United International University (UIU)

Dept. of Computer Science & Engineering (CSE)

Final Exam, Trimester: Spring 2023
Course Code: CSE-3521 Course Title: Database Management Systems
Total Marks: 40 Duration: 2 hours

Any examinee found adopting unfair means will be expelled from the trimester / program as per UIU disciplinary rules.

1.	a) Consider the following relation.
	R1(A, B, C, D, E, F)
	FD:{
	AB → CD
	BC → DE
	EF → A
	D → E
	E → F
	}
	i) Find out all candidate keys for the given relation.
	ii) Check whether BE→ CD, AB→ F and DE → AC is a valid functional dependency for the relation or not. Justify your answer using Amrstong's Axiom's.
	iii) Find out the canonical cover for the given functional dependencies.
	iv) Check and justify in which normal form the relation is.
	
	b) Consider the following relation,
	R2(A, B, C, D, E, F)
	FD: {
	AB → C
	CD → E
	EF → AB
	}
	Suppose, we want to decompose the relation in following way,
	R21(E, F, A, B)
	R22(C, D, E)
	Will it preserve the dependencies? Justify your answer with proper explanation.
	
	c) Check whether the following decomposition of the relation given below is a valid decomposition or not. Justify your answer with proper explanation of lossless decomposition.
	R(A, B, C, D, E, F, G)
	FD: {
	AB → C
	AC → DE Decompose to: R1(A, B, C)
	B → F R2(A, C, D, E)
	E → G R3(E, F, G)
	}
		2
		3
		4
		2
		3
		2

2.	a) Consider the following data as incoming values for a B+ tree in the given sequence. Now construct a B+ tree of order 4 using these data. 8, 6, 15, 40, 12, 26, 4, 32, 25, 18, 13, 2 b) Consider a hard disk with block size 2450 Bytes. The data that we want to store is having a size of 320 Bytes each. If we have a total of 25000 data and the data are not having any order then find how many block searches can be reduced if we use indexing techniques. Assume each data of index table entry is of size 35 Bytes.	**6** **4**
3.	Consider an extendible hashing scheme where the bucket capacity is 2 and the initial local and global depth are 0. Assuming LSB (least-significant bit) to be checked to find the directory for a record, insert the following data in the hash table. Show all the necessary steps while inserting.	**7**
4.	a) What do you understand by atomicity and durability properties in a transaction? b) Mention the problems of concurrency when we are working with transactions. Explain with proper examples. c) Consider the given precedence graphs below (i and ii) and find out if the schedule is conflict serializable or not. If yes, then find out all possible valid schedules.	**2** **2** **3**

Pointer	Key_value	Hash(key_value)
Pointer 1	2456	18
Pointer 2	7854	6
Pointer 3	3256	20
Pointer 4	8569	3
Pointer 5	4123	14
Pointer 6	8965	2
Pointer 7	5214	8
Pointer 8	7536	22