

## Databases, Lab week 12

1.

### READ COMMITTED

- Both terminals show the same info since the second terminal has not committed a transaction. After committing changes the second transaction can see updated username
- Second terminal was blocked until the first terminal committed a transaction to prevent a lost update from the first transaction.

### REPEATABLE READ

- Both terminals show the same info since the second terminal has not committed a transaction. After committing changes the second transaction cannot see updated username due to isolation level
- Could not update balance in the first transaction with error “could not serialize access due to concurrent update” since the second terminal changed the row that we tried to change again.

```

psql (13.1 (Debian 13.1-1.pgdg100+1))
Type "help" for help.

defaultdb=# \set autocommit off
defaultdb=# BEGIN;
BEGIN
defaultdb== set transaction isolation level read committed;
SET
defaultdb== select * from account;
 account_id | username |      fullname      | balance | group_id
-----+-----+-----+-----+-----
          1 | jones   | Alice Jones       |      82 |         1
          2 | bitdiddl | Ben Bitdiddle     |      65 |         1
          3 | mike    | Michael Dole      |      73 |         2
          4 | alyssa  | Alyssa P. Hacker  |      79 |         3
          5 | bbrown  | Bob Brown         |     100 |         3
(5 rows)

defaultdb== select * from account;
 account_id | username |      fullname      | balance | group_id
-----+-----+-----+-----+-----
          1 | jones   | Alice Jones       |      82 |         1
          2 | bitdiddl | Ben Bitdiddle     |      65 |         1
          3 | mike    | Michael Dole      |      73 |         2
          4 | alyssa  | Alyssa P. Hacker  |      79 |         3
          5 | bbrown  | Bob Brown         |     100 |         3
(5 rows)

defaultdb== select * from account;
 account_id | username |      fullname      | balance | group_id
-----+-----+-----+-----+-----
          2 | bitdiddl | Ben Bitdiddle     |      65 |         1
          3 | mike    | Michael Dole      |      73 |         2
          4 | alyssa  | Alyssa P. Hacker  |      79 |         3
          5 | bbrown  | Bob Brown         |     100 |         3
          1 | ajones  | Alice Jones       |      82 |         1
(5 rows)

defaultdb== UPDATE public.account SET balance=balance + 10 WHERE fullname='Alice Jones';
UPDATE 1
defaultdb== COMMIT;
COMMIT
defaultdb=#

```

```

psql (13.1 (Debian 13.1-1.pgdg100+1))
Type "help" for help.

defaultdb=# \set autocommit off
defaultdb=# BEGIN;
BEGIN
defaultdb=# set transaction isolation level repeatable read;
SET
defaultdb=# UPDATE public.account SET username='ajones' WHERE fullname='Alice Jones';
UPDATE 1
defaultdb=# select * from account;
 account_id | username |      fullname      | balance | group_id
-----+-----+-----+-----+-----
          2 | bitdiddl | Ben Bitdiddle      |      65 |         1
          3 | mike     | Michael Dole        |      73 |         2
          4 | alyssa   | Alyssa P. Hacker    |      79 |         3
          5 | bbrown   | Bob Brown           |     100 |         3
          1 | ajones   | Alice Jones         |      82 |         1
(5 rows)

defaultdb=# COMMIT;
COMMIT
defaultdb=# select * from account;
 account_id | username |      fullname      | balance | group_id
-----+-----+-----+-----+-----
          2 | bitdiddl | Ben Bitdiddle      |      65 |         1
          3 | mike     | Michael Dole        |      73 |         2
          4 | alyssa   | Alyssa P. Hacker    |      79 |         3
          5 | bbrown   | Bob Brown           |     100 |         3
          1 | ajones   | Alice Jones         |      82 |         1
(5 rows)

defaultdb=# BEGIN;
BEGIN
defaultdb=# set transaction isolation level repeatable read;
SET
defaultdb=# UPDATE public.account SET balance=balance + 20 WHERE fullname='Alice Jones';
ERROR:  could not serialize access due to concurrent update
defaultdb=# ROLLBACK;
ROLLBACK
defaultdb=# █

```

2.

## READ COMMITTED

- Since the commit in the second transaction happened rather late, an increase in the number of people in the second group was not observed, only the balance was updated.

## REPEATABLE READ

- Since the commit in the second transaction happened rather late, the increase in the number of people in the second group was not observed, only

the balance was updated. Nothing different from the READ COMMITTED section.

```
psql (13.1 (Debian 13.1-1.pgdg100+1))
Type "help" for help.

defaultdb=# \set autocommit off
defaultdb=# BEGIN;
BEGIN
defaultdb=# set transaction isolation level read committed;
SET
defaultdb=# select * from account where group_id = 2;
 account_id | username |  fullname  | balance | group_id
-----+-----+-----+-----+-----
          3 | mike    | Michael Dole |      73 |        2
(1 row)

defaultdb=# select * from account where group_id = 2;
 account_id | username |  fullname  | balance | group_id
-----+-----+-----+-----+-----
          3 | mike    | Michael Dole |      73 |        2
(1 row)

defaultdb=# UPDATE public.account SET balance=balance + 15 WHERE group_id = 2;
UPDATE 1
defaultdb=# COMMIT;
COMMIT
defaultdb=# select * from account where group_id = 2;
 account_id | username |  fullname  | balance | group_id
-----+-----+-----+-----+-----
          5 | bbrown   | Bob Brown   |     100 |        2
          3 | mike    | Michael Dole |      88 |        2
(2 rows)

defaultdb=#
```

3.

## REPEATABLE READ

- Since we have REPEATABLE READ first transaction does not see the bob's group change and only mike's balance was doubled

## SERIALIZABLE

- Since we have SERIALIZABLE, the first transaction does not see the bob's group change and only mike's balance was doubled. Nothing different from the SERIALIZABLE section.

```
psql (13.1 (Debian 13.1-1.pgdg100+1))
Type "help" for help.

defaultdb=# \set autocommit off
defaultdb=# BEGIN;
BEGIN
defaultdb=# set transaction isolation level repeatable read;
SET
defaultdb=# select SUM(balance) from account where group_id = 2;
      sum
-----
      103
(1 row)

defaultdb=# UPDATE public.account SET balance=balance + (select SUM(balance) from account where group_id = 2) WHERE group_id = 2;
UPDATE 1
defaultdb=# select * from account where group_id = 2;
 account_id | username |  fullname  | balance | group_id
-----+-----+-----+-----+-----
          3 | mike    | Michael Dole |      206 |         2
(1 row)

defaultdb=# COMMIT;
COMMIT
defaultdb=# select * from account where group_id = 2;
 account_id | username |  fullname  | balance | group_id
-----+-----+-----+-----+-----
          5 | bbrown   | Bob Brown   |       100 |         2
          3 | mike    | Michael Dole |      206 |         2
(2 rows)

defaultdb=#
```