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1. **Name of The Programming Language**

We have decided to name our language as ç++.

1. **BNF Description**

<program> ::= <statement\_list> <program> | <comment\_list> <program> | <comment\_list> | <statement\_list>

<statement\_list> ::= <statement> <SEMICOLON> <statement\_list> | <statement> <SEMICOLON>

<statement> ::= <void\_statement> | <expression>

<comment\_list> ::= <COMMENT> <comment\_list> | <COMMENT>

<void\_statement> ::= <if\_statement> | <loop> | <function\_def> | <type\_def> | <BREAK> | <CONTINUE>

<if\_statement> ::= <IF> <expression> <DO> <LBRACE> <statement\_list> <RBRACE> | <IF> <conditional\_expression> <DO> <LBRACE> <statement\_list> <RBRACE> <ELSE> <DO> <LBRACE> <statement\_list> <RBRACE>

<loop> ::= <while\_loop> | <for\_loop>

<while\_loop> ::= <WHILE> <expression> <DO> <LBRACE> <statement\_list> <RBRACE>

<for\_loop> ::= <FOR> <LP> <assignment\_expression> <SEMICOLON> <expression> <SEMICOLON> <assignment\_expression> <RP> <DO> <LBRACE> <statement\_list> <RBRACE>

<function\_def> ::= <DEF> <VARIABLE> <LP> <variable\_list> <RP> <DO> <LBRACE> <statement\_list> <RETURN> <LP> <expression> <RP> <RBRACE>

<function\_call> ::= <function\_name> <LP> <variable\_list> <RP>

<function\_name> ::= <VARIABLE> | <PRIMITIVE\_FUNCTION>

<variable\_list> ::= <VARIABLE> <COMMA> <variable\_list> | <VARIABLE> | <EMPTY>

<conditional\_expression> ::= <conditional\_expression> <condition\_operator> <low\_precedence\_arithmetic\_expression> | <LP> <conditional\_expression> <RP> | <BOOLEAN>

<condition\_operator> ::= <LESSER> | <LARGER> | <LESSER\_EQ> | <LARGER\_EQ> | <EQUALS> | <NOT\_EQUALS> | <AND> | <OR> | <XOR>

<type\_def> ::= <TYPE> <VARIABLE>

<assignment\_expression> ::= <TYPE> <VARIABLE> <ASSIGNMENT> <expression> | <VARIABLE> <ASSIGNMENT> <expression>

<expression> ::= <conditional\_expression> | <low\_precedence\_arithmetic\_expression>

<low\_precedence\_arithmetic\_expression> ::=  <low\_precedence\_arithmetic\_expression> <low\_precedence\_operator> <high\_precedence\_arithmetic\_expression> | <high\_precedence\_arithmetic\_expression>

<high\_precedence\_arithmetic\_expression> ::= <high\_precedence\_arithmetic\_expression> <high\_precedence\_operator> <low\_precedence\_arithmetic\_expression> | <highest\_precedence\_arithmetic\_expression>

<highest\_precedence\_arithmetic\_expression> ::= <highest\_precedence\_operator> <highest\_precedence\_arithmetic\_expression> | <LP> <low\_precedence\_arithmetic\_expression> <RP> | <value>

<value> ::= <VARIABLE> | <INTEGER> | <FLOAT> | <STRING> | <BOOLEAN> | <function\_call>

<low\_precedence\_operator> ::= <MINUS> | <PLUS>

<high\_precedence\_operator> ::= <DIVISION> | <MULTIPLICATION> | <MODULUS>

<highest\_precedence\_operator> ::= <NOT>

<EMPTY> ::=

1. **Construct Explanations**

* **statement\_list**

This is the starting token for BNF description. It represents the whole file and it is described as the combination of statements used within code. Uses right recursion for combinations.

* **statement**

A statement is the largest building element. It is a part of the code that uses / generates / stores data. They can consist of single lines or single lines. They are divided into two categories depending on their return value. They should always be closed using a semicolon.

* **void\_statement**

A void statement is a statement that has no return value. Those statements can’t be used in places that require a value return.

* **value\_statement**

A value statement is a statement that has return value. Those statements represent different types of values from different sets. They can be used in places that require a re

* **comment**

A comment is a special type of void statement. Those type of statements are non-functional and are meant to be used for documentation / explanation purposes of the code. Comments can only be iniated by the // symbol and they can’t be longer than a line.

* **text**

A text is a set of ASCII characters including white space. They are used within comments only. Every character can be used inside text.

* **conditional\_statement**

A conditional statement is a void statement that uses decision making to run or not run another statement. They take value statements as input to decide whether the given statement will be run or not. They are always initiated by the if keyword. The end of the condition and start of the conditioned statement is initiated by the do keyword. Usage of else keyword is optional, in cases user would like to run a statement when the given value statement is negative. Conditional statements can be nested. The condition is accepted as positive (first given statement is run, else statement is not) when the value statement given as connection is anything but “false” (of Boolean type), 0 (of int type) or 0.0 (of float type).

* **loop**

Loops are used to run statements multiple times. There are two types of loops depending on their decision-making processes. Every kind of loop can be nested.

* **while\_loop**

This kind of loop is used when a statement should run continuously as long as a given condition is met. When the statement is done and condition is positive, it will be run again from the top. Similarly to conditional statements, they take value statements as input to decide whether the given statement will be run or not. They are always initiated by the while keyword. The end of the condition and start of the conditioned statement is initiated by the do keyword. The condition is accepted as positive (given statement is run) when the value statement given as connection is anything but “false” (of Boolean type), 0 (of int type) or 0.0 (of float type).

* **for\_loop**

This kind of loop is used when

* **function\_def**
* **function\_call**
* **expression**
* **integer**

Integer is a set of values that represents all integers, e.g. 5, -7, 2 , 0…

* **Float**

Float is a set of values that represents all floating point numbers, e.g. 3.1, -9.7 , 1.12335664…

* **String**

String is a set that represents a combination of characters and are enclosed within “”, e.g. “egg”, “apple”, “happiness”…

* **Boolean**

Boolean is a value representing either true or false.