# The Grammars of the Atlas Engine

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**Abstract**

Atlas is an exploratory project meant to strengthen knowledge in the fields related to parsing and implementation of algorithms related to mathematics. Atlas will be utilized as a computation engine that will calculate a variety of mathematical equations. These equations are going to be limited to simple infix equations as well as concepts from the first semester of Calculus, initially. Atlas accepts a specific Context Free Grammar as it's input and parses that input using a recursive decent pattern. This paper discusses all of the grammars that are used in the Atlas engine and details the implementations. As stated, this project is going to service as exploration to enhance knowledge in specific fields but may not be making any ground breaking finds.

## 1 Introduction

A Context Free Grammar is a set that contains 3 other sets and a singleton. The first to be described is a set of all terminal symbols which are the characters that appear in the string generated by the grammar. Next, we will discuss the set of all non-terminal symbols which are the placeholders for the patterns of the elements from the set of terminals. The last set we have is a list of productions which define the rules for replacing non-terminals with other non-terminals or terminals. The last element of a grammar is simply the starting symbol which defines which non-terminal the pattern will begin with.

$$G = \{ V, \Sigma, R, S \} \tag{1}$$

### 1.1 Subsection Heading Here

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## 2 Conclusion

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