

PyScript Drawing

Johi Chawla | 023-21-0029 | BSCS-Vii-B

RAMIM ALI SIDDIQUI | 193-21-005 | BSCS ( AI )-VII-B

Aqib Ali | 023-21-0027 | Bscs-vii-b

# Context-Free Grammar (CFG)

### 1. **Language Description and Features**

**Language Name:** PyScript

**Description:**  
 PyScript is a simple scripting language designed for drawing commands on a canvas. It allows users to move a "pen" to different positions, draw shapes such as circles, and change the drawing color. The language supports basic commands like move, draw\_circle, set\_color, and clear, providing a basic interface for graphical operations.

**Features:**

* **Move Command:** Allows the user to move the pen to a specific (x, y) position.
* **Draw Circle Command:** Draw a circle at the current pen position with a specified radius.
* **Set Color Command:** Sets the color of subsequent drawing operations.
* **Clear Command:** Clears the drawing canvas.

### 2. **Grammar Rules and Productions**

#### **CFG for PyScript**

command -> move LPAREN NUMBER COMMA NUMBER RPAREN SEMICOLON

| draw\_circle LPAREN NUMBER RPAREN SEMICOLON

| set\_color LPAREN COLOR RPAREN SEMICOLON

| clear LPAREN RPAREN SEMICOLON

LPAREN -> "("

RPAREN -> ")"

SEMICOLON -> ";"

NUMBER -> [0-9]+

COLOR -> "red" | "blue" | "green"

The PyScript language can be described using the following Context-Free Grammar (CFG):

* <program> ::= <command\_list>
* <command\_list> ::= <command> ";" <command\_list> | <command> ";"
* <command>::= <move\_command> | <draw\_command> | <set\_color\_command> | <clear\_command>
* <move\_command> ::= "move" "(" <number> "," <number> ")"
* <draw\_command> ::= "draw\_circle" "(" <number> ")"
* <set\_color\_command> ::= "set\_color" "(" <color> ")"
* <clear\_command> ::= "clear" "(" ")"
* <number> ::= <digit> <number> | <digit>
* <digit>::= "0" | "1" | "2" | "3" | "4" | "5" | "6" | "7" | "8" | "9"
* <color> ::= "red" | "blue" | "green" | "black"

**Explanation of Productions:**

* **<program>**: The start symbol of the grammar, representing the entire script, which is composed of a list of commands.
* **<command\_list>**: A list of commands, where each command is followed by a semicolon.
* **<command>**: Represents one of the four supported drawing commands: moving the pen, drawing a circle, setting a color, or clearing the canvas.
* **<move\_command>**: Specifies the "move" command to move the pen to a position (x, y).
* **<draw\_command>**: Specifies the "draw\_circle" command to draw a circle with a given radius.
* **<set\_color\_command>**: Specifies the "set\_color" command to set the current drawing color.
* **<clear\_command>**: Specifies the "clear" command to clear the canvas.
* **<number>** and **<digit>**: Define the syntax for numeric values used in positions and sizes.
* **<color>**: Specifies a finite set of color names supported by the language.