Informatics Ethics and Law

Prof. Dr. Eşref ADALI

IT System Design and Development
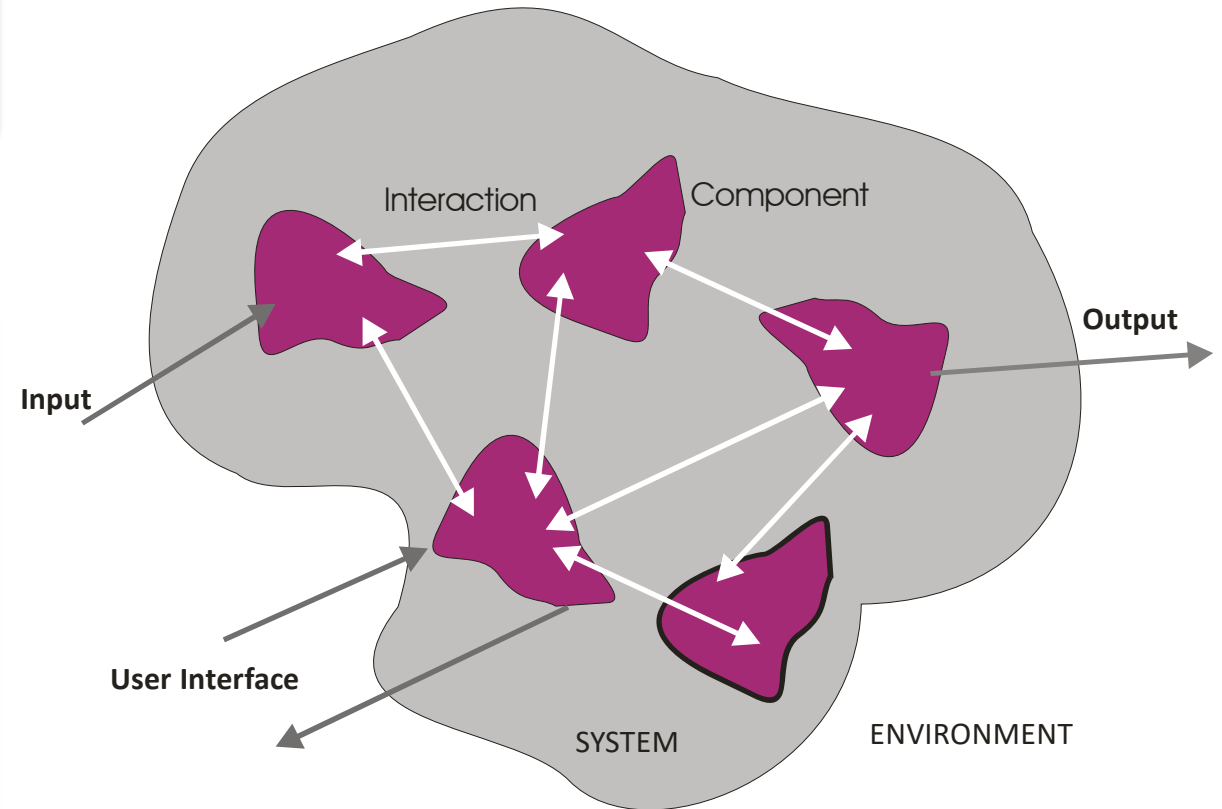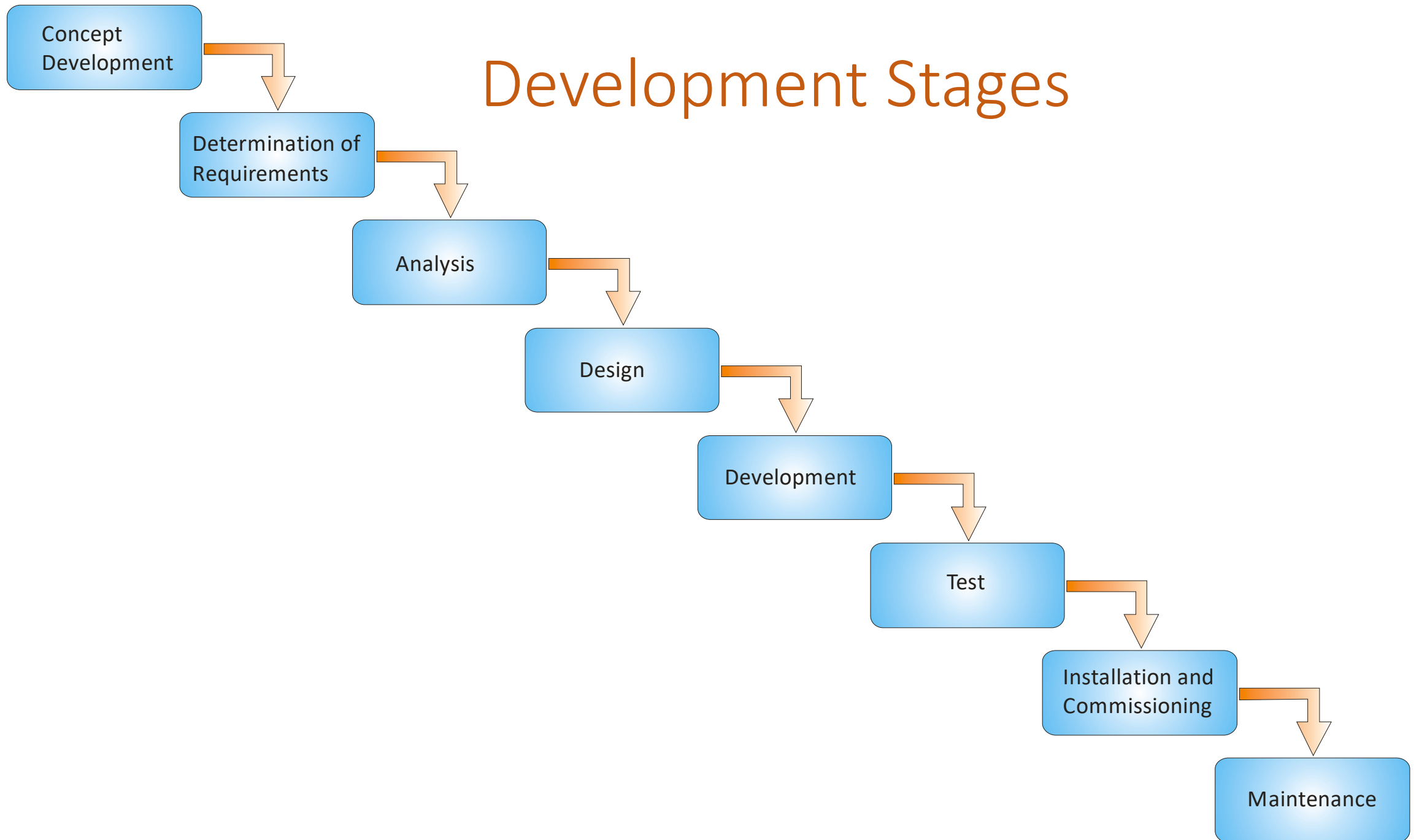
7

System

A set of components that come together and work together to perform a certain job is called a **system**.

A system should have the following features:
- Every system should serve a purpose,
- Every system should have a limit,
- The system must consist of components,
- There are relationships between components.
- Each system interacts with its environment.
- In order to interact with its environment, there should be input and exit possibilities and a user interface if necessary,
- Every system should have its limitations.

Development Stages

Concept Development

Determination of Requirements

Analysis

Design

Development

Test

Installation and Commissioning

Maintenance

Concept Development

We briefly call the concept development studies for the determination of the project **target**, **purpose** and **scope**.

Those whose opinions and requests will be consulted can be classified as follows:

Top Managers: Depending on the size of the business, the owner or general manager of the business is considered a top manager. As the top manager will have the power to make decisions, he is considered a key person for the project.

Managers: It consists of the managers of departments or units where the information system will be used. Managers are responsible for jobs within their departments. Therefore, they are concerned with the part of the information system that concerns them and the interaction with other departments.

Employees: People who will use the information system are called as employees or users. The people in this class want to know about the conveniences that the information system will provide them, as well as the difficulties they will encounter during use.

Designers and developers: Those who will design and develop the information system may not be in the business. Whether inside or outside the business, it is a group that needs to work together in the decision making process for the information system.

Ethics and Law in Concept Development Stage

The system desired to be realized must first of all be in accordance with the laws and ethical values. No matter who wants to develop a system that is not in compliance with the law, it should be opposed. If the top manager wants to set up such a system, managers, employees, designers and developers should stand up. They may be dismissed as a result of disagreeing with the top manager's request. However, they will be happy later because they do not participate in the crime. If the legal or unethical system recommendation comes from managers, users or designers, the top manager should not allow it.

Those involved in a legal or unethical project are equally responsible to the law. Crime rate is higher especially for top manager and then managers.

Known examples of illegal but established information systems include gambling, drug marketing and child abuse websites. Although those who set up these sites know that the system they set up is not legal and ethical, they do these things with the ambition of making money.

An unethical practice that is not prevented by law is solving services, preparing homework and preparing a thesis. In order to provide this service, those who provide services over Internet say that they have established this system in order to contribute to the students and that they do not provide illegal services. Those who do their homework and even their thesis in such a place, deceive someone when they present it and get a passing grade or degree. So what they do is not ethical.

Determination of Requirements

After the concept development studies are completed, the requirements of the information system that is targeted to be realized should be determined. In the CMMI method, which is widely used in software development, requirements are classified into three types:

Customer or user requirements

Product requirements

Product component requirements

The following constraints should also be taken into account when determining the requirements:

Constraints from today's technology

Constraints from today's technology

Temporal constraints

Possible risks

Universal and local legal constraints

It is the constraints set by universal and local laws that need to be considered during the determination of requirements. Universal and local ethical values can be added to these constraints.

Analysis

During the analysis of an information system, we may encounter different options. Some of these options may have been tried and used, and some may be more current but not tried. Top managers, managers, employees, designers and consultants, if any, should work together to determine which of these solutions are best suited for the business.

Conservative Approaches: For the information system that needs to be established in order to meet the information system goals determined by the enterprise, solutions that use conventional and known technologies should be considered first.

Striking Approaches: The most up-to-date and striking solution examples for the information system that must be established to meet the set goals should also be considered. These solutions, which we call striking approaches, may still not be used. Therefore, we may not know about their reliability. However, the superiority of such solutions should be demonstrated.

Today's Solution Opportunities: In addition to the solutions proposed with a conservative and striking approach, the existing solution possibilities should be offered to the decision makers. In this way, it can be decided which solution will be more suitable for the business.

Ethics and Law in the Analysis Stage

During the analysis phase, we encounter different solutions as described above. When evaluating these solutions, the following points should be considered:

All possible solutions must be legal.

Possible solutions can be striking and conservative. They are also evaluated in terms of cost.

Striking suggestions are recommended by those with a breakthrough character. It is obvious that such projects will carry risks, but it is known that competitors will be prevented when successfully completed. Those who make striking suggestions will consider themselves successful when the project is completed. It should be investigated whether those who made striking suggestions made this proposal for the success of the organization or for their own success. Only those who make suggestions for their ambition and success can be considered unethical.

Conservative suggestions can be considered irresponsible at first glance. However, it can be said that they do not act ethically when they consider their conservative suggestions so as not to disturb their comfort.

Of course, it is desirable that the material burden of the solution options is low. However, sacrificing quality in order to provide a low-cost solution can cause major problems during the application phase. Even using hardware or software that seems likely to be a problem in the future means breaking the ethical values.

Feasibility Study

Before an investment decision is made for any project, it is investigated whether the project considered is feasible first and then whether it is profitable. These studies are called feasibility studies. Coverage of feasibility is:

- The objectives of the project
- Current state
- Solution possibilities
- Financial aspect and return of each solution
- Comparison of solution possibilities financially and technologically
- Determination of the most suitable solution
- Calculation of investment requirements for the most suitable solution
- Calculation of the most suitable solution operating costs
- Examining the income and expense status of the most appropriate solution depending on the years

Investigation calculations made at the feasibility stage must be made honestly. Changes to the accounts and features in order to show the proposed projects good or bad to senior management mean breaking the ethical values.
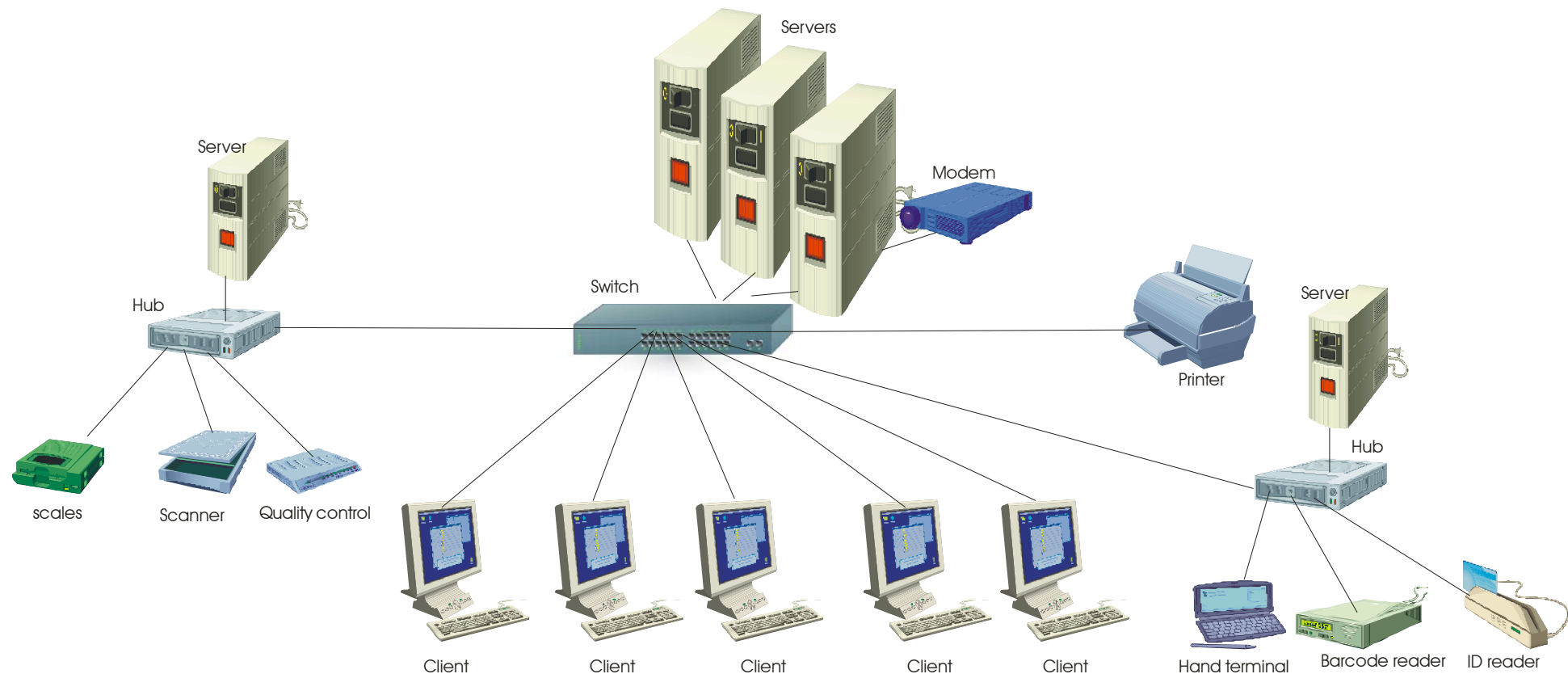
Compliance of the Project with Laws and Rules

It cannot be said that every project put forward during concept development is feasible. The project can be technically highly competent. However, the form of implementation of the project may not comply with social rules or even laws.

The feasibility of a project should not only be evaluated technically; It should also be evaluated in terms of compliance with national, international customs, rules and laws.

Design

The design of an information system is done in two parts as hardware and software. Hardware-related design can be considered easier than software design. The products to be used in the hardware can be supplied to a large extent. At worst, existing hardware can be easily adapted to meet the requirements. When evaluated from this point of view, it would be a more accurate definition to determine the technical qualities of the hardware. It is very easy to select the software to be used in the design from among the ready-made software. However, it is not always possible to find ready-made software.

Development

The realization of a software is, according to some, the simplest stage during the development of the information system. For this reason, this stage is also called the coding stage. However, those who have experience on the subject disagree with this view. There are issues to be considered during the realization of a software that has been designed with the most successful software. Writing programs without errors is at the top of these issues.

Software developers develop the software in accordance with the software design document given to them. During the development phase, they use the software development infrastructure, if any. In the meantime, they add some object or service programs previously prepared in the organization to the software. While adding these connections and making connections, they pay attention to compatibility of object and utility programs.

The programming phase of a software whose analysis and design has been completed requires particular attention.

- Those who write the program may or may not ignore some parts, knowingly or unknowingly. The effect of the defected portions may not appear in the first uses, but is seen when the software is started to be used. If the prosecution has been done deliberately, it can be considered as a crime against the institution, beyond being ethical.
- It is known that program parts are placed in the program to work when a certain time or situation arises. It is illegal to intentionally insert such program parts, called virtual time bombs, into the program.

Test

Software that has been completed should definitely be tested. Testing is naturally done by a person or individuals independent of software developers. The objectives and performance criteria are taken into consideration during the testing phase. In addition, the software is tested for errors. Various methods developed for this purpose are used to find errors.

The program components that make up the software are tested one by one in the first phase of the test run. This stage is called unit testing. Those who fail this test are sent back to the performers for correction. After the corrections are made, they are tested again. This cycle is repeated until the program is error free.

After all the program components that make up the software have successfully passed the unit test, the interoperability test phase is passed. Errors encountered at this stage are sent back for correction. This process continues until the interop test is error free.

For information systems containing hardware, it is also tested whether the software works in harmony with the hardware.

A software needs to be tested for both functionality and malicious additions and repudiations.
Therefore, the test should be tested first for functionality and then for source code.
No flaws should be ruled out during testing.

Installation, Commissioning and Maintenance

An information system that has successfully passed all of the testing steps is set up and put into operation at the relevant location. Some problems arise during the installation and commissioning phase. The cause of these problems is investigated first. Then each problem is tried to be solved. Some problems may occur later.

Problems are encountered later in an information system that has been successfully established and commissioned. These problems may be caused by errors that have not been noticed before, as well as emerging requests and situations. Therefore, maintenance service should be considered for each software and planning should be done accordingly.