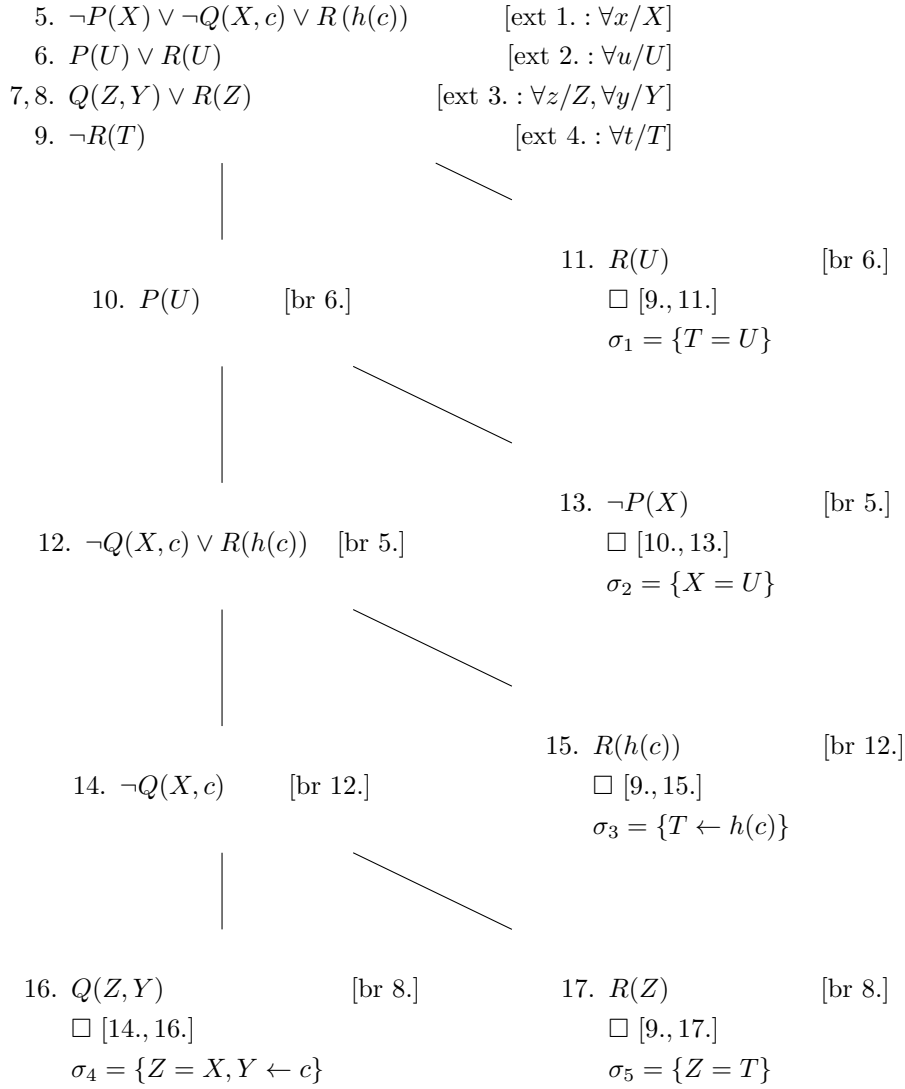**TD 12. Exercice 1 :** Correction (Tableaux)

1. $\forall x \; [P(x) \Rightarrow (Q(x,c) \Rightarrow R\,(h(c)))]$
   $\equiv \forall x \; [\neg P(x) \vee \neg Q(x,c) \vee R\,(h(c))]$
2. $\forall u \; [P(u) \vee R(u)]$
3. $\forall y \, \forall z \; [Q(z,y) \vee R(z)]$
4. $\neg \exists t \, R(t)$
   $\equiv \forall t \, \neg R(t)$

$|$

5. $\neg P(X) \vee \neg Q(X,c) \vee R\,(h(c))$ [ext 1. : $\forall x / X$]
6. $P(U) \vee R(U)$ [ext 2. : $\forall u / U$]
7,8. $Q(Z,Y) \vee R(Z)$ [ext 3. : $\forall z / Z, \forall y / Y$]
9. $\neg R(T)$ [ext 4. : $\forall t / T$]

10. $P(U)$ [br 6.]

11. $R(U)$ [br 6.]
   $\square$ [9., 11.]
   $\sigma_1 = \{T = U\}$

12. $\neg Q(X,c) \vee R(h(c))$ [br 5.]

13. $\neg P(X)$ [br 5.]
   $\square$ [10., 13.]
   $\sigma_2 = \{X = U\}$

14. $\neg Q(X,c)$ [br 12.]

15. $R(h(c))$ [br 12.]
   $\square$ [9., 15.]
   $\sigma_3 = \{T \leftarrow h(c)\}$

16. $Q(Z,Y)$ [br 8.]
   $\square$ [14., 16.]
   $\sigma_4 = \{Z = X, Y \leftarrow c\}$

17. $R(Z)$ [br 8.]
   $\square$ [9., 17.]
   $\sigma_5 = \{Z = T\}$

$$\Sigma = \{T = U = X = Z \leftarrow h(c), Y \leftarrow c\}$$