Shahjalal University of Science & Technology

Institute of Information and Communication Technology

Discipline: Software Engineering

3rd Year 1st Semester Examination, 2020

Session: 2017-18

Course: **CSE 323** (Computer Networking)

Group A

Answer all the questions

1.

a. Assume ten devices are arranged in a mesh topology. How many cables are needed? How many ports are needed for each device? 0.5

b. Name two functions of transport layer. 0.5

c. What is the meaning of response status code: 301 and 404? 0.5

d. Write the IP address 16.5.2.10 with mask 255.255.255.128 in CIDR notation. 0.5

e. What at the loop back address used in IPV4 and IPV6? 0.5

2.

a. IP/Network layer provides best effort service- write two properties of best effort service. Write the name of another protocol which provides best effort service. 2.5

b. TCP is not a secure protocol by itself. How can you make it secure? 2.5

c. List the available residential access technologies in your city. For each type of access, provide the advertised downstream rate and upstream rate. 2.5

3.

Can frames collide with CSMA and how? What is the problem in CSMA that CSMA/CD is trying to resolve? 5

Group B

Answer all the questions

4.

a. What are the additional layers in OSI model that are absent in TCP IP protocol suite? 0.5

b. What is multicast transmission? 0.5

c. Name two functions of physical layer. 0.5

d. What is the purpose of the DHCP? 0.5

e. Which control bit flags are used during the TCP 3-way handshake. 0.5

5.

a. Why it is said that HTTP sends control in formation "in band"? 2.5

b. What is the difference between a recursive query and an iterated query in the DNS? 2.5

c. What is subnet mask? How many subnets can be gained by subnetting 172.17.32.0/23 into a /27 mask and how many usable host addresses will there be per subnet? 2.5

6.

Consider the E Commerce site- Daraz, that wants to keep a purchase record for each of its customers. Describe how this can be done with cookies. 5

Shahjalal University of Science and Technology
Institute of Information and Communication Technology
3rd Year 1st Semester Final Examination (Session: 2017-18)
Course Code: SWE 321 Course Title: Software Architecture and Design Patterns

Group A
[Answer all the questions]

1) What is the motivation of Template pattern? What are the participant object of template pattern? Briefly explain the role of each participant object. Show an UML diagram and example code that demonstrate the use of template pattern. 6

2) Consider a class TCPConnection that represents a network connection. A TCPConnection object can be in one of several different states: Established, Listening, Closed. When a TCPConnection object receives requests from other objects, it responds differently depending on itscurrent state. For example, the effect of an Open request depends onwhether the connection is in its Closed state or its Established state. 6

   Based on this behavior, state a solution applying appropriate design pattern. Mention the participants for the pattern and provide UML diagram.

3) Explain what the team Oddball Solution means, giving a short code or diagram example to illustrate the remedies. 3

Group B
[Answer all the questions]

4) i) "*Talk to the interface, not to the concrete class*" ---Explain the statement with appropriate reasoning. 4
   ii) What does Delegation and Object Composition means?

5) Name two different patterns that are used to eliminate if else statement in code? Give an example each of these two patterns explaining how these patterns help eliminating if else statement. 4

6) Imagine you are an executive chef who oversees a large chain of restaurants that serves pasta. In order to ensure that dishes at all the restaurant locations are consistent, instructions are provided for making popular dishes. The two most popular dishes are spaghetti with tomato sauce and meatballs, and penne noodles with alfredo sauce and chicken. 7
   Both dishes require that you boil water, cook the pasta, add the sauce, add the protein, and garnish the plate. Some of these steps have different implementation depending on which dish is being prepared – each dish has a different sauce, protein, and garnish. Other steps, however, would be the same, such as boiling the water.

   Design the above mentioned system with appropriate design pattern. Draw the class diagram and write the code to support your design.

Shahjalal University of Science and Technology
Institute of Information and Communication Technology
BSc (Engg.) in Software Engineering 3rd year 1st Semester Final Exam, 2020
Course: SWE 327 (Database Management System)

Marks: 30; Credit: 3.0

PART A

Q.1. Consider the bank database of figure 1 and answer the following questions. (2+3+10)

branch(branch_name, branch_city, assets)
customer (customer_name, customer_street, customer_city)
loan (loan_number, branch_name, amount)
borrower (customer_name, loan_number)
account (account_number, branch_name, balance)
depositor (customer_name, account_number)

Figure 1: Banking Database

a) What are the appropriate primary keys?

b) Given your choice of primary keys, identify appropriate foreign keys.

c) Write the following query in SQL, using the bank schema.

   i. Find the name of all branches located in "Dhaka".
   ii. Find the names of all borrowers who have a loan in branch "Mirpur".
   iii. Find all loan numbers with a loan value greater than BDT100,000.
   iv. Find the names of all depositors who have an account with a value greater than BDT60,000.
   v. Find the names of all depositors who have an account with a value greater than BDT60,000 at the "Motejheel" branch.

PART B

Q.2. Answer of the following questions. (7+3+5)

a. Give a lossless-join, dependency preserving decomposition into 3NF of the following video library schema. Also explain each steps.

   member(<u>membershipid</u>, fullname, physicaladdress, saluation)

   movierented(membershipid, moviesrented)

b. Explain the difference between a weak and a strong entity set.

c. Design an E-R diagram for keeping track of the exploits of your favorite sports team. You should store the matches played, the scores in each match, the players in each match, and individual player statistics for each match. Summery statistics should be modeled as derived attributes.

Set—**01**

Shahjalal University of Science and Technology

Department of Computer Science and Engineering

3rd year 2nd Semester Final Examination—December 2020 (Session 2017-18)

Course No.—**CSE 361**

Course Title—**Computer Networking**

Time—**5 Hours** Credit: **3.00** Total Marks#**30**

(Answer All the Questions)

Group A

1. Answer the following **Five** Questions. $5 \times 1 = 5$
   (a) What is the default subnet masks of Class A and Class C networks?
   (b) What is the Loopback address?
   (c) Write the IP address 222.1.1.20, subnet mask 255.255.255.192 in CIDR notation.
   (d) What is a Man-in-the middle attack?
   (e) What is the purpose of class E address?

2. Answer the following **Two** Questions. $2 \times 2.5 = 5$
   (a) Define the runt frame and jumbo frame. How will the NIC detect these type of frames?
   (b) Define cancellation techniques for noise minimization with proper example.

3. An organization needs at least 5 subnets with the network address fixed as X.Y.Z.0 where X, Y, Z are 8 bit integers. Design the subnets and represent in schematic diagram with following specifications (any 2 subnets): subnet address, broadcast address, host IP addresses. 5

Group B

1. Answer the following **Five** Questions. $5 \times 1 = 5$
   (a) What is RFI?
   (b) HTTP and POP use the _____ as their layer 4 (transport) protocol.
   (c) _____ protocol is used to resolve the IP address of any host like www.sust.edu
   (d) True or False? If False, write the correct statement: End systems, or hosts, communicate with each other using either server or client models.
   (e) True or False? If False, write the correct statement: Both UDP and TCP require that the applications recognize their own data formats.

2. Answer the following **Two** Questions. $2 \times 2.5 = 5$
   (a) Is Fiber cable affected by RFI or EMI? List some merits of using fibre.
   (b) What is the difference between Integrated services (IntServ) and Differentiated services (DiffServ)?

3. What is VLAN? What are the benefits of implementing VLANs? Explain two different types of VLAN. 5

-END-

Set—**02**

Shahjalal University of Science and Technology

Department of Computer Science and Engineering

3rd year 2nd Semester Final Examination—December 2020 (Session 2017-18)

Course No.—**CSE 361**

Course Title—**Computer Networking**

Time—**5 Hours** Credit: **3.00** Total Marks#**30**

(Answer All the Questions)

Group A

1. Answer the following **Five** Questions. $5 \times 1 = 5$
   (a) What is the EMI?
   (b) Name the PDUs generated by presentation and data-link layers.
   (c) A layer-4 firewall CANNOT block which type of traffic? [HTTP/ICMP/TCP]
   (d) TFTP and SNMP use the _____ their layer 4 (transport) protocol.
   (e) What is HTTP and what port does it use?

2. Answer the following **Two** Questions. $2 \times 2.5 = 5$
   (a) Explain the collision handle technique in CSMA/CD used by IEEE 803.
   (b) What is the broadcast and network address for host 222.129.199.222/21?

3. Explain TCP 3-Way Handshake Process. 5

Group B

1. Answer the following **Five** Questions. $5 \times 1 = 5$
   (a) The reason why does IP use the time-to-live (TTL) field in the IP datagram header is _____.
   (b) Name the PDUs generated by application and transport layers.
   (c) Primary benefit of using connection-oriented protocol like TCP is _____.
   (d) True or False? If False, write the correct statement: IP is a connection-oriented protocol.
   (e) True or False? If False, write the correct statement: A single program may have several open sockets at any time.

2. Answer the following **Two** Questions. $2 \times 2.5 = 5$
   (a) Contrast between the client-service and P2P service model. Name some common applications.
   (b) Why is it said that FTP sends control information "out-of-band"?

3. An IPv4 datagram has arrived with the following information in the header (in hexadecimal): 0x45 00 00 54 00 03 58 50 20 06 00 00 7C 4E 03 02 B4 OE OF 02. Answer the followings: 5
   - Is the packet fragmented?
   - What is the size of the data?
   - How many more routers can the packet travel to?
   - What is the identification number of this packet?

-END-

CSE 361: Computer Networks

Term Test # 3 Marks: 20 Time: 40 minutes

Answer the following Questions:

Q1. Compare and contrast Link-state and Distance-vector routing algorithms. (4)

Q2. Elaborate: RIP, OSPF, BGP, DHCP. (2)

Q3. Consider the following three node topology. Compute the distance tables after the initialization step and after each iteration of a synchronous version of the distance-vector algorithm. (10)

Q4. Consider the network setup in the following figure. Suppose that the ISP assigns the router the address 24.34.112.235 and that the network address of the home network is 192.168.1/24.

a. Assign addresses to all interfaces in the home network. (2)

b. Suppose each host has one ongoing TCP connection, all to port 80 at host 128.119.40.86. Provide the three corresponding entries in the NAT translation table. (3)

NAT translation table	
WAN side address	LAN side address

Shahjalal University of Science and Technology
Department of Computer Science and Engineering
3rd Year 2nd Semester Final Examination, Dec 2019 (Session: 2016-17)
Course Code: CSE 361 Credits: 3 Course Title: Computer Networks
Time: 3 hrs Total Marks: 100

Group A

[Answer all the questions]

1. Answer any FIVE. **5*2=10**

a) What are the two most important network-layer functions in a datagram network?

b) What is a loopback address? What is default gateway?

c) How many host addresses are available on the **192.168.10.128/26** network? Change the mask to a prefix length: **255.255.255.192**

d) What is the minimum and maximum size of an Ethernet Frame?

e) Suppose you want to send the data bits 101110 in an Ethernet frame. The value of generator is 1011 and number of CRC bits is 3. Calculate the CRC and write the bit sequence that will be sent.

f) A client residing on a host with IP address 112.12.5.9 sends a message to the corresponding server residing on a host with IP address 158.32.49.75. If the well-known port is 161 and the dynamic port is 52500, what are the pair of socket addresses used in this communication?

g) Find the network address and the broadcast address of **123.56.77.55/29**.

h) What is static route?

2. Answer any FOUR. **4x5=20**

a) Consider the circuit-switched network in the following figure where there are 4 circuits on each link. Label the four switches **A**, **B**, **C** and **D**, going in the clockwise direction.

i) What is the maximum number of simultaneous connections that can be in progress at any one time in this network? (2.5)

ii) Suppose that all connections are between switches **A** and **C**. What is the maximum number of simultaneous connections that can be in progress? (2.5)

b) Assume that Bob uses an e-mail client (a mail reader) such as Outlook to send an e-mail to Alice who uses a Web-based e-mail account (such as Gmail). The IP address of Alice's mail server is initially unknown to Bob's mail server. List all the transport and application layer protocols that are involved from the time when Bob sends the e-mail to the time when Alice reads it. Clearly indicate in which part of the transfer of the e-mail these transport/application layer protocols are used. (5)

c) i) What are the primary functions of MAC sub layer? (1.5)

ii) Write the basic functions of ARP. What are the issues of ARP? (3.5)

d) Suppose there are three routers between a source host and a destination host. Ignoring fragmentation, an IP datagram sent from the source host to the destination host will travel over how many interfaces? How many forwarding tables will be indexed to move the datagram from the source to the destination? Explain with a figure. (5)

e) i) Consider the count-to-infinity problem in the distance vector routing. Will the count-to-infinity problem occur if we decrease the cost of a link? Why? How about if we connect two nodes which do not have a link? (2.5)

ii) Compare and contrast the advertisements used by RIP and OSPF. (2.5)

f) Suppose you want to visit the URL http://cse.sust.edu. Explain step by step how IP address of the web server is obtained using Domain Name Service. (5)

3. **Answer any TWO.** **2x10=20**

a) i) List six access technologies. Classify each one as home access, enterprise access, or wide-area wireless access. (5)

ii) Consider transferring a Web page from a server to a client using HTTP with Non-persistent connections. Explain the steps between the client and the server. (5)

b) Suppose your organization uses the network address of 10.100.128.0/17. The network needs to be partitioned into 11 subnets. Answer the following questions: (10)

a) For creating subnets, how many bits must be borrowed from the host address bits?
b) What is the subnet mask for these subnets, written in decimal?
c) What is the CIDR notation for the last (11th) subnet's network address?
d) In total, how many host addresses will be lost for this subnetting process?
e) What is the range of host addresses for the last (11th) subnet?
f) Suppose you have two more networks each with 2 hosts only and therefore you want to further divide the first subnet of the above 11 subnets, so that, only two usable IP addresses remain in each sub-sub-net. Write the network address along with the subnet-mask in decimal of such a sub-sub-net.

c) Consider the following network. With the indicated link costs, use Dijkstra's shortest-path algorithm to compute the shortest path from x to all network nodes. Show how the algorithm works by computing a table. (10)

Group B

[Answer all the questions]

4. **Answer any FIVE.** **5*2=10**

a) What is Multicasting?
b) What is Classless Addressing?
c) What is the ***gateway of last resort***?
d) What is CSMA/CA? Where is it used?
e) What is the Class of the address **132.56.8.6**? What is the ***net id*** and ***host id*** of this address?
f) What is the difference between a virus and a worm?
g) What is the function of web proxy server?
h) What is Administrative Distance?

5. **Answer any FOUR.**

a) i) Consider that an application wishes to pass real time traffic. Which transport protocol should it use – TCP or UDP? Justify your answer, explaining the implications of using each of the two protocols. (3)

ii) What is the difference between a recursive query and an iterated query in the DNS? (2)

b) i) What is NAT? Will NAT be obsolete once IPv6 is fully deployed? (3)

ii) Why DHCP is required in a Network? (2)

c) Consider the following topology where router R1 is NAT enabled. Write source IP address, source port number, destination IP address, destination port (5)

number for the following communication cases. Choose port numbers from your own where necessary.

i) PC1 to R1
ii) R1 to Web server
iii) Web server to R1
iv) R1 to PC1

d) i) Fill in the boxes with suitable descriptors. (2.5)

ii) How TCP controls the flow in a congested network? (2.5)

f) Explain how states are managed using cookies with appropriate figures. (5)

6. **Answer any TWO.**

a) i) Compare between LS and DV algorithms. (2)

ii) Consider the network fragment shown below. **x** has only two attached neighbors, **w** and **y**. **w** has a minimum-cost path to destination **u** (not shown) of 5, and **y** has a minimum-cost path to **u** of 6. The complete paths from **w** and **y** to **u** (and between **w** and **y**) are not shown. All link costs in the network have strictly positive integer values.

i) Find **x**'s distance vector for destinations **w**, **y**, and **u**. (6)

ii) Find a link-cost change for either **c(x,w)** or **c(x,y)** such that x will inform its neighbors of a new minimum-cost path to **u** as a result of executing the distance-vector algorithm. (2)

b) You are given a block of IPv4 addresses of **120.124.80.0/24**. You need to create 3 subnets: one subnet with 110 addresses, one subnet with 40 addresses and one subnet of 9 addresses. Create an efficient subnetworking plan and find out the following for each subnet:

i) The subnetwork address and subnet mask. (6)
ii) The first host, last host and broadcast address for each subnet. (3)
iii) How many host addresses will be lost for this subnetting process? (1)

c) i) Explain the Router Boot-up process. (3)

ii) Fill up the table using the information given in the following figure. (7)

Device Name	Interface	IP Address	Default Gateway
PC1	NIC	?	?
PC4	NIC	?	?
R1	G0/0	?	N/A
	G0/1	?	N/A
	S0/0/0	?	N/A
S2	VLAN1	?	?
R2	G0/0	?	N/A
	G0/1	?	N/A
	S0/0/0	?	N/A
S3	VLAN1	?	?

CSE395/CSE313 Term Test #3

Full Marks: 20 Time: 35 minutes

1.

```
R1# show ip route | begin Gateway
Gateway of last resort is 209.165.200.234 to network 0.0.0.0

S*    0.0.0.0/0 [1/0] via 209.165.200.234, Serial0/0/1
                is directly connected, Serial0/0/1
      172.16.0.0/16 is variably subnetted, 5 subnets, 3 masks
C       172.16.1.0/24 is directly connected, GigabitEthernet0/0
L       172.16.1.1/32 is directly connected, GigabitEthernet0/0
R       172.16.2.0/24 [120/1] via 209.165.200.226, 00:00:12,
        Serial0/0/0
R       172.16.3.0/24 [120/2] via 209.165.200.226, 00:00:12,
        Serial0/0/0
R       172.16.4.0/28 [120/2] via 209.165.200.226, 00:00:12,
        Serial0/0/0
R     192.168.0.0/16 [120/2] via 209.165.200.226, 00:00:03,
      Serial0/0/0
      209.165.200.0/24 is variably subnetted, 5 subnets, 2 masks
C       209.165.200.224/30 is directly connected, Serial0/0/0
L       209.165.200.225/32 is directly connected, Serial0/0/0
R       209.165.200.228/30 [120/1] via 209.165.200.226, 00:00:12,
        Serial0/0/0
```

Consider the above routing table of a router R1. Answer the following questions:

a) Define ultimate route and give example from the above figure. 1.5

b) What do the letters L and C at left-most side of the routing table mean? What is the difference? 2

c) Define default route and gateway of the last resort? Considering the above table, how they are related? 3

d) What is a network route? Give example from the above figure? How many network routes are there in the table? 2

e) What is the difference between dynamic and static routing? How many dynamic routes are there in the above table? 2.5

f) Suppose a packet arrives at the router R1 with a destination network address 172.15.0.0. Considering the above routing table, explain step-by-step route-lookup process for this packet. 4

2. Draw a figure of a stub network. Explain how using static routes can be useful in such network. 3

3. Write four features of OSPF protocol that do not belong to RIP protocol. 2

syntax
semantics

fault tollerance
security.

Term Test 1

Course Code: SWE 313
Course Title: Computer Networking
Department of Software Engineering
Time: 30 min **Total Marks: 20**

DA J

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1. Describe the four fundamental characteristics of Data communications. 5

2. a. What are the key elements of network protocol? 3

   b. State the benefits of using a layered model? 2

3. Draw the graphs of the Manchester and NRZ-I schemes using the following data stream: 5

   01001100, assuming that the last signal level has been positive.

   1 → IN

4. Explain the four basic characteristics of a reliable network architecture. 5

Shahjalal University of Science & Technology

Department of Computer Science & Engineering

3rd Year 2nd Semester Final Examination' 2018 (Session: 2015-16)

Course No: CSE 361, Title: Computer Networking

Credits : 3.0 Full Marks : 100 Time : 3 Hours

Group A (answer ALL the questions)

Q1. Answer any TEN **10*1**

a. Expand the IPv6 address to its original- 0:15::1:12:1213

b. If an IP address uniquely defines a host on the internet, then what does a port address do?

c. Assume five devices are arranged in a full mesh topology. How many cables are needed?

d. If you are to connect a PC to switch, which cable (Crossover or Straight-through) would you use?

e. Write a link-local address.

f. What is the difference between pure ALOHA and slotted ALOHA?

g. 11100010.23.14.227 –Is it a valid IPv4 address? Why?

h. Name a path vector routing protocol.

i. What is meant by "maximum burst size" for a network?

j. What is a trap message?

k. If the cipher text for the plain text "GAME" is "MAEG", then which types of cipher it is?

l. Which encapsulation is used in dynamic VPN?

m. Show the traffic profile for VBR.

n. To assign IP addresses automatically to devices from an address pool, which protocol is used?

o. Correct the sentence: "Both ARP request and reply is broadcast message."

Q2. Answer any FOUR **4*5**

a. What is "*two node instability problem*" in Link State routing protocol? How this problem can be solved? 2+3

b. Construct a routing table for R1 for the following topology and write the forwarding process if a packet arrives at R1 with destination address 180.70.65.140. 2+3

c. Describe the open loop congestion control mechanisms in brief. 5

d. i. Suppose Lily and Mily are about to start a transmission. They want to generate a session key using Diffie-Hellman algorithm. If they use g = 7 and p = 23, then find the symmetric key *K* for the session. 3

ii. Assume Bill received a cipher text "26" which John sends him using RSA encryption. Here, p = 11 , q = 7, e= 13 and d = 37. Decrypt the cipher text into plain text. 2

e. Use FLSM to find out the followings of the given network address, 172.16.5.0/20 with 2 sub-network of 850host and 256hosts.

i. How many subnets can be configured? 1

ii. What are the network addresses of those subnets? 2

iii. What is the 5th host address of 3rd subnet? 2

f. What is anycast address? Find wildcard mask for for 192.16.7.3/26. Why classless addressing was introduced over classful addressing? 1+4

Q3. Answer any TWO **2*10**

a. i. Define: SONET and SDH. Write down the main functions of network management system. 6

ii. How SMI and MIB supports SNMP? 4

b. Suppose, you have an IT firm in Varsity Gate named VGIT. Recently, you have owned another company in Surma named SIT. You also own the IP 204.15.5.0/24. Both of your companies have two branches (IT, Admin) each. The IT and admin branches of VGIT have 64 and 14 PCs respectively. On the other hand, SIT has 7 and 28 PCs in admin and IT branches respectively. You can afford at least two routers. Is it possible to manage the whole topology with the current IPs? If yes, then find the network address, first usable IP, last usable IP for each network; if no, then explain the difficulties and calculate how many IPs are lacking. 10

c. i. Show the formation of routing table for node A in OSPF for the following topology: 6

ii. Describe how ARP maps logical address to physical address? 4

Group B (answer ALL the questions)

Q4. Answer any TEN 10*1

a. Abbreviate the IPv6 address- FDEC:0074:0000:0000:0000:B0FF:0000:FFF0
b. Give example of a physical address.
c. Which types of LAN standard/ specifications are defined by IEEE 802.11?
d. What is an access point?
e. Write a site-local address.
f. Name different types of Cipher.
g. What is proxy ARP?
h. Find the Caesar cipher text for the word "CSE".
i. How many host bit is there in the network 172.16.9.15/27 ?
j. Fill in the blank: RIP sends periodic updates every _____ seconds.
k. Correct the sentence: *Open Shortest Path First* is a path vector routing protocol.
l. What is the size of message digest in SHA-1?
m. What is the purpose of ***tracert*** command?
n. What is a jitter in a network?
o. What is a one-password?

Q5. Answer any FOUR 4*5

a. What does NAT do? Assume the following scenario of four consecutive messages of a transmission. Construct the following NAT table and fill up the question marks with proper addresses. Please draw the whole figure to answer your question. 1+4

b. Write the steps to select private and public keys using RSA algorithm. Assume John wants to send the plain text "5" to Bill using asymmetric key encryption. John chooses p = 11 , q = 7, e= 13 and d = 37. Find the cipher text using RSA algorithm. 3+2

c. Find out the network address, gateway address, broadcast address, subnet mask and available host address range of the following IPv4 address : 192.16.5.5/25 5*1

d. What is weighted fair queuing? Name two techniques for shaping traffic to improve QoS. Find the aggregated Network address for the following networks: 192.18.10.0/22, 192.18.14.0/26 and 192.18.8.0/25 1+2+2

e. What is the access method of wireless LAN? Differentiate between circuit-switched network and packet-switched network. 1+4

f. i. What is VLAN? Write the loop-back address. Why ***ping*** and ***ifconfig*** commands are used? 1+2
ii. Determine the type of following Ethernet addresses:
1) 4A:30:10:21:10:1A and 2) 47:20:1B:2E:08:EE

Q6. Answer any TWO 2*10

a. i. What is VPN? Which encapsulation and encryption methods are used to apply static VPN? 2
ii. What are the techniques for transition from IPv4 to IPv6? 4
iii. Write short note on any two from the following: i) HTTP ii) DNS iii) FTP 2

b. i. Define the following attacks: Dictionary attack and man-in-middle attack. 4
ii. How salting is applied on fixed password? 3
iii. What is message digest? What are the main criteria for hash function? 3

c. i. Describe ICMP query messages in brief. 4
ii. List all types of IGMP messages. Change the multicast IP address 238.212.14.7 to an Ethernet multicast physical address. [Hint: An Ethernet multicast physical address is in the range from 01:00:5E:00:00:00 01:00:5E:7F:FF:FF] 6 2+2

Term Test 2
Course Code: CSE 365
Course Title: Computer Networking
Department of Computer Science and Engineering
Time: 30 min **Total Marks: 20**

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1. Explain why IP is called a connectionless and best-effort delivery service. 5
2. Create 1100 Subnets with a slash 8 prefix. 5 /10
3. How the routers build their routing tables? Explain with example. 5
4. Briefly explain the most important features of TCP. 5

Shahjalal University of Science and Technology

Institute of Information and Communication Technology

3rd Year 1st Semester Final Examination, June 2019 (Session: 2016-17)

BSc (Engg.) in Software Engineering

Course Code: CSE 323 Course Title: Computer Networking

Credits: 3.0 Time: 3 hrs Total Marks: 100

Group A

[Answer all the questions]

1. **Answer any FIVE [5x2=10]**

a) Define Network and Network Protocol.

b) What is CSMA/CA? Where is it used?

c) Draw a figure that shows various components of an optical fiber.

d) Compare fiber optic cabling with UTP cabling.

e) Show with a block diagram the Ethernet frame format including the size of each field.

f) What is the purpose of subnetting?

g) Write the names of PDUs in Transport, Network and Datalink Layers.

h) State the function of IMAP protocol.

2. **Answer any FOUR [4x5=20]**

a) Write Ethernet transmission process (CSMA/CD). How is random backoff algorithm used in it?

b) Write the purpose and function of Address Resolution Protocol (ARP). Write two disadvantages of ARP.

c) How does twisting of a twisted pair cable eliminate noise effect?

d) Explain the differences between cut-through and store and forward switching.

e) How are Internet Protocol of Network layer and UDP of Transport layer related? Explain.

f) Suppose you want to visit the URL http://cse.sust.edu. Explain step by step how IP address of the web server is obtained using Domain Name Service.

3. **Answer any TWO [2x10=20]**

a) Suppose your organization uses the network address of 10.100.128.0/17. The network needs to be partitioned into 11 subnets. Answer the following questions: **1+2+2+1+2+2**

i) For creating subnets, how many bits must be borrowed from the host address bits?

ii) What is the subnet mask for these subnets, written in decimal?

iii) What is the CIDR notation for the last (11th) subnet's network address?

iv) In total, how many host addresses will be lost for this subnetting process?

v) What is the range of host addresses for the last (11th) subnet?

vi) Suppose you have 2 more networks each with 2 hosts only and therefore you want to further divide the first subnet of the above 11 subnets, so that, only two usable IP addresses remain in each sub-sub-net. Write the network address along with the subnet-mask in decimal of such a sub-sub-net.

b) i) What is the purpose of cladding in an optical fiber? Discuss its density relative to the core? **4+3+3**

ii) What are the differences between Circuit-Switch and Packet-Switch?

iii) Explain the method of Datagram approach.

c) i) Why do you think that for video streaming UDP is a good choice that TCP? **2+4+4**

ii) Consider the 3-way handshake protocol shown in the Fig. A. Fill up the values of missing fields.

iii) Consider the TCP congestion and flow control operation shown in the Fig. B. Fill up the missing values. Draw the figure for additional two steps.

Fig. A

Fig. B

Group D

[Answer all the questions]

Answer any FIVE [5x2=10]

a) What are the goals of IPv6 design?
b) What is a floating route? Give an example.
c) What is the difference between classful and classless routing?
d) What do you understand by 10BaseT?
e) Give the hierarchical classification of dynamic routing protocols and give example of each class.
f) Suppose a router R1 needs to reach all of the remote networks: 10.15.0.0/27, 10.20.0.0/27, 10.25.0.0/27 and 10.35.0.0/27. The networks can be reached through a single interface of the router. Calculate a summary network and prefix.
g) Write two advantages and two disadvantages of NAT.
h) What is port forwarding? Give a simple example.

5. **Answer any FOUR [4x5=20]**

a) What is inter-VLAN routing? Differentiate between Router-on-a-Stick and Switch-based method of inter-VLAN routing.
b) When a packet arrives on a router interface, the router examines the IP header, identifies the destination IP address, and proceeds through the router lookup process. Write the steps that comprises the lookup process.
c) How fast is the Fast Ethernet? Explain the standard 100Base-FX.
d) What is an ACL? In what layers of OSI model does an ACL work? Write three functions of ACLs.
e) Show the leasing operation between a DHCP client and DHCP server with a figure and write. Write in brief the function of each message. What is the reason to broadcast the DHCPREQUEST message?
f) Consider the following topology where router R1 is NAT enabled. Write source IP address, source port number, destination IP address, destination port number for the following communication cases. Choose port numbers from your own where necessary.
   i) PC1 to R1, ii) R1 to Web Server
   iii) Web Server to R1, iv) R1 to PC1

Network Topology

6. **Answer any TWO [2x10=20]**

a) Consider the routing table shown in following figure. Answer the following questions:
   i) What is an ultimate route? Give example from the given figure.
   ii) Define level 1 parent route and level 2 child route and give example of each.
   iii) Write the names of different parts of the route with the destination network 192.168.1.0 shown in the figure.
   iv) What is the name of the last route shown in the figure? What does it mean?
   v) Draw the network topology from the routing table shown in the figure.

```
Gateway of last resort is 0.0.0.0 to network 0.0.0.0

    192.0.2.0/24 is variably subnetted, 2 subnets, 2 masks
C     192.0.2.0/30 is directly connected, Serial0/0/1
C     192.0.2.64/26 is directly connected, FastEthernet0/1
D   192.168.1.0/24 [90/2172416] via 192.168.2.1, 00:01:36, Serial0/0/0
C   192.168.2.0/24 is directly connected, Serial0/0/0
C   192.168.3.0/24 is directly connected, FastEthernet0/0
D   192.168.5.0/24[90/2172416] via 192.168.2.1, 00;01:36, Serial0/0/0
S*  0.0.0.0/0 is directly connected, Serial0/0/1
```

b) i) Name two popular routing algorithms? Find out the shortest path for every node from 'a' using any routing algorithm for the following figure. **6+4**

ii) Write short notes on Gigabit Ethernet and SONET.

c) i) What is a VLAN?
   ii) How can the VLANs improve security?
   iii) Why does VoIP service in a network should be installed under a VLAN?
   iv) What is the difference between trunk and access ports?
   v) What is the purpose of Dynamic Trunking Protocol?

CSE395/CSE323 Term Test #2

Full Marks: 20 Time: 35 minutes

1. Suppose your organization uses the network ID of 172.200.0.0/16 . The network needs to be partitioned into 11 subnets. Answer the following questions: 1+2+2+1+2
   a) For the subnets, how many bits must be borrowed from the host address bits?
   b) What is the subnet mask for these subnets, written in decimal?
   c) What is the CIDR notation for the last (11th) subnet's network ID?
   d) In total, how many host addresses will be lost for this subnetting process?
   e) What is the range of host addresses for the last (11th) subnet?
2. IP/Network layer provides best effort service – write two properties of best effort service. Write the name of another protocol which provides best-effort service. 3
3. 2+1

00-07-E9-42-AC-28	00-07-E9-00-BC-70	192.168.1.27	192.168.1.7	1022	8080	Data	CRC

Consider the above frame. Write the names of each of the fields. What is the source socket values (a socket contains the IP address and port number).

4. Consider the 3-way handshake protocol shown in the figure. Fill up the values of missing fields. 4
5. What is the function of TTL (Time to Live) field in IP header? 2

Name: MD. WASIF MUSTAHID

Reg. No.: 2016831031

CSE324/CSE396 Lab Final Examination (Practice)

Full Marks: 100 Time: 1 hour

You are given the network address of 192.168.40.0/21 to subnet and to provide the IP addresses to the hosts of the network shown in the above topology.

The examination has two parts: Part1 and Part 2.

Part 1: Design an IP addressing scheme (Marks: 20)

Calculate and write the following values:

Subnet	Subnet Address	First Usable Host Address	Last Usable Host Address	Broadcast Address
0	192.168.40.0	192.168.40.1	192.168.43.254	192.168.43.255
1	192.168.44.0	192.168.44.1	192.168.47.254	192.168.47.255

New Subnet Mask:

Binary	11111111 . 11111111 . 11111100 . 00000000
Decimal	255 . 255 . 252 . 0

Part 2: Design the topology in packet tracer, assign IP addresses to network devices and verify Connectivity (Marks: 80)

- *Assign Subnet 0 to the LAN 0 and Subnet 1 to the LAN 1*
- *Assign the first usable IP addresses to R1's two LAN interfaces*
- *Assign the next two usable IP addresses to PCs*
- *Assign the last usable IP addresses to Servers*
- *Configure DNS, Web and DHCP servers.*

Term Test 2

Course Code: SWE 313

Course Title: Computer Networking

Department of Software Engineering

Time: 30 min **Total Marks: 20**

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1. a) Briefly describe the responsibilities of data link sublayers. 3

   b) What is the purpose of GET message of HTTP protocol? 2

2. a) Why do we need port addressing? State the range of valid port numbers. 3

   b) What are the features of a default gateway? 2

3. Describe the Host Forwarding Decision technique. 5

4. What Is NAT? How Does NAT Work? 5

Term Test 1

Course Code: CSE 361

Course Title: Computer Networking

Department of Computer Science and Engineering

Time: 30 min **Total Marks: 20**

1	c. Define Intranets and Extranets with examples.	2.5+ 2.5
	d. What are the functions that may be provided by a network protocol?	
2	Explain the four basic characteristics of a reliable network architecture.	5
3	c. What are the network protocol requirements?	2.5+ 2.5
	d. State the benefits of using a layered model?	
4	Briefly describe the responsibilities of data link sublayers.	5