Informatics Ethics and Law

Prof. Dr. Eşref ADALI

Professional Ethics

8

Profession

- The profession is defined as the name of the skill and title acquired by people at the end of the process that he / she does to sustain his life and usually requires intensive education and work. The person who has gained this skill is expected to use his skill for the benefit of humanity. Each profession has its own values and ethical principles and members of the profession are expected to comply with these principles.
- In order for a profession to be learned, it is necessary to see a certain education and at the end of this education, a certificate of authority must be gained. The professional who has gained the authorization certificate is accepted to that profession. The professional person is obliged to continue his profession in accordance with certain rules. If he does not fulfill these obligations, he will be dismissed from the profession.

Ahi

It was founded in the 12th century by Ahi Evran (1171-1262) to teach people art and art morals. Ahi means brother as a word. These organizations established for different professions are called ahi guilds. Among the Ahi guilds, people would earn the title of apprentice, master and master.

Functional duties of Ahi guilds:

- Vocational training
- To provide continuity of the profession by providing in-service training
- Providing assistance to colleagues with financial needs
- To teach and supervise professional ethics
- Preventing the sale of poor quality or expensive products
- Ensuring the relationship between the state and professionals

Professional Ethics

The main objectives of professional ethics are:

- To organize competition within the profession
- Extracting inadequate and unprincipled members
- To ensure the protection of service targets
- Providing professional discipline
- Providing commitment to the profession

Depending on these objectives, the basic principles of professional ethics are:

- Accuracy
- Legality
- Competence
- Reliability
- Commitment to the profession

- It is the principles and rules about what is right, what is wrong, what is fair and what is unfair about professional behavior.
- In addition to ensuring that professional practices comply with the law, it is the provision of accurate and reliable information to the society by caring about the value judgments of the society.

Engineering and its Development

Engineers are people who develop and manufacture technologies that we use today. The twenty most successful engineering topics that have contributed to our lives in the 20th century are as follows:

- Electricity,
- Car,
- Airplane,
- Water supply and distribution,
- Electronic,
- Radio and television,
- Agricultural vehicles,
- Computer,
- Telephone,
- Refrigerator and air conditioning device,
- Highways,
- Spacecraft,
- Internet,
- Image processing in medicine,
- Home appliances,
- Health technologies,
- Petrochemical technologies,
- Laser and fiber optics,
- Nuclear technologies,
- High performance materials

Engineering is the act of producing useful products from natural sources by using scientific and mathematical principles, experience and creativity.

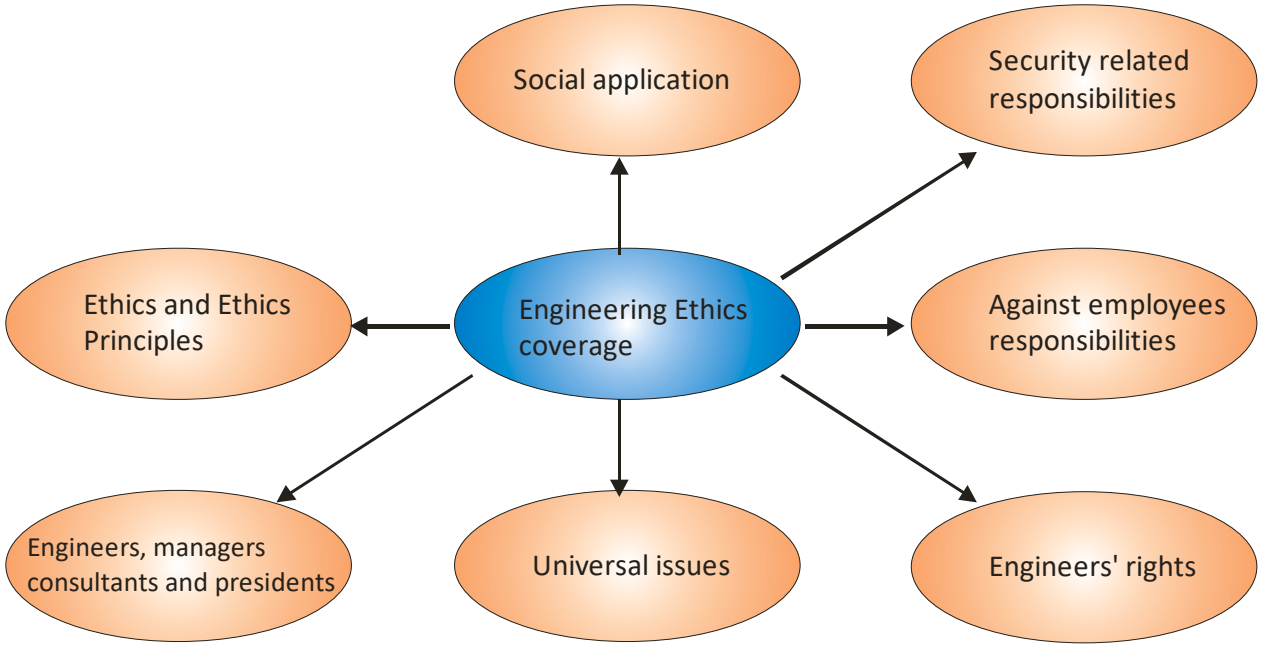
Duties and Responsibilities of Engineers - I

- **Obligation**: The behavior that the engineer is obliged to do. Being correct, honest and fair in behaviors are mandatory for engineers.

- **Responsibility**: It means taking responsibility due to a transaction or action it performs, it is also called accountability. It means being able to explain the process or action to their superiors and their surroundings and to undertake their responsibilities.

- **Care**: Engineers take care to make a process and action perfect. Every engineering project has a margin of error and they are determined as criteria when determining project requirements. Care is taken to comply with these standards during product development. It was seen that the limits determined by the dimensions were exceeded. However, it is expected that these excesses will not be caused by negligence.

- **Condemnation or Rewarding**: Any transaction that takes place can be condemned or rewarded. Therefore, the responsible person should endure both results.



Duties and Responsibilities of Engineers - II

Responsibilities to Self

- They consider using science and technology to benefit humanity and maintain natural balance as the basic principle of their profession.
- They feel the responsibility to act with the thought and effort of constantly improving their knowledge and skills.
- They are responsible for providing the best design and application services in their profession.
- They act with the awareness that they are responsible for the developments and changes in the fields of justice, equality, freedom, honesty, reliability, respect and law in the fields of service production and life.
- They follow the rules in the employment contracts and expect the same understanding from the other side.
- They accept the aim and principle of producing professional services in the fields they are sufficient. They aim to produce together in multidisciplinary studies and show the necessary respect for other professionals. Engineers find it appropriate to use only the titles they deserve.
- They cannot engage in attitudes and behaviors contrary to professional behavior principles. They cannot tolerate those who act against these principles and contribute to the development of an organizational response.

Duties and Responsibilities of Engineers - III

Responsibilities to Society

- They develop relationships by prioritizing respect for human rights, peace, democracy and society.
- They carry out their services in this understanding by making efforts to protect a multicultural structure without regard to religion, language, race, all kinds of beliefs, gender differences, geographical discrimination, and to develop cultural wealth.
- They support the behaviors that will develop the healthy development of the society by prioritizing the environment. For this purpose, they prioritize the healthy development of the natural and social environment.
- They use their professional knowledge, skills and experience for the common interests of society, the protection of universal human achievements and cultural heritage, and the development of human well-being. Their responsibility for the health, safety and well-being of society is always above their own personal interests, that of their colleagues.
- If they conclude that the job requested from them will pose a serious danger to the society and the environment, and if their professional judgments are not taken into account by the employer or the customer, they inform their employers or clients in writing, and if they do not get results, they inform the professional organizations and the authorities and public authorities when necessary.
- They explain their views, reports, technical issues that are of public interest, explicitly, thoroughly and objectively, leaving the commercial and personal concerns aside, fully investigated, examined and equipped with sufficient information and data.
- They take the necessary precautions to protect workers' health and ensure work safety in their workplaces, and inform their employees in these matters.
- They treat employers, customers, colleagues and everyone fairly, honestly and in good faith.
- They strive to understand the technology, its appropriate use and potential consequences by the society in order to increase the technology and engineering capabilities of the country.

Duties and Responsibilities of Engineers - IV

Responsibilities Against Nature and Environment

- They consider protecting nature and the environment, not harming them, ensuring that their practices are compatible with nature, as an integral part of their professional responsibilities; pay special attention to the frugal use of natural resources and energy.

Responsibilities to Employer and Customer

- They work with a suitable and proper level of work in their technical exchanges with the employer and the customer, as a reliable employee, or as an agent or consultant, and by using their professional skills and experience to the full, without compromising the welfare and health and safety of the society for the interests of the employer or client.
- They do not accept any gift, money or service or job offer directly or indirectly, affecting their business relationship with their employers or customers; they do not offer to others, they do not make donations for political purposes in order to improve their professional relations.
- They do not reveal the commercial and technological secrets of the employer or customer to others without permission, and do not use them for their personal interests.

Duties and Responsibilities of Engineers - V

Responsibilities to the Profession and Colleagues

- They continue their professional activities in a way that will gain the trust of all their colleagues and with the utmost care for the dignity of the profession.
- They respect all their colleagues with respect, do not compete with their colleagues unfairly, and make special efforts for the development of their subordinates, help them, respect copyright and original work, indicate their contribution and contributors to the work.
- They provide professional services only in the areas they are competent in, seek the opinions of the authorities in other specialties that may affect their services, and encourage interdisciplinary collaboration.
- They transfer their professional duties, powers and responsibilities only to their colleagues who are experts in compulsory situations.
- They do their jobs only within the framework of their professional duties, powers and responsibilities, and use only the titles and titles they have officially been entitled to.
- They do not help those who violate these principles of professional behavior, they are not involved in their activities, they warn them; they cooperate with professional organizations on this matter and support those who act in accordance with these principles with all their strengths.
- They strive to actively participate in the activities of professional organizations, and support them; they contribute to the development of the profession.

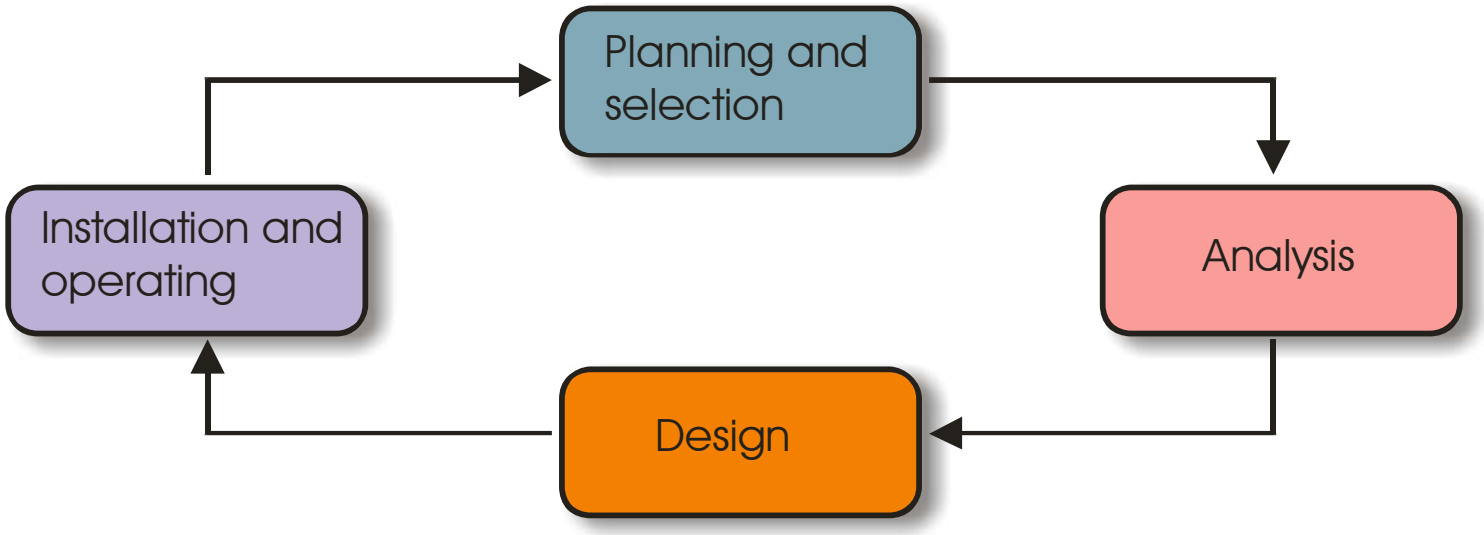
Responsibilities of Computer Engineers

The phases of developing a project with the most general evaluation are considered in four stages.

1. Planning and selection
2. Analysis
3. Design and
4. Installation and operation

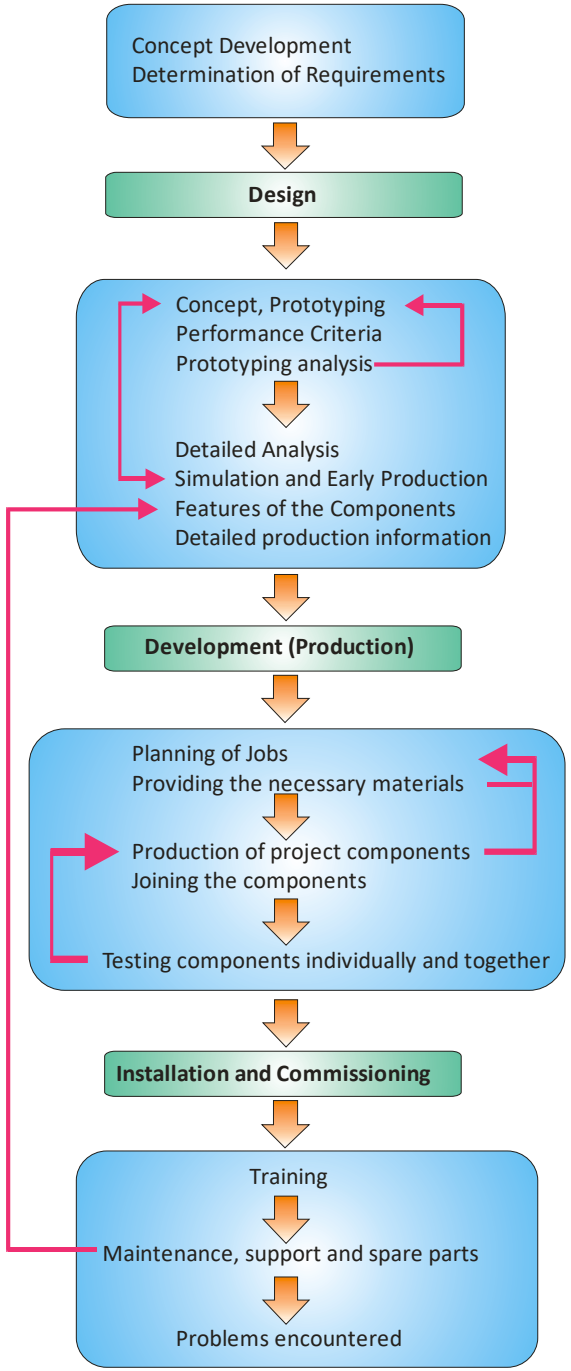
Details these stages for an IT project:

1. Conceptual studies
2. Determining the requirements
3. Analysis
4. Design
5. Realization
6. Test
7. Installation and commissioning
8. Maintenance



Project Development Process

Engineers take part in each stage of the project development process and express their opinions. These opinions affect the development of the project and the decisions taken. Therefore, they will also have an impact on the resulting product. During the development of the project, there will be transitions and turns between the stages. Different solution methods will be explored especially for the problems that will arise during the development phase.



Conceptual Studies

The concept development phase is the phase where the justification, aims and objectives of the project are determined. In other words, it is the stage of defining the project. The aim and scope of the project to be realized must be in accordance with the laws, regulations, standards and ethical values associated with the project. A project that does not provide one of these should not be started. Similarly, projects that contradict society's moral values and general ethical values should not be prepared.

Deciding whether a project complies with laws, regulations, measures and ethical values can be both easy and difficult. If a weapon is produced for homeland defense, it is acceptable, but if it is to be produced for occupation of the country of others, it is not acceptable. It is necessary to think twice if the weapon is to be sold for money and to be sold to everybody.

Establishing a website to sell drugs, creating a gambling environment similarly is common in some countries, while in others it is prohibited by law.

A project that will enable companies providing general service to direct advertisements by looking at the content of the e-mails that come and go, should not be initiated because it contradicts the principle of privacy of personal information.

- Whether a project is in compliance with general and local laws, whether it contradicts ethical values, and whether it contradicts moral judgments should be addressed in detail during the concept development phase.
- Those who develop the biggest share concept in the responsibility that will occur after the project is completed. If an engineer participating in this stage sees the purpose and scope of the project, the law, regulation, measure does not comply with ethical values and morals, he must first warn those around him and leave his job when his warnings are not taken into consideration.

Determination of Requirements

After determining the purpose and scope of the project, it is time to determine the requirements. At this stage, what is expected from the project, what can be done when the project is completed and what its success should be determined. It is beneficial to be realistic during the determination of the requirements. The results that are difficult to realize should not be targeted and performance values that cannot be achieved should not be aimed.

Hardware components are also determined at the stage of determining the requirements. When determining the hardware components, each hardware:

- Technical specifications should be specified.
- Features that determine the hardware, such as operating speed, connectivity, memory capacity, etc. should be explained.
- The national and international standards that the hardware must comply with should be specified.

When the studies on determining the requirements are completed, a detailed requirement report should be prepared for each component of the information system. This report will actually be in the form of a technical specification. Features of each component will be included in this report. This report will be used as a resource during the evaluation of the problems that will arise when the project is completed.

Analysis

The solution stage can be started for an informatics project whose purpose and scope has been determined and requirements are defined. Each project can have multiple solutions. Some solutions can be expensive, some have high performance, and some have good security.

While preparing solution suggestions for the project, there may be different solution possibilities for all or certain parts of the project, different solutions can be found for the same purpose.

The important thing is to determine the most appropriate of these solutions. The most appropriate solution should be chosen from among the solutions that meet the project requirements completely. While conducting the most appropriate solution research, discussions may arise between the units and engineers who want the project.

- Everyone has the right to speak in their field of expertise. Outside his specialty, he should not speak even if he has authority.
- The person who is an expert in the field should definitely reveal the problem that may arise. He should explain the issue to those who are not experts in this matter but who have enforcement powers and state that they will account for the problems that will arise later. It must present this in writing.

Design

During the design work related to the solution determined during the analysis phase, a design must be made in accordance with the determined solution. The designer or team should not design according to his own wishes. In some cases, situations that force the designer may arise or the designer may find more suitable solutions. In such cases, the analysts should be discussed. At the end of these negotiations, changes can be made during the analysis phase.

The design document that will be prepared at the end of the design phase is extremely important for those who will develop programs. The presentation methods of the design are as important as the content of this document. It is recommended to use generally accepted methods as presentation format.

Development

Studies in the realization of an information system include software and hardware. The developed software is requested to be error-free and durable. However, it is not possible to say that software without errors has been developed. It should be considered that some program developers may behave unethically during the development of the software. Some examples of such behavior are given below:

- Some program developers use the program parts they have made in their past work to the program they have just developed. They may or may not care whether the patch is suitable for the new program. Such patches can cause problems over time.
- Some use the program parts prepared by others as they are. When what is in the ready program is not examined in detail, it can cause big problems.
- Programs are prepared to perform certain functions. It is known that not every program that provides the purpose will be sufficient. The program should be able to work in all conditions. For this, additions should be made to enable it to operate at different input values and under different conditions. Some programmers can dismiss such additions that will reinforce the program.
- Apart from these habits, some programmers embed a bomb program into the program, thinking that it might be necessary later. The bomb program can damage the entire information system at a time determined by the programmer.

Testing, Commissioning, Maintenance

Large-scale information systems must be tested strictly before commissioning. Tests should be carried out by a person or individuals who are not independent of and who develop the system naturally The task of testing engineers is to test a prepared software or, in a broader sense, the information system to operate under any condition.

Errors and odds that occur during the test are reported to the system developers and the problem is asked to be fixed. The test is repeated after the problems are fixed. An excuse such as "**overlooked**" during the testing process is not acceptable.

Problems may also be encountered during installation and commissioning. The source of the problems is determined and the relevant department is informed about this issue and the problem is asked to be resolved. It is witnessed that some commercial concerns and problems are ignored. Later, when the problems begin to emerge, it is understood that this event occurred as a result of who's being dismissed.

It is understood later that there are some errors especially in the software parts of the information systems. Patch programs are prepared to correct these errors. Such defects must be met up to a certain quality and quantity. When defects arise, users of the system should be warned immediately and necessary patches should be made. Hiding commercial concerns and errors and not distributing patches in a timely manner do not comply with ethical values.

Production and Application Responsibilities

Those who take part in production and implementation have responsibility related to the task they assume. This type of responsibility is called **role-based responsibility**.

It is accepted that some problems may arise when each product is used. The product can be a vehicle, a production system, or an information system. People's expectation is that the systems are smooth. However, it is known that a zero problem system cannot be created. The problem may arise from the product itself or from the way it is used. It is important to investigate the causes of this when a problem arises, as it will be instructive for further work. It is also a responsibility to explain the source of the problem to the concerned.

Responsibility for investigating a problem that arises during the use of a system is called **passive responsibility**. As we just mentioned, the important thing is to see the things that may cause problems during production and take the necessary measures. In addition, it is necessary to convey information about the part that may cause problems to the senior management. Responsibilities of those who take part in the production stage are defined as **active responsibilities**.

Sources of Errors

Production Error: Mistakes made knowingly or unknowingly during production.

Wrong Decision: It is a mistake to knowingly apply or apply a piece or method that may cause problems. It is seen that such errors are generally made by authorized managers.

Foresight: Even if there is no production error or wrong decision during production, There may be problems that may arise during its use. Being able to predict such potential problems requires a certain experience. When bad events are examined in terms of passive responsibilities, errors arising from inexperience are found.

Freedom of Action: The practitioner must decide at some points during the use of the product. Decision making means choosing one of the options. At this point, the authorized person using the product has the freedom to make decisions. He is responsible depending on the results of his decision.

Technical Aims

- Engineers are often open to innovation. The fact that young engineers have such objectives should be welcomed and even supported. It is known that most inventions are realized as a result of the engineers' goals. There were even those who risked their lives to achieve their goals.
- The period of single-person inventions has passed and team work is under way today. It is natural to have excited engineers in the team. The objectives of these excited engineers should be evaluated by experienced engineers.
- An engineer who changes the content of the project only for his individual excitement cannot be considered ethically correct.

The period of single-person inventions has passed and team work is under way today.

Some of the employees in the organization are more effective than other employees. For example, managers and owners are active people. Some people are experts on some issues, but their powers are limited. In order for a project to be successful, active people must make decisions by evaluating the expertise of the experts. It is not an ethical behavior especially for active people to direct the project using their activities.

Social Context

- Community health should be taken into consideration when producing each product. The product itself or its derivatives can cause harmful consequences for the community.

- Whether the subjects such as chemical substance, gun production, explosive production are beneficial or harmful for the society are always discussed. Some engineers do not think about where and for what purpose their research, which they have done as the captives of high target instincts, will be used.

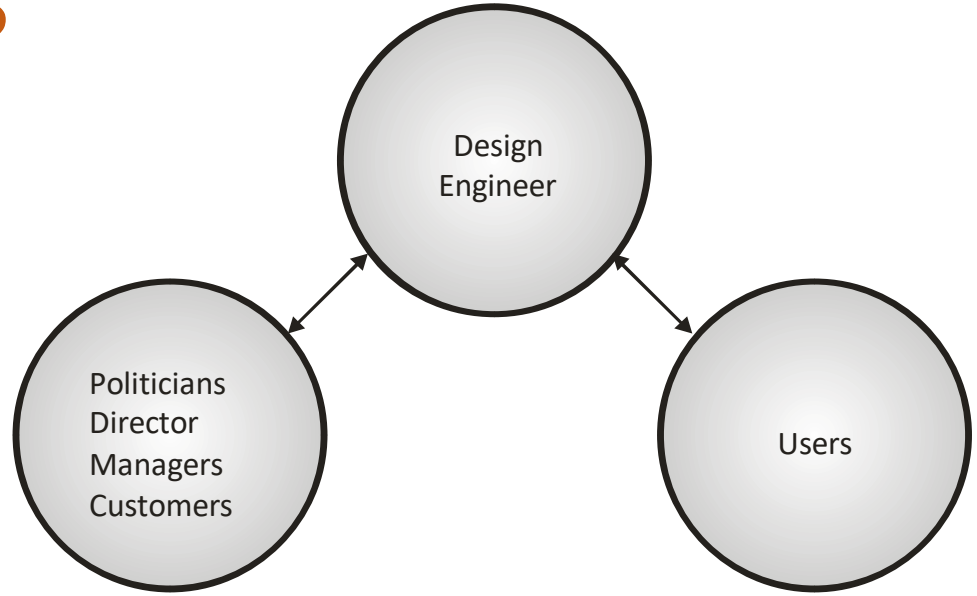
An engineer cannot say

"I do my job, the rest is not my business".

- It may not be thought that information systems can harm the society at first sight. However, it is seen by living that IT applications are as effective as a bomb, and that some of them are much stronger.
- Some examples of studies that will harm the society are given:
  - Establishing an information system that will take over the administration of a country's electricity distribution system without permission.
  - Preparing a program to read and evaluate the contents of e-mails sent by Internet service provider.
  - Preparation of a software that will take over the air traffic system.
  - Preparation of a software that will take over the city traffic system.

Engineers and Managers

- Within an organization, managers and engineers responsible for financial affairs work together. The efficiency and competencies of these different class employees within the organization are different. Engineers are experts in system design and implementation. For this reason, they are seen as the class producing within the organization. Managers can come from different professions, they may be engineers or social scientists. People responsible for financial issues will naturally be trained on these issues.



- If they do not come from the engineering field, those who are in the executive cluster may sometimes disagree with engineers.

- Authorities in an organization, and hence those who have influence, must consider the competencies of engineers. *I am the manager; what I say will be done.* This logic can cause great damage. Everyone in the organization should work and make decisions knowing their authority, knowledge and ability. This rule is called task sharing.

- Nowadays, engineered managers take part in certain business lines. It can be said that there are fewer managers and engineers conflicts in organizations where managers of engineer origin work.

Ethical Principles for Computer, IT and Software Engineers

A basic resource defining ethical rules for computer, IT and software engineers has been prepared by IEEE-CS and ACM.
The main issues addressed in these sources are:

Objective: It is prepared to explain the responsibility and ethical rules that software engineers must follow.
Software engineers are asked to know their responsibilities at all stages of the project (concept development, determining requirements, analysis, design, development, testing, commisioning and maintenance) and act according to ethical values in order to ensure that their professions are respected. As an engineer responsibility, they are asked to adhere to the following eight principles, prioritizing public welfare, safety and health:

1 - Public: Must be in the public interest. Therefore, he should take full responsibility for his work.

2 - Client and Employer: It should act in the interests of the client and employer, provided that it does not contradict the public interest.

3 - Product: The quality of the product to be developed should be aimed to be at the highest possible level.

4 - Judiciary: Their judgment should be consistent with the principle of consistency and independence.

5 - Management: Managers should adopt working in accordance with their methods of software development and maintenance and comply with ethical rules.

6 - Occupation: It should raise the reputation of its profession in a way to ensure the interests of the society.

7 - Colleagues: Should be fair and supportive to their colleagues.

8 - Essence: It should adopt lifelong learning and develop ethical values related to the profession.

Basic Principles of Professional Ethics

Justice: It is defined as the free, multi-faceted development of all people, sharing equal rights and responsibilities. Managers are obliged to distribute their duties, obligations and responsibilities fairly within the organization.

Equality: Equality is a concept integrated with the concepts of honesty and justice. It is expected that benefits, problems and services will be distributed equally within an organization.

Honesty and Integrity: Ethical behavior requires being honest with others.

Impartiality: Managers have to be neutral towards their colleagues.

Responsibility: It is defined as the fulfillment of a certain task in the desired quality and quantity.

Loyalty: Managers and employees must be committed to their professions and willing to progress and progress in their professions. For this purpose, they should attend meetings related to their professions, on-the-job trainings and watch the publications.

Love: Love requires being eager for someone else to grow and develop. The formation of love among colleagues provides development together.

Tolerance: When interacting with colleagues, it is important to work together to be tolerant so that you can replace yourself.

Respect: It is necessary to be respectful towards colleagues because they are human.

Frugality: It is necessary to use organization resources in the most efficient way, in other words, to be frugal.

Openness: The principle of openness should be adopted in interpersonal communication. Oral and written opinions should be clearly stated. Managers must be open to criticism in order to act openly. Criticism should be purposive, neutral, interest-free and personal.

Paying the Right of Labor: Employee's service is labor. The right of labor must be paid by the organization and the amount paid must be proportional to the labor.

Confronting Law and Unethical Orders: If the manager's orders are contrary to laws and ethical rules, the employee has the right to oppose and resist.

Unethical Behaviors

- Not caring about the quality of work.
- Ignoring product liability and safety.
- Abusing institutional assets.
- To neglect the task.
- Discrimination in the workplace.
- Not treating employees equally.
- Using the facilities of the institution for personal purposes.
- Interfering with private life.
- Requesting or giving bribes, receiving gifts and entertainment.
- Misinformation or storing information.
- Making changes in interest in documents and reports.
- Abuse of authority.

- Establish an unethical relationship with the authorities.
- Entering conflicts of interest.
- Intimidating and frightening colleagues.
- Exploiting co-workers.
- Theft at work.
- Leak commercial or professional secrets.
- Using unethical methods to gather information about competitors.
- Making false and defamatory discourses about colleagues.
- Saying insults and rude words against those in the institution.
- Sexually harassing.

Ethical Judgment of Behaviors

There may be different reasons for breaking the code of ethics, for example:

- Ambition: Profession ambition, ambition to outlast competitors, money making ambition,
- The desire to have the power of management,
- Lack of experience,
- Selfishness,
- Technical incompetence,
- Not knowing the laws, regulations and standards,
- Hiding an event for the purpose of protecting the organization or person, providing benefits to witnesses to hide,
- Political view

It is suggested that a manager, engineer or practitioner answer the following questions to test whether his decision about the situation he is currently facing is ethical:

1. Is it true ?: The question about whether the decision to be made is not correct.
2. Is it fair ?: The question about whether the decision to be made is fair or not.
3. If one of the decisions is to be harmed, who is this ?: This question is in line with the concept of utilitarian ethics.
4. If your decision is at the forefront of the press, would you feel uncomfortable?
5. Does the decision you make disturb your relatives around you
6. What does the decision look like?