V

Paper / Subject Code: 31907 / Elective - I Advance Algorithm (DLOC) (CMPN)

T.E. Sem. V (CBCGS) Dec 2018

(3 Hours) **Total Marks: 80**

N.B.: (1) Question No. 1 is compulsory.
(2) Attempt any three questions out of remaining five questions.
(3) Make suitable assumptions wherever necessary but justify your assumptions.

Q.1(a) Find the maximum flow for the following network using Ford Fulkerson algorithm: 10 M

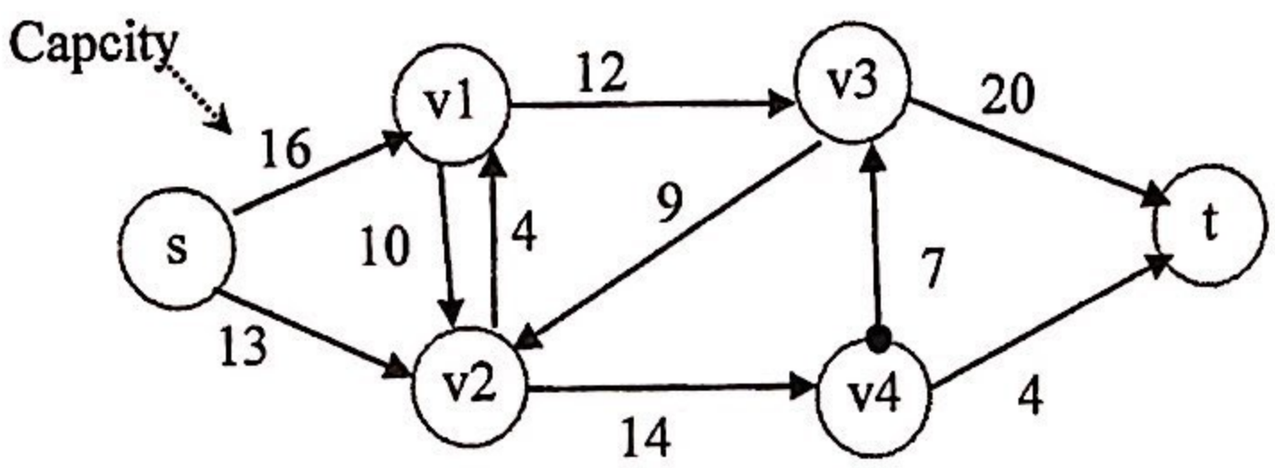

Figure for Q.1 (a)

Q.1(b) Show TSP is NP Complete and design an approximation algorithm for TSP. 10 M

Q.2(a) What is convex hull? Explain the Graham's scan algorithm 10 M

Q.2(b) In January, you buy a Ferrari from Lucky Motors, a dealer who offers you the following maintenance contract: Rs.50000 each month other than March, June, September and December (this covers an oil change and general inspection), Rs.1,00,000 every March, June, and September (this covers an oil change, a minor tune-up, and a general inspection), and Rs.2,00,000 every December (this covers an oil change, a major tune-up, and a general inspection). 10 M
Obtain an upper bound on the cost of this maintenance contract as a function of the number of months, using amortized accounting method.

Q.3 (a) Explain the various methods to find complexity of recursive algorithms. 10 M
Use recursive tree method to find time complexity of the following recursive equation

$$T(n) = 3\,T(n/4) + cn^2$$

Q.3 (b) Create a Red Black Tree for the following elements: 10 M

4, 2, 8, 10, 18, 6, 12, 14

Q.4 (a) What is binomial heap? Draw a binomial heap for the following elements: 10 M

3, 1, 2, 9, 0, 6, 4, 8, 5, 10

After creating binomial heap, delete a node with minimum key and show resultant heap.

Q.4 (b) Explain Travelling Salesman Problem in details. 10 M

Q.5 (a) Explain with example Maximum Biparite matching. 10 M

Q.5(b) Explain closest pair of points using divide and conquer. 10 M

Q.6(a) What is the hiring problem? Discuss randomized algorithm for the same. 10 M

Q.6(b) Discuss in details line segment properties. 10 M

Time: 3 Hours **Marks: 80**

1. Question 1 is compulsory.
2. Attempt any three from the remaining five questions.
3. Assume suitable data where required.

1 a.) What do you understand by Hybrid Kernel? Give suitable example. [5]
b.) Explain Cache Affinity. [5]
c.) Differentiate between Hard Real Time and Soft Real Time operating system. [5]
d.) Explain middleware and its role in distributed system. [5]

2 a.) What is buffer cache? Describe the structure of the buffer header. [10]
b.) What is U Area? Explain in detail. [10]

3 a.) Explain Transparency design issues in distributed computing. [10]
b.) Mach OS ensures location independency during Inter-Process Communication. Explain in detail. [10]

4 a.) Differentiate between Clock Driven and Event Driven scheduler. [10]
b.) What are the criteria for selecting appropriate frame size in cyclic scheduler? Compute suitable frame size for the following. e stands for executing time, p stands for period and d stands for deadline. All the timing parameters are in miliseconds. [10]

e1=1, p1=4 d1=4;
e2=1, p2=5 d2=5;
e3=1.5, p3=20, d3=20

5 a.) Explain Test & Set lock algorithm. Discuss the benefits of Test Test & Set over Test & Set algorithm. [10]

b.)Explain non-uniform memory access (NUMA) architecture? Explain cache coherency in NUMA types multiprocessor. [10]

6 a.)Discuss various issues of cloud OS. [10]
b.)Explain Android OS architecture in detail. [10]

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(3 Hours) **[Total Marks: 80]**

NB : 1) **Question 1 is compulsory.**
2) Attempt any **three** questions from the **remaining** questions.
3) **Assume** suitable **data** wherever applicable.

Q1.	a	Explain the applications of virtual reality	5
	b	Explain parallel and perspective projections	5
	c	Explain the need for homogeneous matrix representation.	5
	d	Explain boundary filling and flood filling algorithm	5
Q2.	a	Explain Bresenham's line drawing algorithm. How it is different from DDA	10
	b	Define virtual reality. Explain the components of VR.	10
Q3.	a	Explain input and output devices used for virtual reality systems.	10
	b	Explain Sutherland Hodgeman polygon clipping.	10
Q4.	a	Define curve? How Bezier curve algorithm works? List out properties of the same.	10
	b	Explain graphics rendering pipeline.	10
Q5	a	Explain 3D transformations i.e. translation, scaling, rotation, reflection with examples.	10
	b	Describe computer animation and the use of 2D and 3D morphing in it.	10
Q6.		Write short notes on **(any four)**	20

a. VRML
b. Color Models.
c. Fractals
d. Aliasing and Anti-aliasing
e. Text clipping

1T00725 - T.E.(COMPUTER)(Sem V) (Choice Based) / 31903 - Computer Network

[TIME-3 hrs.] **[Total Marks :80]**

N.B: Question No.1 is Compulsory.
Attempt any three question out of remaining questions.
Make Suitable assumption whenever necessary.

Q.1 **Any -5** **4x5**

a) What are the design issues for the OSI layers?
b) Differentiate between connection oriented and connectionless Service?
c) List the advantages of fiber optics as a communication Medium.
d) Explain with examples the classification of IPv4 addresses.
e) Explain in short different framing methods.
f) Explain the need of subnet mask in subnetting.

Q.2 **a)** What is topology? Explain the types of topologies with diagram, advantages and disadvantages. **10**
b) What is IPv4 protocol? Explain the IPv4 header format with diagram. **10**

Q.3 **a)** Explain CSMA Protocols. Explain how collision are handled in *CSMAlCD.* **10**
b) What is Traffic shaping? Explain leaky bucket algorithm and compare it with token backed algorithm. **10**

Q.4 **a)** What is ICMP Protocol? Explain the ICMP header format with diagram. **10**
b) Write a program for client server application using Socket Programming(UDP) **10**

Q.5 **a)** Explain the use of TCP timers in detail. **10**
b) Compare Open Loop congestion control and Closed Loop congestion control. **10**

Q.6 **Write a short note on the following (Any Two)** **20**

A. Intemetworking Devices
B. Distance Vector Routing
C. ARP/RARP
D. SMTP

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(3 Hours) **[Total Marks : 80]**

N.B. :(1) Question **No.1** is **Compulsory.**

(2) Attempt any 3 questions out of rest.

(3) Make suitable assumptions if any.

(4) All questions carry equal marks.

1.

a) Define DBA. Discuss role of DBA **5**

b) Explain Components of ER Model **5**

c) Explain ACID Properties of transaction **5**

d) Explain Database Languages **5**

2. a) Define Deadlock. Explain Deadlock Detection, Prevention and Recovery **10**

b) List 5 Significant differences between file processing system and Database Management System **10**

3. a) Explain Overall Architecture of DBMS in detail **10**

b) Construct ER diagram and convert into Relational Model for Company Which has several Employees working on different types of projects. Several Employees are working on one department. Every Employee has Manager. Several Employees are supervised by one Employee. **10**

4. a) Explain the concept of Serializability with its types **10**

b) Explain following Relational Algebra operations with suitable example **10**

a) Project b) Select

b) Union d) Cartesian Product

5. a) Employee(eid,ename,address,city) **10**
Works(eid,cid,salary)
Company(cid,cname,city)
1) Modify database so that John now lives in Mumbai
2) Find Employees who live in same city as the company for which they work.
3) Give all employees of "AZ Corporation" where there is increase in salary by 15%
4) Find the names of all employees, company name and city of residence such that Employee name begins with 'I'
5) Delete all tuples in works relation for employees of small bank corporation.

b) Define Normalization. Discuss 1NF, 2 NF and 3 NF in Detail **10**

6. Write short notes on any two **20**

a) Log Based Recovery

b) Constraints in SQL

c) Specialization and Generalization

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(3 Hours) [80 Marks]

N.B. 1) Question No. 1 is compulsory.
2) Attempt any **Three** questions out of remaining.
3) Assume suitable data wherever necessary and state them clearly.

Q.1 a) Draw and explain memory read machine cycle timing diagram in minimum mode of 8086. 5
b) Write a short note on mixed language programming. 5
c) Explain flag register of 80386 microprocessor. 5
d) Give formats of initialization command words(ICW's) of 8259 PIC. 5

Q. 2 a) Explain the maximum mode configuration of 8086 microprocessor. 10
b) Design 8086 based system for following specifications:
i) 8086 in minimum mode with clock frequency 5MHz.
ii) 64 KB EPROM using 16KB*8 chips
iii)16 KB RAM using 8KB*8 chips 10

Q. 3 a) Explain the branch prediction logic used in Pentium processor . 10
b) Draw and explain the block diagram of 8257 DMA controller. 10

Q.4 a) Explain the modes of operation of 80386 microprocessor . 10

b) i) Explain the I/O mode control word format of 8255 PPI . 5
ii) Explain an instruction issue algorithm of Pentium processor. 5

Q.5 a) Differentiate procedure and macro. Write a program to find the factorial of a number using procedure. 10
b) Explain the interrupt structure of 8086 microprocessor 10

Q.6 a) Explain segmentation of 8086 microprocessor. Give its advantages. 10
b) Explain different addressing modes of 8086 microprocessor. 10

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4/12/2018
EC

Paper / Subject Code: 31905 / Elective - I Multimedia System (DLOC) (CMPN)

T. E. Sem. V (CBCGS) Dec 2018

Maximum Marks - 80

Duration – 3 hours

Note:

1. Question No 1 is compulsory.
2. Attempt any 3 questions from the remaining 5 questions.
3. Draw neat diagrams wherever necessary.

Q.No. 1 Explain in Brief: 20

a. Characteristics of sound waves and their digital representation
b. Different redundancies in images
c. Working of Digital Camera
d. Need for Quality of Service and the parameters associated.

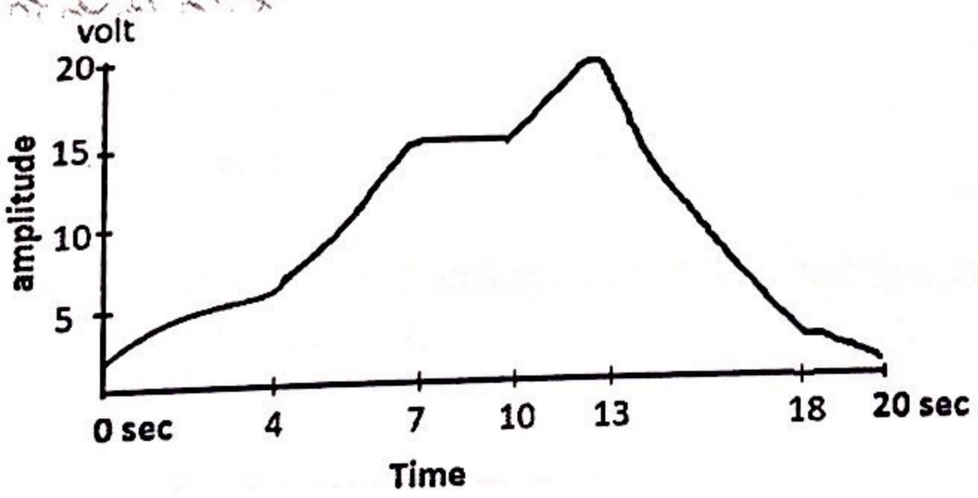
Q.No. 2(a) What are the redundancies considered in the video compression? Explain the different motion estimation techniques. 10

Q.No. 2(b) What is steganography? What are the different methods? Discuss LSB steganographic method and its merits and demerits. 10

Q.No. 3(a) What are the different features that make a text into a rich text? Explain how these formatted texts are encoded in RTF. 10

Q.No. 3(b) For the following 20 sec waveform 10

a. Perform the sampling at every 1sec using 8 levels of quantization.
b. Encode using PCM.
c. Reconstruct the wave after decoding.



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Q.No. 4(a) Give the architecture of multimedia streaming system on the internet and explain the role of each protocol. 10

Q.No. 4(b) What kind of redundancy is removed by Huffman coding? For the following image histogram of an image of size 50x50 (2500 pixels) and 8 gray levels, perform Huffman coding to find the code for each gray level. Also find the reduction achieved. 10

Gray level	0	1	2	3	4	5	6	7
Count of pixels	89	600	35	73	267	565	770	101

Q.No. 5(a) What is an authoring system? Why it is needed? Explain the different design issued faced. 10

Q.No. 5(b) Describe the steps followed in JPEG image compression. 10

Q.No. 6 Write short notes on **any two** 20

a. MPEG compression
b. Digital Signatures
c. DVD

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Time: 3 Hours **Total Marks: 80**

N.B.: (1) Question No.1 is compulsory.

(2) Attempt any three questions from the remaining five questions.

(3) Make suitable assumptions wherever necessary but justify your assumptions.

1. (a) Explain Chomsky Hierarchy. 05

(b) Differentiate between PDA and NPDA. 05

(c)Define Regular Expression and give regular expression for 05

i) Set of all strings over { 0, 1 } that end with 1 has no substring 00

(d) Explain Halting Problem. 05

2. (a) Design a Finite State Machine to determine whether ternary number (base 3) is divisible 5. 10

(b) Give and Explain formal definition of Pumping Lemma for Regular Language and prove that following language is not regular. 10

$L=\{ a^m b^{m-1} | m>0 \}$

3. (a) Construct PDA accepting the language $L=\{a^{2n}b^n | n\geq 0\}$. 10

(b) Consider the following grammar 10

$S \rightarrow i\ C\ t\ S \mid i\ C\ t\ S\ e\ S \mid a$

$C \rightarrow b$

For the string 'ibtaeibta' find the following:

(i) Leftmost derivation

(ii) Rightmost derivation

(iii) Parse tree

(iv) Check if above grammar is ambiguous.

4. (a) Construct TM to check wellformedness of parenthesis. 10

   (b) Convert following CFG to CNF 10

$$S \rightarrow ASA \mid aB$$

$$A \rightarrow B \mid S$$

$$B \rightarrow b \mid \in$$

5. (a) Convert (0+1) $(10)^*$(0+1) into NFA with ε-moves and obtain DFA. 10

   (b) Construct Moore and Mealy Machine to convert each occurrence of 100 by 101. 10

6. Write short note on following (any 4) 10

   (a) Closure properties of Context Free Language 10

   (b) Applications of Regular expression and Finite automata

   (c) Rice's Theorem

   (d) Moore and Mealy Machine

   (e) Universal Turing Machine