

## # COMP9315 20T1 Final Exam Q4

Type your answer(s) to replace the xxx's  
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a.

$$c\_R = \text{floor}(4096 / 32) = 128$$

$$b\_R = \text{ceil}(10000 / 128) = \text{ceil}(78.125) = 79$$

b.

Signatures are padded to 64 bits (8 bytes)

$$c\_S = \text{floor}(4096 / 8) = 512$$

$$b\_S = \text{ceil}(10000 / 512) = \text{ceil}(19.531) = 20$$

c.

b\_q = pages read in answering the query

b\_S = signature pages

b\_T = true match pages

b\_F = false match pages

$$\begin{aligned} b\_q &= b\_S + b\_T + b\_F \\ &= 20 + 4 + 10 \\ &= 34 \end{aligned}$$

d.

The query will match all tuples.

So assuming signatures are still used, all pages will be read.

$$\begin{aligned} b\_q &= b\_S + b\_R \\ &= 20 + 79 \\ &= 99 \end{aligned}$$

e.

The query signature will consist entirely of zeroes. This means it will match all tuple signatures (no matter what they are), which means all tuples need to be examined, and there is no need to read the signature file. By skipping reading the signature file, we can reduce the number of page reads to  $b\_R = 79$ .

f.

$$m = (1 / \ln(2))^2 \cdot n \cdot \ln(1 / p\_F)$$

Applying the formula for deriving m with  $n = 128 * 4$  (as each data page has 128 tuples) gives  $m = 7361$  bits (rounded). k is still 10.