Republic of the Philippines
SORSOGON STATE COLLEGE – BULAN CAMPUS
Information and Communication Technology Department

PLATFORM TECHNOLOGIES

Week 3 – General Concept of Systems

Description

The purpose of this course is to enable students the knowledge in the key concepts and principles of basic operation of platform technologies, including general purpose computers and peripherals, and communication infrastructure such as transmission systems (copper, wireless, optical fibre), networking and networking devices. In addition, this unit introduces digital data representation, including number systems and character encodings

This course develops the essential skills to install, use, and support PC hardware and software proficiency skills and to be able to identify and diagnose possible problems and troubleshoot personal computer systems.

Module for: BSIT 2A and 2B Students

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Module 2– *System Concepts and System Architecture*

I. Learning Activities Assignment and Assessment

The general concept of Systems

The purpose of an IT system is to allow organizations to process, access, and share information. The results of a successful IT system are documents, information, improved business processes and productivity, profits, strategic plans, and the like. This is, in fact, the "output" of the input–processing–output (IPO) model

In general, though, there is no requirement that a system serve a specific, definable purpose. The fact that the set of components may be considered as a single unit is sufficient to satisfy the concept of a system. The solar system is an example of a system where the purpose is unspecified. There is also no requirement that the components of a system be physical. The links between components can also be physical or conceptual. In fact, the system itself may be conceptual, rather than physical. The number system is an example of a conceptual system. Computer operating systems are also conceptual, rather than physical. Business systems are also conceptual, although some of the components that they contain may be physical. The words *tangible and intangible* are sometimes used in place of *physical and conceptual*, respectively. Intangible or conceptual components and systems include *ideas*, *methods*, *principles and policies*, *processes*, *software*, *and other abstractions*.

If, for example, the components in a system represent steps (intangible) in multistep process, the links may represent the need to complete one step before the next is begun (also intangible).

FIGURE 2.1(a)

Plumbing System Diagram

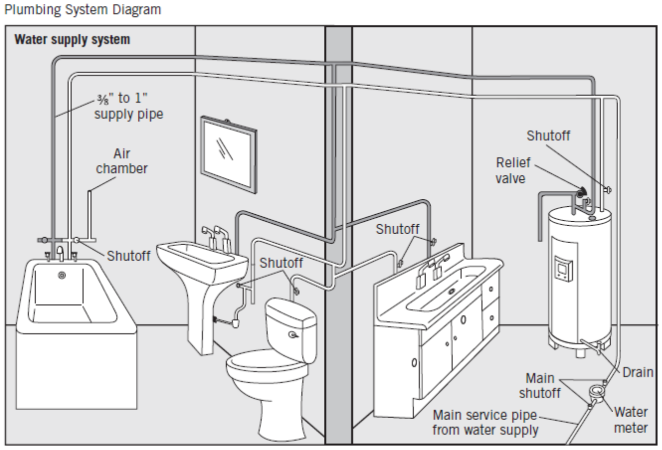


Figure 2.1(a) is a model of a home plumbing system. This is a physical system. The components are plumbing fixtures, linked by pipes. Figure 2.1(b) is a simplified representation of the solar system. The sun and planets are physical; the links in this system are conceptual, specifically, the distance of each planet from the sun, interplanetary and solar gravity, orbital relationships, the distances between planets at a particular point in time, and other attributes.

FIGURE 2.1(b)

The Solar System

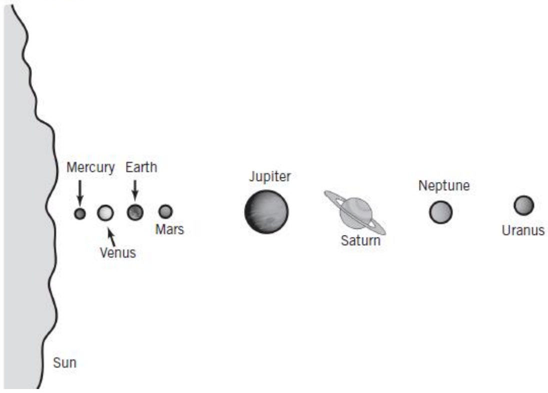


FIGURE 2.1(c)

A Typical Home Network System

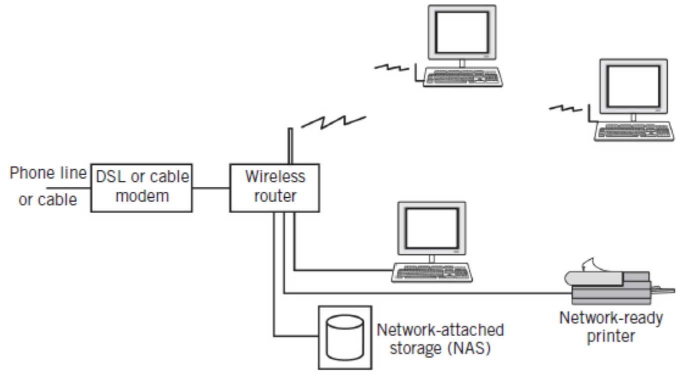


Figure 2.1(c) is a diagram of a home networking system. The links in this case are a mixture of physical wires and (intangible) wireless connections. Sometimes the nature of the links is important only in terms of providing the proper interface connections to the components.

With these pictures and ideas about systems in mind, we will define a system as follows:

A system is a collection of components linked together and organized in such a way as to be recognizable as a single unit.

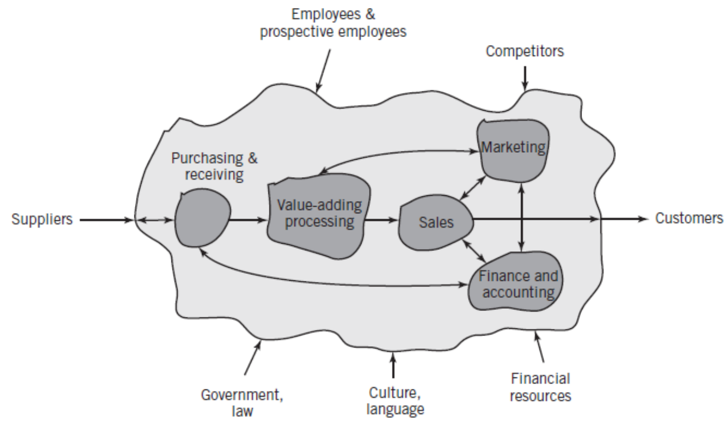
The linked components that constitute a system also define a boundary for the system. Anything outside the boundary represents the environment that the system operates or presents itself within. The environment may interact with and affect the system in various ways. The interface between the system and its environment is an important characteristic of the system. If the interface is well defined, it is often possible to replace the existing system with a different system, as long as the interface between the system and the environment remains constant.

This idea can have important implications when designing IT systems. *For example, in a particular IT installation, a single large computer may be functionally the same as a network of small computers. When we define inputs and outputs for a system, the environment is the source of the input and also the receiver of the output*.

As an example of the relationship between a system and its environment, consider the rather simplistic view of an e-business system illustrated in Figure 2.3. The organization represented by this illustration purchases goods from suppliers and makes them available for sale. (The value-adding component in the figure consists of various operations that make it worthwhile to buy from this organization, rather than directly from the supplier.

FIGURE 2.3

A Simple E-Business System



For example, Amazon.com makes it possible to buy a wide variety of books from one source, rather than having to place separate orders from a number of different suppliers.) The environment for this system consists of customers who purchase from the system, suppliers to the system, governments who control the legal aspects of the business and collect taxes, employees and prospective employees, external support personnel (**such as repair people**), *financial resources, and others.* The primary interfaces for this system are system input from suppliers and system output to purchasers; however, there are additional, subtler interfaces to be considered, including ***legal, cultural, and financial interactions*** with the system. *For example, sensitive cultural and language issues that offend potential customers on a website might have an important impact on an organization's sales.*

When analyzing a system, the components of the system may be treated as irreducible or they may themselves be representable as systems. When considered in the context of a particular system, these components would be viewed more accurately as **subsystems.**

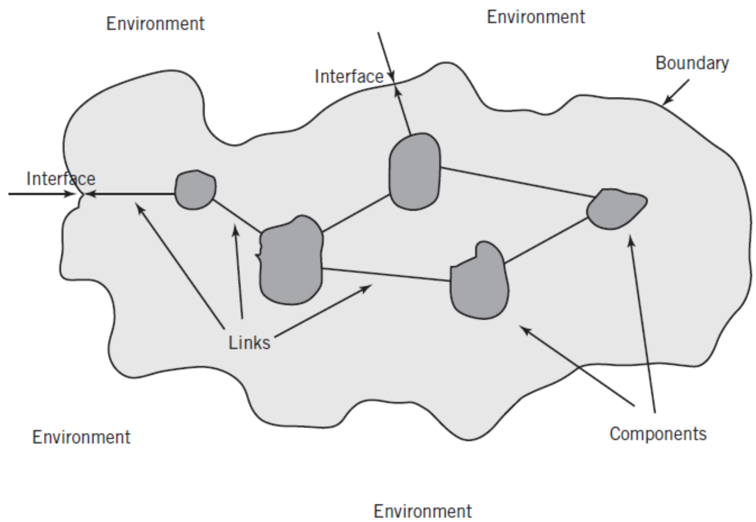
A **business IT system**, for example, might have *marketing, manufacturing, purchasing, inventory, finance, and accounting subsystems, among others*. Even these components might be expanded. The marketing subsystem might be further broken *down into sales, development, and advertising components, as one possibility*. The level of detail to be considered depends on the context in which the system is being considered, discussed, evaluated, or used. The division of a system or subsystem into its components and linkages is called **decomposition**.

Decomposition *is inherently hierarchical. The ability to decompose a system hierarchically into* ***subsequent*** *sets of components and subsystems is an important property of systems.*

The fundamental properties, and the patterns of relationships, connections, constraints, and linkages among the components and between the system and its environment are known collectively as the **architecture** of the system.

FIGURE 2.2

General Representation of a System



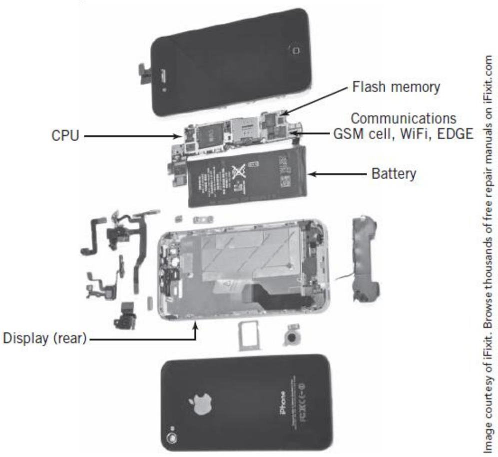
It is common to represent systems and their components by models or drawings on paper or objects within a computer program. *These representations are abstractions*. They represent the real system but are not actually the real system. (For example, the solar system does not fit conveniently inside a computer!) It should be obvious to you that all of the illustrations of systems in Figures 2.1, 2.2, and 2.3 are abstractions.

Abstraction in its main sense is a conceptual process where general rules and concepts are derived from the usage and classification of specific examples, literal ("real" or "concrete") signifiers, first principles, or other methods.

The primary reason for humans to group components into systems and to represent them as abstractions is to simplify understanding and analysis, particularly if the individual components are numerous and complex. We can study the relationships between the different components without the distraction created by the details of individual components. We can decompose, isolate, and study individual components when required. We can study the interactions between the environment and the system as a whole. Effectively, our analyses are simplified by eliminating factors that are not relevant in the context of our interests.

FIGURE 2.4

iPhone Components

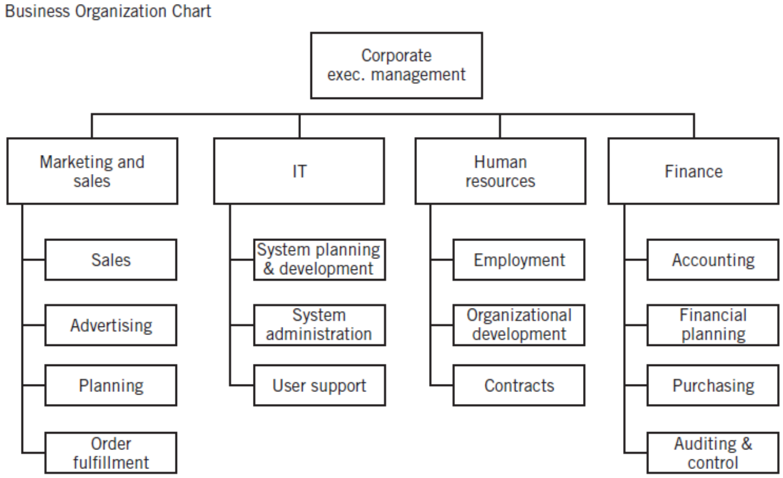


When the goal of a project is to implement a system of some type, it is sometimes convenient to view the components of a system as modules that can be implemented independently, then linked together to produce the final result. This technique *can simplify analysis, design, assembly, upgrading, and even repair*. *It also supports collaboration during the design process, since individual components can be designed by different individuals using specifications for the interfaces.*

For example, a cell phone might consist of a computer control module, a memory module, a display module, an audio I/O module, a radio transmitter/receiver module, a keypad/text input module, and a wireless networking module. Each component might have been developed by a different team. These modules, designed, constructed, and manufactured as individual assemblies, properly interfaced, wired together, and mounted into a case, constitute the design of a typical cell phone. They also represent the components that might appear in the system diagram for a cell phone. The same approach might be taken with a computer system, with a central processor module, a graphics display module, an audio module, a network module, a hard drive controller module, and so on. Figure 2.4, for example, shows the basic system *hardware components that make up an iPhone.*

FIGURE 2.5(a)

Business Organization Chart



It is also important to realize that there may be many different representations for a system to reflect the various uses of the system model. Returning to our IT roots, for an example, the representation of the business system shown in Figure 2.5(a) is a traditional hierarchical organization chart. The components are departments that perform various functions within the business.

Progress Assessment

Answer the Progress Assessment question 1.0 Week 3 on the Learning Management System.

II. Assessment (Quiz)

Assessment

The Questions in this assessment is available on the Learning Management System, you can take the assessment within the week.

References:

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