## Exercises – Semantic Tableaux Method

**Exercise 1**

Using the semantic tableaux method decide what kind (consistent, inconsistent, valid) of formula is .

If  is consistent, find all its models.

1.;

2.;

3.;

4.;

5.;

6.;

7.;

8..

**Exercise 2**

Prove that the following formulas are tautologies using the semantic tableaux method:

1.distribution of ’’ over ’’: ;

2.separation of the premises law: ;

3.distribution of ’’ over ’’: ;

4.distribution of ’’ over ’’: ;

5.reunion of the premises law: ;

6.distribution of implication:;

7.distribution of ’’ over ’’: .

8.permutation of the premises law:;

**Exercise 3**

Using the semantic tableaux method, decide whether the following logical consequences hold or not.

If a logical consequence does not hold find an anti-model of it.

1.

2.

3.

4.

5.

6.

7.

8.

**Exercise 4**

Write all the anti-models of the propositional formulas  using the semantic tableaux method.

1.;

2.;

3.;

4.;

5.;

6.;

7.;

8..

**Exercise 5**

Using the semantic tableaux method, prove the following properties in predicate logic:

1.’’ is semi-distributive over ’’:

 and



2.’’ is semi-distributive over ’’:

 and



3.’’ is semi-distributive over ’’:

 and



4.’’ is semi-distributive over ’’ :

 and



5.and



6.’’ is distributive over ’’



7.’’ is distributive over ’’



8.

**Exercise 6**

Check the validity of the following first-order formulas using the semantic tableaux method:

1.;

2.;

3.;

4.;

5.;

6.;

7.;

8..

**Exercise 7**

Using the semantic tableaux method check whether the following logical consequences hold.

1.;

2.

3.;

4.;

5.;

6.;

7.;

8..