

2012

Full Marks - 70

Time : As in Programme.

The questions are of equal value.

Answer ALL questions.

1. (a) What is Multimedia ? How do you integrate different domains in Multimedia ? Explain with suitable illustration.
- (b) Explain different mediums in multimedia.

OR

- (a) Short notes on :
 - (i) Representation Value.
 - (ii) Representation Dimensions.
 - (b) Different transmission modes in multimedia.
2. (a) Explain, how do you represent sound in your computer system ?
 - (b) Describe the components of MIDI devices.

[Cont.

OR

Short notes related to sound and midi concepts.

- (a) Midi messages
 - (b) Speech generation
 - (c) Speech analysis
3. (a) How do you represent image in your computer system. Explain at least two different types of image formats.
- (b) How do you process image in your computer system ?

OR

- (a) What do you mean by image analysis ? Explain image reorganization steps with suitable illustration.
 - (b) Describe different image transmission methods with example.
4. (a) How do you distinguish between lossy and lossless coding techniques ? Explain Huffman coding techniques with example.

[Cont.

- (b) Explain, how do you compress image through Joint Picture Extension Group compression techniques.

OR

- (a) How do you distinguish between JPEG and MPEG ? Explain MPEG compression techniques.
- (b) What do you mean by Digital Video Interactive ? Explain Videos Encoding techniques.
5. (a) What do you mean by media preparation and explain different media supports.
- (b) How do you compose different media into a single Interface ?

OR

- (a) Explain different editor for Media integration.
- (b) How do you distinguish between Conversational and Message Service ? Explain different types of Message services.



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1. (a) Write the difference between TCP and UDP.

[4

OR

- (b) How long was a bit on the original 802.3 standard in meters? Use a transmission speed of 10 Mbps and assume propagation delay in coax is 2×10^{-8} m/s. [3

- (c) Explain principal difference between connection less and connection oriented services. [3

- (d) A collection of 5-routines is to be connected in a point-to-point subnet. Between each pair of routers, the designer put a high speed line, a

[Cont.

medium speed line, a low speed line or no line. If it takes 100ms. of computer time to generate and inspect each topology, how long will it take to inspect all of them. [4]

OR

- (e) For a noisy channel if signal to noise ratio is 30 dB, band width is 10 Mbps. Then determine the maximum data rate of the channel. [3]
- (f) If probability of a bit get damaged is a P and a packet consists of L -bits. Then what is the probability that the packet a erroneously arrived at the receiver: [3]
- (g) A noiseless 4-KHZ channel is sampled in every 1 ms. Then calculate maximum data rate and sampling interval length. [2]
- (h) Suppose a broad cast channel is divided into discrete time slots, and each of the n -hosts attempting to use the channel with probability ' P ' during each slot. What fraction of slots are wasted due to collision? [4]

2. (a) Write the difference between FDM and TDM. [4]
- (b) Encode the following bit strings using NRZ-L, NRZ-I and Manchester encoding. [4]
101101001101
- (c) Suppose a signal has voltage levels $-9v$, $10v$, $3v$, $-5v$. Then calculate its baud and bit rate. [3]
- (d) An image is 1024×768 pixels with 3 bytes/pixel. If the image is transmitted over a channel of band width 56 kbps and propagation delay 2×10^8 m/s. Then calculate the time taken for whole image to arrive at the receiver. Assume that queuing delay is zero. [3]

OR

- (e) A cable TV has 100 commercial channels, all of them alternating programs with advertising. Is this more like TDM or like FDM. [2]
- (f) An upper layer packet is split into 20 frames, each of which has 85 percentage of chance of

arriving and imaged. If no error control is done by the data link layer protocol, how many times must the message be sent on average to get the entire message through ?

- (g) Encode the following bit pattern using NRZ-L NRZ-I and Manchester encoding. [4]

011001010101

- (h) Explain PCM encoding. [3]

3. (a) The following character encoding is used by data link protocol. [4]

A: 01000111

B: 11100011

Flag: 01111110

ESC: 11100000

Using bit stuffing encode the frame A B ESC Flag. At that in bit stuffing a frame begins and ends with Flag byte.

- (b) A bit stream 10011101 is transmitted using CRC polynomial x^3+1 . Then determine the transmitted bit string. [5]

- (c) Obtain hamming code (1 bit) for the bit string 10101111. [5]

OR

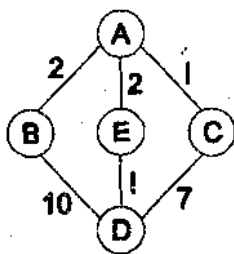
- (d) Obtain hamming code (1 bit) for the bit string 10101001. [5]

- (e) Sixteen bit messages are transmitted using Hamming code. How many check bits are needed for detecting and correcting single bit error. For this problem determinè the relation between n-data bits for detecting two bits error. [4]

- (f) Explain CSMA/CD protocol sed in MAC layer. [5]

4. (a) Write the responsibility of network layer. [5]

- (b) Use link state routing algorithm to find the routing table for the router A in the following figure. [6]



[Cont.]

- (c) A network on the internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts it can handle? [1]
- (d) Convert ipaddress whose hexadecimal representation is C22F1582 to dotted decimal notation. [2]

OR

- (e) What is subnetting? Explain it with example. [4]
- (f) Suppose a class B up addressing scheme reserves 3 bytes for netid and 2 bytes for hostid (we assume up address size is 5 bytes). [3]

Then calculate no of class B networks and number of hosts under a class B network.

- (g) A router has following entries in its routing table.

| Subnet No | Subnet Mask | Next hop |
|--------------|---------------|----------------|
| 128.96.170.0 | 255.255.254.0 | interface 0 |
| 128.96.168.0 | 255.255.254.0 | interface 1 |
| 128.96.166.0 | 255.255.254.0 | R ₂ |
| Default | | R ₄ |

Describe what router does with a packet addressed to each of the following destinations.

(i) 128.96.171.92 [3]

(ii) 128.96.167.151

(h) Explain in short leaky bucket algorithm for congestion control. [4]


5. Write TCP client-server pair programmes to exchange messages between server and client. [7+7]

OR

Explain the followings:

(a) DNS

(b) E-mail


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Six is compulsory.**

1. a) Are there agent functions that can't be implemented by any agent program? Justify.
- b) Explain the difference between the performance Measure and the Utility Function.
- c) Explain why problem formulation must follow Goal Formulation.
- d) Design a 5-4-3 Artificial Neural Network.
- e) Explain with example perceptron Learning Rule.
- f) Give the difference between Supervised and Unsupervised Learning Method.
- g) Explain how a Deterministic Task Environment differs from Stochastic Task Environment.

[Cont.]

- h) What is branching factor ? If the branching factor is b and the shallowest Goal Node is present at depth d . How much time an iterative DFS will take to reach the goal node.
- i) Write the difference between State and State Space.
- j) Give a ~~feas~~^{PEAS} description for an Automatic Taxi Driver.
2. What is an Agent ? Explain different types of agents with example. [10]
3. Explain Breadth First Search with its limitations. Explain how BFS search is a special case of Uniform Cost Search. [10]
4. Explain A* search algorithm with example. Differentiate A* from Best First Search with suitable example. [10]
5. Draw decision Tree for the problem of deciding whether to move forward at a road intersection, given that the light has just turned green. [10]

6. a) Discuss different classes of Artificial Neural Network according to their Architecture
- b) Design a McCulloch-Pitt model that computes OR function. (Specify the units you are using).
7. Describe a state space in which Iterative Deepening search performs much worse than DFS. [10]
8. Consider a state space where the start state is number 1 and the successor function for state n returns two states numbers $2n$ and $2n+1$. Suppose the Goal is 11. List the order in which nodes will be visited for BFS and Depth Limited Search with limit 3. [10]

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1. a) Draw and explain the layered architecture of Unix OS.
- b) Distinguish between interrupts verses exceptions with examples.

OR

- a) Draw the structure of Unix file system and explain its characteristics.
 - b) Explain the operating system services provided by Unix.
2. Draw the block diagram for unix kernel architecture. Discuss its components.

OR

[Turn over

Discuss the data structures used by unix kernel for

- a) File subsystem
 - b) Process control subsystem.
3. a) Explain the shell commands used for :
- i) searching a file
 - ii) sorting a file.
- b) Explain the shell commands used for controlling access to files/directories.

OR

- a) Explain the shell commands used for :
 - i) translating a file
 - ii) printing a file
 - b) Explain the shell commands used for rearranging structures of file in unix.
4. a) Write a shell program to generate and print first n terms of fibonacci series.
- b) Write a shell program to test if an input string is a palindrome.

OR

- a) Write a shell program to delete all dummy files from the current directory.
 - b) Write a shell program to send a common message to all online users that belong to your group.
- 5.
- a) Write a shell program to monitor the users logging-in and logging-out of the system at regular interval of every 10 minutes.
 - b) Write a shell program to ^{Compare} ~~compare~~ two files and delete one of them if both are same in content.

OR

- a) Discuss the looping structures used in ^{awk} ~~rank~~.
 - b) Discuss the pattern matching characters used in ~~rank~~ ^{awk}.
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