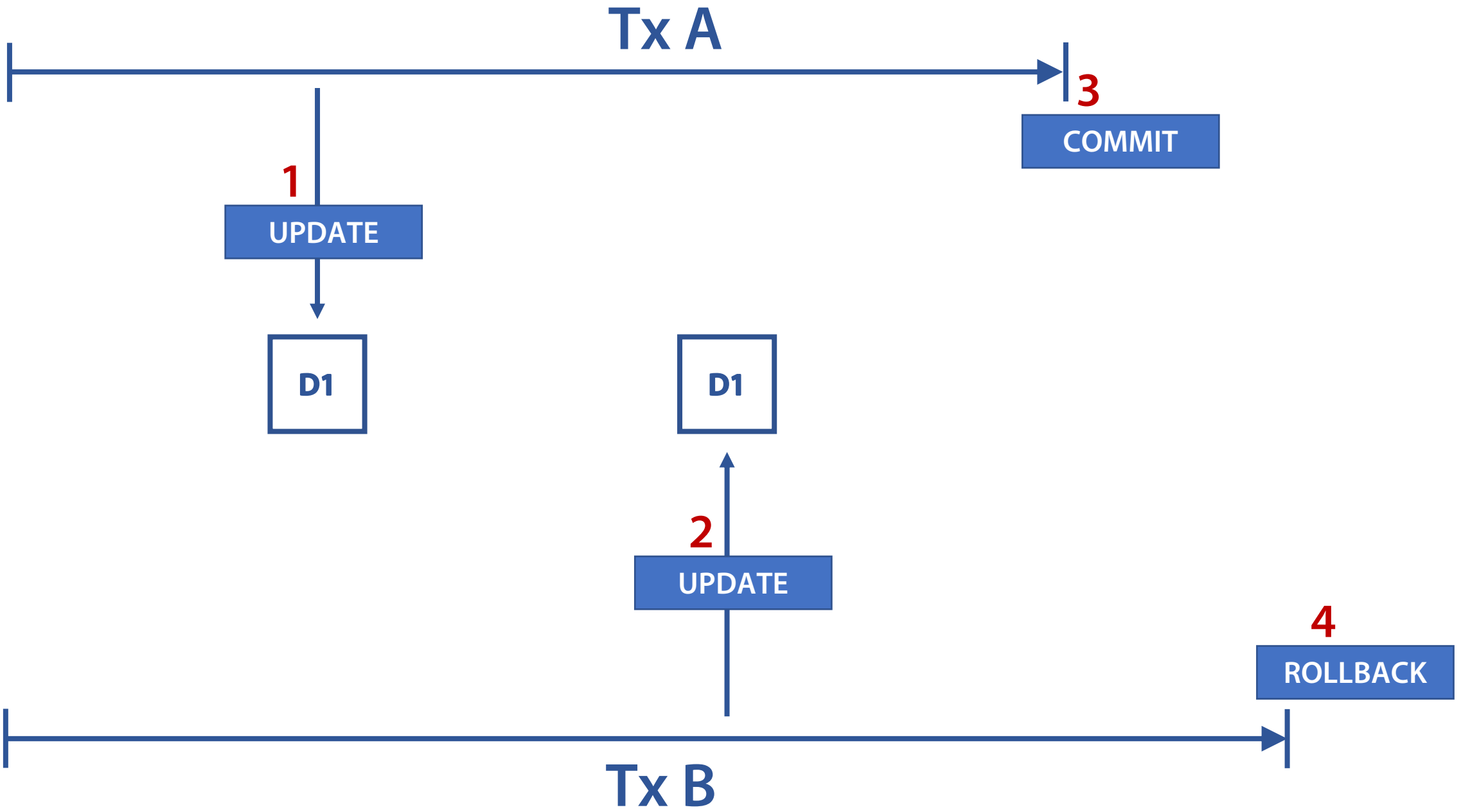
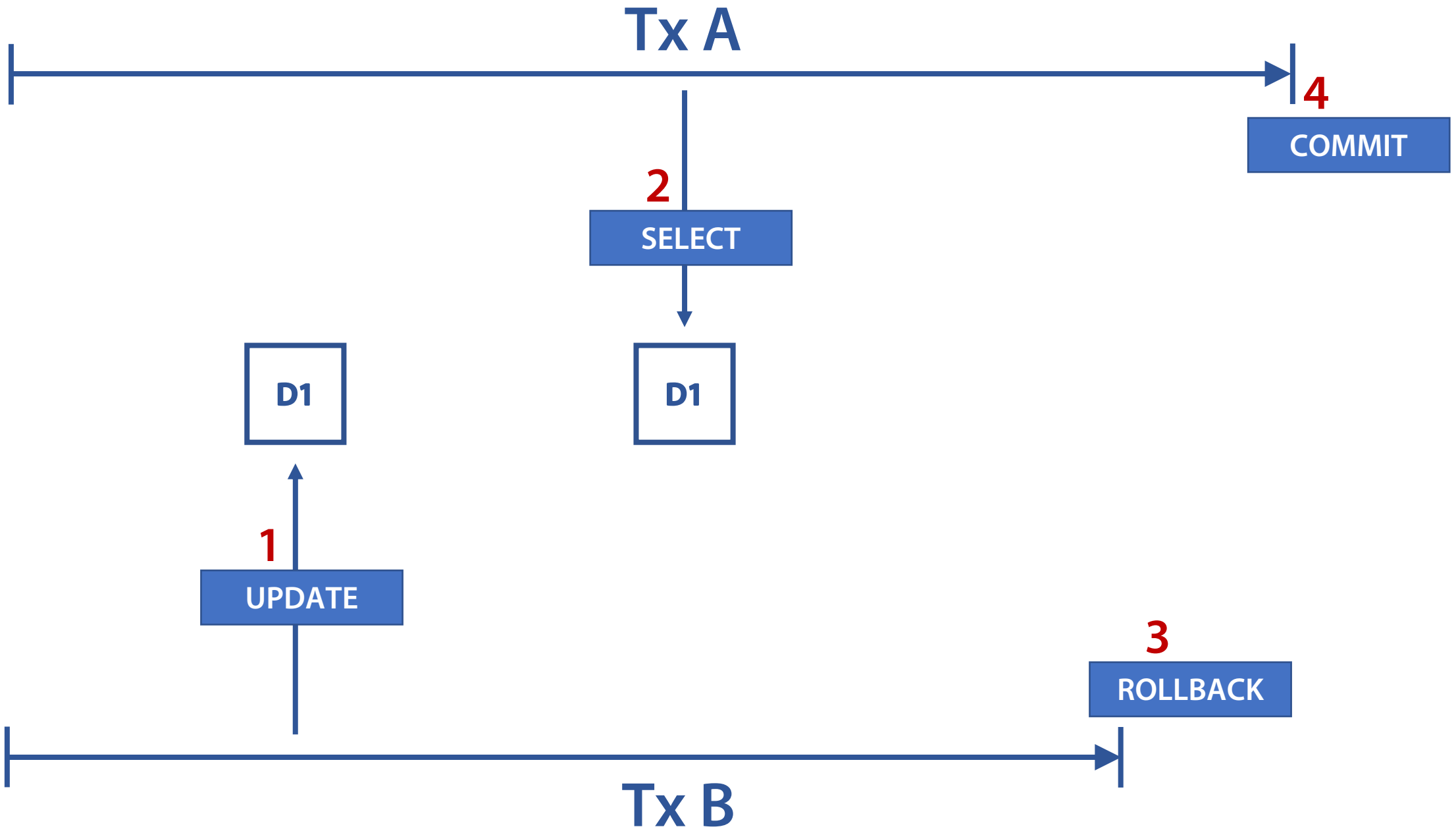
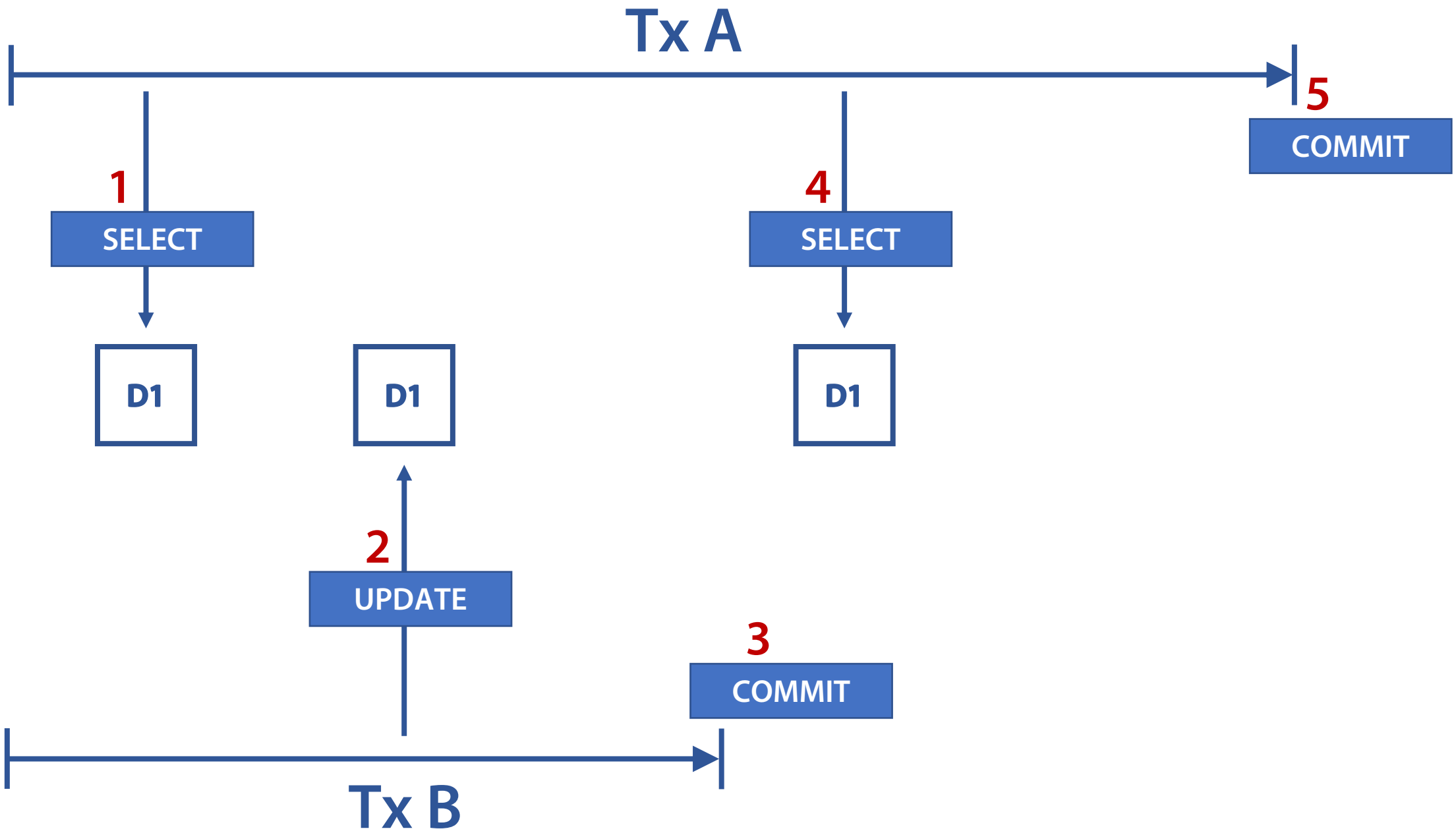
Problem #1: Lost update



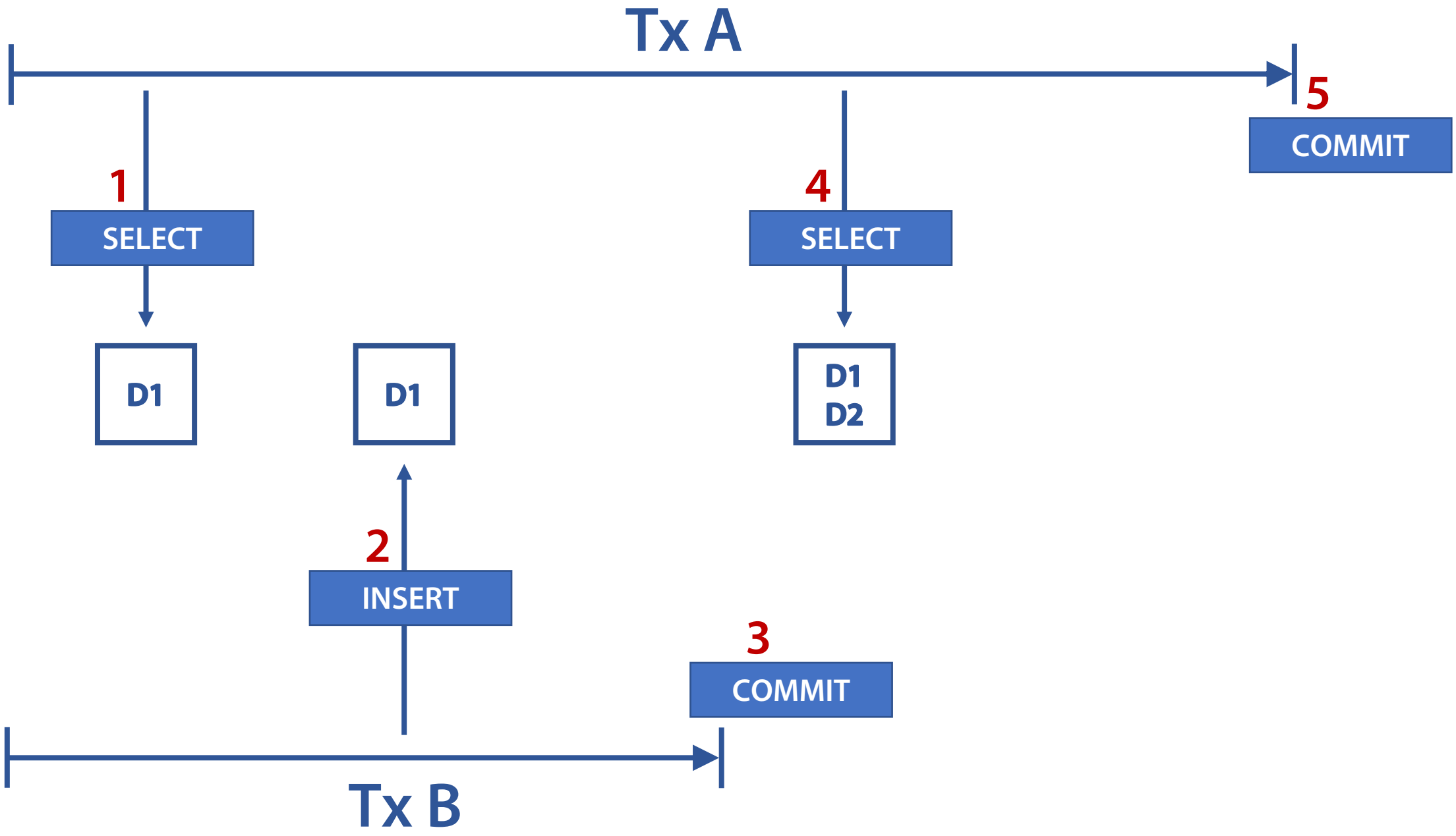
Problem #2: Dirty read



Problem #3: Unrepeatable read



Problem #4: Phantom read



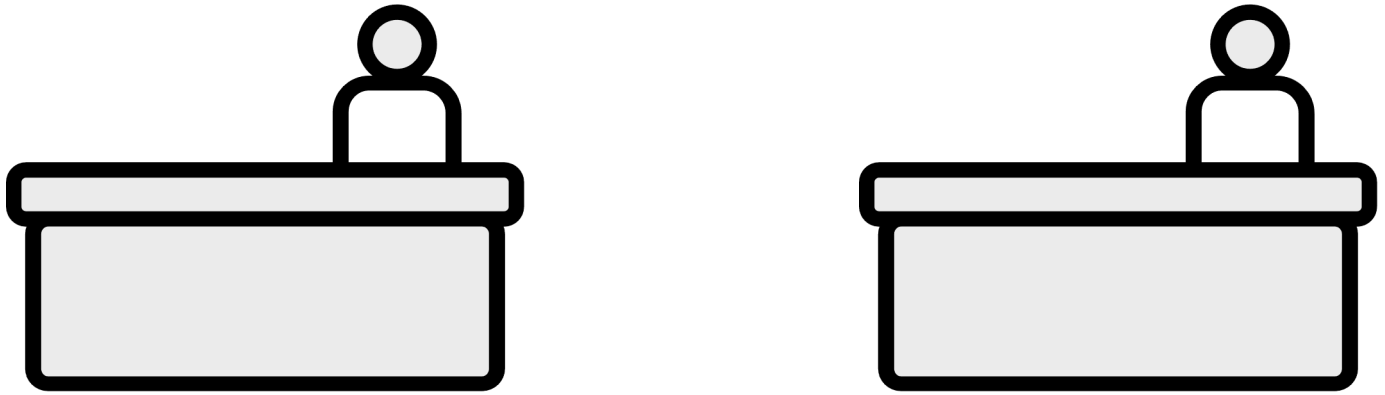
Nivo izolacije transakcija

```
connection.setTransactionIsolation(...);
```

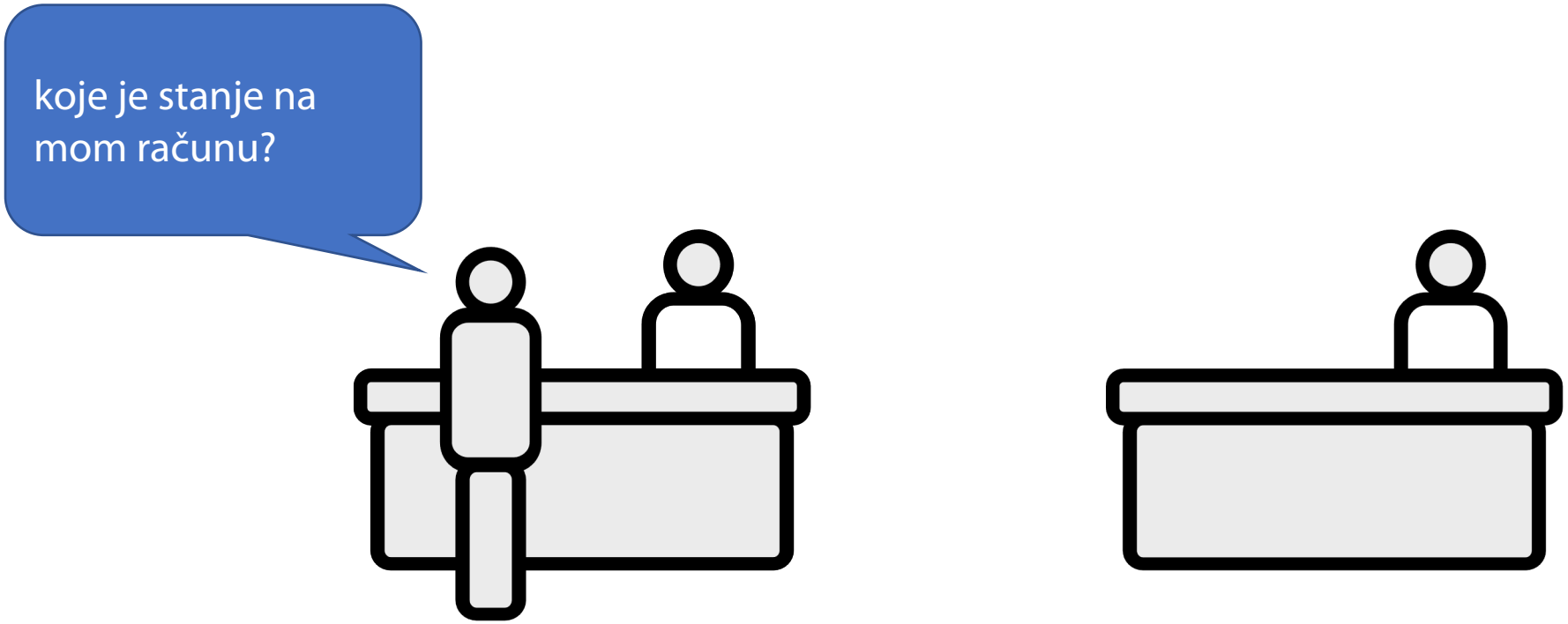
Nivo izolacije	Eliminiše problem
READ_UNCOMMITTED	lost update
READ_COMMITTED	dirty read
REPEATABLE_READ	unrepeatable read
SERIALIZABLE	phantom read

Optimističko zaključavanje

Situacija u banci: dva istovremeno dostupna šaltera, dolazi jedan klijent...



Optimističko zaključavanje

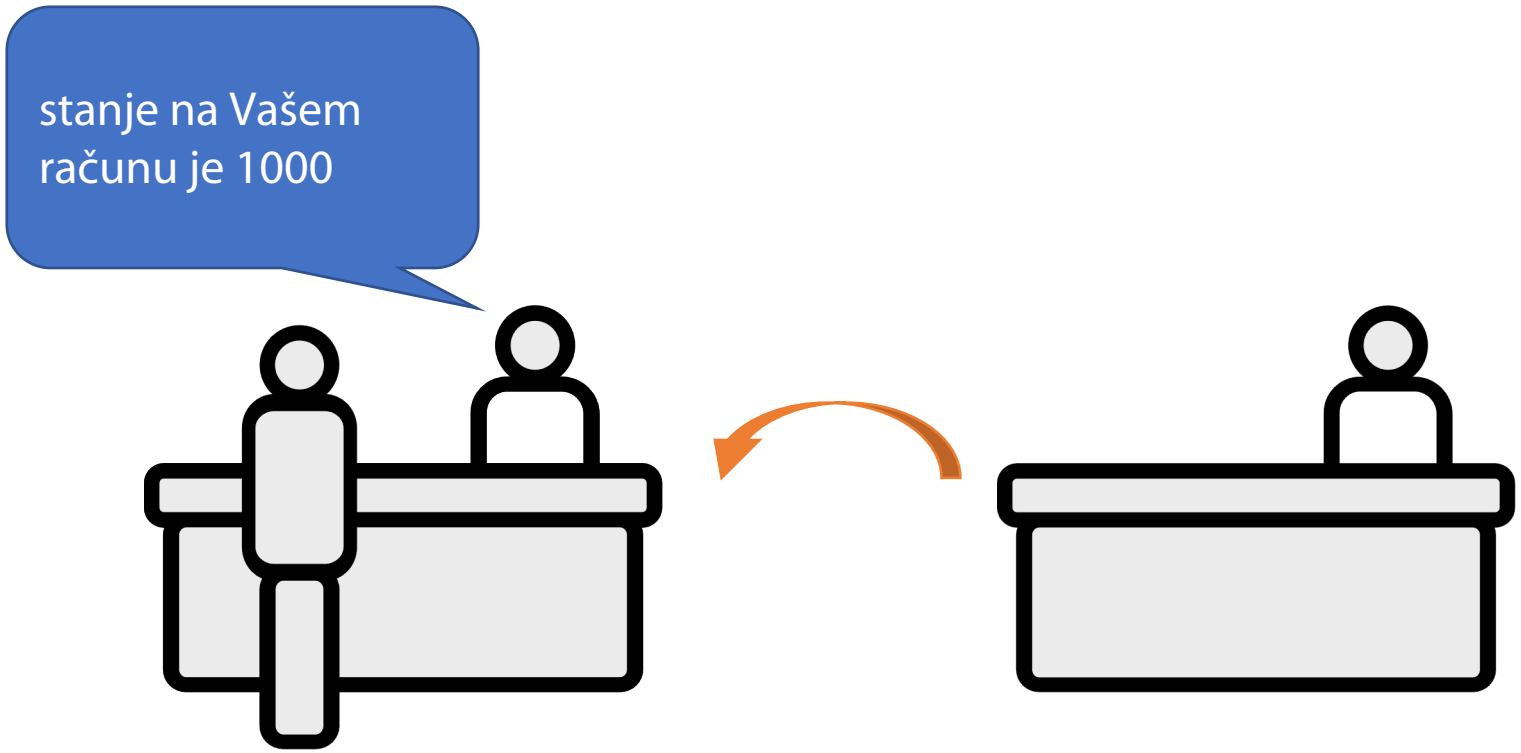



```
SELECT stanje FROM racuni
  WHERE br_racuna=1234567;
```

Optimističko zaključavanje

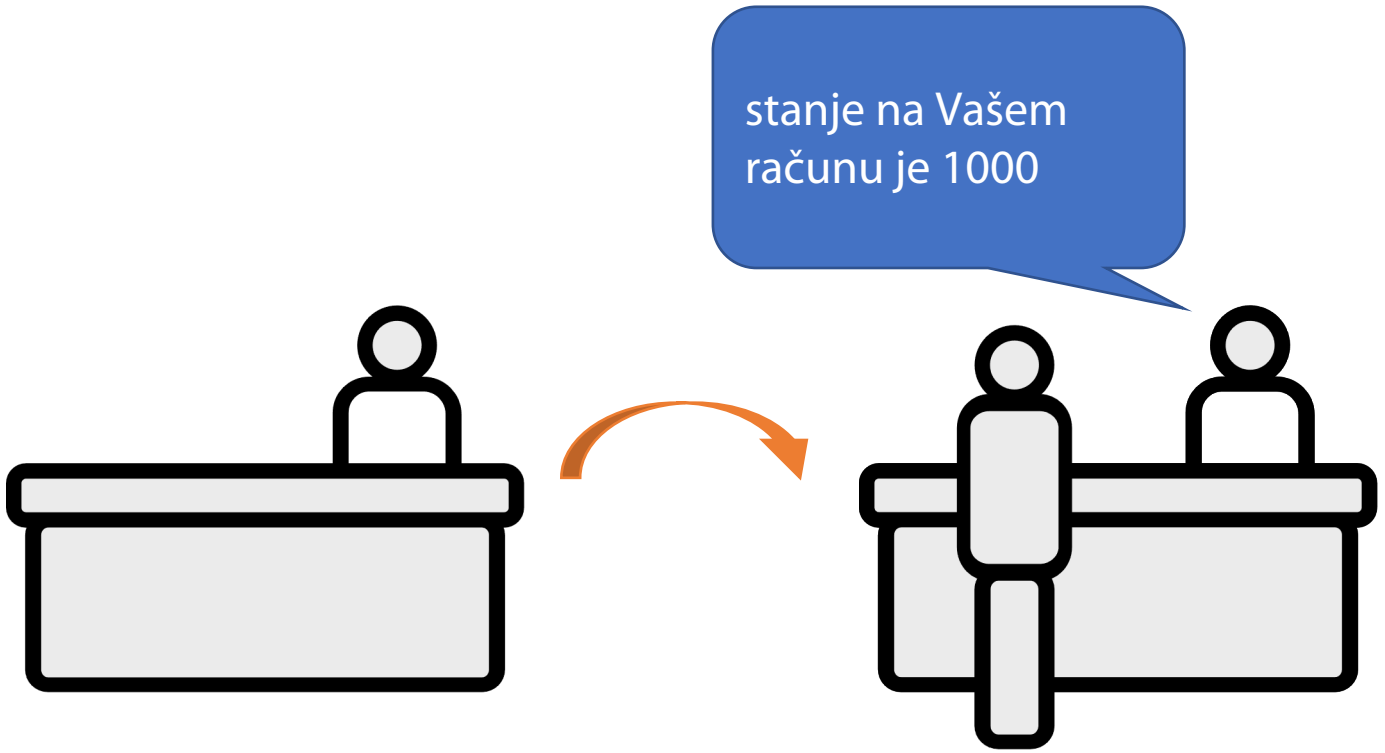
```
SELECT stanje FROM racuni
  WHERE br_racuna=1234567;
```

Optimističko zaključavanje



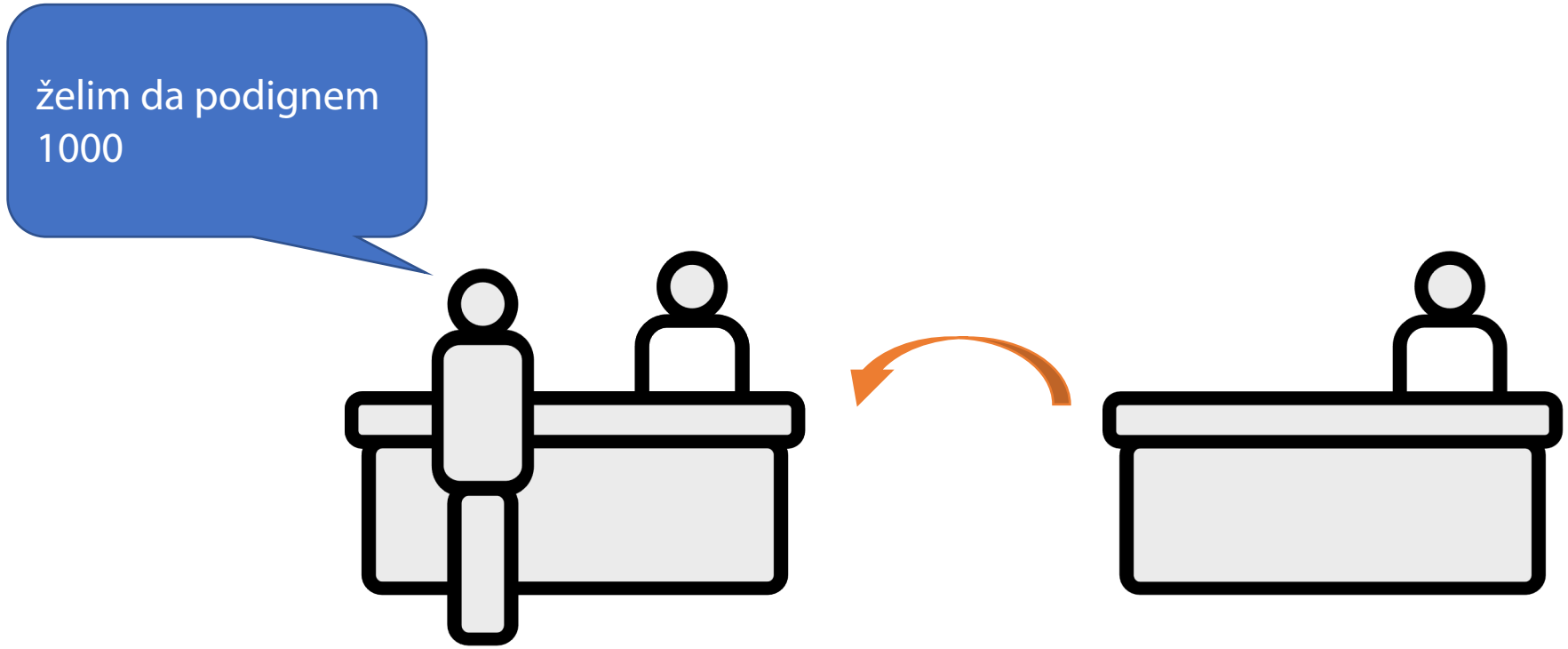

```
SELECT stanje FROM racuni
  WHERE br_racuna=1234567;
--->  1000
```

Optimističko zaključavanje




```
SELECT stanje FROM racuni
  WHERE br_racuna=1234567;
--->  1000
```

Optimističko zaključavanje

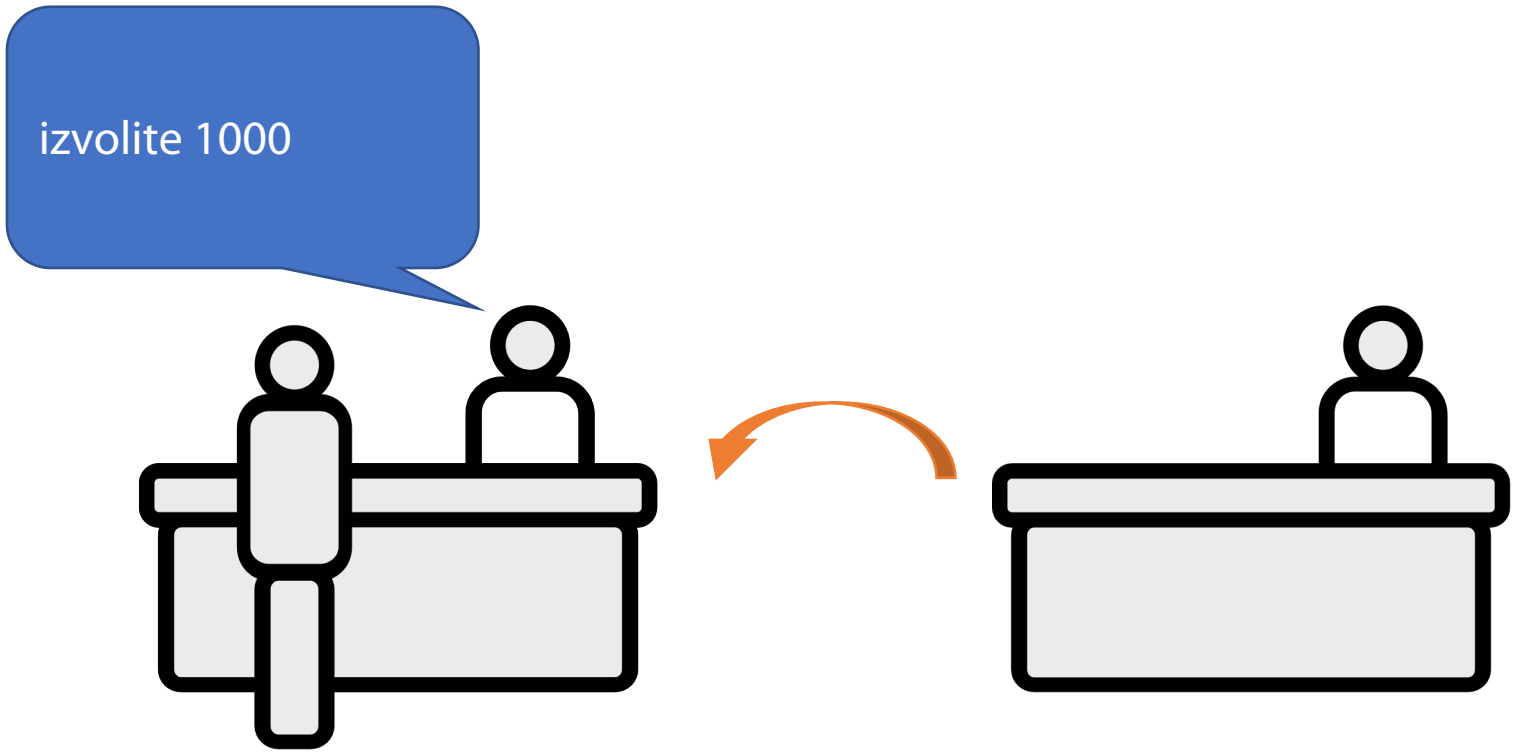



```
UPDATE racuni
  SET stanje=stanje-1000
  WHERE br_racuna=1234567;
```

Optimističko zaključavanje

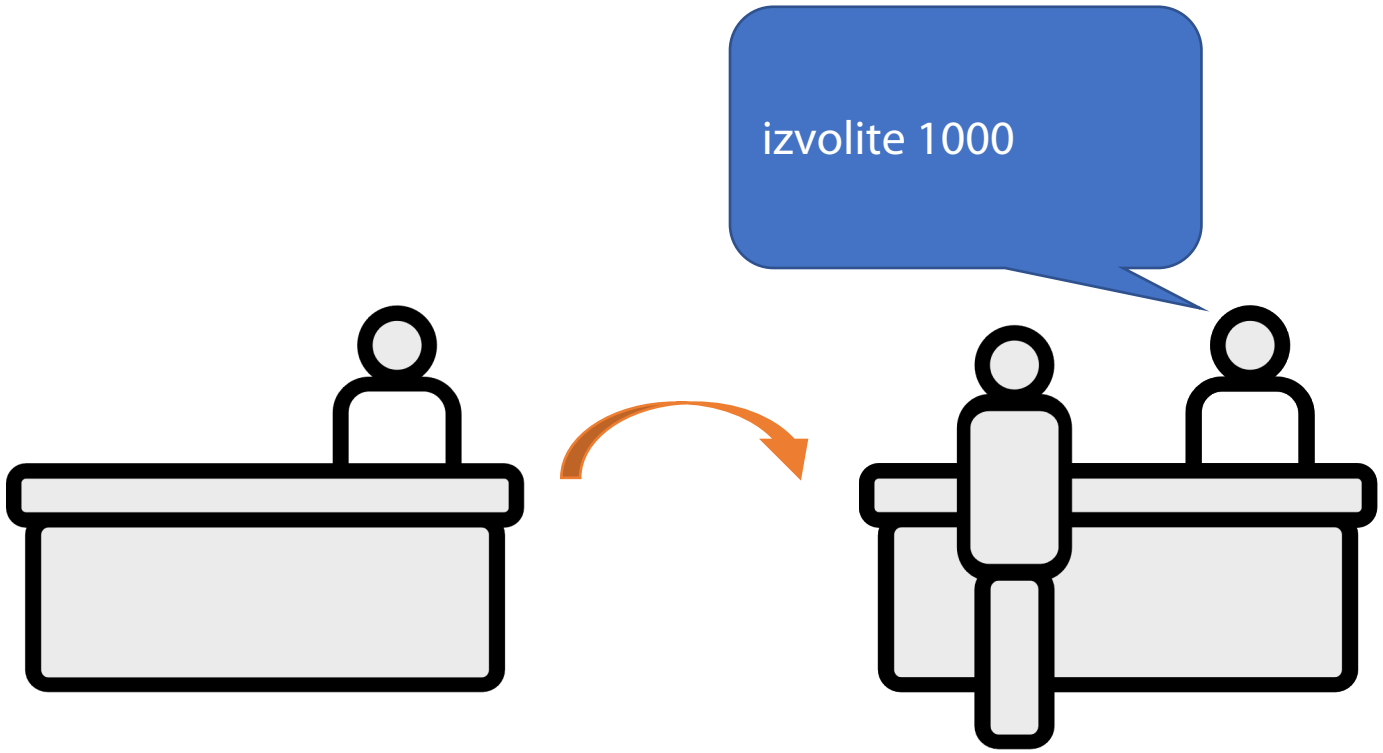
```
UPDATE racuni
  SET stanje=stanje-1000
  WHERE br_racuna=1234567;
```

Optimističko zaključavanje



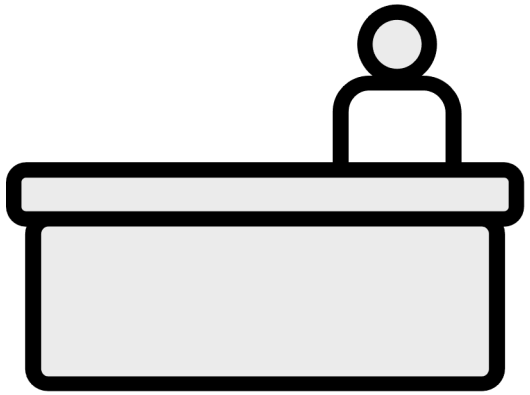

```
UPDATE racuni
  SET stanje=stanje-1000
  WHERE br_racuna=1234567;
COMMIT;
```

Optimističko zaključavanje

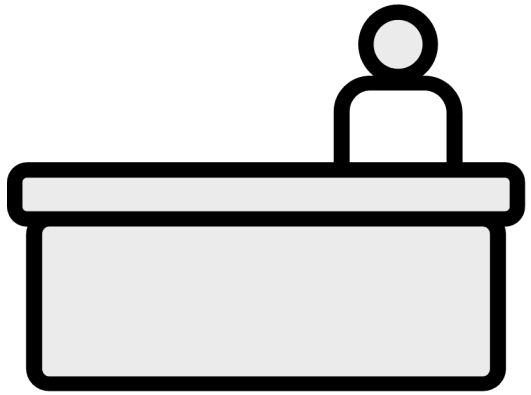



```
UPDATE racuni
  SET stanje=stanje-1000
  WHERE br_racuna=1234567;
COMMIT;
```

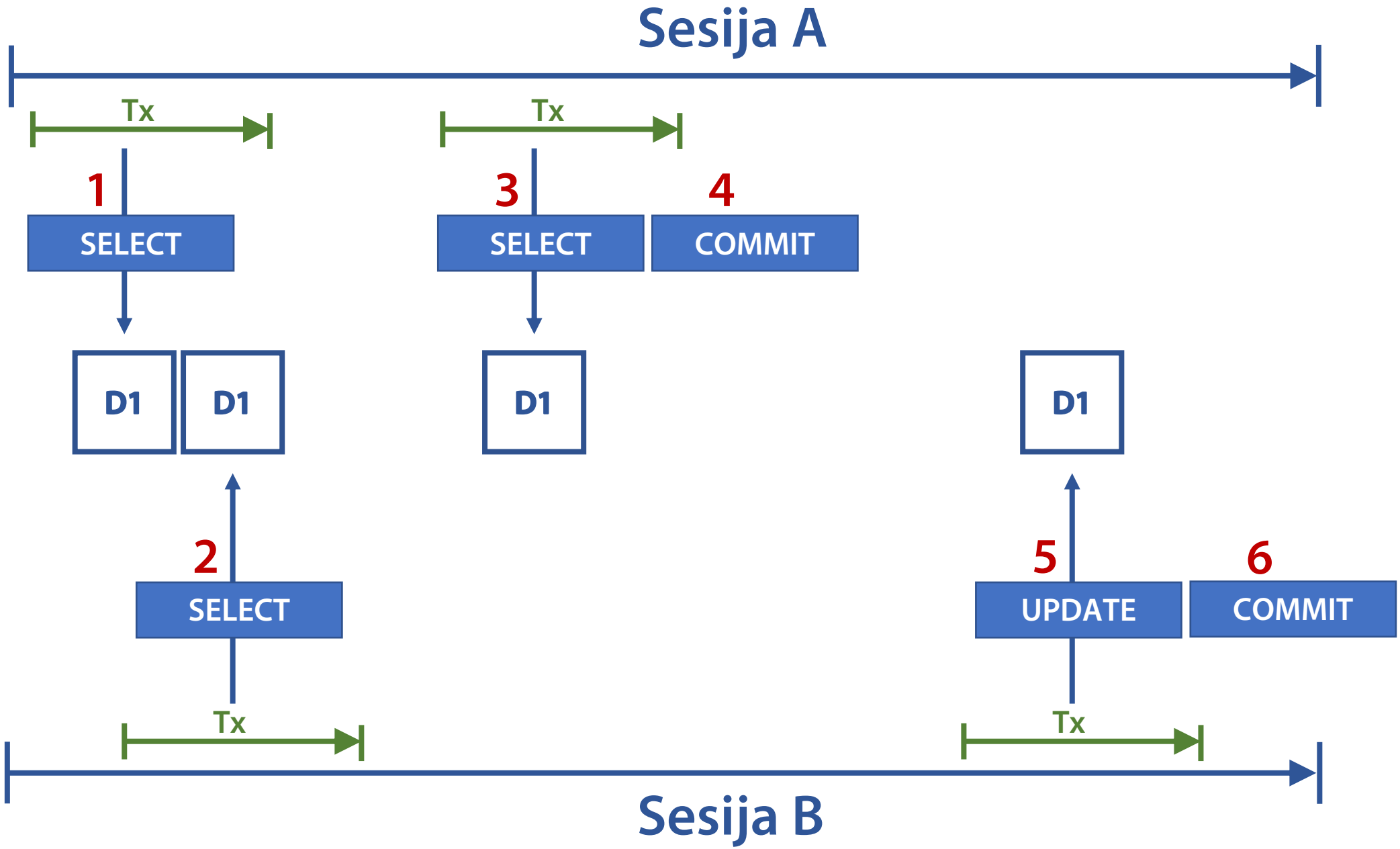
Optimističko zaključavanje



```
prethodno stanje: 1000
novo stanje:         0
```



```
prethodno stanje: 1000
novo stanje:         0
```

Klijent izašao sa: 2000

Optimističko zaključavanje