

2a. Query 1:

Π u.screen_name (on the fly)

σ u.screen_name = 'ajc' (on the fly)

σ (Full table scan)

users

#bytes per record: $(1 \cdot 80) + (1 \cdot 80) + (1 \cdot 80) + (1 \cdot 80) + (4 \cdot 1) + (4 \cdot 1) = 408$

#Records per page: $\text{floor}(4000/408) = \text{floor}(9.8) = 9$

#num pages: $\text{ceil}(5000/9) = \text{ceil}(555.5) = 556$

Query 2:

temp (write to disc)

Π t.id (on the fly)

σ posting_user = 'ajc' (on the fly)

σ (full table scan)

tweets

• Disc I/O cost = cost full table scan + write

• Full table scan:

#bytes per record: $(8 \cdot 1) + (4 \cdot 1) + (4 \cdot 1) + (4 \cdot 1) + (1 \cdot 80) = 104$

#Records per page: $\text{floor}(4000/104) = \text{floor}(38.4) = 38$

#num pages: $\text{ceil}(10000/38) = \text{ceil}(263.1) = 264$

• Writing:

#rows to write: $10000 \cdot 0.1 = 1000$

#bytes per row: $8 \cdot 1 = 8$

#rows per page: $\text{floor}(4000/8) = 500$

#data pages to write: $\text{ceil}(1000/500) = 2$

$2 + 264 = 266$

2b. Query 1:

Π u.screen_name (on the fly)

σ u.screen_name = 'ajc' (index on u.screen_name)

users

Query 2:

temp (write to disc)

Π t.id (on the fly)

σ posting_user = 'ajc' (index on posting_user)

tweets