

Language Name = AFS

Group = 1

Group Members :

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CS315 PROJECT 1

BNF RULES: program → <statements>

<statements> → <while_statement> | <statement> | <if_statement> | <statements> | <init_var> | <output_statement> | <init_const> | <predicate_def>

<while_statement> → while (<expression_bool>) <statement> | while (<expression_bool>) { <statements> }

<expression_bool> → <term> <comparator> <term> | <term> <comparator> (<expression_bool>) | <variable>

<term> → <variable> | <const>

<comparator> → ifaoif | > | < | imp | ?? | !?

<statement> → <variable> => <assignment>; | <variable> => <input_statement>;

<input_statement> → scanOf()

<expression> → <variable> | <const> | <bool_value>

<assignment> → <variable> <operator> <expression> | <variable> <operator> <assignment> | <variable> <operator> <predicate_call>

<operator> → and | or | xor | nand | nor

<if_statement> → if (<expression_bool>) <statements> | if (<expression_bool>) <statements> else <statements>

<init_var> → <type> <identifier> | <type> <identifier> => <bool_value> | <type> <identifier> => <expression> | <type> <identifier> => scanValue() | <array_init> | <array_ex>

<array_init> → <type> \$<identifier>[<int>] |

<array_ex> → <type> \$<identifier>[<int>] => { <bools> }

<output_statement> → printOf(<expression>)

<bools> → <array_element> , <array_element> .. <array_element>

<array_element> → <expression_bool> | <bool_value> | <const>

<const_init> → <const> <type> <identifier> => <boolean_value>;

<predicate_def> → fnc <identifier> (<parameters>?) { <predicate_body> }

<predicate_body> → <statements>? return <expression>;

<parameters> → <type> <identifier> | <type> <identifier> , <parameters>)

<predicate_call> → <identifier> (<identifier>?);

Description about the BNF rules

Nonterminals:

- 1- Program occurs with statements as happens in the others languages.
- 2- Statements can be while statement , if statement, initializing variable statement, output.statement or predicate statement and for continuity statements are added as recursive way.
- 3- <while_statement> while statement is a basic loop operation if <expression_bool> becomes false while ends.
- 4- <expression_bool> basic boolean expression, eg. a boolean variable or a comparison like $5 > 3$.
- 5- <term> is basically the values that created in program like constants or variables
- 6- <comparator>s will be our comparators that we choose from propositional logic comparators such as <, >, implicant
- 7- <statement>s are basically, each sentences in the language, in general they are assignments.
- 8- <input_statement> this statement is used for scanners.
- 9- <expression>s are the basic expressions like constants and variables
- 10- <assignment> is the right side of equality like $x = y + 5$.
- 11- <operator>s are necessary operators for propositional logic
- 12- <if_statement> is basic if statement if the <expression_bool> is true make if and if it is not true it makes else part. Else part is not necessary.
- 13- <init_var> is initializing the variable like `int x = 0;` in java.
- 14- <array_init> is the initializing of the array. We have used \$ assign for array identifier.
- 15- <array_ex> this does either initializing or assigning value.
- 16- <output_statement> printing values.
- 17- <bools> indicates that array take many element with comma between them
- 18- <array_element> what can be an element of array
- 19- <const_init> initializing of constants.
- 20- <predicate_def> syntax of methods in this language.
- 21- <predicate_body> indicates how to write the predicate
- 22- <parameters> indicates what can be a parameter
- 23- <predicate_call> indicates how can the predicate be called.

Terminals:

type can be string, bool or int.

identifier is the name of variable or constant.

variables are values that can be changed in run time

constants are values that cannot be changed in run time.

boolean values are what can a bool represent, for our program they are only True and False.

int is used for only arrays.

Nontrivial tokens:

We are going to use # token for comments. Identifiers will start with small letter and it can have digits. Reserver words are fnc for functions(predicates), return for return values, some operation words like ifaoif, and, or etc. Scanning and output values, scanOf and printOf. For values int, String and bool is also reserved word.