VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERABAD-31
B.E 2/4 (CSE-A) II-SEMESTER
Department of Computer Science and Engineering
Name of the Subject: Database Management Systems
Assignment –III   **DOS: 20-06-2023**

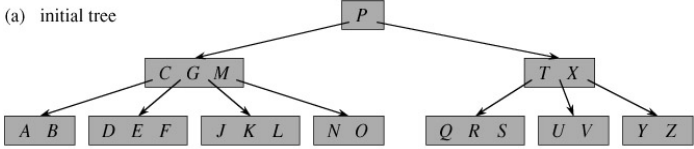| Q.no.	Question	Blooms Taxonomy	Mapped CO	PO
Set-1 (1602-21-733-012, 013, 015, 020, 026, 029, 032, 036, 037, 069) answer the following Questions				
1	Perform the following operations on given B+tree i)) add 10 ii) add 69 iii) delete 55	3	4	1,2

2	Construct B-tree for the following set of key values
	    5 11 22 32 43
	  44 45 76 47 58
		3	4	1,2

3	Suppose we are using extendable hashing on a file that contains records with the following search key values
	    2 3 5 7 11
	   17 19 23 29 31
	Show the extendable hash structure for this file if the hash function is h(x)=x mod 8 and buckets can hold three records
		3	4	1,2

4	Consider the following precedence graph. Is the corresponding schedule conflict serializable? Explain your answer. 	3	4	1,2

Set-2 (1602-21-733-001, 002,003,004,005,006,007,008) answer the following Questions				
1	Construct B-tree for the following set of key values 　　6　　17　　28　　32　　43 65　76　　　87　　98　　99	3	4	1,2
2	Justify the following statement: Concurrent execution of transactions is more important when data must be fetched from (slow) disk or when transactions are long and is less important when data are in memory and transactions are very short.	3	4	1,2
3	Perform the open hashing on a file that contains records with the following search key values 　　　2　　3　　5　　7　　11 　　17　　19　　23　　29　　31 hash function is h(x)=x mod　8	3	4	1,2
4	Suppose that data base schema R = (A, B, C, D, E, F) of explain and apply 2NF AB → C A → D B → EF	3	4	1,2,3
Set-3 (1602-21-733-009, 010,011,014,016,017,018,019) answer the following Questions				
1	Construct a B+ tree with fan-out (no of points per node) is 3 for the following search key values 80, 50, 10, 70, 30, 100, 90. Assume that the tree is initially empty and the values are added in the order given. 　　a) Show the tree after insertion of 10, after insertion of 30, and after insertion of 90. Show the tree after deletion of 30, 10.	3	4	1,2
2	Consider a file system such as the one on your favorite operating system. a. What are the steps involved in creation and deletion of files, and in writing data to a file? b. Explain how the issues of atomicity and durability are relevant to the creation and deletion of files and to writing data to files.	3	5	1,2
3	Suppose we are using extendable hashing on a file that contains records with the following search　key values 　　　2　　6　　9　　12　　16 　　15　　19　　23　　14　　29 Show the extendable hash structure for this file if the hash function is h(x)=x mod　8 and buckets can hold three records	3	4	1,2
4	Lots(Property_id#, County_name, Lot# ,Area ,Price, Tax_rate) Apply second normal form and third normal form FD1: Property_id# → County_name Lot# Area Price Tax_rate FD2 : County_name, Lot# → Property_id#, Price, Tax_rate FD3 : County_name → Tax_rate FD4: Area → Price.	3	4	1,2

Set-4 (1602-21-733-020,021,022,023,024,025,027,028) answer the following Questions				

1	Construct a B tree for the following set of key values
	    5 105 25 55 45
	    35 65 15 85 95
	(i) delete 65 from the tree (ii) Insert 100 to the tree
		3	4	1,2

2	Construct a B+ tree for the following set of key values. (2,3,5,7,11,17,19,23,2,31).Assume that the tree is initially empty and values are added in ascending order.	3	4	1,2
3	The lost update anomaly is said to occur if a transaction T_j reads a data item, then another transaction T_k writes the data item (possibly based on a previous read), after which T_j writes the data item.The update performed by T_k has been lost, since the update done by T_j ignored the value written by T_k .	3	5	1,2
4	Consider the following set F of functional dependencies on schema (SSN,Ename,Bdate, Address,Dnumber,Dname, Dmgr_SSN) SSN→Ename,Bdate,Address,Dnumber Dnumber → Dname, Dmgr_SSN Explain 3NF for the above relation schema	3	4	1,2
Set-5 (1602-21-733-030,031,032,033,034,035,038,039) answer the following Questions				

1	Construct B-tree for the following set of key values
	    5 11 22 32 43
	    44 45 76 47 58
		3	4	1,2

2	Perform the open and closed hashing on a file that contains records with the following search key values
	    2 3 5 7 11
	    17 19 23 29 31
	    hash function is h(x)=x mod 8
	Describe the advantages and disadvantages of both methods
		3	4	1,2,3

3	Consider a database for a bank where the database system uses snapshot isolation. Describe a particular scenario in which a nonserializable execution occurs that would present a problem for the bank.	3	4	1,2
4	Prove that BCNF always not leads to the loss less join using the following relation schema Lots(Property_id#, County_name, Lot# ,Area) FD1: Property_id# → County_name, Lot# ,Area FD2 : County_name, Lot# → Property_id#, Area FD3: Area → County_name	3	5	1,2,3

	Set-6 (1602-21-733-040 to 047) answer the following Questions			

1	Construct a B+ tree for the following set of key values: (2,3,5,7,11,17,19,23,29,31) here no of pointers are 4 and perform the following operations
	   i) Insert 9
	   ii) Insert 10
	   iii) Delete 23
	   iv) Delete 19
		3	4	1,2

2	Suppose that data base schema R = (A, B, C, D, E, F) of explain and apply 2NF AB → C A → D B → EF	3	4	1,2

3	Draw the deadlock detection graph for the following situations and write whether deadlock is detected or not
	   i) Transaction T1 is waiting for T6&T2
	   ii) Transaction T3 is waiting for T6
	   iii) Transaction T4 is waiting for T2&T3
		3	4	1,2

4	1.Write a procedure to update salary of given employee by 10% 2. Write a procedure to count number of students taken the given course	3	4	1,2,3
	Set-7 (1602-21-733-048 to 055) answer the following Questions			
1	(a) initial tree Perform the following operation on B tree Delete F Delete G Delete X And Redistribute the elements	3	4	1,2

2	T1 | T2
	  Read(A)
	 A:=A-50
	 Write(A)
	               Read(A)
	               Temp:=A*0.1
	               A:=A-Temp
	               Write(A)
	 Read(B)
	 B:=B+50
	 Write(B)
	               Read(B)
	               B:=B+ temp
	               Write(B)
		3	4	1,2

	Check whether the given schedule is conflict serializable or not			
3	Consider a database for an airline where the database system uses snapshot isolation. Describe a particular scenario in which a nonserializable execution occurs, but the airline may be willing to accept it to gain better overall performance.	3	4	1,2
4	Prove that BCNF always not leads to the loss less join using the following relation schema Lots(Property_id#, County_name, Lot# ,Area) FD1: Property_id# → County_name, Lot# ,Area FD2 : County_name, Lot# → Property_id#, Area FD3: Area → County_name	3	4	1,2
	Set-8 (1602-21-733-056 to 062,064) answer the following Questions			

1	Draw the deadlock detection graph for the following situations and write whether deadlock is detected or not
	   iv) Transaction T1 is waiting for T3&T2
	   v) Transaction T3 is waiting for T6
	Transaction T4 is waiting for T2&T3
		3	4	1,2

2	Consider the following set F of functional dependencies on schema (SSN,Ename,Bdate, Address,Dnumber,Dname, Dmgr_SSN) SSN→Ename,Bdate,Address,Dnumber Dnumber → Dname, Dmgr_SSN Explain and Apply 3NF for the above realtion schema	3	4	1,2

3	Suppose we are using extendable hashing on a file that contains records with the following search key values
	        12 2 16 9 32 76
	        15 59 43 14 39 10
	Show the extendable hash structure for this file if the hash function is $h(x)=x \bmod 8$ and buckets can hold 2 records
		3	4	1,2,3

4	1) Consider the following two transactions:
	     T13:
	   read(A);
	   read(B);
	    if A = 0 then B := B + 1;
	   write(B).
	     T14:
	   read(B);
	   read(A);
	   if B = 0 then A := A + 1;
	   write(A).
	   Let the consistency requirement be A = 0 V B = 0,
	   with A = B = 0 the initial values.
	    a. Show that every serial execution involving these
	      two transactions preserves the consistency of the
		3	4	1,2

	database. b. Show a concurrent execution of T13 and T14 that produces a nonserializable schedule. c. Is there a concurrent execution of T13 and T14 that produces a serializable schedule?			
Set-9 (1602-21-733-065,066,067,135,136 ,301) answer the following Questions

1	Construct the B+ tree for the following set of key values
	    5 15 25 35 45
	    55 65 75 85
		3	4	1,2

2	Consider the following two transactions:
	 $T13$: read(A);
	 read(B);
	 if $A = 0$ **then** $B := B + 1$;
	 write(B).
	 $T14$: read(B);
	 read(A);
	 if $B = 0$ **then** $A := A + 1$;
	 write(A).
	 Let the consistency requirement be $A = 0 \lor B = 0$, with $A = B = 0$
	 the initial values.
		3	4	1,2,3

3	The lost update anomaly is said to occur if a transaction T_j reads a data item, then another transaction T_k writes the data item (possibly based on a previous read), after which T_j writes the data item.The update performed by T_k has been lost, since the update done by T_j ignored the value written by T_k.	3	5	1,2
4	1.Write a procedure to update salary of given employee by 10% 2. Write a procedure to count number of students taken the given course	3	4	1,2
Set-10 (1602-21-733-302 to 307) answer the following Questions

1	Perform the closed hashing on a file that contains records with the following search key values
	    2 3 5 7 11
	    17 19 23 29 31
	    hash function is h(x)=x mod 8
		3	4	1,2,3

2	Consider the following locking protocol: All items are numbered, and once an item is unlocked, only higher-numbered items may be locked. Locks may be released at any time. Only X-locks are used. Show by an example that this protocol does not guarantee serializability.	3	4	1,2,3

3	1.Write a procedure to list the number courses taken by the given instructor 2. Write a procedure to find the sum of salaries of employees belongs to given department name	3	5	1,2

4	(a) initial tree
	
	P
	C G M T X
	A B D E F J K L N O Q R S U V Y Z
	
	   i) Insert W
	   ii) Delete T
	Delete P
		3	4	1,2,3