

Monterrey Institute of Technology and Higher Education



Initial proposal

竜語

Compiler Design

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Proposal

Cryptography: Library for cryptography that supports Japanese-language inputs and outputs. This could be used for applications like secure messaging, file encryption, and digital signatures.

Tokens

Token	Regular Expression	Example
ASSIGN	$r'=''$	$x = 5$
PLUS	$r'+''$	$x + y$
MINUS	$r'-''$	$x - y$
TIMES	$r'*''$	$x * y$
DIVIDE	$r'/'$	x / y
EQUALS	$r'=='$	$x == y$
NOTEQUAL	$r'!='$	$x != y$
LESS	$r'<''$	$x < y$
GREATER	$r'>''$	$x > y$
LPAREN	$r'('$	(
RPAREN	$r')'$)
LBRACE	$r'\{'$	{
RBRACE	$r'\}'$	}
LBRACK	$r'['$	[
RBRACK	$r']'$]
SEMICOLON	$r';'$	$x = 5;$
COLON	$r':'$	dict:
COMMA	$r','$	x, y
ID	$r'[\backslash u30A0-\backslash u30FF\backslash u3040-\backslash u309F\backslash u4E00-\backslash u9FFF]+[a- zA-Z_][a-zA-Z_0-9]^*$	Juanです メキシコ人 です

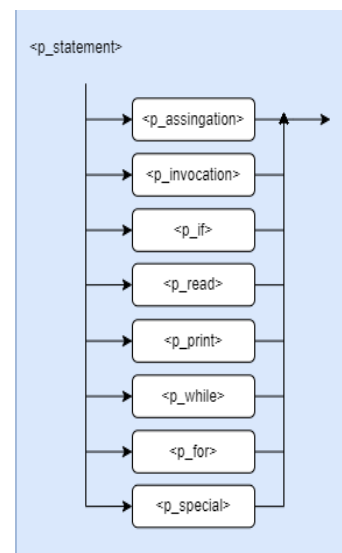
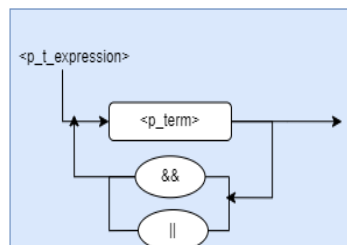
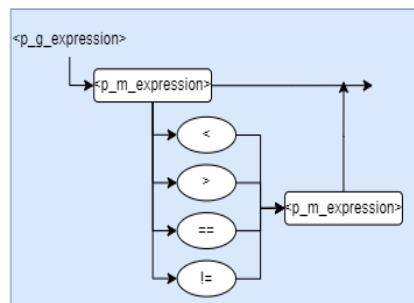
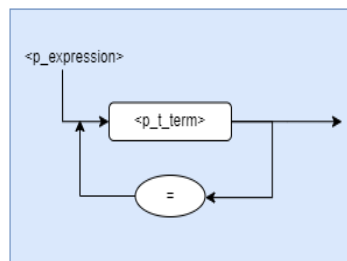
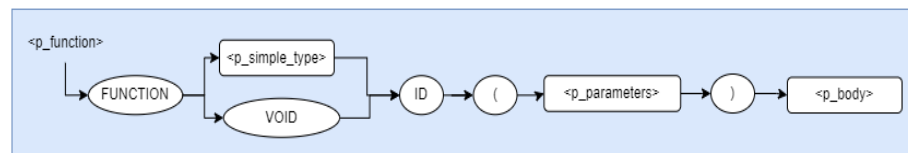
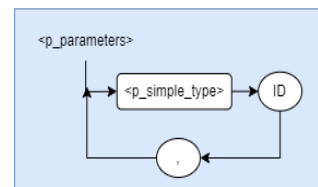
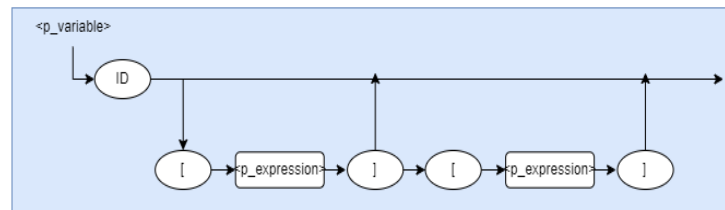
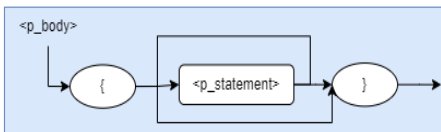
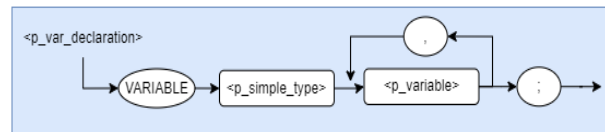
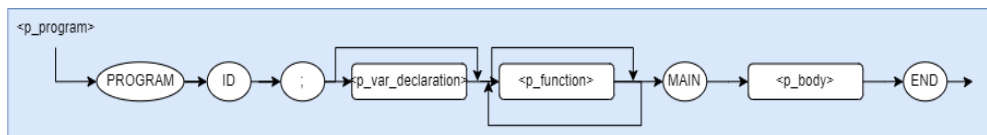
CTEI	<code>r'\d+'</code>	123
CTEF	<code>r'([0-9]+[.])[0-9]+'</code>	3.14
CTEB	<code>r'\s(true OR false)\s'</code>	true
CTES	<code>r'".*?"'</code>	"Hello"
CTEC	<code>r'"\''</code>	'c'
AND	<code>r'&&'</code>	x && y
OR	<code>r' '</code>	x y

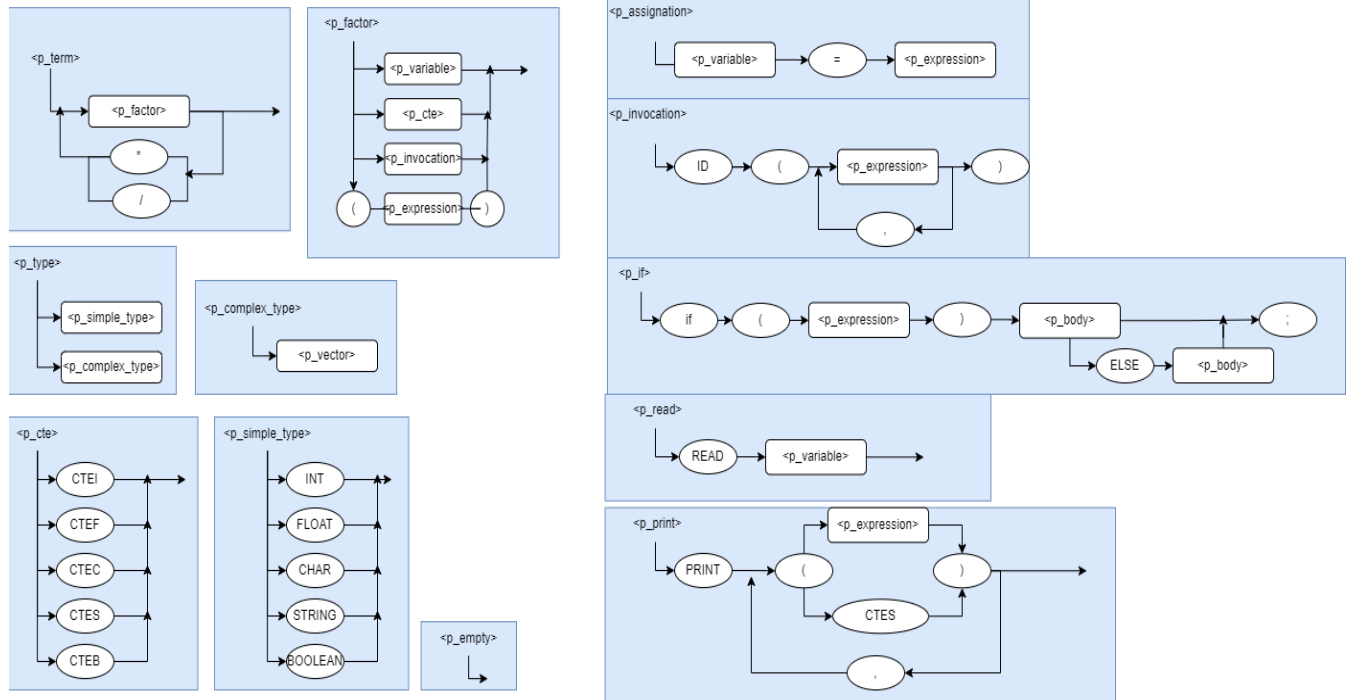
Reserved

Kanji	Hiragana	English
プログラム	ぷろぐらむ	PROGRAM
メイン	めいん	MAIN
変数	へんすう	VARIABLE
関数	かんすう	FUNCTION
整数	せいすう	INT
浮動小数点数	ふどうしょうすうてんすう	FLOAT
文字列	もじれつ	STRING
文字	もじ	CHAR
ブーリアン	ぶーりあん	BOOLEAN
トゥルー	とぅるー	TRUE
フォルス	ふぉるす	FALSE
もし	もし	IF
ならば	ならば	THEN
違えば	ちがえば	ELSE
繰り返す	くりかえす	WHILE

プリント	ぷりんと	PRINT
リターン	りたーん	RETURN

Syntax diagrams





Main semantic characteristics

left_op	right_op	+	-	*	/	> < AND OR	!= ==
int	int	int	int	int	float	boolean	boolean
int	float	float	float	float	float	boolean	boolean
int	char	int	int	int	int	boolean	boolean
int	boolean	NaN	NaN	NaN	NaN	NaN	NaN
int	string	string	NaN	NaN	NaN	boolean	boolean
int	vector	NaN	NaN	NaN	NaN	NaN	NaN
float	float	float	float	float	float	boolean	boolean
float	char	string	NaN	NaN	NaN	boolean	boolean
float	boolean	NaN	NaN	NaN	NaN	NaN	NaN
float	string	NaN	NaN	NaN	NaN	boolean	boolean
float	vector	NaN	NaN	NaN	NaN	NaN	NaN
char	char	int	int	int	int	boolean	boolean

char	boolean	NaN	NaN	NaN	NaN	NaN	NaN
char	string	string	NaN	NaN	NaN	boolean	boolean
boolean	boolean	NaN	NaN	NaN	NaN	boolean	boolean
string	string	string	NaN	NaN	NaN	NaN	boolean
vector	vector	vector	NaN	NaN	NaN	NaN	boolean

Brief description of special functions

```
#include <string>

// 1. Encryption using symmetric key
std::string encrypt(std::string message, std::string key);

// 2. Decryption using symmetric key
std::string decrypt(std::string ciphertext, std::string key);

// 3. Generation of random numbers within a given range
int rand_range(int min, int max);

// 4. Calculation of the hash value of a message
std::string hash(std::string message);

// 5. Creation of a digital signature of a message using a private key
std::string sign(std::string message, std::string private_key);

// 6. Verification of a digital signature using a public key
bool verify(std::string message, std::string signature, std::string public_key);

// 7. Generation of a symmetric key
std::string gen_key();

// 8. Encryption of a file using symmetric key
bool encrypt_file(std::string input_filename, std::string output_filename,
std::string key);

// 9. Decryption of a file using symmetric key
bool decrypt_file(std::string input_filename, std::string output_filename,
std::string key);

// 10. Generation of a secure password
std::string gen_password(int length);
```

Data types

1. Integer: a whole number that can be positive, negative, or zero.
2. Float: a number with a decimal point that can represent a wide range of values, including numbers with fractions or decimals.
3. Character: a single symbol, letter, or digit that can be used in a program.
4. Boolean: a data type that can have one of two possible values, typically "true" or "false".
5. String: a sequence of characters, usually representing text or words.
6. Vector: a data structure that contains an ordered collection of the same data type.

Language and OS that will be used for development.

Windows/MacOs and python with the library ply

Bibliography

[PLY \(Python Lex-Yacc\) \(dabeaz.com\)](http://dabeaz.com/PLY/)