

~~4.11. RISK-BENEFIT ANALYSIS~~

4.11.1. What Is Risk-Benefit Analysis?

- ✓ Risk-benefit analysis is a technique, similar to cost-benefit analysis, used to analyze the risk in a project and to determine whether the project should be carried out or not.
- ✓ Risk-benefit analysis answers the following questions:
 - What are the benefits of the project/product?;
 - Is the project/product worth the risks connected with its use?; and
 - Do benefits outweigh the risks?
- ✓ It is understood that everyone is ready to certain levels of risk as long as the project/product/activity promises sufficient benefit or gain.
- ✓ In risk-benefit analysis, the risks and benefits of a project/product are assigned money values, and the most favorable ratio between risks and benefits is determined.

4.11.2. Conceptual Difficulties In Risk-Benefit Analysis

Risk-benefit analysis is a very difficult process, because of the following reasons:

- ✓ In risk-benefit analysis, both risk and benefits are very difficult to quantify. Because both lie in the future. That is, both risk and benefits are associated with uncertainties.
- ✓ It should be noticed that who takes the risks and who enjoys the benefits? Therefore it is important to ensure that those who have taken the risks are the beneficiaries of it.
- ✓ It is mostly difficult to express both risk and benefits in a common set of units. For example, when the risks can be expressed and measured in one set of units (say, accidents/deaths on the airways) and benefits in another (say, speed of travel), then very difficult to do risk-benefit analysis. In this case, risk-benefit analysis is used to judge the relative merits of different designs.

4.11.3. Ethical Implications On Risk-Benefit Analysis

While performing the risk-benefit analysis, one should keep in mind the following ethical questions:

- (a) Under what conditions, someone in society is entitled to impose a risk on someone else on behalf of a supposed benefit to others?
- (b) How can we consider the worst-case scenarios of persons exposed to maximum risks while they are also obtaining only minimum benefits? Are their rights violated? Are they provided safer alternatives?

4.12. PERSONAL RISK

- ✓ If sufficient information is given to a person, then he can be able to decide whether to participate in a risky activity or not.
- ✓ Many experiments have concluded that individuals are more willing to face voluntary risks than involuntary risks, even when the voluntary risks are more harmful than the involuntary ones.
- ✓ Personal risks are difficult to assess especially if they are involuntary personal risks.
- ✓ **Examples for personal risks:**
 - A person living near a chemical plant voluntarily or involuntarily; and
 - A person working in a nuclear power plant or oil refinery plant.
- ✓ The quantification in assessing personal safety and risk is very difficult to estimate.
- ✓ While assessing the personal risk, one should consider the following ethical questions:
 - How to access the money value of an individual's life?
 - On what basis, the compensation for a risk can be decided?
 - Is the compensation for a risk by an amount based on the exposure tolerance of the average person justifiable?
 - What will be the compensation if the tolerance level of the person is below or above the average tolerance level?
- ✓ In order to minimize the above difficulties in assessing personal risks, the analysts employ all the available quantitative measures such as
 - making judgments on the basis of the amount of life insurance taken out by an individual; and
 - assessing a hazardous job by looking at the increased wages a worker demands to carry out the task.

4.13. PUBLIC RISK AND PUBLIC ACCEPTANCE

- ✓ Risks and benefits to the public at large can be more easily determined than the personal risks and benefits. Because individual differences tend to even out as large numbers of people are considered.
- ✓ Assessment studies relating to technological safety can be conducted in a better manner for public risk than for personal risk, as statistical parameters take on greater significance.
- ✓ In this regard, America's National Highway Traffic Safety Administration (NHTSA) has emphasized the following two points:
 1. A value for human life can be estimated based on loss of future income and other costs associated with an accident.

2. An estimate of quantifiable losses in social welfare (resulting from a fatality) is not based on the maximum expenditure allocated to save a life.)

4.14. ACCOUNTING PUBLICLY FOR BENEFITS AND RISKS

Public accountability for risk has been affected by the following problems:

- ✓ An expert or even group of experts cannot be expected to know everything. Hence the public processes (which are designed to establish safeguards and regulations) suffer from incomplete engineering knowledge.
- ✓ The uncertainty produced by scientists and regulators (who assure the public that there are no risks, but they know that the answers are not at hand) also infects the risk regulation. In other words, a refusal to face the hard questions created by lack of knowledge affects the risk regulation.
- ✓ Since the conceptions of risk vary depending on how the facts are presented, therefore special caution should be given when stating probabilities of rare events.

4.15. BECOMING A RESPONSIBLE ENGINEER REGARDING RISK

(Role Of Engineers To Safeguard The Public From Risk)

- ✓ The engineers can provide background material to prove the faulty positions.
- ✓ Engineers should actively participate in the debates related to safety and risk.
- ✓ Engineers should always insist on meaningful numbers and figures when assessing safety and risk.
- ✓ Engineers should also recognize the previously mentioned difficulties with measuring risks and benefits in absolute terms.
- ✓ Engineers should not be influenced by any influential lobby or trade organization.
- ✓ Engineers need to be sensitive to various qualitative value judgments related with human and ethical values.
- ✓ Engineers should be aware at the legal liabilities regarding risk.

4.16. REDUCING RISK

- ✓ As we know, it is impossible to design and manufacture anything to be completely risk free. However, it is the responsibility of the engineers to explore all the possible ways to reduce the risk under the given financial and time constraints.
- ✓ **Risk Management Defined:** Risk management may be defined as the eradication or minimization of the adverse effects of the pure risks to which an organization is exposed.
- ✓ **Elements of a risk management programme:** According to the recent health and safety legislation, the three important elements of a risk management programme are:

1. Risk identification;
2. Risk evaluation (or risk measurement); and
3. Risk control.

1. Risk Identification

- ✓ Risk can be identified by various techniques such as physical inspection, safety audit, job-safety analysis, management and worker discussions, and historical data analysis.

2. Risk Evaluation

- ✓ Risk can be measured on the basis of economic, social or legal considerations.
- ✓ Economic and social considerations include financial aspects, uninsured cost of accidents, insurance premium, overall effect on the profitability, and possible loss of production.
- ✓ Legal considerations include possible constraint from compliance with health and safety legislation, code of practice, guidance notes and accepted standards, fire prevention, pollution and product liability.

3. Risk Control

- ✓ Risk control consists of four areas: risk avoidance, risk retention, risk transfer and risk reduction.
- ✓ **Risk avoidance:** It refers to the conscious decision by the management to avoid completely a particular risk by discontinuing the operation producing the risk.
- ✓ **Risk retention:** It refers to retaining a particular risk for which any consequent loss is financed by the organization.
- ✓ **Risk transfer:** It refers to the legal assignment of the cost of certain potential losses from one party to another (example, by insurance).
- ✓ **Risk reduction:** It refers to the reduction or elimination of all aspect of accidental loss that lead to a wastage of an organization's assets.

4.17. FAULTY ASSUMPTIONS AND THEIR REALITIES ABOUT SAFETY

There are many misconceptions about safety. Some of the popular fault assumptions

5.6 COLLECTIVE BARGAINING

5.6.1. What Is Meant By Collective Bargaining?

- ✓ International Labor Organization (ILO) has defined collective bargaining as "negotiation about working conditions and terms of employment between an employer and one or more representative employee's with a view to reaching agreement".
- ✓ The process is collective in the sense that the issue relating to terms and conditions of employment are solved by representatives of employees and employers rather than individuals.
- ✓ The term *bargaining* refers to evolving an agreement using methods like negotiation, discussion, exchange of facts and ideas rather than confrontation.

5.6.2. Process Of Collective Bargaining

The process of collective bargaining can be summarized in the following three steps:

Step I. Presenting the character of demands by the union on behalf of the constituent elements.

Step II. Negotiations at the bargaining table.

Step III. Reaching an agreement.

5.6.3. Unionism And Professionalism

(Are *unionism and collective bargaining practices ethical?*)

- ✓ Collective bargaining assumes 'unionism'. Legally, any organization employing more than 20 employees could have a union. In organizations, more than one union is also permitted.
- ✓ The employers form unions to safeguard the interests of employees and to prevent exploitation of employee.
- ✓ Many professional managers have argued that the ethical aspects of professionalism in engineering are inconsistent with union ideology and practice.
- ✓ According to John Kemper, the unionism and professionalism are conflicting with each other. Professionalism offers paramount importance to the interests of society and of the employer. But unions, also known as *collective bargaining* consider the economic interests of the members ahead of the interests of agents, consider the economic interests of the members ahead of the interests of their employer.
- ✓ Also, a number of professional societies have emphasized that loyalty to employers and the public is not possible with any form of collective bargaining.
- ✓ Even many professional societies indirectly instruct the engineers that they should not become member of the unions. For example, the NSPE code of ethics states that engineers shall not actively participate in strikes, picket lines, or other collective coercive action.

"I will give thrice so much land to any well-deserving friend; but in the way of bargain, mark me, I will cavil on the ninth part of a hair." - Shakespeare

- ✓ Thus professional societies oppose unionization because of the issue of conflicting loyalties and on the grounds that it is unprofessional.
- ✓ In a nutshell, the general view is that it is impossible for an engineer to belong to a union and at the same time to maintain the standards of his profession.
- ✓ **Conclusion:**

From the above discussions, the following conclusions can be made:

1. We can observe whether collective bargaining and its tactics are ethical or unethical, only on the basis of the given situation.
2. Though unions often have misused their power and irresponsibly disregarded the public good, the formation of engineering unions should not be considered always unprofessional.
3. The moral assessment of unions is complex. Many morally relevant facts and factors should be considered while judging about any union.

5.6.4. Arguments Over Unions

There are two arguments in favor of and against unions.

1. Arguments in Favor of Unions

- ✓ Unions play a vital role in achieving high salaries and improved standard of living of employees.
- ✓ Unions give employees a greater sense of participation in organization decision-making.
- ✓ Unions ensure job security and protection against arbitrary treatment to the employees.
- ✓ Unions have the ability to resist any orders from employers to perform unethical acts.
- ✓ Unions maintain stability by providing an effective grievance procedure for employee complaints.
- ✓ Unions can act as a counterforce to any radical political movements that exploit the employees.

2. Arguments Against Unions

- ✓ Unions shatter the economy of a country by placing distorting influences on efficient uses of labor.
- ✓ Unions remove person-to-person negotiations between employers and employees. Thus an individual is not given much importance in the process of collective bargaining.
- ✓ Unions encourage unrest and strained relations between employees and employer.

"Union does everything when it is perfect. It satisfies desires, simplifies needs, foresees the wishes, and becomes a constant fortune." - Senancour

- ✓ Unions encourage the unhealthy concept of job promotion, salary hike, etc on the basis of seniority.
- ✓ Unions prevent employer from rewarding individuals for their personal achievements.

WEAPONS DEVELOPMENT

7.16. INTRODUCTION

The Military or Defense industry uses most of world's latest technological activity. The entire world spends much of its money in the new development of military weapons. Engineers involve either directly or indirectly in designing and developing of these new weapons.

There are several reasons for an engineer to join the military services. The first and foremost reason is that of patriotism and prudential interest. The latter can be threats or compulsion from the government or the ruler of the country.

There are also several reasons for an engineer to refuse the war work. Because fundamentally the purpose of designing war weapons is to kill human beings. Therefore many reasonable engineers feel that the activity of weapons development as unethical.

Every engineer has to decide by examining his or her own conscience whether to work or not to work in defense-related industries.

7.17. ROLE OF ENGINEERS IN DEFENSE INDUSTRY

- ✓ Defense industry is one of the areas, which provide number of jobs opportunities to engineers. Engineers are capable of innovating and developing new weapons. Weapons are designed for one purpose – to kill human beings.
- ✓ On the one hand, many of the rational engineers feel that they cannot work on designing weapons, which are ultimately used to kill the human beings. Even though they are not the ultimate users of those weapons, they find it morally unacceptable to work on such areas.
- ✓ On the other hand, similar morally responsible engineers feel that working in defense industry is ethical. Because they feel it as a honor to work for their nation/government.
- ✓ In fact, the above two different views about working in defense industry are well justified by various ethical theories.
- ✓ Also the engineers should not be attracted by incentives and advancements that are being offered in the defensive industries, they must have the potential judgments to serve in defense works that would jeopardize the human community.

"Moral disarmament is to safe-guard the future; material disarmament is to save the present, that there may be a future to safeguard." - Elihu Root

7.18. THE ENGINEERS INVOLVEMENT IN WEAPONS WORK

- ✓ Engineers, who have engaged themselves in manufacturing of war weapon and antipersonal bombs, have developed compromising attitudes about their involvement, though they are aware of consequences of war weapons.
- ✓ Sometimes engineers are forced to involve in weapons work for their survival and livelihood of their family members.
- ✓ Thus every engineer who accepts job in a war-related industry should seriously consider his or her motives in doing so. They should think morally before getting involved in weapon's production.

7.19. DEFENSE INDUSTRY PROBLEMS

Many nations give privileges to defense industry, without even thinking, on serious problems that arise in large military build-ups. Some of the problems are:

1. The problem of waste and cost overruns is a major one in the defense industry.
2. Another problem faced by the defense industry is the 'technology creep'. The technology creep refers to the development of new weapons, such as the cruise missile, which can change diplomatic arrangements even as they are being negotiated. Thus it affects the political stability of a country.
3. Secrecy creates problems for the defense industry. If the secrets of planned funding were leaked to prospective contractors, then it may lead to high cost and poor quality of defense materials and weapons.
4. Many countries allocate funds for the defense sector than that of the other public welfare schemes.

In a nutshell, engineers should examine both his individual conscience and the social and political issues of weapons technology, before involving in the weapons development.

REVIEW QUESTIONS

case is particularly useful to all engineering students especially to the students in design, dynamics and structures courses.

3.6. CODES OF ETHICS

3.6.1. Introduction

One of the trademarks of contemporary professions is code of ethics. Codes of ethics are propagated by various professional societies. These codes of conduct are guidelines for specific group of professionals to help them perform their roles; to know how to conduct themselves; and to know how to resolve various ethical issues. These codes convey the rights, duties, and obligations of the members of the profession.

Now we shall examine the codes of ethics of professional engineering societies, in detail, in the following sections.

3.6.2. What Are Codes Of Ethics?

- ✓ The primary aspect of codes of ethics is to provide the basic framework for ethical judgment for a professional.
- ✓ The codes of ethics, also referred as **codes of conduct**, express the commitment to ethical conduct shared by members of a profession. In other words, these codes furnish common, agreed-upon standards for professional conduct.
- ✓ The codes of ethics express the ethical principles and standards in a coherent, comprehensive, and accessible manner.

* For detailed case study, refer Appendix I, page A.1.

"A Humanist Code of Ethics:

Do no harm to the earth, she is your mother.

Being is more important than having.

Never promote yourself at another's expense.

Hold life sacred; treat it with reverence.

Allow each person the dignity of his or her labor." - Arthur Dobrin

- ✓ The codes of ethics also define the roles and responsibilities of professions.
- ✓ The codes of ethics help the professionals to apply moral and ethical principles to the specific situations encountered in professional practice.
- ✓ These codes are based on five canons i.e., principles of ethics-integrity, competence, individual responsibilities, professional responsibilities, and human concerns.
- ✓ It is also to be noted that ethical codes do not establish new ethical principles. They use only those principles that are already well established and widely accepted in society.
- ✓ Thus the codes of ethics create an environment within a profession where ethical behavior is the norm.

3.6.3. Positive Roles of Codes of Ethics (Functions of codes of ethics)

The codes of ethics propagated by professional societies play a variety of roles. They are:

1. Inspiration;
2. Guidance;
3. Support for responsible conduct;
4. Deterring and disciplining unethical professional conduct;
5. Education and promotion of mutual understanding;
6. Contributing to a positive public image of the profession;
7. Protecting the status quo and suppressing dissent within the profession; and
8. Promoting business interests through restraint of trade.

1. Inspiration

- ✓ Ethical codes provide a positive inspiration for the professionals to exercise their obligations effectively.
- ✓ These codes inspire the engineers to apply moral principles under the various conflicting situations.

2. Guidance

- ✓ The ethical codes provide guidelines for achieving the obligations of professionals.
- ✓ These codes also provide specific guidelines, which tell how to apply the code to the unique situations.

3. Support

- ✓ The ethical codes offer positive and potential support to engineers to perform their duties in ethical manner.

"In contrast with the scientist, whose main interest is in discovering new knowledge, the engineer's greatest enjoyment derives from creatively solving practical problems." - Ibid

3.10

- ✓ At times, the codes can serve as legal support for those engineers who are tangled in professional obligations and conflicts.

3. Deterrence and Discipline

- ✓ The ethical codes can be used for deterring and disciplining unethical professional conduct.
- ✓ These codes are also considered as the formal basis for investigating unethical conduct.

4. Education and Mutual Understanding

- ✓ The ethical codes can be used in educational institutions and other places for emphasizing the importance of moral issues and values.
- ✓ They are also useful to encourage a shared understanding among professionals, the public, and government organizations concerning the moral responsibilities of engineers.

5. Contributing to the Profession's Public Image

- ✓ The ethical codes can confer a positive image to the public of an ethically committed profession.
- ✓ The codes enable the engineers to serve the public more effectively.

7. Protecting the Status Quo

- ✓ The codes institute ethical conventions. These ethical conventions can promote a minimum, acceptable level of ethical conduct.
- ✓ The codes can also suppress the dispute within the profession.

8. Promoting business interests

- ✓ The codes of ethics promote business interests through restraint of trade.
- ✓ They help in facilitating morally feasible business dealings to the professionals.

Note: Some of the reputed engineering societies that have published codes of ethics are:

1. American Society Of Mechanical Engineers (ASME);
2. American Society Of Civil Engineers (ASCE);
3. Institute Of Electrical And Electronics Engineers (IEEE);
4. The Institution Of Engineers (India);
5. National Society Of Professional Engineers (NSPE); and
6. American Institute Of Chemical Engineers (AIChE).

3.6.4. Codes And The Experimental Nature Of Engineering

(Which functions of the codes of ethics are the most valuable, in the perspective of engineering as social experimentation?)

- ✓ The perspective of engineering as social experimentation provides some useful clues in prioritizing and ranking the various functions of the ethical codes.
- ✓ The supportive function of engineering codes is viewed as the primary important function. Because the supportive function of engineering codes enable the engineers to express their views freely, especially about safety to those affected by engineering projects.
- ✓ The disciplinary function of engineering codes is recognized as the secondary important function. Because, this function is essential in engineering as it ensures all clear and enforceable rules.
- ✓ The guidance, inspirational, and educational functions of engineering codes are also important. Because they promote mutual understanding among those affected by them.
- ✓ The functions of protecting the status quo and promoting only business interests in violation of free competition should be avoided altogether.

Thus it should be kept in mind that codes are only a small part of engineering ethics. Also codes are not sacred writ and should always be open to critical examination. The codes should be applied with caution, keeping in view their limitations.

3.6.5. Limitations Of Codes

(Objections to codes)

The four major limitations of codes of ethics are as follows:

1. Codes of ethics are broad guidelines, restricted to general and vague wordings/phrases. The codes cannot be applied directly to all situations. Also it is impossible to predict all aspects of moral problems that can arise in a complex, dynamic engineering profession.
2. Engineering codes often have internal conflicts, which may result in moral dilemmas. That is, several entries in codes overlap with each other, so there are internal conflicts. But the codes do not provide a method for resolving these conflicts.
3. The codes cannot serve as the final moral authority for professional conduct.
4. The proliferation of codes of ethics for different branches of engineering gives a feeling that ethical codes are relative.

3.7. PROPOSALS FOR PROMOTING ETHICS

(In what ways, the engineering societies can promote ethics?)

The specific ways in which engineering societies can promote ethics are as follows.

1. Engineering societies should act as the forum for debating what should be in a professional code of ethics.
2. Engineering societies could promote ethics by establishing awards for engineers and employers who exhibit commendable ethical conduct.
3. Engineering societies could assist and protect engineers who have been discharged because they stick on to high ethical standards.
4. Engineering societies could establish 'ethics helplines' or other services whereby engineers could seek advice on difficult ethical issues.
5. Engineering societies could promote ethics by helping to educate the public about new technologies.
6. Engineering societies could investigate charges of wrongdoing by members because of malice or false information.
7. Engineering societies could also promote the discussion and understanding of engineering ethics by depicting on the application of their codes.

8. A BALANCED OUTLOOK ON LAW

(Interaction of rules with the engineering codes)

A balanced outlook on laws emphasizes the necessity of laws and regulations and their limitations in governing engineering practice. Now we shall examine the role of formal rules and their ethical implications.

8.1. A Regulated Society^a

✓ What is a law?

- Law is a body of rules of action prescribed by a controlling legal authority and having binding legal force.
- In general, law means all the rules established by authority or custom for regulating the conduct of members of a community or country.

nature in so many ways apart from the stage the engineering products are produced from natural resources.

COMPUTER ETHICS

7.13. INTRODUCTION

The computer is considered one of the most important technological advances of the twentieth century. As the general public becomes increasingly 'computer literate,' the gap between technology and peoples' intellect notably shrinks. The readily available computers, software, and assorted output devices have enlightened many. It is becoming increasingly important, as computers become the technological backbone of modern society. But, in turn, they have increased the use of computers for unethical activities, privacy invasion and illegal purposes leading to serious ethical issues. Some of the issues arise due to the computer abuse are: hacking^c, cyber crimes^c, computer virus^c, software piracy, cyber squatting^d, and Internet defamation.

^c Hacking is a crime in which a person cracks a system and gains unauthorized access to the data stored in them.

^c Cyber crimes refer to the various kinds of computer and Internet related crimes.

^c Viruses are programs introduced deliberately for destroying or altering the operating systems and database of computer.

^d Cyber squatting is an offence that relates to the registration of a domain name by an entity that does not have an inherent right to identical trademark registration.

"The act of breaking into a computer system has to have the same social stigma as breaking into a neighbor's house. It should not matter that the neighbor's door is unlocked. Misguided use of a computer is no more amazing than drunk driving an automobile." – Ken Thompson

Legal sanctions against abusive use of computers are a reactive approach. A proactive approach is to teach engineering students about computer ethics in classrooms. It is anticipated that through this study of computer ethics, students will personalize the need for developing ethical standards of behavior as computer users. Therefore they will develop their code of ethical behavior. Also as designers, programmers, managers, and system analysts, the engineers should have the moral responsibility to help promote the ethical use of computers. It is therefore important for computer professionals, engineers, policy makers, leaders, teachers, and social thinkers to get involved in the social and ethical impacts of this communication technology.

7.13.1. What Is Computer Ethics?

- ✓ Computer ethics is the study of ethical issues that are associated primarily with computing machines and the computing profession.
- ✓ It is the field of applied professional ethics dealing with ethical problems aggravated, transformed, or created by computer technology.
- ✓ Cyber ethics is the field of applied ethics that examines moral, legal, and social issues in the development and use of cybertechnology.
- ✓ Cybertechnology refers to a broad range of technologies from stand-alone computers to the cluster of networked computing, information and communication technologies.
- ✓ Thus computer ethics is the analysis of the nature and social impact of computer technology and the corresponding formulation and justification policies for the ethical use of such technology.

7.14. CATEGORIES OF COMPUTER ETHICS PROBLEMS

The three board categories of computer ethical problems are:

1. Those ethical problems for which the computer is the instrument of the unethical act. For example, the use of a computer to defraud the bank.
2. Those problems for which the computer is the object of the unethical act. For example, stealing computer software and installing it on one's own computer to access others' information.
3. Those problems associated with the autonomous nature of computers.

7.14.1. Computers As The Instrument Of Unethical Behavior

Computers are sometimes used as an instrument for carrying out some unethical activities. The two important unethical acts under this category are:

1. Bank robbery; and
2. Privacy

1. Bank Robbery

- ✓ Computers can be used to steal from an employer; outsiders can get into a system and steal from an institution such as a bank. In the same way, a company can use the computer to steal from its clients and customers.
- ✓ Computers are used more efficiently to steal money in a bank. The robber simply sits at a computer terminal, invades the bank's computer system and directs some of the banks assets be placed in a location accessible to him. The use of computer makes the crime impersonal. The criminal never comes face to face with the victims.

2. Privacy

- ✓ Privacy means the basic right of an individual to control access to and use of information about himself.
- ✓ Computers make privacy more difficult to protect, since large amounts of data on individuals and corporations are centrally stored on computers where an increasing number of individuals can access it.
- ✓ Invasions of privacy can be harmful to an individual in two ways, as given below:
 1. The leaking of private information can lead an individual being harassed or blackmailed.
 2. Personal information can also be considered personal property. Any unauthorized use of this information is theft.

7.14.2. Computers As The Object Of Unethical Acts

- ✓ When the computers are used as the objects of the unethical acts, ethical issues may arise. This act is prevalently known as 'hacking'.
- ✓ **What does hacking mean?**
Hacking is nothing but gaining unauthorized access to a database, implanting false information in a database or altering existing information, and disseminating viruses over the Internet.
- ✓ In other words, hacking is a crime in which a person cracks a system and gains unauthorized access to the data stored in them.
- ✓ Accessing private information violates the private rights of individuals and corporations.
- ✓ Hacking has thrown a challenging threat to the internal security of a nation when hackers develop illegal access to the secret military information.
- ✓ **Computer viruses:** Viruses are programs introduced deliberately for destroying or altering the operating systems and database of computer.
- ✓ Transmission of computer viruses leads to the complete destruction of files and data stored in the computers. This type of destruction frequently occurs in the records of financial institutions, corporations, government offices, and taxpayers.

"Respect the privacy of others." – ACM Code of Ethics