**CIS 350 – INFRASTRUCTURE TECHNOLOGIES**

**HOMEWORK # 1**

Group homework: maximum 2 students

Student Name(s):

\_\_\_\_\_\_\_\_Louis S. Ries\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

# Topics: Chapters 1 and 2 (Englander)

Fill out the blanks or circle the right answer for multiple choice or True/False questions. Staple all your work and turn in this homework with the attached pages at the beginning of class on the due day.

Part A.

1. The architecture of the computer system rests on a solid foundation that has changed only slightly and gradually since the \_\_\_\_\_\_\_\_\_\_.

a. late 1930s b. late 1940s c. late 1950s d. late 1960s

2. As a matter of necessity, network interfaces must conform to standard agreements, known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, for messages to be understood by both computers during a message exchange between a pair of computers.

**a**. protocols b. I/O services c. device controllers d. Ethernet standards

3. The \_\_\_\_\_\_\_\_\_\_\_\_\_ provides the physical mechanisms to input and output data, to manipulate and process data, and to electronically control the various input, output, and storage components.

a. data b. network c. computer hardware d. computer software

4. Which of the following is *not* part of the conceptual view of a CPU?

a. ALU b. Control Unit c. Interface Unit d. Main memory

5. The idea that the program instructions and data are both stored in memory while being processed is known as the

a. processing concept. b. stored program concept. c. data-instruction concept.

d. memory-data-instruction concept.

6. The operating system's \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ acts as an interface for application programs and utilities to access the internal services provided by the operating system.

a. monitoring system b. supervising system c. application subsystem

d. application program interface

7. The fact that different types of computers can work together, share files, and communicate successfully is known as

a. supercomputing b. open computing c. distributed computing

d. coupled systems computing

8. \_\_\_\_\_\_\_\_\_\_\_ are agreements among interested parties, often manufacturers, to assure that various system components will work together interchangeably.

a. Manuals b. Standards c. References d. Operating procedures

9. MPEG-4 is a(n)

a. text standard b. video standard c. audio standard d. graphic standard

10. Which of the following is not a feature defined in a protocol specification for communication?

a. message format b. data representation c. Operating System vendor

d. identification and authentication

11. A bundle of wires that can carry signals, power, data, commands, and instructions is called a \_\_\_\_\_\_.

a. channel b. bus c. interface unit d. communication channel e. protocol

12. 1,099,511,627,776 bytes is exactly \_\_\_\_\_\_\_\_\_.

a. 100GB b. 10GB c. 10TB d. 1TB e. 4TB

13. A 4GB memory has exactly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ bytes.

a. 4,000,000,000 b. 4,294,967,296 c. 2,147,483,648 d. 4,194,304

e. 1,073,741,824

14. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ contains the most important operating system processing functions.

a. application programming interface

b. user interface c. file management system e. I/O driver f. kernel

15. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ stored in ROM loads the remainder of the operating system from disk or network into RAM.

a. application program b. bootstrap program c. IPO program d. embedded program

e. virtual program

16. In the concept of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ computing, each computer can do part of the processing for higher overall efficiency.

a. open b. closely-coupled c. loosely-coupled d. distributed e. shared

17. Special I/O hardware consisting of a \_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ within the computer, serves as an interface between the computer and the communication channel.

18. The links between the components of a system must be physical (True/False).

19. The diagram of a system drawn on paper is very often an abstraction of the real system (True/False).

20. To simplify analysis, understanding, and maintenance of a system, one can decompose the system into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

a. clients b. servers c. subsystems d. peers e. procedures

21. The relationship between a client and a server in the client-server model can be

a. 1 to 1. b. 1 to many. c. many to 1. d. many to many.

22. How many computers would typically be involved in 3-tier architecture? \_\_\_\_\_\_\_\_\_\_\_\_\_

23. The problem of solving incompatibilities between the application software residing on different computers which have to work together is often assigned to special software called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

a. operating system b. application program c. I/O drivers d. middleware e. shared server

24. The different types of “*n*-tier architectures” mainly concern distributing the processing load among *n* computers involved (True/False).

25. Google is always eager to reveal the details about the infrastructure technologies that it uses (True/False). (From the extra reading assignments)

26. Anything outside the system boundary represents the \_\_\_\_\_\_\_\_\_\_\_\_\_ that the system operates.

a. interface b. subsystem c. environment d. super system

27. The division of a system or subsystem into its components and linkages is called

a. itemization b. reconstruction c. decomposition d. categorization

28. Which of the following are not input devices?

a. stylus b. headphones c. touch screen d. mouse and keyboard

29. 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

30. 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

31. 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.

32. 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.

33. 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.

34. The organization's internal network, is commonly called a(n)

a. intranet b. employee network c. corporation network d. organizational network

35. 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

Part B. Short essay questions. On each of the 2 topics your answers should be comprehensive and capture the essence. There is no credit for a 1- or 2-sentence answer.

1. Describe briefly the term “web-based computing”.

Web based computing can be described as the processing of information done on a server computer as a result of a web request from a user’s computer. The transaction is completed when the server sends the user the transaction’s results. Multiple users can start transactions, and the results of each transaction can be shared with multiple users. Web applications can be scaled across multiple computers and take advantage of distributed computing, allowing multiple threads of data to be processed concurrently, yielding faster results.

1. What are the differences between client-server computing and peer-to-peer computing?

Client-server computing involves a central server with its own storage and an authentication system that allows an administrator to limit what different users have access to. Peer-to-peer computing does not involve a central server and authentication is done per each computer, making security difficult to manage. Peer-to-peer networks are easy to setup, where client-server networks require much configuration and are often more expensive due to the costs of dedicated server hardware and software.

Part C. Short essay questions. On each of the 4 topics your answers should be comprehensive and capture the essence. There is no credit for a 1- or 2-sentence answer.

Work the following from the textbook. You must provide the answers to Part C on two pages: this page and the next page. Your answers to this homework cannot exceed the total of 5 pages.

1. Ex. 1.6, p. 36 (starts with *Virtualization is a concept ……*   
   Virtualization is a technique that allows for multiple computers to be simulated on an individual computer system. Each simulated computer has its own OS and programs but all share the same REAL hardware(CPU, Disk, RAM…). These computers are isolated from accessing the real computer and from each other. Virtual drivers allow simulated hardware to send commands to the real hardware. The virtualization software manages these drivers and prevents them from breaking isolation.
2. Ex. 1.6, p. 36 (starts with *Protocols and standards* …....  
   Protocols are needed for computers to be able to interact with each other. They are the rules for how devices and applications communicate. Standards are the agreed-upon way of accomplishing something or the (often implicit) rules for how something should be.
3. Ex. 2.11, p. 67

Cloud computing is the offloading of data processing from a single server computer onto one or more external computer systems utilizing their available CPU resources. These external computer systems are often not on the same network as the server, and may either be dedicated to that server or shared with other unrelated servers. It’s considered highly advantageous for long and resource expensive tasks, especially when the tasks can be distributed among several threads to be completed sooner. It is also advantageous to use when the execution of a process may pose a threat to the system it is run on. The major risks of cloud computing include shared access, where if the external computer’s real hardware is shared by other customers rather than dedicated to one and only one customer, resources may not be consistently available to use, and virtual exploits of the cloud computer, exploits where users other than the customer can steal and manipulate resources including the data stored on a virtual computer.

1. Ex. 2.12, p. 67

Software as a Service is where the task of managing software applications and their deployment is offloaded to a third-party service. An example of a SaaS provider is SalesForce. Platform as a Service is a cloud service built on virtualization technology that gives clients an environment in which the operating system and server software among other things are managed by the provider of the service. This allows for clients to focus on the business side of scalability and the development of their product or service. An example of PaaS would be the Google App Engine. Infrastructure as a Service gives a cloud machine in which the client manages the applications, data, runtime, middleware, and the OS. This offers the most control next to using an on-premises machine. An example of an IaaS provider is Softlayer.