

1a)

<b>begin transaction</b>	
<b>update fármacos</b> <b>set NomeF= 'aspirina'</b> <b>where NumF=1;</b>	
	<b>update fármacos</b> <b>set NomeF= 'benuron'</b> <b>where NumF=2;</b>
	<b>update fármacos</b> <b>set NomeF= 'aspirina'</b> <b>where NumF=1;</b>
<b>update fármacos</b> <b>set NomeF= 'benuron'</b> <b>where NumF=2;</b>	

1b) The following is a schedule for which one gets different results in the different isolation level modes. Note that for SERIALIZABLE ISOLATION LEVEL there are two possible alternative sequences <T1,T2> or <T2,T1>

<b>T1</b>	<b>T2</b>	Uncom mitted Read	Commi tted Read	SR T1,T2	SR T2,T1
<b>begin transaction</b>					
<b>select * from fármacos</b>		<i>empty</i>	<i>empty</i>	<i>empty</i>	<b>2</b>
<b>insert into fármacos</b> <b>values (1,'aspirina',...);</b>					
	<b>begin transaction</b>				
	<b>select * from fármacos;</b>	<b>1</b>	<i>empty</i>	<b>1</b>	<i>empty</i>
	<b>insert into fármacos</b> <b>values (2,benuron,...)</b>				
	<b>select * from fármacos</b>	<b>1</b> <b>2</b>	<b>2</b>	<b>1</b> <b>2</b>	<b>2</b>
	<b>commit;</b>				
<b>select * from fármacos</b>		<b>1</b> <b>2</b>	<b>1</b> <b>2</b>	<b>1</b>	<b>1</b> <b>2</b>
<b>commit;</b>					

1c) See slide 261 in the slides aula8concurrency.

**1d)** With timestamp-based protocol

<b>TS(t1)=1</b>	<b>TS(t2)=2</b>	<b>A(R-ts,W-ts)=(0,0)</b>	<b>B(R-ts,W-ts)=(0,0)</b>
<b>read(A)</b>		<b>(1,0)</b>	
	<b>write(A)</b>	<b>(1,2)</b>	
<b>write(B)</b>			<b>(0,1)</b>
	<b>commit;</b>		
<b>commit;</b>			

With 2-phase locking protocol

<b>lock-s(A)</b>	
<b>read(A)</b>	
	<b>lock-x(A) SUSPENDS HERE !!!</b>
	<b>write(A)</b>
<b>lock-x(B)</b>	
<b>write(B)</b>	
	<b>unlock(A)</b>
	<b>commit;</b>
<b>unlock(A)</b>	
<b>unlock(B)</b>	
<b>commit;</b>	

**1e)** Assuming that doctor 7 does not exist previously, the following transaction would fail if checking of foreign key constraints are not deferred to the end of the transaction, since all doctors must have at least one appointment, and all appointments are done by a doctor.

```
begin transaction;
insert into medicos(7,'Cristiano',...);
insert into consultas(1000,7,'José',...);
commit;
```

**1f)** Not taught.