Propositional Logic – Syntax (2A)

Young W. Lim
3/20/17

Please send corrections (or suggestions) to youngwlim@hotmail.com.

This document was produced by using LibreOffice

Based on

Contemporary Artificial Intelligence,
R.E. Neapolitan & X. Jiang

Logic and Its Applications,
Burkey & Foxley

Formal Language

A **formal language** :
A set of **words** or **expressions**
which are obtained using a **alphabet** and **rules**.

Alphabet : the set of **symbols**

Syntax : the set of **rules**
specifies how elements of the **alphabet**
are combined to construct **words**

Proposition Logic

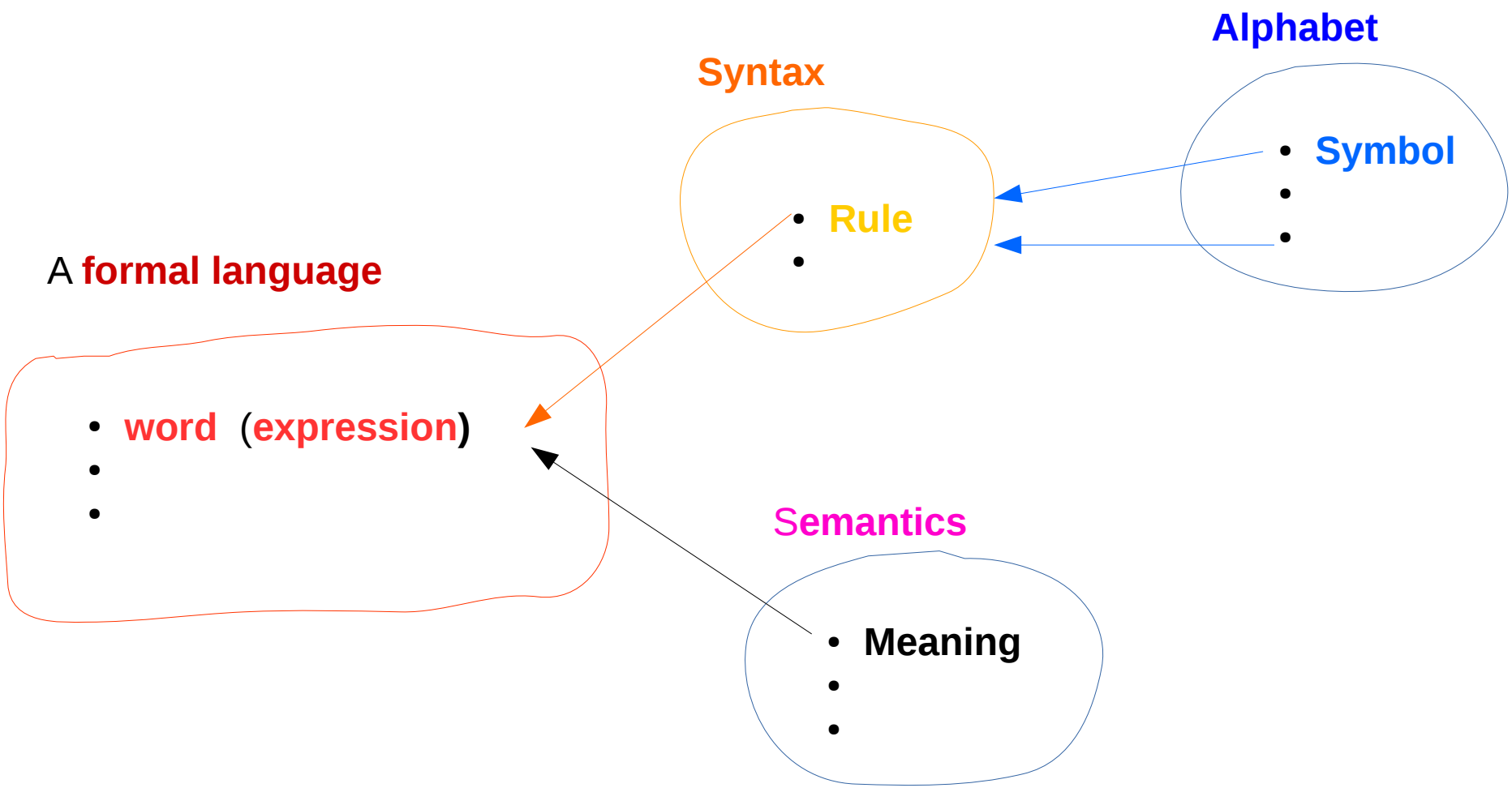
from en.wikipedia.org

Propositional Logic :
A **formal language** **Syntax** + **Semantics**

Semantics : gives **meaning** to the **well formed strings** (**propositions**)

Syntax : the set of **rules**
specifies how elements of the **alphabet**
are combined to construct **words**

Formal Language



Alphabet of Proposition Logic

from en.wikipedia.org

1. the letters of the English alphabet and each with an index
2. the logical values True and False
3. Special symbols for NOT, AND, OR, IF-THEN, IF AND ONLY IF, GROUPING

   Unary and **Binary Connectives**

Syntax of Proposition Logic

1. **Atomic Propositions**:

   all letters, all indexed letters, and True and False are propositions

2. **Compound Propositions**:

   If *A* and *B* are positions,

   A and *B* connected by **unary** and **binary connectives**

   are also propositions

   The *negation* of *A*, the *conjunction* and *disjunction* of *A* and *B*

3. **Variables** : *italicized letters* to refer to propositions

   whose values can be atomic or compound propositions

   enables recursive definition of compound propositions

   not part of the alphabet

Statements of Proposition Logic

Propositional logic was developed

To make **statements** about the real world and

To **reason** with these statements

References

[1] en.wikipedia.org
[2] en.wiktionary.org
[3] U. Endriss, “Lecture Notes : Introduction to Prolog Programming”
[4] http://www.learnprolognow.org/ Learn Prolog Now!
[5] http://www.csupomona.edu/~jrfisher/www/prolog_tutorial
[6] www.cse.unsw.edu.au/~billw/cs9414/notes/prolog/intro.html
[7] www.cse.unsw.edu.au/~billw/dictionaries/prolog/negation.html
[8] http://ilppp.cs.lth.se/, P. Nugues,` An Intro to Lang Processing with Perl and Prolog