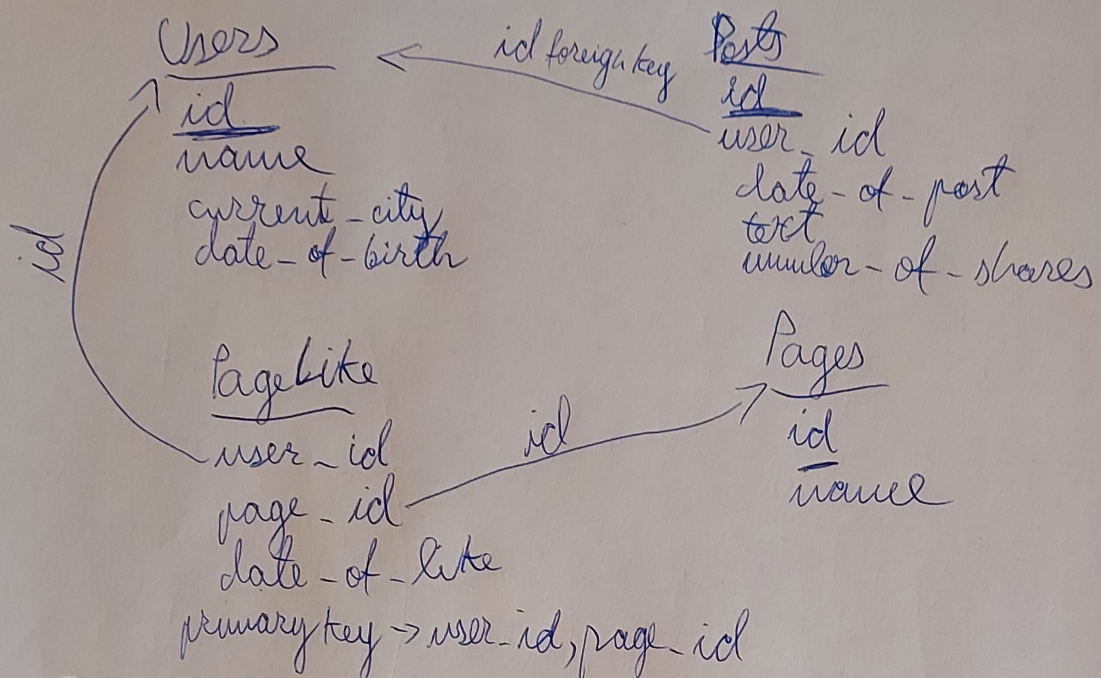
Q2

II. a)

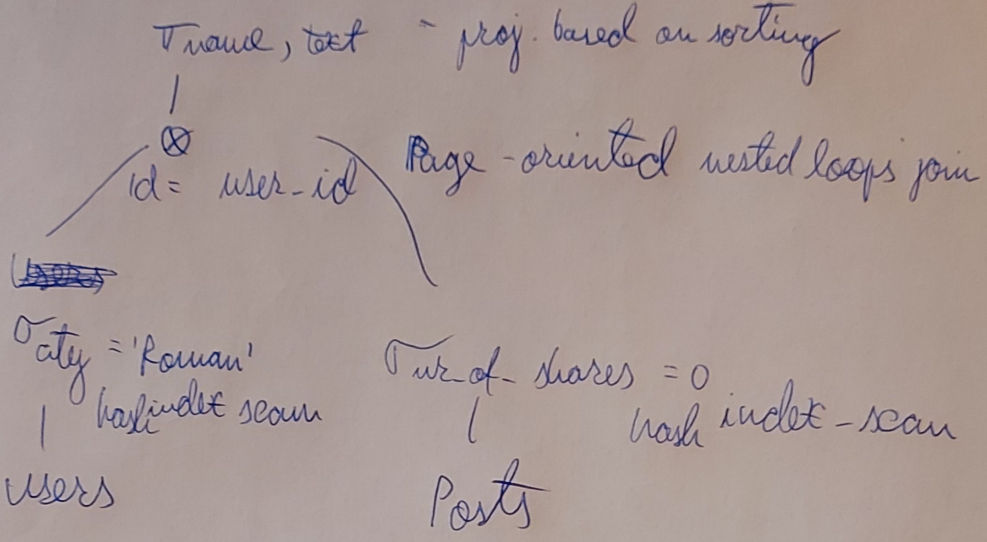


The references (arrows) are the foreign keys and the underlined rows are the primary key.

b) One scenario would be two users sharing a post at the same time and the same Posts row gets incremented on number_of_shares by both clients. The database needs to syncronize the transactions by locking the row ~~for both~~ with an exclusive lock.

c) select user.name, ~~user~~ post.text
from Users user join Posts post on user.id = post.user_id
where user.current_city = 'Roman' and post.number_of_shares
= 0

Ex



Suppose 100 pages of users and 50 pages of posts and 200 buffer pages.

Selection cost - nr of results (suppose 10 user pages and 20 post pages)

Page oriented - users - outer rel.

$10 + 10 \cdot 20 = 210$ IOs

Suppose 30 results

proj - sort the 30 results → $2 \cdot 30$ IOs

- scan → 30 IOs

Total: $10 + 20 + 210 + 90 = 330$ IOs