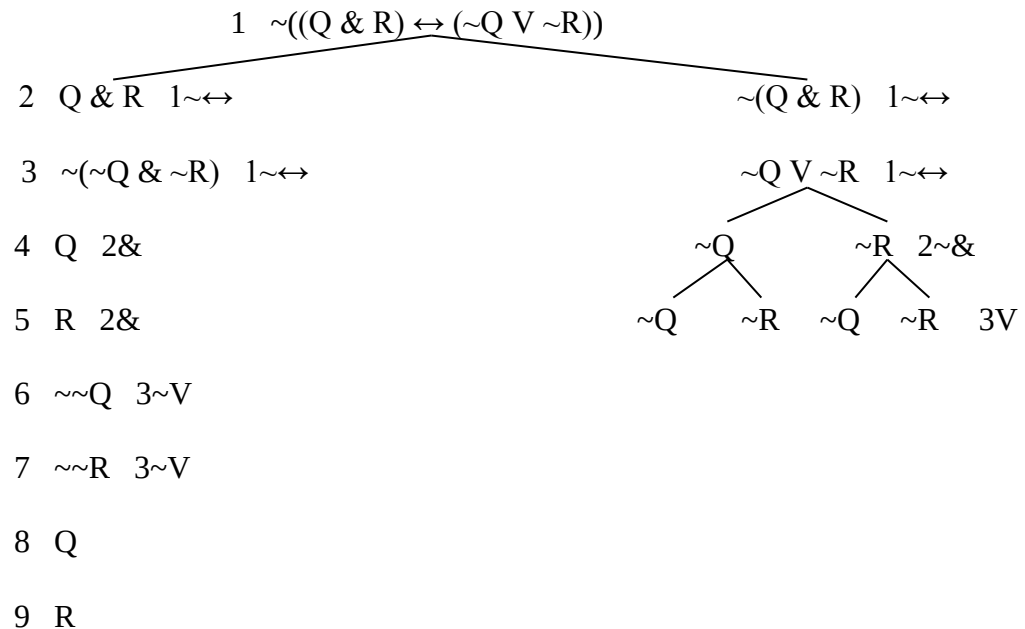


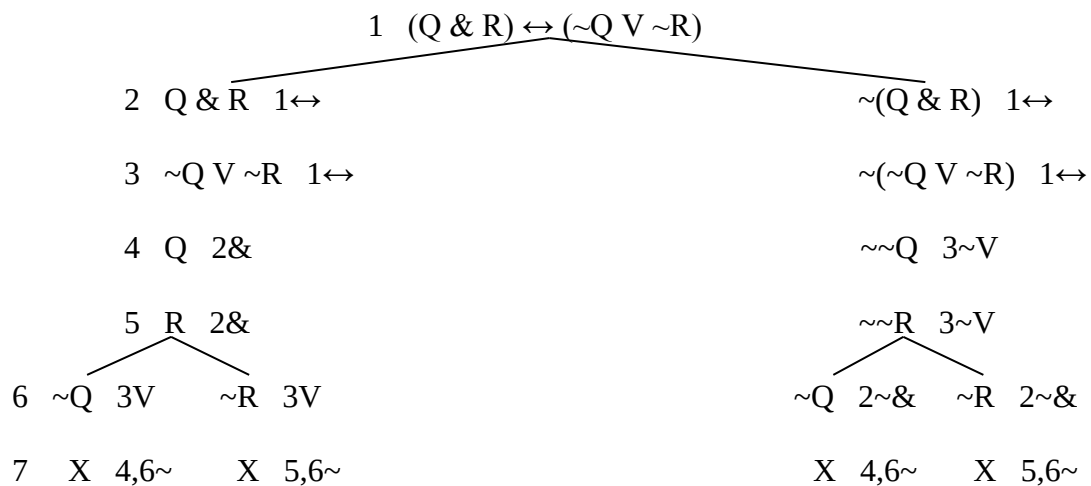
Logica (a.a. 2013-2014 – I semestre)

Compito 3 – Soluzioni

3.1.1. $(Q \& R) \leftrightarrow (\sim Q \vee \sim R)$

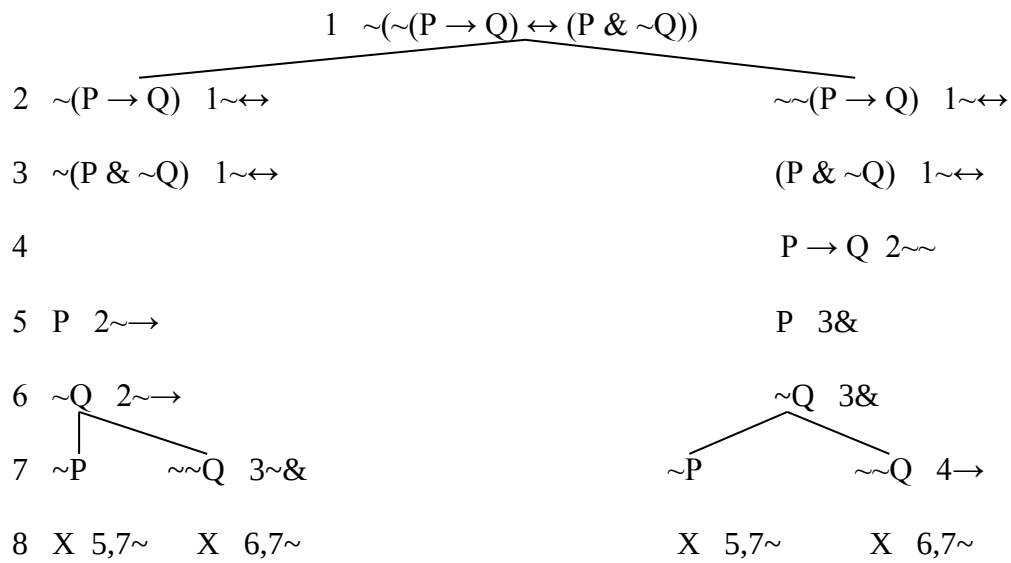


La formula di partenza non è una tautologia.



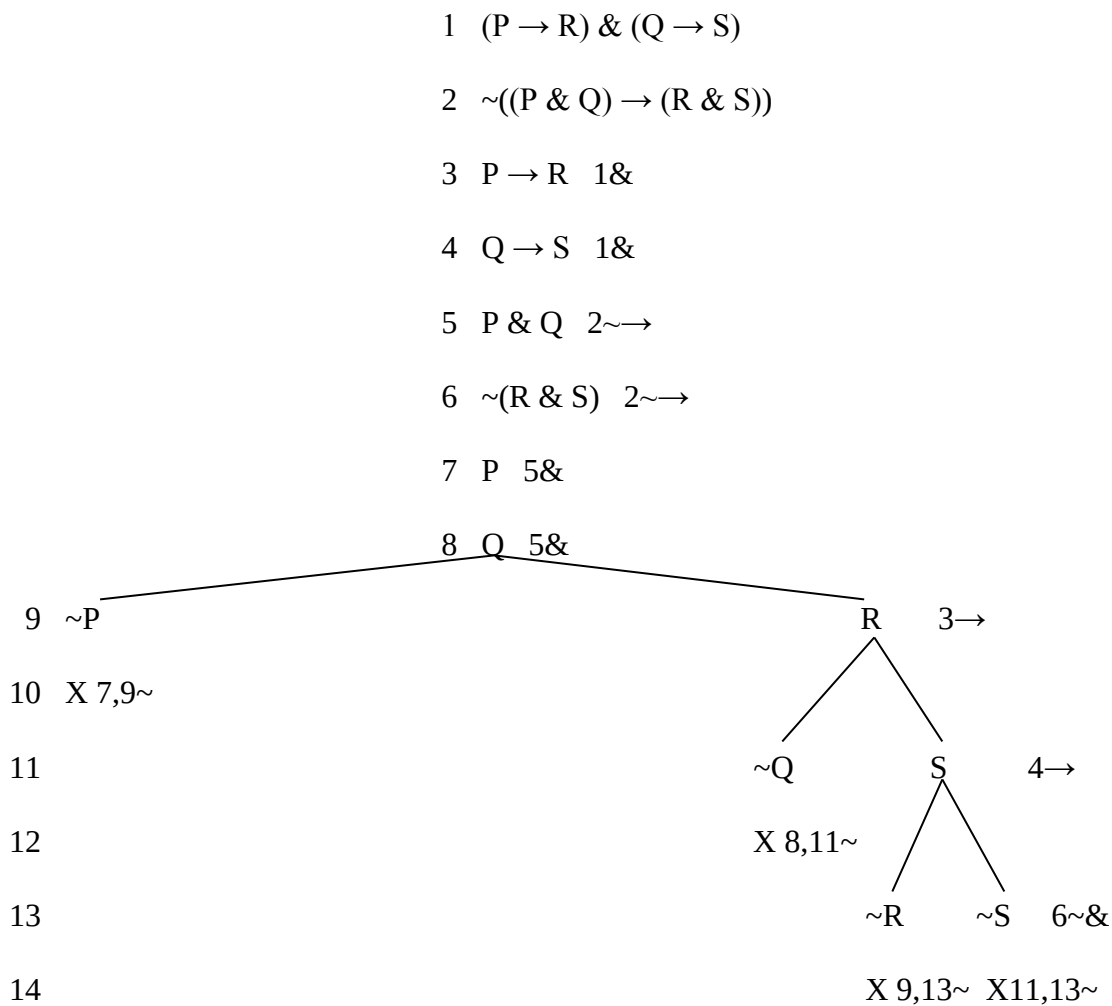
La formula di partenza è una contraddizione.

3.1.2. $\sim(P \rightarrow Q) \leftrightarrow (P \& \sim Q)$



La formula di partenza è una tautologia.

3.2.1. $(P \rightarrow R) \& (Q \rightarrow S) \vdash (P \& Q) \rightarrow (R \& S)$



La forma argomentativa è valida.

3.2.2. $P \rightarrow (R \& S), Q \rightarrow (R \& T) \vdash P \vee Q \rightarrow R$

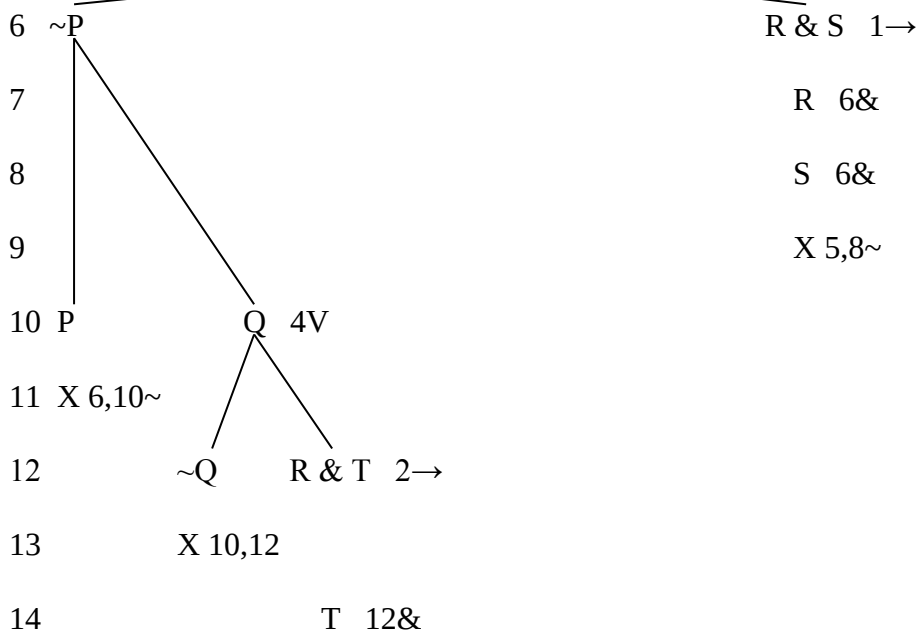
1 $P \rightarrow (R \& S)$

2 $Q \rightarrow (R \& T)$

3 $\sim((P \vee Q) \rightarrow R)$

4 $P \vee Q$ 3 $\sim\rightarrow$

5 $\sim R$ 3 $\sim\rightarrow$



15 R 12&

16 X 5,15~

La forma argomentativa è valida.

3.3.

1	$(P \rightarrow R) \& (Q \rightarrow S)$	A
2	$P \& Q$	H ($\rightarrow$ I)
3	$P \rightarrow R$	1 &E
4	P	2 &E
5	R	3,4 $\rightarrow$ E
6	$Q \rightarrow S$	1 &E
7	Q	2 &E
8	S	6,7 $\rightarrow$ E
9	$R \& S$	5,8 &I
10	$(P \& Q) \rightarrow (R \& S)$	2-9 ($\rightarrow$ I)

1	$P \rightarrow (R \& S)$	A
2	$Q \rightarrow (R \& T)$	A
3	$P \vee Q$	H ($\rightarrow$ I)
4	P	H ($\rightarrow$ I)
5	$R \& S$	1,4 $\rightarrow$ E
6	R	5 &E
7	$P \rightarrow R$	4-6 ($\rightarrow$ I)
8	Q	H ($\rightarrow$ I)
9	$R \& T$	2,8 $\rightarrow$ E
10	R	9 &E
11	$Q \rightarrow R$	8-10 ($\rightarrow$ I)
12	R	3,7,11 VE
13	$(P \vee Q) \rightarrow R$	3-12 ($\rightarrow$ I)