

# Introduction TO Syntax & Semantics



## Syntax:-

Like Ordinary language English, programming Languages have Syntax.

The Syntax of a (programming) Language is a set of rules that defines what sequences of **Symbols** are considered to be valid expressions (programs) in the language.

OR

The Syntax of a programming language is what the program looks like.

Syntax provides significant information needed for understanding a program and provides much-needed information towards the translation of the source program into the object program.

## A Valid Representation of Syntax

$$x = y + z$$

Invalid Representation may be

$$xy + -$$

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$2 + 3 \times 4$  text will be interpreted this expression as having value 14 and not 20. That is, expression is

interpreted as if written  $2+(3 \times 4)$  and is not interpreted as if written  $(2+3) \times 4$

We can specify either interpretation, if, we wish, by syntax and hence guide the translator into generating the correct operations for evaluating this expression.



In a statement

$x = 2.82 + 3.68$  Syntax cannot

tell the type of  $x$ , on which result is depended

IF  $x$  is Real then output will be 6.50 and IF

IF  $x$  is integer then output will be 6.

To completely describe the syntactic structure of programming language we need something else which can tell us the meaning of expression, statements and program units.

Semantics:- Semantics is the meaning of an expression (program) in a programming language

In C to declare a 10 elements vector  $V$  of integer

has declaration

$\text{int } V[10];$

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In Pascal

$V: \text{Array}[0, \dots, 9] \text{ of integer}$

Although both creates similar data objects at run

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time, their Syntax is very different. To understand the meaning of declaration we need to know the Semantics of both Pascal and C for such array declaration.

Another Example

**While (< Boolean\_exp >) < Statement >**

The Semantics of this Statement form is that when the current value of the Boolean\_exp. is true, the embedded Statement is true.



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