COMP9311 Assignment 2

1.

1) $\{A\}^+ = \{A,C,D,E,H,G,I\}$, so $A \rightarrow I \in \{A\}^+|_F$. Therefore, $A \rightarrow I \in F^+$.

2) Superkey = {A,B,C,E,H,J}

If we remove A : $\{B,C,E,H\}^+ = \{A,B,C,D,E,G,H,I\}$. So A can be removed.

If we continue to remove B:$\{C,E,H\}^+ = \{A,C,D,E,G,H,I\}$,so B can't be removed.

Then we try to remove C,E,H step by step,and finally we find a candidate key {B,E,J}.

3)$\{E\}^+ = \{A,C,D,E,G,H,I\}$, $\{B\}^+ = \{B,G,I\}$, so G and I can be determined by either B or E of the candidate key {B,E,J},so it is not in 2NF.Besides,its attribute values are atomic,so it's in 1NF.

4) First,we remove the right side.

F' = {A->D,A->E,B->G,B->I,E->C,E->D,CE->A,CE->D,CE->H,H->D,AH->I}

Second,we remove the left side.

F'' = {A->D,A->E,B->G,B->I,E->C,E->D,E->A,E->H,H->G,A->I}

Finally,we remove the redundant FDs.

Fm = {A->E,A->I,B->G,B->I,E->C,E->D,E->A,E->H,H->G}.

5) For Fm:

From A->E,A->I,derive R1{A,E,I}

From B->G,B->I,derive R2{B,G,I}

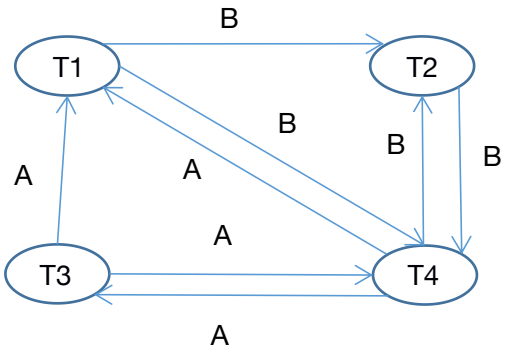
From E->C,E->D,E->A,E->H,derive R3{A,C,D,E,H}

From H->G,derive R4{H,G}

No relation contains a key of J,so we add R5{B,E,J}

2.

1)



From the graph,we can know there are many cycles,so it's not conflict serialisable.

2)

T1	T2	T3	T4
R(B)			
R(A)			
W(B)			
W(A)			
			R(A)
			W(A)
			R(B)
			W(B)
		R(A)	
		W(A)	
	R(B)		
	W(B)		

3)

T1	T2
write_lock(B)	
R(B)	
write_lock(A)	
R(A)	
write(B)	
unlock(B)	
	write_lock(B)
	R(B)
write(A)	
unlock(A)	
	write(B)
	unlock(B)