CS304
Database System Concepts

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Quiz 5

1. We say an index is a primary index if

a) the search key specifies the sequential order of the file

b) the search key is primary key

c) the search key specifies an order different from the sequential order of the file

d) the search key is candidate key

2. Which property about B^+-tree is ***NOT*** correct?(n=max fanout)

a) All paths from root to leaf are of the same length

b) Each node that is not a root or a leaf has between $\lceil n/2 \rceil$ and n children.

c) If the root is not a leaf, it has at least 2 children.

d) A leaf node has between 0 and (n-1) values.

3. Which statement about B-tree is ***NOT*** correct?

a) Search keys in non-leaf nodes appear nowhere else in the B-tree

b) There is an additional pointer field for each search key in a non-leaf node.

c) Sometimes possible to find search-key before reaching leaf node.

d) Usually B^+-tree have greater depth than B-tree when we index a same file.

4. What's the bitmap index of fig 1 for Gender?

a) m:1010;f:0101

b) m:0101;f:1010

c) m:1100;f:0011

d) m:0011;f:1100

	ID	Gender	Income_level
0	1111	m	L1
1	2222	f	L2
2	3333	m	L3
3	4444	f	L1

Fig 1

5. What's the cost of retrieving a single record that satisfies the corresponding equality condition by using B⁺-tree index?

a) $(h_i + 1) * (t_T + t_s)$

b) $h_i * (t_T + t_s)$

c) $(h_i + 2) * (t_T + t_s)$

d) $2 * (h_i + 1) * (t_T + t_s)$

h_i: height of B⁺-tree

t_T: time to transfer one block

t_s: time for one seek

6. If the initial file has 12 blocks and we have 3 buffer blocks, how many block transfers will external sort-merge need to sort this file?(ignore write final result)

a) 60

b) 72

c) 84

d) 96

7. What's the block transfer cost to compute $r \bowtie_\theta s$ using Nested-Loop Join in the worst case?

a) $n_r * b_s + b_r$

b) $b_r * b_s + b_r$

c) $b_r + b_s$

d) $b_r * b_s$

n_r: # of records in relation r

b_s: # of blocks consisting relation s

b_r: # of blocks consisting relation r

relation r is outer relation

8. Before we use merge-join algorithm, we first should:

a) sort both relation on their join attribute

b) partition both relation on their join attribute

c) sort and partition both relation on their join attribute

d) sort both relation on their primary key

9. Which equivalence rule is ***NOT*** correct?

a) $\sigma_{\theta_1 \wedge \theta_2}(R) = \sigma_{\theta_1}(\sigma_{\theta_2}(R))$

b) $\sigma_{\theta_1}(\sigma_{\theta_2}(R)) = \sigma_{\theta_2}(\sigma_{\theta_1}(R))$

c) $(r_1 \bowtie r_2) \bowtie r_3 = r_1 \bowtie (r_2 \bowtie r_3)$

d) $\sigma_{\theta}(E_1 \cup E_2) = \sigma_{\theta}(E_1) \cup E_2$

10. What's the estimated number of tuples for the expression $\sigma_{\theta 1 \vee \theta 2 \vee \ldots \vee \theta n}(r)$

a) $n_r * \left(\frac{s_1}{n_r} * \frac{s_2}{n_r} * \ldots * \frac{s_n}{n_r} \right)$

b) $n_r * \left((1 - \frac{s_1}{n_r}) * (1 - \frac{s_2}{n_r}) * \ldots * (1 - \frac{s_n}{n_r}) \right)$

c) $n_r * \left(1 - (1 - \frac{s_1}{n_r}) * (1 - \frac{s_2}{n_r}) * \ldots * (1 - \frac{s_n}{n_r}) \right)$

d) $n_r * \left(1 - \frac{s_1}{n_r} * \frac{s_2}{n_r} * \ldots * \frac{s_n}{n_r} \right)$

n_r : # of records in relation r

s_i : # of tuples in r satisfying θ_i