Name: Ige Samuel .A

Matric No: 17/sci01/039

Course Code: CSC312(Compiler Construction I)

**Question**  
Define Grammar Write on the following: I. Derivation ii. Production iii. Sentence iv. Null Symbol

**Solution.**

A formal **grammar** is a set of rules for rewriting strings, along with a "start symbol" from which rewriting starts. Therefore, a **grammar** is usually thought of as a language generator.  grammar does not describe the [meaning of the strings](https://en.wikipedia.org/wiki/Semantics) or what can be done with them in whatever context—only their form. A formal grammar is defined as a set of [production rules](https://en.wikipedia.org/wiki/Production_(computer_science)) for [strings](https://en.wikipedia.org/wiki/String_(computer_science)) in a formal language.

1. A derivation is basically a sequence of production rules, in order to get the input string. During parsing, we take two decisions for some sentential form of input:

* Deciding the non-terminal which is to be replaced.
* Deciding the production rule, by which, the non-terminal will be replaced.

To decide which non-terminal to be replaced with production rule, we can have two options.

1. Left-most Derivation
2. Right-most Derivation
3. A production or production rule in computer science is a [*rewrite rule*](https://en.wikipedia.org/wiki/Rewrite_rule) specifying a symbol substitution that can be recursively performed to generate new symbol sequences. A finite set of productions {\displaystyle P}is the main component in the specification of a [formal grammar](https://en.wikipedia.org/wiki/Formal_grammar) (specifically a [generative grammar](https://en.wikipedia.org/wiki/Generative_grammar)).
4. Grammar is a set of rules by which valid sentences in a language are constructed. sentence is a sentential form consisting only of terminals such as a + a \* a. A **sentence** can be derived using the following algorithm: Algorithm Derive String String := Start Symbol REPEAT Choose any nonterminal in String. ... UNTIL String contains only terminals.
5. Null Symbol: the null symbol is also called empty string and it is useful to specify that a symbol can be replaced by nothing at all.