STEP BY STEP Application of rules in the Tableaux algorithm for the example in the slides:

After initial pre-processing steps, we get:

A^2 = { (∃R.A)(a), (∀R.B)(a), (∀R.(¬A ⊔ ¬B))(a) }

Applying ∃-rule to (∃R.A)(a) gives:

A^3 = { (∃R.A)(a), (∀R.B)(a), (∀R.(¬A ⊔ ¬B))(a), **R(a,b), A(b)** }

Applying ∀-rule to (∀R.B)(a) gives:

A^4 = { (∃R.A)(a), (∀R.B)(a), (∀R.(¬A ⊔ ¬B))(a), R(a,b), A(b), **B(b)** }

Applying ∀-rule to (∀R.(¬A ⊔ ¬B))(a) gives:

A^5 = { (∃R.A)(a), (∀R.B)(a), (∀R.(¬A ⊔ ¬B))(a), R(a,b), A(b), B(b), **(¬A ⊔ ¬B)(b)** }

Applying ⊔-rule to (¬A ⊔ ¬B)(b) gives the following two interpretations:

A^{61} = { (∃R.A)(a), (∀R.B)(a), (∀R.(¬A ⊔ ¬B))(a), R(a,b), A(b), B(b), (¬A ⊔ ¬B)(b), **¬A(b)** }

A^{62} = { (∃R.A)(a), (∀R.B)(a), (∀R.(¬A ⊔ ¬B))(a), R(a,b), A(b), B(b), (¬A ⊔ ¬B)(b), **¬B(b)** }

Both these interpretations contain "clashes"; So, the original KB is UNSATISFIABLE!