Chapter 2 An Introduction to System Concepts

1) From a systems perspective, how would you classify a computer operating system?
a) A tangible system
b) A physical system
c) A conceptual system
d) A perceptible system

Section 2.1 The General Concept of Systems

2) Anything outside the system boundary represents the _____ that the system operates.
a) interface
b) subsystem
c) environment
d) super system

Section 2.1 The General Concept of Systems

3) A large organization's IT system might have specific programs such as marketing, manufacturing, purchasing, inventory, finance, and accounting. These are considered _____ to the larger IT system.
a) interfaces
b) subsystems
c) the environment
d) super systems

Section 2.1 The General Concept of Systems

4) The division of a system or subsystem into its components and linkages is called
a) itemization
b) reconstruction
c) decomposition
d) categorization

Section 2.1 The General Concept of Systems

5) What is not part of an abstract description of system architecture?
a) system constraints
b) system interconnections
c) linkages among the components
d) physical location of the servers

Section 2.1 The General Concept of Systems

6) Which of the following are not input devices?
a) stylus
b) headphones
c) touch screen
d) mouse and keyboard

Section 2.2 IT System Architectures

7) The system architecture representation of the flow and processing of data within an organization is called
a) three-tier architecture
b) application architecture
c) flow control architecture
d) customer oriented architecture

Section 2.2 IT System Architectures

8) Scalability is the ability of a system to
a) handle a growing amount of work.
b) allow access to information when it is needed.
c) protect data against unauthorized access or modification.
d) allow configuration, monitoring, and maintaining operation.

Section 2.2 IT System Architectures

9) Information availability is the ability of a system to
a) handle a growing amount of work.
b) allow access to information when it is needed.
c) protect data against unauthorized access or modification.
d) allow configuration, monitoring, and maintaining operation.

Section 2.2 IT System Architectures

10) Data security is the ability of a system to
a) handle a growing amount of work.
b) allow access to information when it is needed.
c) protect data against unauthorized access or modification.
d) allow configuration, monitoring, and maintaining operation.

Section 2.2 IT System Architectures

11) System administration is the ability of a system to
a) handle a growing amount of work.
b) allow access to information when it is needed.
c) protect data against unauthorized access or modification.
d) allow configuration, monitoring, and maintaining operation.

Section 2.2 IT System Architectures

12) In a client-server architecture, the only limitations to running multiple applications on a single server are the potential slowdowns that may result from the load on the server computer and
a) traffic on the Internet.
b) load on client computer.
c) users who open many web browsers.
d) the traffic on the network to that server.

Section 2.2 IT System Architectures

13) A two-tier architecture simply means that there are _____ computers involved in the service.
a) one
b) two
c) two to five
d) two or more

Section 2.2 IT System Architectures

14) A web-browser connected to a web-server is an example of
a) multiprocessing
b) cluster computing
c) n-tier architecture
d) client-server technology

Section 2.2 IT System Architectures

15) Because response time is considered an important measure by most Web users, it is often more practical to separate the database and page processing into a third computer system. This is an example of
a) multiprocessing
b) cluster computing
c) n-tier architecture
d) three-tier architecture

Section 2.2 IT System Architectures

16) The protocol that makes communication between a Web server and a database application possible is called
a) SQL
b) HTTP
c) Database Control Language
d) Common Gateway Interface

Section 2.2 IT System Architectures

17) _____ is software designed to handle potential incompatibilities between the application software that resides on different equipment.
a) Middleware
b) Versioning software
c) Compatibility software
d) Application interface software

Section 2.2 IT System Architectures

18) The organization's internal network, isbcommonly called a(n)
a) intranet
b) employee network
c) corporation network
d) organizational network

Section 2.2 IT System Architectures

19) Internet standards such as _____ allow the easy identification of relevant data within data streams between interconnected systems, making these applications possible and practical.
a) XML
b) FTP
c) SSH

d) HTTPS

Section 2.2 IT System Architectures

20) What is not a benefit of cloud services?
a) Backup and offsite storage
b) Additional computing capability when and where it is needed
c) Lower hardware and software investments
d) Added security

Section 2.2 IT System Architectures

Chapter 2 Discussion Questions

1) What is the top-down approach to system architecture?

Sol: Short description: Start with the system as a whole and then continuously decompose each function into a set of dependent subsystems of increasing detail.

Sol: from the text: "The analysis, design, and implementation of IT systems must take place at different levels of detail and frequently require collaboration among many analysts and designers. This corresponds well with the ability to decompose systems into components, hierarchically, which allows us to concentrate at the appropriate levels of detail during each step along the way. This approach is known as a top-down approach."

2) What are the benefits of the top-down approach to system architecture?

Sol: from the text: "The top-down approach allows us to focus on the specific areas of interest without the distraction of details that are irrelevant for the level that we're studying. In this way, a system architect can analyze and study the IT system as a whole, encapsulating the computer systems, software systems, network architecture, and Web architecture that represent components, and focusing instead on the large picture: the purpose of each component and the requirements for the interfaces and linkages that connect and integrate them. With the IT system architecture firmly established, we can consider the individual business functions, computer systems, and networks that will link them together. For IT system analysis, this is often sufficient, at least superficially, assuming that the system architects actually understand the conditions and constraints imposed by details at the lower levels."

3) Give a short description of peer-to-peer architecture.

Sol: from the text: "An alternative to client-server architecture is peer-to-peer architecture. Peer-to-peer architecture treats the computers in a network as equals, with the ability to share files and other resources and to move them between computers."

4) Reread "Google: A System Architecture Example" from the text. What are Google's three specific processing tasks that the system must fulfill?

Sol:
1) The system must accept search requests from users, identify and rank matches, create a Web page, and serve it to the user.
2) The system must collect data—lots of data! This task "crawls the Web," identifies the search terms (every significant word) on every Web page it encounters, and maintains an

index database connecting each term to the corresponding page. It likewise stores every Web page in a Web page database and assigns a ranking value to each entry.
3) The system must manage advertisements, identify appropriate advertisements in response to user search requests, and make the advertisements available to the Web page creation application mentioned in 1.

May be more suitable for an exercise or take-home test.

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5) Why does Google use inexpensive commodity PCs, similar to standard, medium power, non-state-of-the-art, off-the-shelf PCs in its datacenter?

Sol: From the text: "Overall, this design allows a large number of searches to progress in parallel. The use of inexpensive PC hardware makes the solution cost-effective. The system can be scaled easily by adding more computers. Finally, the failure of a PC does not result in failure and, in fact, has minimal effect on the performance of the system overall. Thus, this solution meets the original requirements admirably."

There is a good article here:
Taylor, 2003. Google's Secret: 'Cheap and Fast' Hardware.
http://www.pcworld.com/article/112891/article.html

Solutions

Problem	Answer	Section in text / comments
1	c	**Section 2.1 The General Concept of Systems**
2	c	**Section 2.1 The General Concept of Systems**
3	b	**Section 2.1 The General Concept of Systems**
4	c	**Section 2.1 The General Concept of Systems**
5	d	**Section 2.1 The General Concept of Systems**
6	b	**Section 2.2 IT System Architectures**
7	b	**Section 2.2 IT System Architectures**
8	a	**Section 2.2 IT System Architectures**
9	b	**Section 2.2 IT System Architectures**
10	c	**Section 2.2 IT System Architectures**
11	d	**Section 2.2 IT System Architectures**
12	d	**Section 2.2 IT System Architectures**
13	b	**Section 2.2 IT System Architectures**
14	d	**Section 2.2 IT System Architectures**
15	d	**Section 2.2 IT System Architectures**
16	d	**Section 2.2 IT System Architectures**
17	a	**Section 2.2 IT System Architectures**
18	a	**Section 2.2 IT System Architectures**
19	a	**Section 2.2 IT System Architectures**
20	d	**Section 2.2 IT System Architectures**