100
95
90
85 I
80 I
75
70 III
65 III
60 IIIII
55 IIII
50 IIIII
45 II
40 II
35 I
30 I
25
20 I
15 I
10
5

Before 13 POINT CURVE Added

Exam 1

Thursday October 12 2006

Name Key

25 Questions at 4 points each.

No books, notes, or computers may be used when taking the exam.

1. The motivation for constructing distributed systems stems from a desire to share resources. Name at least four commonly shared resources:
   DOCUMENTS APPLICATIONS
   PROCESSOR
   FILE SYSTEM
   PRINTERS

2. Certain classes of problems are associated with the execution of a distributed system. These problems are not normally associated with the execution of a non-distributed system. Name at least three of these problems or concerns:
   INDEPENDENT FAILURE OF COMPONENTS OPENNESS NOT correctness
   LACK OF GLOBAL CLOCK SECURITY
   COMMUNICATION FAILURES CONCURRENCY

3. The World Wide Web is based on three main technological components. Name these three technological components:
   URL'S
   HTTP
   HTML
   Attempt a reasonable answer -2

4. With respect to distributed systems, heterogeneity applies to all of the following:
   NETWORKS OPERATING SYSTEMS
   PROCESSORS APPLICATIONS
   PROGRAMMING LANGUAGES DATA TYPES
   PROGRAMMERS

5. The Coulouris text discusses distributed system scalability in terms of costs and losses that need to be controlled. A cost that needs to be controlled is HARDWARE COST. A loss that needs to be controlled is LOSS OF PERFORMANCE.
   NOT DATA LOSS. THAT IS A RELIABILITY ISSUE.

6. MIDDLEWARE is defined as a layer of software whose purpose is to mask heterogeneity and to provide a convenient programming model to application programmers.

7. The aim of PEER TO PEER architecture is to exploit the resources (both data and hardware) in a large number of participating computers for the fulfillment of a given task or activity.

8. An Asynchronous is a distributed system where there are no bounds on process execution speed, message transmission delays or clock drift rates.

9. A specification of the sequence of messages that must be exchanged along with the specification of the format of the data in the messages is called a Protocol.

10. Adaptive is a type of routing where the best route for communication between two points in the network is re-evaluated periodically, taking into account the current traffic in the network and any faults such as broken connections or routers.

RIP -3
Shortest Path -3
Best Effort -3
Dynamic -1

11. Recall the routing algorithm discussed in class. Suppose that router A receives a routing table from router B. Suppose too that router A finds that a remote row's destination is not in A's local table. What will router A do with the remote row?
Add it to its table -1

12. IP addressing provides a uniform internetwork addressing scheme that enables packets to be addressed to any host connected to any subnet.

Subnet Masking -3
RIP

13. IP Protocol provides a protocol defining the format of internetwork packets and giving rules according to which they are handled.

TCP/IP -1

14. Domain Name Service is used to translate names such as www.cnn.com into IP addresses.

15. NAT routers maintain an address translation table and exploit the source and destination port number fields in the UDP and TCP packets to assign each incoming reply message to the internal computer that sent the corresponding request message.

16. DHCP (Dynamic Host Configuration Protocol) enables a newly connected computer to dynamically acquire an IP address in the address range of the local subnet and discover the addresses of local resources such as a DNS.

17. Mobile IP enables a newly connected computer to act as a server in a new subnet. It's an example of IP tunneling.

18. An Ethernet Switch performs a routing function but at the Ethernet level.

19. The ARP (Address Resolution Protocol) is responsible for converting Internet addresses to network addresses for a specific underlying network. For example, it maps IP addresses to Ethernet addresses.

20. Wi-Fi or WaveLAN is in many ways similar to Ethernet but adds RTS and CTS frames.

21. Create a document that conforms to the following DTD. The root of the document is FFS.

```
<?xml version="1.0" encoding="utf-8"?>
<!ELEMENT FFS ( Notional, Fixed_Rate) >
<!ELEMENT Notional (#PCDATA)>
<!ATTLIST   Notional currency (pounds | yen)   #REQUIRED>
<!ELEMENT Fixed_Rate (#PCDATA) >
```

```
<FFS>
   <Notional currency="yen">100</Notional>
   <Fixed_Rate> 4.0 </Fixed_Rate>
</FFS>
```

22. With respect to the grammar in question 21, which asynchronous method will a SAX parser call when it encounters the #PCDATA content in a conforming document instance?

characters

setCharacters = -2

23. The following snippet of code is from the XSDL document that you worked with in Project 2. Briefly describe why this is an example of promoting interoperability.

```
<simpleType name="startType">
      <restriction base="time"/>
</simpleType>
```

The Format of time is defined by a standards body.

24. Recall the knock knock protocol that we reviewed in class. Briefly describe how this protocol lends support to the end-to-end argument?

The KKP did error checking of its own that would not be appropriate for a lower level protocol.

25. Consider the following lines of code from a DOM program. What Java class would we expect the variable score to be?

```
Text value = document.createTextNode("100");
score.appendChild(value);
```

A class that would implement the Element interface.

OR Node