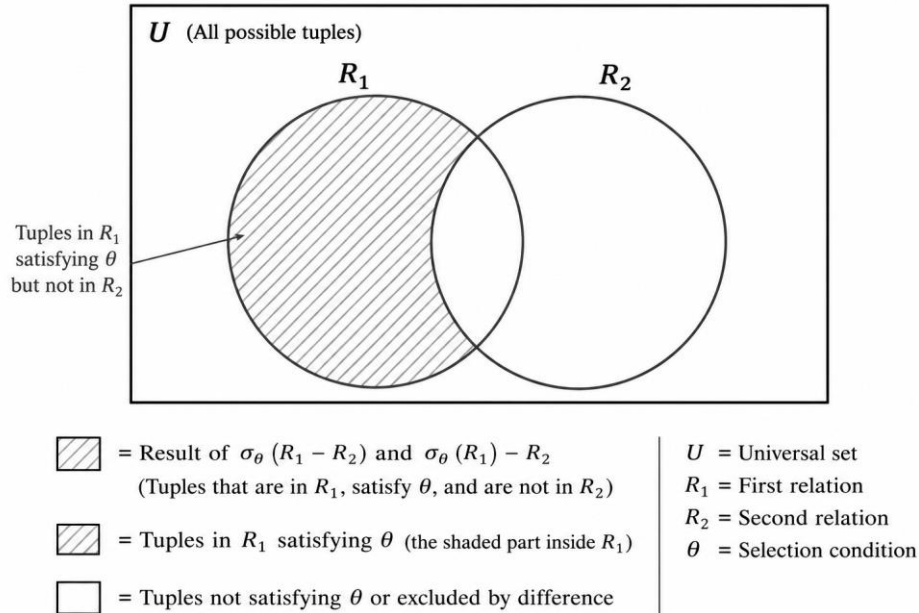


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Database Management Systems

Answer Keys

FIRST HALF

1. Prove with the following Venn diagram:



2. (a)

X
1
1

X is not a superkey.

(b)

$\underline{X}$	$\underline{Y}$
1	1
2	3

X and Y are both candidate keys because they contain unique values separately.

(c)

$\underline{X}$
1
2

X	$\underline{Y}$
1	1
1	2

X is a foreign key in the second table because it is a primary key in the first table.

(d)

X
1
1, 2

X is a multi-valued attribute.

(e)

X	$\underline{Y}$
1	1
1	2

X	$\underline{Y}$
1	1
1	3

The first entity reflects overlapping generalization in both the tables.

3. (a) (i) Efficient because it will require range search.

(ii) Not efficient because it will require point search and scan.

(b) The disadvantages of a B^+ -tree are extra storage overhead and maintenance cost.

4. (a) $\{V \rightarrow W, V \rightarrow X, V \rightarrow Y, W \rightarrow X, W \rightarrow Y, X \rightarrow Y, X \rightarrow W, Y \rightarrow W, Y \rightarrow X, VZ \rightarrow X, VZ \rightarrow Y, VZ \rightarrow W\}$.

(b) VWXYZ.

(c) $\langle V, W \rangle, \langle W, X \rangle, \langle X, Y \rangle$ and $\langle V, Z \rangle$.

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SECOND HALF

1. Disprove with a counterexample by considering the following:

The schema of both the relations be $A(R_1) = A(R_2) = \{X\}$.

Define $R_1 = \{1\}$ and $R_2 = \{2\}$.

Choose the selection condition θ as $X = 1$.

2. Airports (code, name)

Flights (fid)

PricingPlans (name, conditions)

Passengers (pid, name, phone, seatPref)

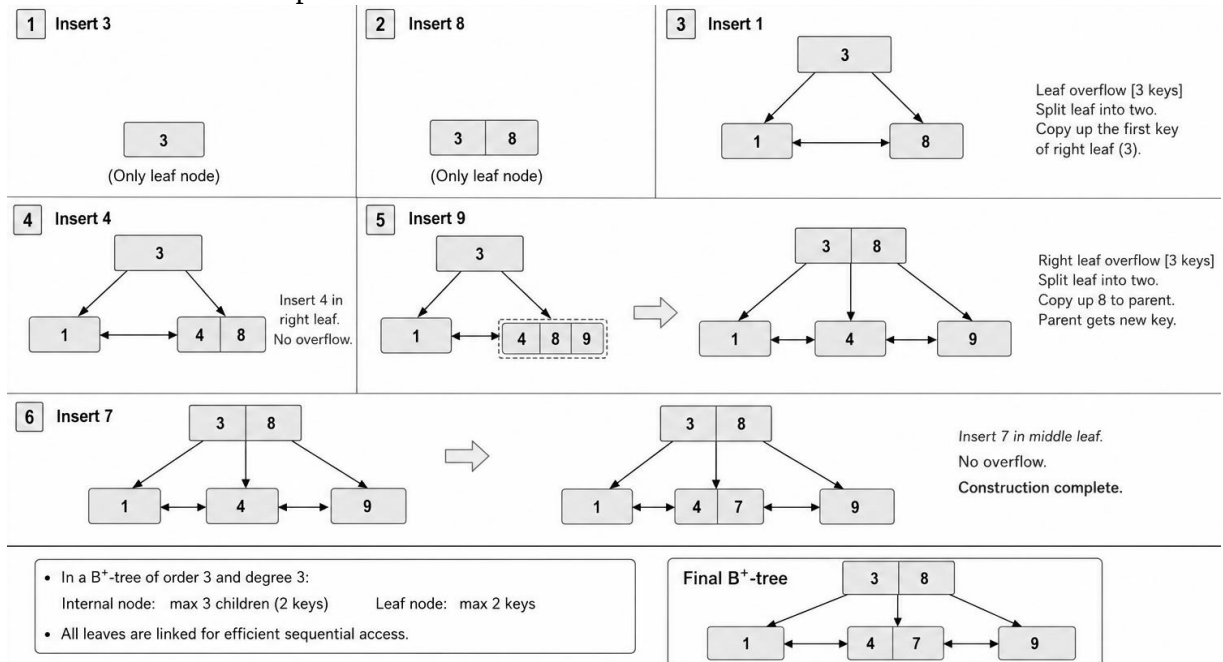
depart (code, fid, date, time)

arrive (code, fid, date, time)

has (id, name)

reservation (fid, pid, seat)

3. Here follows the stepwise B⁺-tree construction:



4. (a) 1NF.

(b) $\langle V, W \rangle$, $\langle V, X \rangle$ and $\langle V, Y, Z \rangle$.

(c) No and No.