CONTEXT FREE GRAMMARS

Context-free grammars (CFGs) are a formalism used to describe the syntax of languages. A CFG consists of a set of production rules that define how a language can be generated. Each rule has a left-hand side, which is a nonterminal symbol, and a right-hand side, which is a sequence of terminals (symbols that cannot be further expanded) and nonterminals.

Starting from a designated start symbol, a CFG can be used to generate all possible strings that belong to the language described by the grammar. The rules of a CFG are typically written in the form:

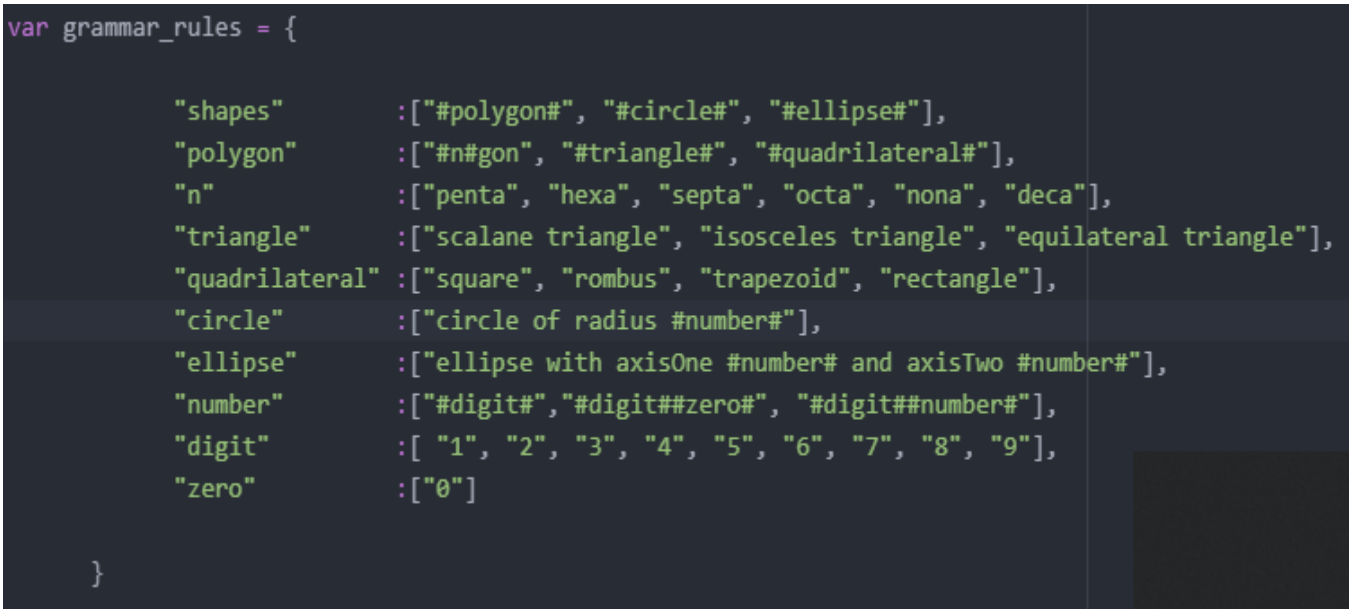
$A \rightarrow \beta$

where `A` is a nonterminal symbol and `β` is a sequence of terminals and nonterminals. This rule can be read as "replace `A` with `β`".

Context-free grammars are widely used in computer science, particularly in the design and implementation of programming languages and compilers. They are also used in natural language processing and other areas of linguistics.

Given below is a snippet of a CFG rules that define shapes and some screenshots of the sentences generated;

Screenshot of CFG rules for shapes defined in a javaScript file.

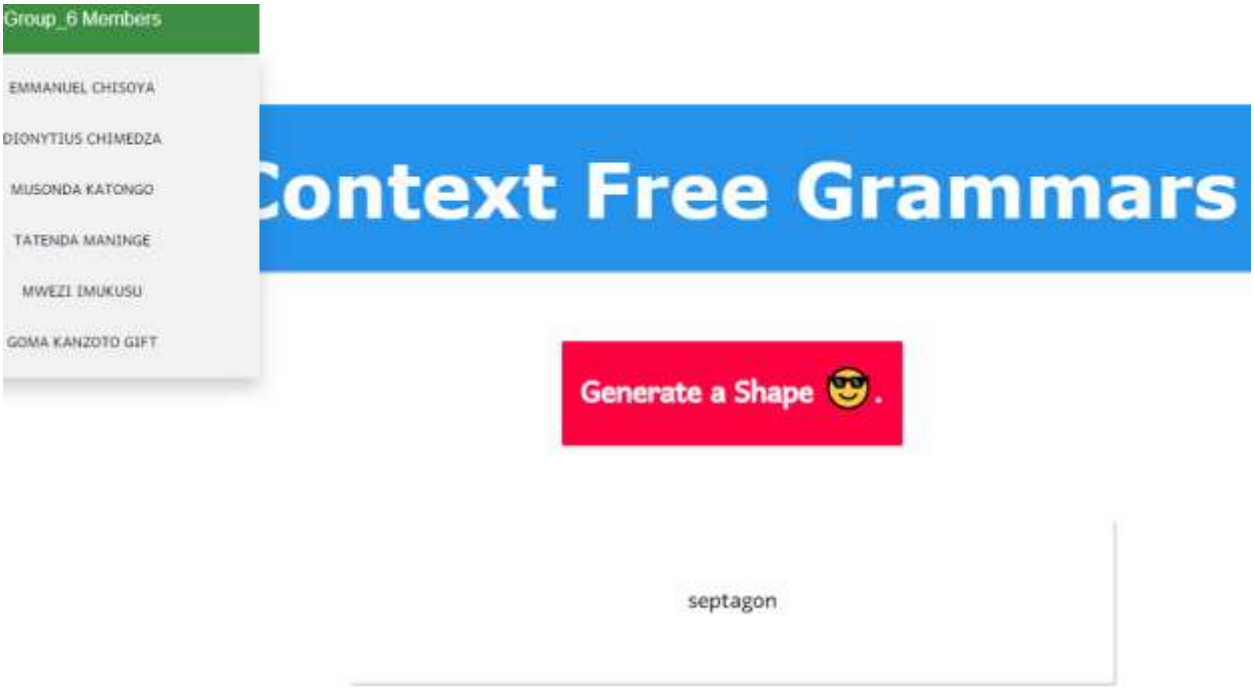


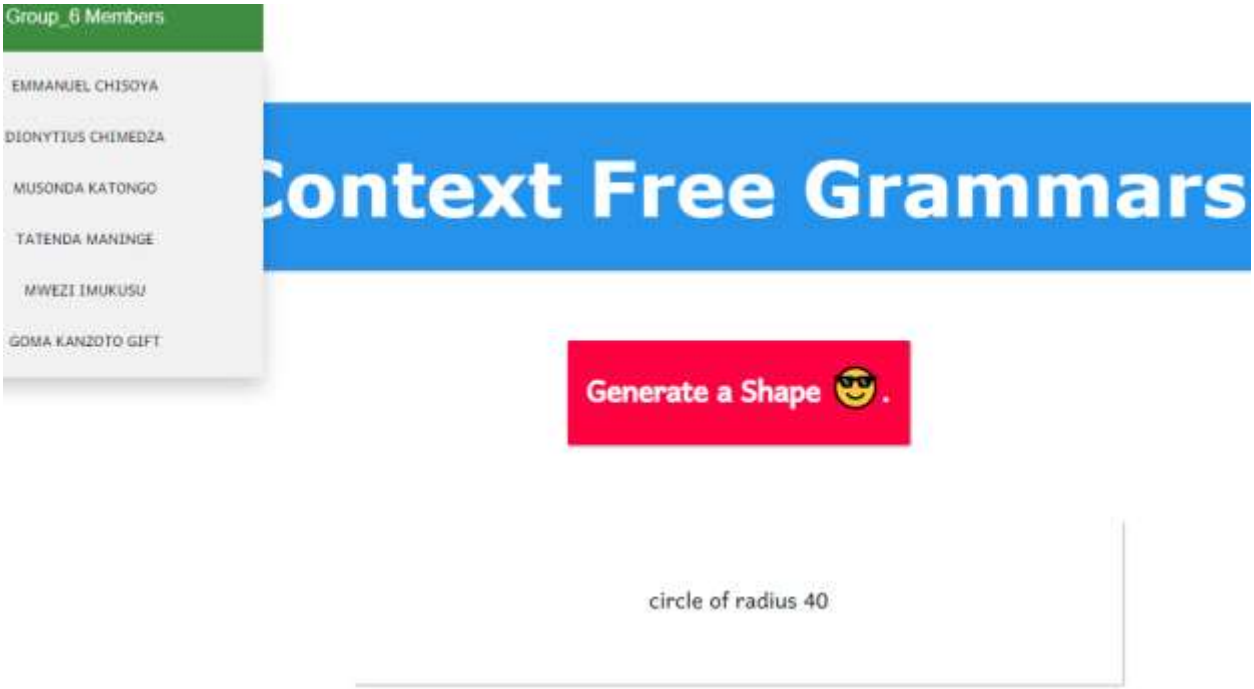
```
var grammar_rules = {

            "shapes"        :["#polygon#", "#circle#", "#ellipse#"],
            "polygon"       :["#n#gon", "#triangle#", "#quadrilateral#"],
            "n"             :["penta", "hexa", "septa", "octa", "nona", "deca"],
            "triangle"      :["scalane triangle", "isosceles triangle", "equilateral triangle"],
            "quadrilateral" :["square", "rombus", "trapezoid", "rectangle"],
            "circle"        :["circle of radius #number#"],
            "ellipse"       :["ellipse with axisOne #number# and axisTwo #number#"],
            "number"        :["#digit#","#digit##zero#", "#digit##number#"],
            "digit"         :[ "1", "2", "3", "4", "5", "6", "7", "8", "9"],
            "zero"          :["0"]

      }
```

Shape strings generated





Group_6 Members

EMMANUEL CHISOYA

DIONYTIUS CHIMEDZA

MUSONDA KATONGO

TATENDA MANINGE

MWEZI IMUKUSU

GOMA KANZOTO GIFT

Context Free Grammars

Generate a Shape 😎.

ellipse with axisOne 37 and axisTwo 1

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Context Free Grammars

Generate a Shape 😎.

trapezoid