Chapter 2
An Introduction to System Concepts and Systems Architecture

2.1. (BL 2) There are a number of possibilities. Here are two: a *functional* representation, in which the components include the digestive system, circulatory system, skeletal system, nervous system, muscular system, respiratory system, reproductive system, etc. The digestive system can be broken further into the stomach, intestines, liver, bladder, rectum, and so on. Another system representation would be *physical*. System components would consist of head, arms, hands, torso, legs, and feet. Head components might include forehead, ears, eyes, nose, mouth, chin, and so on. There are many other possible models that students might come up with.

2.2. *The answer to this question will be different for every student, depending on the organization that they select.*

2.3. (BL 2-) The parts of the book are divided into *chapters*. Chapters are comprised of sections, including numbered sections, plus summary and review, "for further reading," key concepts and terms, reading review questions, and exercises sections. Many sections are subdivided into *subsections*. Beneath the sections or subsections are *paragraphs*, and then *sentences*, *words*, and *alphanumeric characters*.
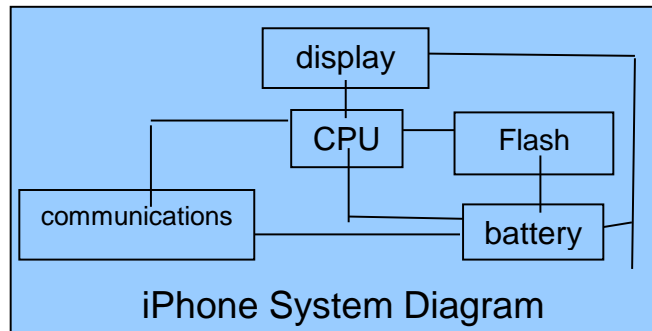
2.4. (BL 2) The key to system analysis is the ability to divide a system into smaller pieces that can be analyzed more easily and somewhat independently. Because the system is made up of components and links it becomes possible to decompose and analyze components individually and to isolate and study the interactions between components that comprise the links. Further decomposition allows simplification of the analysis of the more complex components. Additionally, the clear delineation between a system and its environment allows analysis of the interaction and impacts between the system and the various elements of the environment.

2.5. (BL 2) The input to this system is a request for data from the database in the form of a query. The environmental element making the request is a *user*. The expected output from the system is the requested data. Again, the environmental element receiving the output is the user.

The processing takes place in a number of steps:

(1) Keyboard input from the user is translated by the Web browser into an HTTP request, which is sent to the Web server.
(2) The Web server interprets the user's request, creates a corresponding CGI request, and sends the CGI request to the database server.
(3) The database server processes the request to obtain the desired database results, and returns the results to the Web Server.
(4) If necessary, the Web server transforms the results into suitable HTML format and sends the HTML to the Web browser for display.
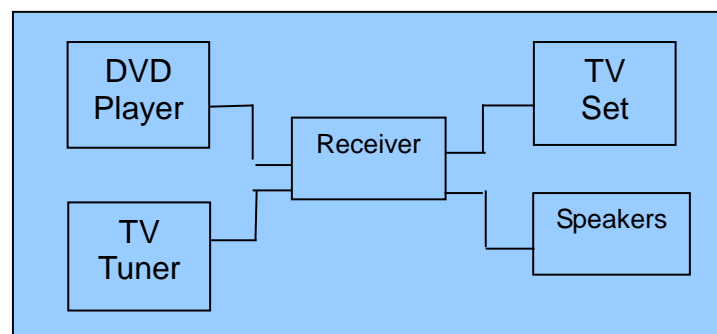(5) The Web browser processes the HTML to display the results for the user.

2.6. (BL 2-)

iPhone System Diagram

2.7. (BL 2-) The cloud is an abstraction representing the end-to-end connection between two communicating computers, including all components required to implement and support the connection. These components might include computers, routers, modems, cables, transmitters, receivers, software, protocols, Wi-Fi access points, etc.
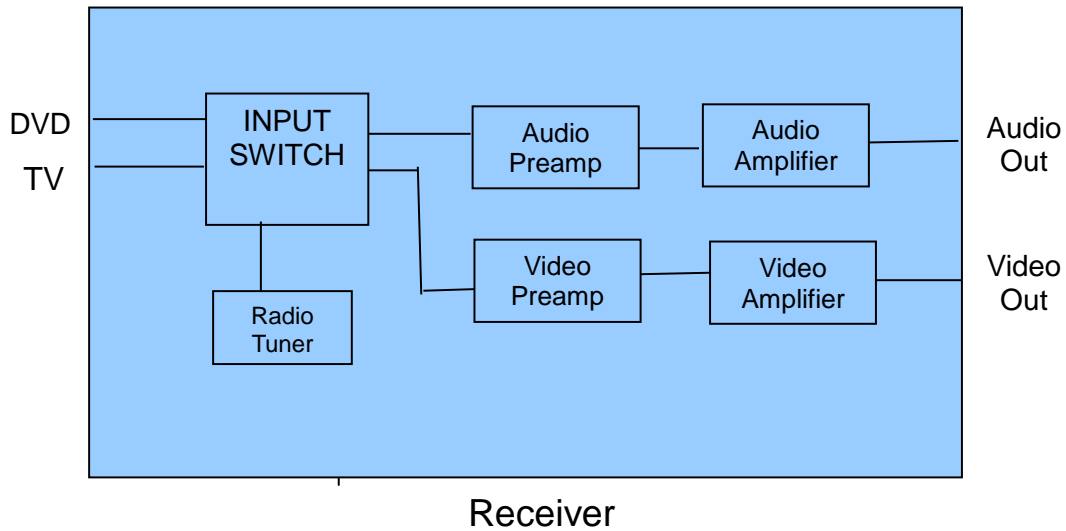
2.8. (BL 2+) The primary environmental interface for this system is *customers*. Within this context, however, there are a number of environmental requirements and constraints, including cultural, finance, shipping and delivery issues, taxes and import duties, supplier, and legal issues. The financial interface must provide a means for customers to pay, preferably in their own currency, using secure payment techniques that are appropriate to their normal usage. The cultural environment requires a Web design that considers the language(s) in use, particular design, words, and color elements that may please or offend customers, and the like. Shipping and delivery to a particular country may be difficult or impossible, or may require use of particular carriers. It may also affect the choice of shipping point, particularly if taxes or import duties must be charged to the customer and paid. There must be a convenient means of customer support available. Finally, legal issues may make sales and delivery of some items to a particular country or area difficult or impossible. There are many other environmental issues that a student might mention, as well.

2.9. (BL 2)

Home Theatre System

The inputs to this system are DVDs for the DVD player, and an antenna, cable, or satellite connection for the TV tuner. The outputs are the display on the TV set and audio from the speakers.

Receiver

The inputs to the receiver consist of the outputs from the DVD player and the TV tuner. The video output from the receiver goes to the TV set; the audio output goes to the speakers. The inputs and outputs for the receiver correspond to the links in the home theatre system diagram, as one would expect.

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