Paper / Subject Code: 32405 / Elective - I Advance Data Structures & Analysis of Algorithms (DLOC)

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

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

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

(2) Attempt **any three** out of remaining questions.

(3) Assume Suitable data if necessary.

(4) **Figures** to the **right** indicate full **marks.**

Q1. (a) Explain with example how divide and conquer strategy is used in Binary Search? 5

(b) Explain flow shop scheduling technique. 5

(c) Write a note on AVL Tree. 5

(d) Write an algorithm for finding minimum and maximum number from given set. 5

Q2. (a) What is longest common subsequence problem? Find LCS for following string. 10

X=ACBAED

Y=ABCABE

(b) Which are the different methods of solving recurrences? Explain with examples. 10

Q3. (a) Compare Greedy and Dynamic Programming approach for an algorithm design. Explain how both can be used to solve knapsack problem. 10

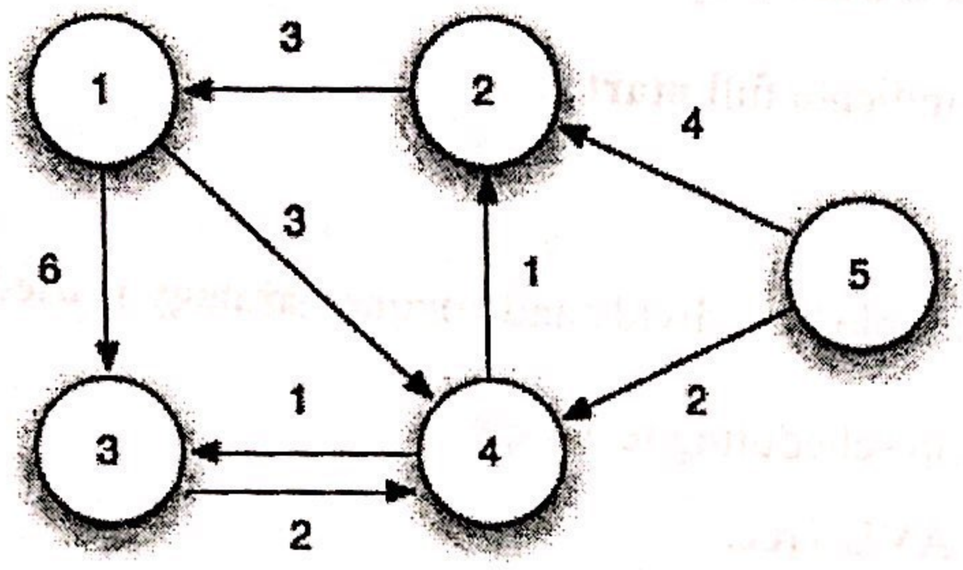
(b) Explain Huffman algorithm. Construct Huffman tree for **MAHARASHTRA** with its optimal code. 10

Q4. (a) Explain Job sequencing with deadlines.
Let n=4,(p1,p2,p3,p4)=(100,10,15,27) and (d1,d2,d3,d4)=(2,1,2,1).Find feasible solution. 10

(b) Sort the following numbers using quick sort. Also derive time complexity of quick sort. 10

27 10 36 18 25 45

Q5. (a) Apply all pair shortest path on the following graph 10



(b) Given a chain of four matrices A_1, A_2, A_3 and A_4 with $P_0=5$, $P_1=4$, $P_2=6$, $P_3=2$ and $P_4=7$. Find m[1,4] using matrix chain multiplication 10

Q6. Write Note on **(Any two)** 20

i. Rabin Karp Algorithm.
ii. Topological Sort.
iii. Knuth-Morrie-Pratt algorithm.
iv. Red-Black Tree.

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

N.B. : (1) Question No. 1 is **compulsory**
(2) Solve any **three** questions out of remaining five **five**

1.	(a) Differentiate between dimension model and ER model?	5
	(b) What is the Fragmentation? Elaborate horizontal fragmentation and derived horizontal fragmentation?	5
	(c) What are the types of Single Level Ordered Indexes .	5
	(d) Explain Data Loading and its techniques.	5
2.	(a) Design a schema in SQL for college attendance system. Show one example each for primary key and foreign key constraint. Create a suitable ECA example to enforce defaulters constraint.	10
	(b) Describe 3 phases of ARIES recovery method.	10
3.	(a) Compare MAC and DAC and RBAC for multi level security.	10
	(b) What are the advantages of dynamic multilevel indexes. Explain with the help of B trees and B^+ trees	10
4.	(a) Explain concurrency control in distributed database?	10
	(b) Explain with suitable example object identity, object structure and type constructors in OODB.	10
5.	(a) What is data warehouse architecture and list its types.	10
	(b) Elaborate types of slowly changing dimension tables with the help of examples.	10
6.	(a) List the challenges in the ETL process and explain it in detail.	10
	(b) Differentiate between OLTP and OLAP.	10

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[Time: Three Hours] **[Marks: 80]**

N.B: (1) Question No.1 is compulsory
(2) Attempt any three of remaining five questions
(3) Assume any suitable data if necessary and justify the same

Q 1	a)	Explain Brute-Force Nested Loop Join algorithm.	5
	b)	What is dead lock, explain wait and die scheme used for deadlock prevention.	5
	c)	What is Temporal Database? What are its characteristics?	5
	d)	Explain roll-up, drill down, slice, dice operations in OLAP.	5
Q 2	a)	Explain basic time stamp ordering protocol and compare it with 2 phase locking protocol in terms of deadlock and rollbacks.	10
	b)	Explain Mandatory Access Control and Discretionary Access Control, also explain access control list and access control entry w.r.t. the same.	10
Q 3	a)	Why fragmentation is required in distributed data bases, Explain Vertical fragmentation with example, comment on completeness , reconstruction and disjointness aspect of it.	10
	b)	Explain 2 Phase commit protocol with proper flow diagram.	10
Q 4	a)	Explain MOLAP, ROLAP and HOLAP Models.	10
	b)	What is the significance of serializability, explain conflict serializability and view serializability with the help of example.	10
Q 5	a)	Explain types of data extraction methods in ETL process	10
	b)	What is basic difference between pessimistic and optimistic concurrency control algorithm. Explain distributed 2PL algorithm.	10
Q 6		Write short notes on **(any two)**	20

a. Role Based Access Control
b. Query Optimization
c. Data Warehouse Architecture
d. Challenges in ETL functions

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(3 Hours)

[Total Marks: 80]

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

(2) Answer any three questions from Q.No. 2 to Q.No. 6

(3) Figures to the right indicate full marks

(4) Assume suitable data if required

Q.1 a. Differentiate between Bitmap and Vector based graphics [5]

b. Explain inside-outside test [5]

c. Explain graphical rendering pipeline [5]

d. Explain Java 3D [5]

Q.2 a. Draw Bezier curve of order 3 having 4 control points (1, 1), (2,3), (4,3) and (6, 4) [10]

b. What are the applications of Virtual Reality? [10]

Q.3 a. Explain Cohen Sutherland line clipping algorithm. Hence find the clipping coordinates of line AB where A(-1,5), B(3,8). Window coordinates are (-3, 1) and (2,6) [10]

b. Explain types of projections. [10]

Q.4 a. Find coordinates of a polygon bounded by (0,0), (1,5), (6,3) and (-1,4) when reflected with respect to y=2x + 4. [10]

b. Explain Midpoint circle drawing algorithm [10]

Q.5 a. Explain 3D rotation with respect to arbitrary axis which is not parallel to x, y and z axis [10]

b. Explain VRML [5]

c. Find normalization transformation matrix in which window has lower left corner at (1,1) and upper right corner at (6,6) which is mapped to the viewport where Viewport is a normalized device screen. [5]

Q.6 Write short note on:

a. Types of VR Systems [5]

b. Text clipping [5]

c. Koch curve [5]

d. Warping [5]

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Time (3 Hours) [Total Marks 80]

N. B:

1. Question No. 1 is Compulsory.
2. Solve any THREE from Question No. 2 to 6.
3. Draw neat well labeled diagram wherever necessary.

Q. 1	a)	Enlist security goals. Discuss their significance.	(5)
	b)	Compare and contrast HMAC and CMAC.	(5)
	c)	SHA provides better security than MD. Justify.	(5)
	d)	Design Sample Digital Certificate and explain each field of it.	(5)
Q. 2	a)	Explain Transposition Ciphers with illustrative examples.	(10)
	b)	Given modulus n=91 and public key, e=5, find the values of p, q, phi(n), and d using RSA. Encrypt M=25. Also perform decryption.	(10)
Q. 3	a)	What are Block Cipher Modes. Describe any two in detail.	(10)
	b)	Using Affine cipher, encrypt the Plaintext 'SECURITY' with key pair (5, 2).	(10)
Q. 4	a)	Given generator g= 2 and n=11. Using Diffie Hellman algorithm solve the following: 1. Show that 2 is primitive root of 11 2. If A's public key is 9 , what is A's private key? 3. If B's public key is 3, what is B's private key? 4. Calculate the shared secret key.	(10)
	b)	Explain different types of Denial of Service attacks.	(10)
Q. 5	a)	What is Authentication? Explain Needham Schroeder Authentication protocol.	(10)
	b)	What is a firewall? Explain different types of firewall.	(10)
Q. 6		Write short notes on any **FOUR:** 1. Email Security 2. SSL/TLS 3. IPSec 4. Port Scanning. 5. Honey pots	(20)

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42018

Paper / Subject Code: 32407 / Elective - I E-Commerce & E-Business (DLOC) (IT)

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

Time : 03 hrs. **Marks : 80**

Note : Question No 1 is compulsory.
Attempt any 3 questions from remaining.
Assume suitable data whenever necessary.

Q1. You are appointed as developer of e-commerce website for Online Education Portal. Design and develop website to promote the same. 20

Q2 A) Define e commerce and explain its different types with examples. 10

B) Explain E commerce Trade cycle with example. 10

Q3 A) Explain various session management techniques in e- commerce. 10

B) Write short note on middleware technologies. 10

Q4 A) Explain security aspects of E-commerce. 10

B) Discuss SET protocol architecture with diagram. 10

Q5 A) Explain characteristics of Internet Payment System. 10

B) What is value chain process in E-commerce? Discuss with diagram. 10

Q6 A) Explain critical elements of E-business. 10

B) Write short note on EDI. 10

Time : 03 hrs. **Marks : 80**

Note : Question No 1 is compulsory.
Attempt any 3 questions from remaining.
Assume suitable data whenever necessary.

Q1. You are appointed as developer of e-commerce website for Online Education Portal. Design and develop website to promote the same. 20

Q2 A) Define e commerce and explain its different types with examples. 10

B) Explain E commerce Trade cycle with example. 10

Q3 A) Explain various session management techniques in e- commerce. 10

B) Write short note on middleware technologies. 10

Q4 A) Explain security aspects of E-commerce. 10

B) Discuss SET protocol architecture with diagram. 10

Q5 A) Explain characteristics of Internet Payment System. 10

B) What is value chain process in E-commerce? Discuss with diagram. 10

Q6 A) Explain critical elements of E-business. 10

B) Write short note on EDI. 10

(3 hours) [80 marks]

NOTE: 1. Question No 1 is compulsory
2. Attempt any three questions from remaining.
3. Assume suitable data if necessary and state the same.

Q1. Answer following.

a. Create a HTML page Showing a message "I use media query". Write media query such that the text color changes to light gray when browser window is 600px wide or less and otherwise it is black. [05]

b. Explain Geo Location API with example usage. [05]

c. What are characteristics of Rich Internet Application? [05]

d. Differentiate between REST and SOAP. [05]

Q2.

a. What is AJAX ? Explain steps required to process AJAX with example. [10]

b. Explain various cross browser compatibility issues. [10]

Q3.

a. What are benifits of using JSON over XML data. Create a XML page storing name, country, runs scored, balls faced for three batsman. Represent same data as JSON object [10]

b. Explain Micro Data with suitable example. How to verify support for Micro Data? [10]

Q4.

a. Explain how session management is done in PHP. Clearly explain how to create, access, modify session variables in PHP. [10]

b. Explain important features of Django framework. [10]

Q5.

a. Create a HTML form that accepts first name, last name, department and designation from user. Create a PHP code that stores this information in a mysql database named employee with an existing table emp_details having appropriate schema and acknowledges the user through appropriate message about success or failure during data insertion. Assume suitable user name and password to access database. [10]

b. Explain with proper syntax and example how to use different types of CSS selectors. [10]

Q.6

a. Explain <audio>, <video> and <canvas> elements in HTML5. [10]

b. Explain "Window" object of JavaScript DOM. Write JavaScript code to change background colour of the web page automatically after every five seconds. [10]

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Time: 3 Hours **Marks: 80**

N.B.: 1. Question No. 1 compulsory.
2. Attempt any Three out of remaining Five questions.
3. Figures to the right indicate full marks.
4. Draw neat diagram wherever necessary.

1. Solve any four out of five
   A) What are the design metrics of an embedded systems. 05
   B) Discuss working of stepper motor. 05
   C) Explain different types of kernals. 05
   D) Explain in brief Assembler Directives with respect to 8051 Assembler. 05
   E) List important features of ARM architecture.. 05

2. A) Describe priority inversion problem and explain how to resolve it? 10
   B) Explain various addressing modes of 8051 microcontroller. 10

3. A) Assuming crystal frequency = 11.0592 MHz, write an assembly language program for 8051 to generate square wave of 2 KHz at pin P2.5. Show necessary delay calculation. (Use Timer-0, Mode-0) 10
   B) List and explain how exceptions and interrupts handled in ARM7. 10

4. A) Write an assembly language program to generate triangular wave using DAC interfacing with 8051 micro controller. 10
   B) Explain various addressing nodes of ARM7 with suitable example instruction. 10

5. A) List discuss different features of Arduino and Raspberry-pi along with their schematic diagrams. 10
   B) Draw and Explain interrupt structure of 8051 microcontroller. 10

6. Write short notes on :
   A) SoC and DSP (Embedded system core) 06
   B) ARM development tools. 07
   C) Extended libraries of Arduino 07

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

N.B.:- (1) Question No. **1** is **Compulsory**.
(2) Solve any **three** questions from the remaining **five** questions.
(3) **Figures** to the **right** indicate **full** marks.
(4) Assume **suitable** data where **necessary.**

1.	(a)	Explain application of Embedded System.	**5**
	(b)	Explain SOC in detail.	**5**
	(c)	Compare AJMP, SJMP, LJMP instructions of 8051	**5**
	(d)	Describe the feature of ARM 7 processor.	**5**
2.	(a)	Explain in details ARM7 pipelining.	**10**
	(b)	Explain the Timer/Counter modes of 8051 microcontroller.	**10**
3.	(a)	Explain addressing modes of ARM 7 processor.	**10**
	(b)	Explain various serial modes of 8051 microcontroller.	**10**
4.	(a)	What is Semaphore? Explain the use of semaphore with respect to embedded systems?	**10**
	(b)	Write an assembly language program for 8051 microcontroller to arrange block of ten numbers in ascending order.	**10**
5.	(a)	Explain priority inversion problem in Embedded Systems. How does it resolved?	**10**
	(b)	Explain the architecture of 8051 microcontroller.	**10**
6.		Write notes on (a) Digital Camera System. (b) Automated meter reading system.	**20**

(3 Hours) **Marks : 80**

N.B. (1) Question number 1 is compulsory.
(2) Solve any 3 from remaining.
(3) Assume suitable data where ever necessary.

Q.1. Attempt the following: 20
a. compare hard and soft links.
b. Explain Linux file access permissions.
c. List 5 Environment variables. Describe their role.
d. Explain Activity Life-cycle using neat Labeled diagram.

Q.2.
(a) Explain role of /etc/passwd, /etc/shadow, /etc/group files with respect to user administration 10
(b) Write short note on 'working with web using shell script'. 10

Q3.
(a) Explain use of grep command. Also give examples of use of c, i and v option with grep. 10
(b) Write a note on process management in Linux along with the relevant commands for process management. 10

Q4.
(a) Explain File System Hierarchy (FHS) of Linux. 10
(b) Write note on iptables and its use as firewall with examples. 10

Q5.
(a) Explain role of Logical Volume Manager in Linux Kernel. 10
(b) Explain the use of following Networking commands: i) ping ii) arp iii) host
iv) traceroute v) ifconfig 10

Q6
(a) Explain sed and with an example shell script explain its usage for replacing a pattern in given input. 5
(b) What are different layouts possible for a view derived from ViewGroup base class. 5
(c) Describe role of Intent in Android Programming. 5
(d) What is the role of init signal. 5

Q.P. Code:-24597

1T01215 - T.E.(INFORMATION TECHNOLOGY)(Sem V) (CBSGS) / 30801 - OPERATING SYSTEMS

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

N.B. : (1) Question No. 1 is **compulsory**
(2) Solve any **three** questions out of remaining **five**
(3) Make suitable assumption if necessary

1. Solve any four out of five:

1. (a) Draw and explain process state transition diagram with all possible transitions. 5
(b) Explain functions and services of an operating System. 5
(c) Differentiate between internal and external fragmentation. 5
(d) Explain the terms: Critical Section and Race Condition 5
(e) Differentiate user level and kernel level threads. 5

2. (a) What is deadlock? Explain necessary and sufficient conditions for deadlock. How to avoid deadlock? 10
(b) Explain paging in detail. Describe how logical address is converted into physical address. 10

3. (a) In system using paging and segmentation, the virtual address space consists of upto 8 segments where each segment can be upto 2^{29} bytes long. The hardware pages each segment into 256 bytes pages. How many bits in virtual address specify the (1) segment number (2) page number (3) offset within page (4) entire virtual address 10
(b) Consider a system with 5 processes and 3 resource types. At a time following snapshot of the system has been taken: 10

	Allocated			Maximum			Available		
Process ID	R1	R2	R3	R1	R2	R3	R1	R2	R3
P1	1	1	2	4	3	3	3	1	0
P2	2	1	2	3	2	2			
P3	4	0	1	9	0	2			
P4	0	2	0	7	5	3			

P5	1	1	2	11	2	3	

1) Determine the total amount of resources of each type. 2) compute the need matrix 3) determine if the state is safe or not using Banker's algorithm,

4. (a) Discuss programmed I/O and DMA in detail. 10

(b) Consider following set of processes with the length of CPU burst time given in ms: 10

Process	Arrival Time	Burst Time
P1	0	6
P2	1	4
P3	3	5
P4	5	3

Draw the gantt chart for: FCFS , SJF (preemptive and non-preemptive) and RR (quantum=2). Calculate turn around time and waiting time in each case.

5. (a) Assume that the disk head is initially positioned over track 100. For the disk space requests of 27,129,110,186,147,41,10,64 and 120. Show how disk scheduling is carried out for SCAN, SSTF and LOOK. Calculate the average seek length and show the tracking of the requests. 10

(b) Explain different file access methods in detail. 10

6. Write notes on the following(any four):

(a) RAID 5

(b) Android OS 5

(c) I-node 5

(d) RTOS 5

(e) System Calls 5

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