TUTORIAL QUESTIONS

Subject: Data Structures through C++

S.NO	QUESTION	BLOOMS TAXONOMY LEVEL	Mapped with CO
	UNIT – I		
1	Explain sparse matrix representation using array with an example. Discuss the advantage and disadvantages of this method.	4	CO1
2	Discuss matrix multiplication with an example.	2	CO1
3	Define polynomial ADT	2	CO1
4	Define data structure. Discuss different types of data structure their implementations applications.	5	CO1
5	What is an array? Discuss different types of array with examples.	6	CO1
6	Explain how to implement polynomial ADT using array. Discuss its Advantages and Disadvantages.	5	CO1
7	Explain polynomial addition using arrays.	6	CO1
	UNIT – II		
1	Write an algorithm to insert and delete a key from circular queue.	6	CO2
2	Explain the procedure to convert infix expression to postfix expression with the following expression: ((A – (B+C) * D) / (E+F))	4	CO2
3	List the application of stacks.	1	CO2
4	Define queue full condition.	1	CO2
5	Write an algorithm for basic operations of stack.	3	CO2
6	Explain the procedure to evaluate postfix expression. Evaluate the following postfix expression 7 3 4 + - 2 4 5 /+ * 6 / 7 +?	4	CO2
8	Explain the operations performed on simple queue with an example.	6	CO2
9	Convert following expression X+(Y * Z) – ((N * M +O) /P) in to post form.	5	CO2
	UNIT – III		
1	List various operations of linked list and explain how to insert a node anywhere in the list.	6	CO3
2	Show how to reverse a single linked list.	7	CO3
3	Write recursive algorithm for lists.	5	CO3
4	Explain the procedure to insert and delete element from sparse matrix.	4	CO3
5	Write an algorithm to push and pop an element from linked stack	6	CO3
6	Discuss sparse matrix representation using linked list.	4	CO3
7	What is the degree of a graph?	2	CO3
	UNIT – IV		
1	List the different tree traversals	2	CO4
2	Define spanning tree.	2	CO4
3	Explain binary tree ADT.	4	CO4
4	Discuss representation of binary tree using arrays and linked list.	8	CO4
5	Define binary search tree. Show how to insert and delete an element from binary search tree.	7	CO4

6	Write algorithm to insert and delete an element from binary search tree.	6	CO4
7	Construct max heap for the following: 140, 80 , 30 , 20 ,10 ,40 ,30 ,60 ,100 ,70 ,160 ,50 , 130, 110, 120	5	CO4
UNIT – V			
1	Define in-degree and out-degree of a graph..	2	CO5
2	Explain Warshall's algorithm to find transitive closure of a graph with a sutable example.	7	CO5
3	Write Prim's algorithm.	4	CO5
4	What is a graph? Explain the properties of graphs.	6	CO5
5	Write breadth first traversal algorithm. Explain with an example.	6	CO5
6	What are connected components of graph? Is there a method to find out all the connected components of graph? Explain.	4	CO5
7	Explain Prim's algorithm with an example.	6	CO5
8	What is planer graph?	1	
UNIT – VI			
1	What is the best sorting technique? Why?	2	CO6
2	State and explain insertion sort with example.	8	CO6
3	Differentiate between iterative merge sort and recursive merge sort.	7	CO6
4	Rearrange following numbers using quick sort: 10, 6, 3, 7, 17, 26, 56, 32, 72	6	CO6
5	Write a program to sort the elements using radix sort.	7	CO6
6	Write algorithm for merge sort.	6	CO6
7	Discuss how to sort elements using merge sort with suitable example.	5	CO6
8	Time complexity of quick sort	2	CO6

TUTORIAL QUESTIONS

Subject: Digital Logic Design

Unit No.	Sl.No.	Questions	Bloom's Taxonomy level	Mapped with CO
I	1.	Convert (i) $(615.25)_8$ to $(?)_{10}$, $(?)_2$ & $(?)_{16}$. (ii) $(12.125)_{10}$ to $(?)_8$, $(?)_2$ & $(?)_{16}$. (iii) $(1101.111)_2$ to $(?)_{10}$, $(?)_8$ & $(?)_{16}$. (iv) $(6A5.B5)_{16}$ to $(?)_{10}$, $(?)_2$ & $(?)_8$.	3	CO 1
	2.	lutions of quadratic equation $x^2 - 11x + 22 = 0$ are $x = 3$ & $x - 6$ $x = 3$ & $x - 6$ Identify the base of the system.	2	CO 1
	3.	ent -45,+45,-65&+65 in (i)sign magnitude form (ii) sign 1's complement form (iii) sign 2's complement form.	4	CO 1
	4.	te using Add and Subtract in BINARY (i) 1111 & 1010 (ii) 100100 & 10110	8	CO 1
	5.	$28)_{10}$ - $(15)_{10}$ using 6-bit 2's complement subtraction.	5	CO 1
	6.	(i) 5250-321 (ii)3570-2100 (iii) 20-100 using 9's complement subtraction and 10's complement subtraction.	6	CO 1
	7.	(i) 3250_{10}-72532_{10} (ii) 72532_{10}-3250_{10} using10's complement subtraction and what did you infer from results.	7	CO 1
	8.	rithmetic operations indicated below and verify answers if left most position is sign bit and negative numbers are in 2's complement form (i)101011+111000 (ii)111001-001010	9	CO 1
	9.	(i) 3250_8-72532_8 (ii) 72532_{10}-3250_{10} using 7's complement subtraction and 16's complement subtraction. what did you infer from results.	7	CO 1
	10.	(i) 3250_8-72532_8 (ii) 72532_{10}-3250_{10} using 1's complement subtraction and 10's complement subtraction.	10	CO 1
	11.	e 2's complement form and 2's complement form of subtraction with example.	1	CO 1
	12.	er 2's complement form and solve 3250_{10}-72532_{10}.	8	CO 1
II		t basic Boolean theorems and properties and give proofs of each property and theorem.	2	CO 2
	2.	de that AND-OR network is equivalent to (i)NAND-NAND network and (ii) NOR-NOR network.	8	CO 2
	3.	y universal gates? Why are they called so?	7	CO 2
	4.	ent XOR & XNOR using Universal gates.	4	CO 2
	5.	the following equations into standard sop B,C,D)= A'B+BC+CD'+ACD B,C,D)= (A+B'+C) (A+D) (B'+C') (A+B+C)	5	CO 2
	6.	the following equations into canonical pos	6	CO 2

		B,C,D)= A'B+BC+CD'+ACD B,C,D)= (A+B'+C) (A+D) (B'+C') (A+B+C)		
	7.	Represent the following functions using (i) NAND gates (ii) NOR gates F_1=A(B+CD)+(BC) F_2=WX'+X'Y(Z+W')	3	CO 2
	8.	Conclude ((AB)'+A'+AB)'=0	8	CO 2
	9.	Reduce the following Boolean expressions AB'(C+BD)+A'B'A'B'C+(A+B+C')'+A'B'C'D	9	CO 2
	10.	Write the complement of the following Boolean expressions X'YZ+XZ XY+X(WZ+WZ')	10	CO 2
	11.	State the Demorgan's theorems and simplify the expression. (((AB)'+ABC)'+A(B+AB'))'.	1	CO 2
	12.	Reduce {(CD)'+A}'+A+CD+AB.	7	CO 2
III	.	Apply K-MAP (i)f(a,b,c,d)=∑(0,2,3,6,7)+d(8,10,11,15) (ii)f(w,x,y,z)=π(4,5,6,7,8,12) φ(1,2,3,9,11,14)	5	CO 3
	2.	Apply K-MAP and implement using NAND gates (i)f(a,b,c,d)=∑(1,2,4,6,7,8,11,12,13) to POS form. (ii)f(w,x,y,z)=π(1,3,7,11,15) φ(0,2,5) to SOP form.	6	CO 3
	3.	Analyze Y= Σ m (3,6,7,8,10,12,14,17,19,20,21,24,25,27,28) using K-Map method.	7	CO 3
	4.	Write minimal SOP and minimal POS expressions for the following function F(A,B,C,D)= Σ m (0,1,1,5,8,9,10).	9	CO 3
	5.	Solve the following Boolean expression using X-NOR and NOR gates F=AB'CD'+A'BCD'+AB'C'D+A'BC'D.	10	CO 3
	6.	Consider K-MAP and simplify f(a,b,c,d)=∑(0,1,3,4,5,6,7,8,9,10,12,14) f(a,b,c)=π(0,2,4,6)	8	CO 3
	7.	Modify using K-MAP and implement using AOI logic f(a,b,c,d)=∑(1,2,4,6,7,8,11,12,13) to POS form. f(w,x,y,z)=π(1,3,7,11,15) φ(0,2,5) to SOP form	3	CO 3
	8.	Represent the following Boolean expression using X-OR and OR gates F=AB'CD'+A'BCD'+AB'C'D+A'BC'D.	4	CO 3
	9.	Reproduce Y=∑ (0,1,4,5,16,17,21,25,29) using K-Map method.	1	CO 3
	10.	Consider K-MAP simplification and implement using AOI logic f(a,b,c,d)=∑(1,2,4,12,13)+d(5,6,7 to POS form. f(w,x,y,z)=π(1,3,9,11,15) φ(0,2,5) to SOP form	8	CO 3
IV	1.	Design (i) HALF ADDER (ii) HALF SUBTRACTOR	9	CO 4

		(iii) FULL ADDER (iv) FULL SUBTRACTOR		
	2.	Explain 4 bit ripple adder/subtractor with suitable example.	7	CO 4
	3.	Design (i) 4bit magnitude comparator (ii) 5bit magnitude comparator	10	CO 4
	4.	Summarize the following code converters (i) GRAY-BINARY (ii) BINARY-BCD (iii) BCD-XS3 (iv) XS3-BINARY (v) INARY-GRAY	8	CO 4
	5.	Design (i) octal to binary encoder (ii) 4 bit priority encoder	9	CO 4
	6.	Reproduce HALF SUBTRACTOR and FULL ADDER using (i) MUX (ii) DEMUX (iii) DECODER	2	CO 4
	7.	Apply decoder and external gates for following (i) $F_1=X'Y'Z'+XZ$ $F_2=XY'Z'+X'Y$ $F_3=X'Y'Z'+XY$ (ii) $F_1=\sum(0,1,3,6,7)$ $F_2=\sum(0,2,4,7)$	5	CO 4
	8.	Represent following using LOGIC GATE (i) 3 to 8 decoder (ii) 4 to 16 mux (iii) 1x16 demux	4	CO 4
	9.	Analyze following using (i) 4 input mux (ii) 8x1 mux (iii) 3 to 8 decoder (iv) 2 to 4 decoder $F_1=\sum(0,1,3,6,7)$	7	CO 4
	10.	Apply (i) 4 input mux (ii) 8x1 mux (iii) 16x1 mux for following $F_1=\sum(0,1,3,4,8,9,15)$	6	CO 4
	11.	Convert 4 to 16 decoder into demux	3	CO 4
V		n the operation of (a) SR latch using NOR gates (b) Gated D latch using NAND gates	7	CO5
	2.	n the operation of negative edge triggered D flip-flop when CP=1.	7	CO5
	3.	is RACE AROUND condition? How can we eliminate it? Explain MASTER SLAVE JK flip-flop and state its advantages.	2	CO5
	4.	n the operation of positive edge triggered JK flip-flop in detail.	3	CO5
	5.	guish combinational & sequential logic circuits?	8	CO5
	6.	et different methods used to trigger a flip-flop?	6	CO5
	7.	flip-flop? Design basic flip-flop circit with NAND gates.	1	CO5
	8.	EXCITATION tables and TRUTH tables of (a) D (b) T (c) JK (d) SR flip-flops.	10	CO5

	9.	ine characteristic equations of (a) D (b) T (c) JK (d) SR flip-flops.	5	CO5
	10.	the following terms with respect to flip-flops (a)Setup time (b) Hold time (c) Propagation delay (d) Preset (e) Clear (f) Latch	8	CO5
	11.	t the following flip-flops (a) JK to D (b) T to D (c) D to SR (d) SR to JK (e) T to SR	4	CO5
VI	.	uish Asynchronous & Synchronous sequential logic circuits?	8	CO6
	2.	eat diagram explain operation of (a)3 bit universal shift register. (b) 4 bit controlled buffer register.	7	CO6
	3.	te Johnson's counter using a 2 bit shift register. Draw waveforms and list applications of shift register.	5	CO6
	4.	e about parallel in serial out shift register. How to load data word ABCD=1101 in the 4 bit bidirectional shift register in shift left mode.	2	CO6
	5.	a register for left & right shift of data for 10110101.	9	CO6
	6.	ntiate ring counter and twisted ring counter. Draw and explain about 4 bit ring counter.	8	CO6
	7.	n about synchronous ripple counter and compare merits and demerits.	3	CO6
	8.	n about 4 bit ripple down counter using positive edge triggered flip-flop.	4	CO6
	9.	ripple counter. Design BCD ripple counter.	1	CO6
	10.	n about working of 4 bit asynchronous counter.	7	CO6
	11.	(a) mod-12 synchronous up counter using 'T' flip-flop. (b) mod-10 synchronous down counter using 'JK' flip-flop. (c) mod-6 synchronous up counter using 'D' flip-flop. (d) mod-6 synchronous down counter using 'SR' flip-flop.	10	CO6
	12.	ter has 14 stable states 0000 to 1101.if input frequency is 50KHz Compute it's output frequency?	6	CO6

TUTORIAL QUESTIONS

Subject: Computer Graphics

	UNIT – I	Blooms taxonomy	Mapping with outcome
1	Explain the Bresenham's line drawing algorithm	4	CO2
2	Explain the midpoint circle drawing algorithm. Assume 10cm as the radius and co-ordinate origin as the center of the circle	4	
3	Explain (a) random and raster scan devices (b) primitives used for filling	3	
4	Explain about filled area primitives	3	
5	Explain D viewing pipeline in detail	3	
6	Explain Cohen-Sutherland's line clipping algorithm.	4	
7	Derive the viewing Transformation matrix in detail	6	
8	Explain polygon clipping algorithm	3	
9	Explain the different 2D transformations	4	
10	Explain the about the lines of attribute primitives?	3	
	UNIT – II		
1	Explain about parallel and perspective projection in detail?	9	CO2
2	Discuss the concept of three dimensional object representations?	8	
3	Explain curved line and splines	9	
4	Explain about quadric surface in detail?	9	
5	Discuss about the concept of Visualization of data sets?	7	
6	Explain about 3D Transformation in detail?	3	
7	Explain the concept of 3D viewing in detail?	4	
8	What are the methods of visible surface detection?	2	
9	What is back face detection ?give one example	1	
10	Write the concept of painter's method?	1	
	UNIT – III		
1	What is the importance of graphics programming?	2	CO3
2	Write short note on the following color models: I. RGB II. YIQ III. CMY IV. HSV	2	
3	What is computer animation? give one example	1	
4	Explain about general computer animation techniques?	3	
5	Discuss about raster animation in detail?	9	
6	Discuss about key frame systems?	4	
7	What are basic graphics primitives?	2	
8	Write the concept of drawing three dimensional objects?	2	
9	Write the concept of drawing three dimensional scenes?	2	
10	What is animation sequence?	2	
	UNIT – IV		
1	What is rendering? give one example	1	
2	What is shading ?give one example	1	
3	Explain the concept of shading models?	4	
4	Discuss the concept of flat and smooth shading?	7	
5	Write the concept of adding textures to faces?	2	

6	Write the concept of adding shadows of objects?	9	CO4
7	Discuss about the concept of building a camera in a program?	9	
8	Explain the concept of creating shaded objects?	3	
9	Discuss about rendering textures?	3	
10	Discuss about drawing shadows?	2	
UNIT – V			
1	Discuss about the concept of Fractals and self similarity?	3	CO5
2	Explain about the concept of peano curves?	9	
3	What is creating image by iterated functions?	2	
4	What are Mandelbrot sets? Give example?	4	
5	Explain about Julia sets? Give example?	3	
6	Explain about Random Fractals? Give example?	4	
UNIT – VI			
1	What is meant by intersecting rays?	2	CO6
2	Give the relationship between intersecting rays and primitives?	2	
3	Write the concept of adding surface textures?	9	
4	What is reflection and transference?	2	
5	Write the concept of Boolean operation on objects?	2	