.

**Related Theory:**

**Ethical issues in information security**

Ethical issues faced by organizations in information technology are generally concerned with privacy, property rights, or the effects of an activity on society. Some of the common ethical issues in the cyber world are as follows:

- **Privacy**

Nowadays, computer users can access different information from various servers located all over the world. Though the users have their private computer, tools, and operating system, their network is distributed at a large scale when they try to access information. As a result, their information is likely to be disclosed to various organizations, and their privacy is not maintained.

Furthermore, hackers often intrude into the computer system of people and access the user's information without authorization. Some organizations also



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sell the information and data of their users. This also raises the question of user information privacy.

That is why companies need to develop ethical policies that can keep the information of their users safe from hackers.

- **Access right**

Lots of industries use computer software and technology to provide services to their customers. This software should be capable of preventing unauthorized access to the system.

Especially in payment or banking software, the developers need to create software that guarantees authorized access and stops malware, viruses, or unauthorized access to the system.

- **Prevention of loss**

According to this ethical principle, information technology should not be used in a manner that would cause harm or loss of property, information, ownership, or destruction of the property. The employees, users, and other public should use all the equipment with care to prevent any severe loss.

- **Patents**

Ethical issues that are regarded as patents are tough to deal with. Patents preserve the unique and secret part of an idea. To acquire a patent, companies need to provide proper disclosure of the software. The patent holder also has to reveal the entire program details to a proficient programmer. If any issues in the patent are found, the company will be answerable to the public or Government.

- **Copyright**

Copyright issues need to be taken extremely seriously by information security professionals. Copyright laws are created to protect computer software before and after a security breach such as the mishandling of data, misusing information, documentation, computer programs, or any other material. Most countries have different laws to handle copyright issues occurring in the cyber world.

- **Trade secrets**

Another common ethical issue in the computer world is trade secrets. Trade secrets keep the value and importance of the ideas, business, or software secure. According to this ethic, the confidential data of an organization should not be



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leaked to outsiders. If this law is broken, it may cause much harm to the company. Therefore, the company's staff and all individuals need to obey this law.

- **Piracy**

Piracy means the creation and usage of illegal copies of the software. This issue commonly occurs in today's world. Software owners have the right to choose how to distribute the software and whether users can create copies of the software. If a developer does not allow duplication of the software, it is considered piracy whenever the software is duplicated. The individual who duplicates the software is also held guilty for that.

The software industry is facing a high number of piracy issues nowadays. Courts are also working to prepare strict laws to prevent piracy.

### **Legal issues in information security**

Similar to ethical issues, information technology organizations are also bound to follow laws issued by the Government. If a company fails to provide satisfactory service to the client or cheats the client, the organization is held guilty in court. The most common legal issues that occur in the information security industry are as mentioned below.

- **Violation of contract**

When a client or organization decides to work with each other, the details are finalized by creating a contract. The contract contains the work duration, the purpose of the work, and other details related to the project. Before getting the client on board, it is necessary to discuss the contract and get all the details approved by the client.

Later, if the client or the organization violates the contract, they may face legal issues. Either party can file an issue in court and get the conflict solved according to the computer acts defined by the Government.

- **Negligence of contract**

If a company fails to fulfill the client's requirements (as mentioned in the contract), it is considered negligence of the contract. In such cases, the company will also be considered guilty and will have to prove itself in court.

Information technology needs to ensure they deliver the correct services to the client within the mentioned time duration to avoid such legal issues.



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**Related Theory (contd...):**

**IPR for IT Based Technologies in India**

Information Technology (IT) covers a set of hardware, software and associated services, which attract Intellectual Property Rights (IPR) in a general sense subject to novelty, non-obviousness and utility aspects. Some common IT products and services that are protected for IP are hardware, software, databases, internet, electronic publishing, web processes like e-commerce, domain names, trade marks and cyber contracts. Application of IP in each of these, with special reference to India and its cyber law, is discussed briefly.

**Patents in IT**

Practical application of computer related innovation is patentable. Though softwares, per se, are not patentable, specific software products that have a useful practical application are patentable, like software used in devices like pacemakers. Utilities of invention must be within the technological arts. A computer program is eligible for patenting if it makes technical contributions to the known art. If a program can make a system work more fast or efficiently, then it is eligible for patenting. Only a claim having a practical application in the technological arts is statutory and hence patentable. Some typical software patents are:

- Ideas, systems, methods, algorithms and functions in software products
- Editing functions, user-interface features, compiling techniques
- OS functions
- Program algorithms
- Menu arrangements
- Display presentations/arrangements
- Program language translations

The US recognizes methods of doing business patentable now and this brought a range of processes like e-commerce, e-gambling and online stock trading as patentable.

**Non patentable**

Softwares, per se, are intangibles and not protected by patents but are protected by copyrights as applicable to literary and aesthetic works. A computer program is therefore dealt with in literary work and the law and practice in relation to literary works will apply to computer programs. Software include programs, musical and artistic works, studio and video recordings, databases and preparation material associated with documents like manuals. Programming languages such Fortran, Basic, Cobol are treated as languages like English, Hindi and are not patentable but protected



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under copyright. Few countries are contemplating patent type protection even in the case of computer software copyright, which also allows a larger period of protection than the patent law allows.

Mathematical algorithms or computer programs are not held as inventions because they merely describe an abstract idea. They merely solve a mathematical problem and not a practical application or idea. They are considered mental acts as any professional could do with requisite skills.

### **Patents V/s Copyright**

There are significant differences in protection by patent and copyright acts. Patent protection is much stronger whereas copyright protection is longer. Some major contrasting features of these two forms of protection are illustrated below.

- Patent law protects the technical idea underlying the invention, i.e. the functional elements. Copyright protects the form in which the idea is expressed, i.e. originality of expression but not the underlying idea or concept or function. In the case of patents if different code achieves the same function then it violates patent law.
- Copyrights become effective the moment they are published or made known whereas patents need to be filed.
- Copyrights last for authors' life plus 60 years whereas patents are granted for a period of 14 years in India.
- Patents provide much stronger protection to software. Development of software using known algorithms or logic but using different language or coding is not copyright violation, whereas it is a patent violation in terms of violating a protected concept of software.
- Presentation of known information is not innovation, but the form of presentation can be protected by copyright.
- Patents and trademarks are statutory and hence protected by respective governments with their jurisdiction. Common-law right, in a universal perspective, protects copyrights as most countries are signatories to Berne and Universal Copyright Conventions – both revised in 1971.

### **Software Patent law in India**

The Indian Patent Law does not contain any specific provision regarding the protection of computer software. There are no guidelines or office procedures followed by the Indian patent office regarding computer software (Anna Elizabeth Kuruvilla, 2003).

Although computer programs are not patentable per se, a claim to a manner of manufacture, which results in a tangible product, which requires the application of an



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algorithm or a particular computer program, may be patentable. India has recently prepared itself for providing patent registrations on software.

### **Copyrights**

Copyright violations can occur in literal and non-literal sense. In literal sense one copies the actual work or text or source code. Non-literal copying pertains to elements such as structure, sequences, functions, interfaces, methodologies etc. Both literal and non-literal expressions are protected – either in parts as whole work.

An example of this is Lotus123 V/s VP-Planner (Asit Narayan and Thakur, 2000). The VP-Planner copied the overall structure, screen display and user interfaces as in Lotus123, but developed the software using different code. This may not be a copyright violation as methods of operation are not protectable but the two line moving cursor of LOTUS is protected and hence VP-Planner is treated as the copyright violation.

Making import, sale, hire of devices specifically designed to circumvent copy protection of a work in electronic form are treated as copyright infringement. Furthermore, publishing information to enable circumvent copy protection is similarly treated. For example, purchasing a CD recorder is legal but copying software without authorization is an illegal use. Recording a TV production and using it later also infringes copyright law. However, if not done purposefully it cannot be a violation, but the accused has to prove innocence.

### **Software copyright law in India**

The Indian government has been an active participant in protecting the rights of Copyright holders. Both the Department of electronics and the Ministry of Human resource Development have actively helped in bringing amendments to the Indian Copyright Act (Naavi, 2003b). Indian copyright act of 1957 is amended to extend its coverage to computer software also. Computer programs received statutory recognition as a 'literary work' in 1984 and the definition has been amended and made more specific and precise in the Copyright Amendment Act of 1994. India was one of the first countries in the world to provide statutory protection to computer software and is one of the toughest in the world. Major changes to Indian Copyright Law introduced in June 1994 include :

- **the definition of computer program,**
- **explains the rights of copyright holder,**
- **position on rentals of software,**
- **the rights of the user to make backup copies, and**
- **punishment and fines on infringement.**



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According to Section 14 of the Copyright Act, it is illegal to make or distribute copies of copyrighted software without proper or specific authorisation. The only exception is provided by the act, which allows a backup copy purely as a temporary protection against loss, distribution or damage to the original copy.

The act prohibits the sale or to give on hire, or offer for sale or hire, any copy of the computer program without specific authorisation of the Copyright holder. In this regard software copyright is different from copyright of literary work as they can be resold. Software is licensed to use in a particular machine. Indian law prohibits unauthorised duplication of software for use by different users or machines within an organisation.

The copyright infringer may be tried under both civil and criminal law. The Act provides for jail terms of 7 days to three years and fines ranging between Rs 50,000 to Rs.2,00,000 and or both (Nasscom, 2003).

As per Indian law, it is not necessary to register with the Copyright Office to get copyright protection. As per the Berne Convention for protection of literary and artistic works- to which India is a signatory- copyright of any work in the member countries is protected in all the signatory countries. Though registration of copyright is optional, it is, however, a good idea to incorporate a copyright notice, as it is helpful in an infringement suit. Copyright protection is automatic from the moment the work is embodied in some medium like CDROM, magnetic tape, diskette or paper. For registration, one has to send three complete copies of works whether published or unpublished along with a fee of Rs 10 to the Registrar of Copyrights, New Delhi.

## **Databases**

Database is a collection of data or works arranged in a systematic and methodical way and capable of being accessed. Like softwares, databases are copy protected. However, no protection is available if the data is mere compilation or result of labor only. If a database is an adaptation of prior work, like dictionaries, then it is protected under copyright. If a database has no such prior existence as a separate literary work, such as survey data, law is not clear in such people generated data using computers (Naavi, 2002). There has to be originality in design, structure and selection of elements for a database to be protected. It can be protected for individual data sets and also for the compilation. In other words, protection is given to databases requiring skill or judgment.

To protect investments in databases which fail to satisfy copyright law a sui generis right is available. This needs proof for investment, time and resources in making it. For example, a database on experts of commonly known people is made after screening, validation and classification. Individual data may be public knowledge but collection with purpose has use. Such databases can be protected.





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A licensed database can be used as long as its use does not prejudice interests of the original developers. Data can also be protected under trade secret laws through contract laws or agreements enforcing employees to sign privacy conditions. As many organizations keep valuable data it is a common practice to protect the data under the contract laws. With increasing electronic transactions both in public and private, various countries are providing consumer privacy under cyber law.

### **Data Protection Laws in India**

In the case of the EU the data is protected for about 15 years but there is no such specific law in India. India has no law that protects the privacy and integrity of personal data, whereas more than 40 countries around the world have enacted, or are preparing to enact a law on this.

In view of the terrorism, visitors to a cyber cafe are identified and monitored for electronic transactions. Interception rights are already available to law enforcement authorities in ITA-2000. The data protection right of an individual may have to be balanced with the requirement of the law enforcement. It will be difficult to pass any strict privacy laws as long as the country is affected by terrorism (Naavi, 2002).

### **Internet or Cyberspace**

Any information placed on the internet is considered as public domain knowledge. This gives the right to others to use it but does not give rights for commercial purposes. One has to be careful in using the information available on the net for commercial purposes. The origin of broadcast and actual use can be different in different geographic locations and jurisdictions. Normally any misuse is treated as an offence at the place where the offence took place. For placing information on the net one has to be careful about laws of all jurisdictions where the site can be accessed through the Internet. Unlike newspapers, the Internet cannot have control on distribution even if intended.

### **Cyber Laws**

Cyber space is theoretically subject to jurisdiction of all of the world's legal systems. By its nature, the Internet makes territorial application of national laws obsolete. There are moves to develop a separate law for cyberspace, which will become applicable anywhere with certain flexibility in terms of limits while making territorial laws. India is one of the first few countries to enact the IT law in 2000 which is broadly in the lines of model law on electronic commerce adopted by United nations commission on international trade law in the year 1997. As per the law most IP items can be used fearlessly for academic and research purposes without any commercial intent.

### **Cyber Crimes**



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The IT Act 2008 addresses the question of cyber crimes by defining what is a crime and the penalties thereof. Broad outline of the cyber crime as per law are (Vivekanandan, 2003b):

- Unauthorised access to information systems
- Disruption of information systems (Denial of access)
- Damage due to introduction of viruses
- Interception of communications
- Malicious misrepresentation (defamation, impersonation, cheating)
- Hacking (tampering, fraud, stalking, spam)
- Providing assistance to others for doing unlawful things

The law specifies the penalties, power to investigate offences and proper law of jurisdiction specific to each violation. The violations are punishable by civil, criminal and administrative means. The owner of the IP can decide on the nature and type of law and redress needed as per the situation and magnitude of infringement or violation.

In India, there are few IT related IP cases of international nature. Indian courts judge infringements based on 'cause of action' test (Krishna Kumar, 2001). Besides, Indian courts respect decrees by foreign courts on IP violations by Indian citizens owing to India's commitment to various international treaties. It is, therefore, not enough to be mindful of local laws alone. In the developed world there is extensive case law largely because of the magnitude of litigation and overall IT penetration in those countries. On this count, the internet poses potential risk, especially to commercial enterprises and individuals doing business through the net in India, as the violations are punishable either by the country's law or by the law of the foreign country from which the business web is hosted.

### **Electronic Publishing**

Electronic journals are good examples of electronic publishing. In such items licensing agreements are very important, as any use beyond scope of license will be a copyright violation. Facilitators need to be careful on who are accessing and the type of use. The facilitators are vulnerable if they are not careful on agreements while subscriptions are made. One way to minimize the risk is to post warning notices and educate the users about copyright law. Nevertheless, one should carefully check the indemnity clauses of contract.

### **ACM Code of Ethics**

The following are the Code of Ethics adopted and enforced by ACM:

#### **1. GENERAL ETHICAL PRINCIPLES.**



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1.1 Contribute to society and to human well-being, acknowledging that all people are stakeholders in computing.

1.2 Avoid harm.

1.3 Be honest and trustworthy.

1.4 Be fair and take action not to discriminate.

1.5 Respect the work required to produce new ideas, inventions, creative works, and computing artifacts.

1.6 Respect privacy.

1.7 Honor confidentiality.

## 2. PROFESSIONAL RESPONSIBILITIES.

2.1 Strive to achieve high quality in both the processes and products of professional work.

2.2 Maintain high standards of professional competence, conduct, and ethical practice.

2.3 Know and respect existing rules pertaining to professional work.

2.4 Accept and provide appropriate professional review.

2.5 Give comprehensive and thorough evaluations of computer systems and their impacts, including analysis of possible risks.

2.6 Perform work only in areas of competence.

2.7 Foster public awareness and understanding of computing, related technologies, and their consequences.

2.8 Access computing and communication resources only when authorized or when compelled by the public good.

2.9 Design and implement systems that are robustly and usably secure.

## 3. PROFESSIONAL LEADERSHIP PRINCIPLES.

3.1 Ensure that the public good is the central concern during all professional computing work.



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3.2 Articulate, encourage acceptance of, and evaluate fulfillment of social responsibilities by members of the organization or group.

3.3 Manage personnel and resources to enhance the quality of working life.

3.4 Articulate, apply, and support policies and processes that reflect the principles of the Code.

3.5 Create opportunities for members of the organization or group to grow as professionals.

3.6 Use care when modifying or retiring systems.

3.7 Recognize and take special care of systems that become integrated into the infrastructure of society.

**4. COMPLIANCE WITH THE CODE.**

4.1 Uphold, promote, and respect the principles of the Code.

4.2 Treat violations of the Code as

**Difference between ethics and law**

<b>Ethics</b>	<b>Laws</b>
These are unwritten principles.	These are formal, well-documented principles.
These are defined by individuals and may vary depending on personal choice.	These are created by the Government and court.
These cannot be applied to everyone. Most of the time, the ethics of different companies will be different.	Laws are applicable to everyone.



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**Implementation Details:**

**Hypothetical Scenario:**

You are asked by your employer, a company that builds and programs self-driving cars, to design the “object avoidance” feature of the vehicles. You currently need to determine what the car will collide with when sandwiched between a stationary object (which could injure/kill the vehicle occupants) and a human moving target, such as a bicyclist or motorcyclist. All you know is that there is the potential for someone to be injured or killed by the programming, and the car needs to hit one of the two targets.

**Description of Ethical Dilemma:**

The ethical dilemma revolves around the decision-making process of the self-driving car when faced with the possibility of collision between a stationary object and a moving human target, with potential for injury or fatality.

**Stakeholders:**

1. Company: The employer requesting the development of the object avoidance feature.
2. Developer: The person/team responsible for developing the Object Avoidance software.
3. Vehicle Occupants: Potential beneficiaries or victims of the decision made by the self-driving car.
4. Pedestrians/Cyclists/Motorcyclists: The moving human target and any potential victims.
5. Regulatory Authorities: Responsible for setting legal standards and ensuring compliance.
6. General Public: May perceive the safety and ethical implications of the technology.

**Options with Corresponding Impact on Stakeholders:**

1. Prioritize Vehicle Occupants: The car could be programmed to prioritize the safety of its occupants, potentially leading to collisions with the moving human target, which could result in injuries or fatalities for the pedestrians or cyclists. This option might lead to public outcry and tarnish the company's reputation.
2. Prioritize Pedestrians/Cyclists: The car could be programmed to prioritize the safety of pedestrians or cyclists, potentially leading to collisions with the stationary object and risking harm to the vehicle occupants. This might raise concerns among potential buyers about the safety of the occupants.



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3. Prioritize both Vehicle Occupants and Pedestrians/Motorcyclists: The car could be programmed to prioritise the safety of both the Vehicle Occupants as well as Pedestrians/Motorcyclists. The difficulty with this option is that it is not what the Company has requested i.e., it is modifying the Company's request. This could probably be due to cost-cutting on the part of the company - this option would require more sophisticated software which could increase the cost of manufacture and thereby the cost of the car, making it less competitive on the market. A solution would be to use alternative/newer technology. For instance, it has been known that Machine Learning techniques, which have been traditionally used for such applications, are very structured and require a lot of computational resources and time. However, advances have led to a successor to Machine Learning, i.e, Deep Learning which can be used to effectively implement Option 3 without sacrificing economic viability of the vehicle, thereby satisfying the Company and convincing it for the necessity to protect both Occupants and Pedestrians rather than one at a time.

**Decision:**

After considering the options, the decision could be to prioritize the safety of all parties involved, minimizing harm as much as possible i.e., following Option 3. This could involve implementing sophisticated algorithms using Deep Learning, rather than older algorithms like Machine Learning, that assess the situation in real-time and aim to mitigate harm to all stakeholders. This decision requires careful balancing of interests and continuous improvement of the technology.

**Alignment with ACM Code of Ethics:**

The decision to prioritize safety aligns with several principles of the ACM Code of Ethics, including ensuring the safety and welfare of society, avoiding harm to others, and striving to design and implement systems that are beneficial to society.

The following ACM Code of Ethics are relevant and have been adhered to:

1.1 Contribute to society and to human well-being, acknowledging that all people are stakeholders in computing.

By sticking with Option 3, human well-being is ensured and it has also been acknowledged that all people are stakeholders - irrespective of whether they are owners of the vehicle or not, thereby avoiding bias.

1.2 Avoid harm.

Option 3 ensures that no stakeholder is subjected to harm, not only the occupants and pedestrians but also the company and even the developer team due to the harmony and mutual understanding that is created by choosing that option.



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2.1 Strive to achieve high quality in both the processes and products of professional work.

The vehicle must be made as safe as possible and care must be taken to ensure high quality.

3.6 Use care when modifying or retiring systems.

Care must be taken to modify the systems and people's perceptions of those systems.

**Measures to Fix the Scenario to Ensure Legal and Ethical Compliance:**

1. Comprehensive Testing: Ensure rigorous testing of the object avoidance feature under various scenarios to minimize potential harm and ensure compliance with safety regulations. This includes simulating real-world scenarios and assessing the performance of the system.
2. Transparency: Provide clear documentation and communication regarding the capabilities and limitations of the object avoidance feature to users and regulatory authorities. Transparency builds trust and helps users make informed decisions.
3. Continuous Improvement: Continuously monitor and update the object avoidance feature based on real-world feedback and advancements in technology to enhance safety and ethical compliance. This involves investing in research and development to stay ahead of potential risks and challenges.
4. Ethical Review: Establish an ethics review board to assess potential ethical implications and ensure alignment with ethical standards and regulations. This board could consist of experts from various fields, including ethics, law, and technology.
5. Legal Compliance: Ensure compliance with all relevant laws and regulations governing the development and deployment of autonomous vehicles, including liability frameworks and safety standards. This involves collaborating with legal experts and staying updated on changes in regulations.

**Conclusion:**

Thus we have understood and studied the various legal and ethical aspects of technology. While considering the work we do, ethics are very important to ensure a safe environment for everyone. We must also always keep in mind the various legal aspects and not violate the law at any time. However tempting it is, we must never compromise our ethics for money or fame or other trivial things.