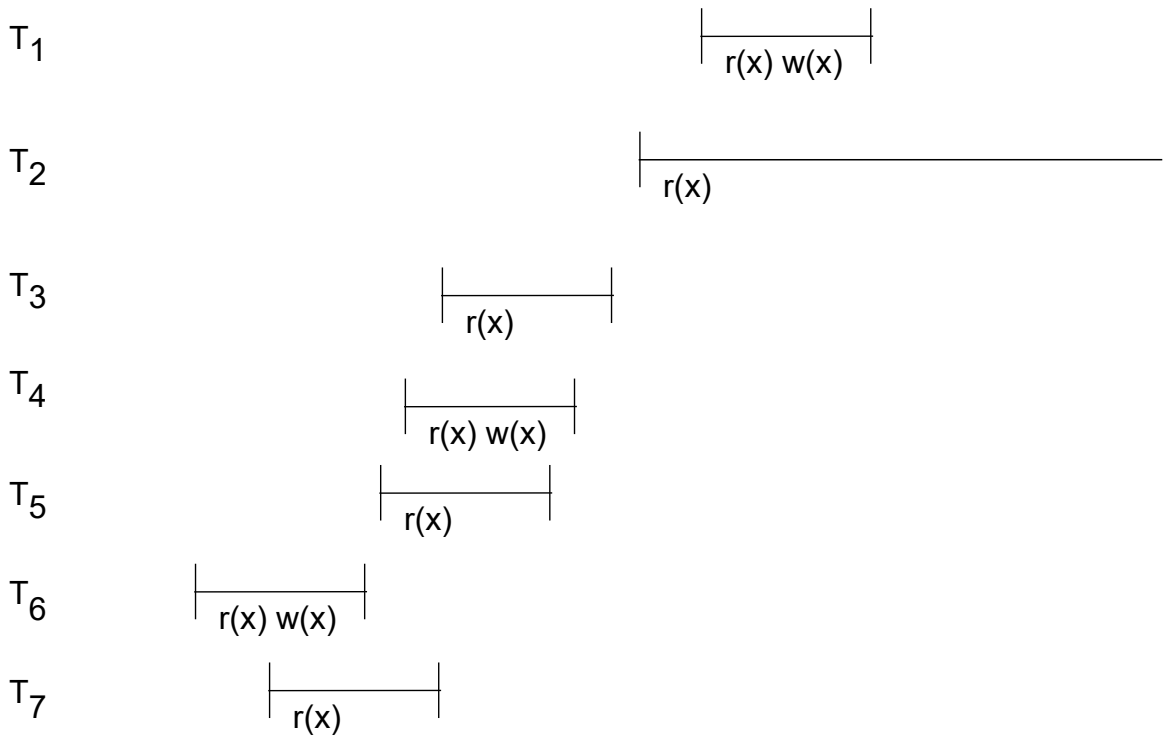
Transaction Processing
Exercise 6

Assignment 1: Explain the multiversion concurrency control (MVCC) protocol based on the following example:

T1	T2
$r_1(x)$	
$w_1(x)$	
	$r_2(\mathbf{x})$
	$w_2(y)$
$r_1(y)$	
$w_1(z)$	
$commit;$	
	$commit;$

Which problem does the MVCC protocol not solve?

Assignment 2: Given is the following schedule:



Determine for each transaction which version of x is read and when the different versions can be released.

Assignment 3: Which problems occur in the following schedule?

- **How can these problems be avoided?**

- **Which further isolation levels do you know?**
- **Explain which problems of multi-user operation can be avoided with the discussed isolation levels.**

T1	T2
r(K)	
	r(K)
	K:=K-1
	w(K)
	commit;
B:=K-0,5	
w(B)	
commit;	

Assignment 4: Explain the concept of serializibility checking based on permutations based on the following schedules s_1 bis s_6:

$$
\begin{aligned}
s_1 &:= w_2(x)w_2(y)r_1(x)r_1(y)w_1(y)r_2(y) \\
s_2 &:= r_1(x)w_1(x)r_2(y)w_2(y)r_1(y)r_2(x) \\
s_3 &:= w_1(y)w_2(y)r_2(y)r_1(x)w_3(z) \\
s_4 &:= r_1(x)w_1(x)r_2(y)r_3(y)w_2(x)w_3(x) \\
s_5 &:= w_2(x)w_1(x)w_1(y)w_2(y)w_1(y)w_3(z) \\
s_6 &:= w_2(x)w_2(y)r_1(x)r_1(y)w_1(y)w_3(z)
\end{aligned}
$$

Which of the schedules are serializible.