Static Analyzer Project Report

EECS 3311 – Summer 2015
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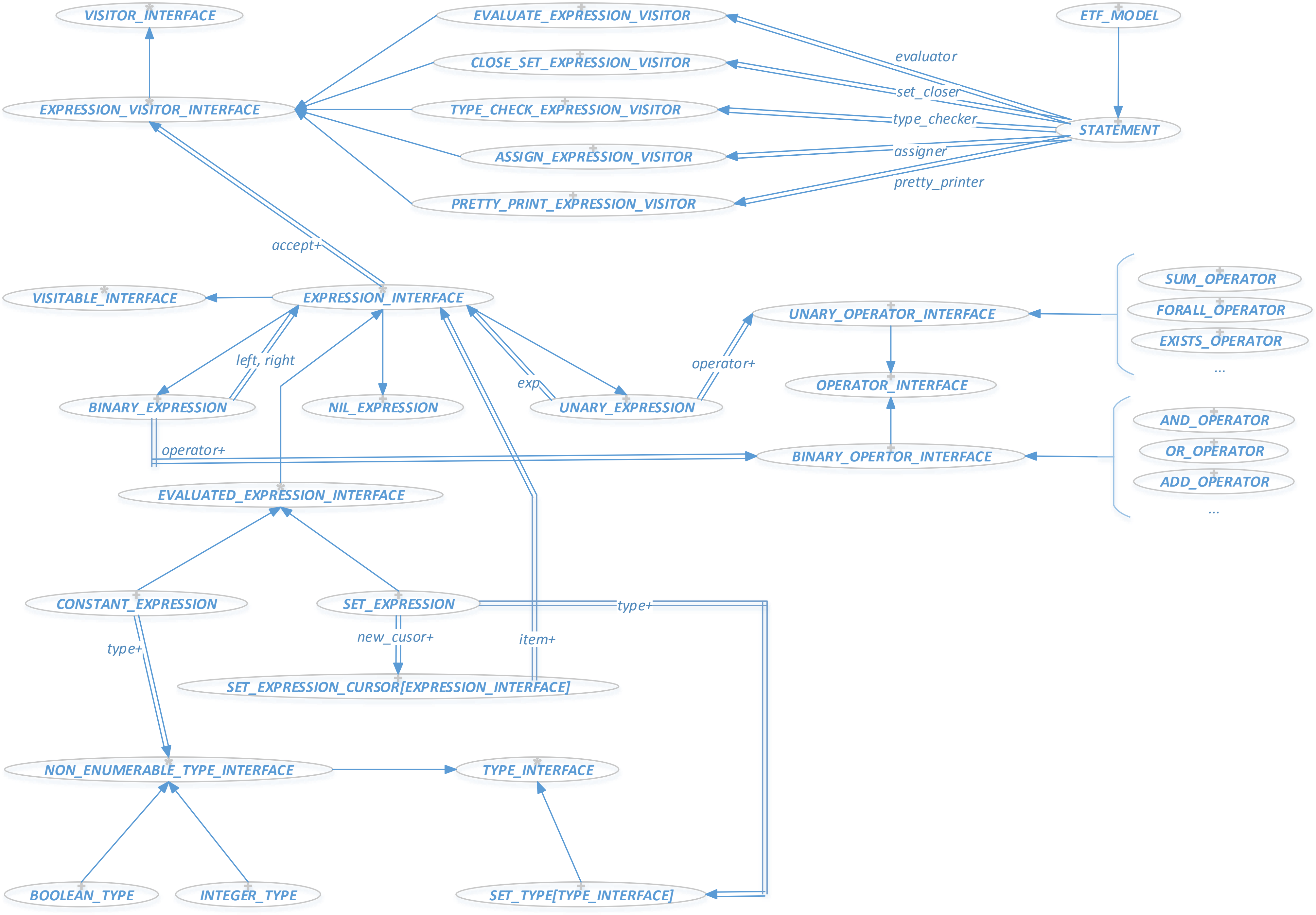
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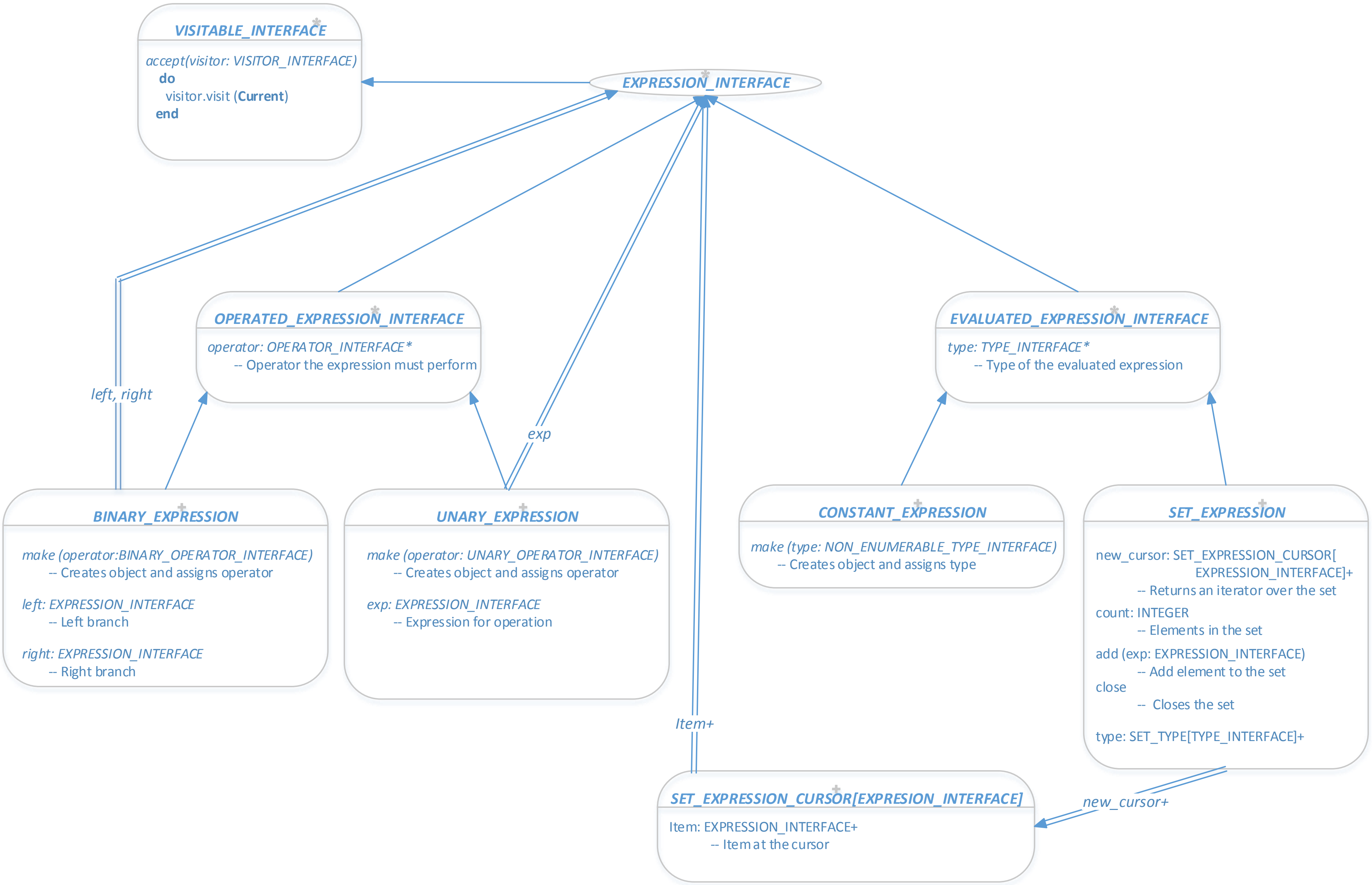


VISITABLE_INTERFACE

accept(visitor: VISITOR_INTERFACE)
do
visitor.visit (**Current**)
end

EXPRESSION_INTERFACE

OPERATED_EXPRESSION_INTERFACE

*operator: OPERATOR_INTERFACE**
-- Operator the expression must perform

EVALUATED_EXPRESSION_INTERFACE

*type: TYPE_INTERFACE**
-- Type of the evaluated expression

BINARY_EXPRESSION

make (operator:BINARY_OPERATOR_INTERFACE)
-- Creates object and assigns operator

left: EXPRESSION_INTERFACE
-- Left branch

right: EXPRESSION_INTERFACE
-- Right branch

UNARY_EXPRESSION

make (operator: UNARY_OPERATOR_INTERFACE)
-- Creates object and assigns operator

exp: EXPRESSION_INTERFACE
-- Expression for operation

CONSTANT_EXPRESSION

make (type: NON_ENUMERABLE_TYPE_INTERFACE)
-- Creates object and assigns type

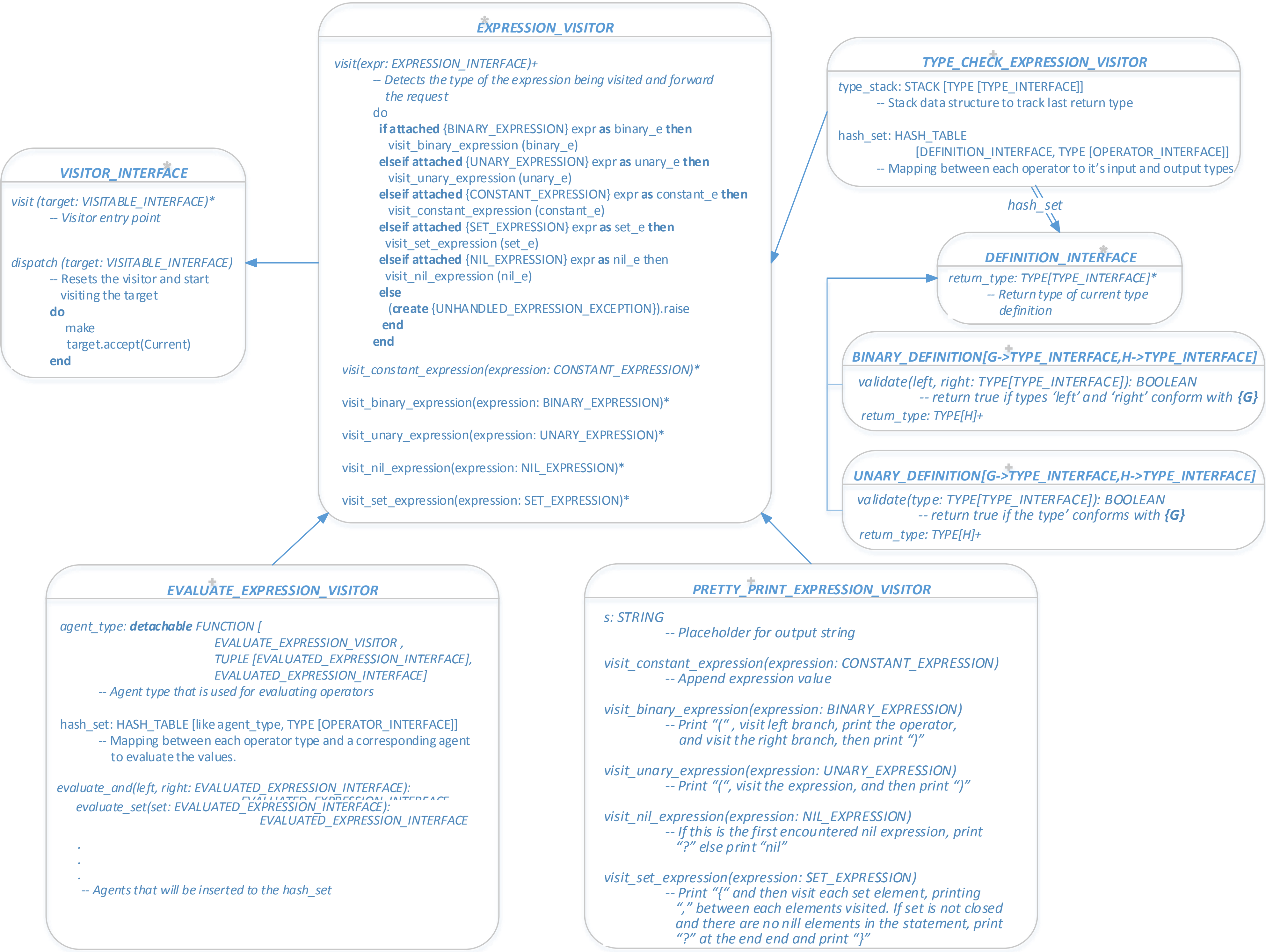
SET_EXPRESSION

new_cursor: SET_EXPRESSION_CURSOR[
EXPRESSION_INTERFACE]+
-- Returns an iterator over the set
count: INTEGER
-- Elements in the set
add (exp: EXPRESSION_INTERFACE)
-- Add element to the set
close
-- Closes the set

type: SET_TYPE[TYPE_INTERFACE]+

SET_EXPRESSION_CURSOR[EXPRESION_INTERFACE]

Item: EXPRESSION_INTERFACE+
-- Item at the cursor



EXPRESSION_VISITOR

```
visit(expr: EXPRESSION_INTERFACE)+
        -- Detects the type of the expression being visited and forward
           the request
        do
         if attached {BINARY_EXPRESSION} expr as binary_e then
           visit_binary_expression (binary_e)
         elseif attached {UNARY_EXPRESSION} expr as unary_e then
           visit_unary_expression (unary_e)
         elseif attached {CONSTANT_EXPRESSION} expr as constant_e then
           visit_constant_expression (constant_e)
         elseif attached {SET_EXPRESSION} expr as set_e then
          visit_set_expression (set_e)
         elseif attached {NIL_EXPRESSION} expr as nil_e then
          visit_nil_expression (nil_e)
         else
           (create {UNHANDLED_EXPRESSION_EXCEPTION}).raise
         end
        end

 visit_constant_expression(expression: CONSTANT_EXPRESSION)*

 visit_binary_expression(expression: BINARY_EXPRESSION)*

 visit_unary_expression(expression: UNARY_EXPRESSION)*

 visit_nil_expression(expression: NIL_EXPRESSION)*

 visit_set_expression(expression: SET_EXPRESSION)*
```

VISITOR_INTERFACE

```
visit (target: VISITABLE_INTERFACE)*
        -- Visitor entry point


dispatch (target: VISITABLE_INTERFACE)
        -- Resets the visitor and start
           visiting the target
        do
            make
            target.accept(Current)
        end
```

TYPE_CHECK_EXPRESSION_VISITOR

```
type_stack: STACK [TYPE [TYPE_INTERFACE]]
        -- Stack data structure to track last return type

hash_set: HASH_TABLE
                [DEFINITION_INTERFACE, TYPE [OPERATOR_INTERFACE]]
        -- Mapping between each operator to it's input and output types
```

DEFINITION_INTERFACE

```
return_type: TYPE[TYPE_INTERFACE]*
        -- Return type of current type
           definition
```

BINARY_DEFINITION[G->TYPE_INTERFACE,H->TYPE_INTERFACE]

```
validate(left, right: TYPE[TYPE_INTERFACE]): BOOLEAN
            -- return true if types 'left' and 'right' conform with {G}
return_type: TYPE[H]+
```

UNARY_DEFINITION[G->TYPE_INTERFACE,H->TYPE_INTERFACE]

```
validate(type: TYPE[TYPE_INTERFACE]): BOOLEAN
            -- return true if the type' conforms with {G}
return_type: TYPE[H]+
```

EVALUATE_EXPRESSION_VISITOR

```
agent_type: detachable FUNCTION [
                              EVALUATE_EXPRESSION_VISITOR ,
                              TUPLE [EVALUATED_EXPRESSION_INTERFACE],
                              EVALUATED_EXPRESSION_INTERFACE]
        -- Agent type that is used for evaluating operators

hash_set: HASH_TABLE [like agent_type, TYPE [OPERATOR_INTERFACE]]
        -- Mapping between each operator type and a corresponding agent
           to evaluate the values.

evaluate_and(left, right: EVALUATED_EXPRESSION_INTERFACE):
                                    EVALUATED_EXPRESSION_INTERFACE
   evaluate_set(set: EVALUATED_EXPRESSION_INTERFACE):
                                    EVALUATED_EXPRESSION_INTERFACE

    .
    .
    .
    -- Agents that will be inserted to the hash_set
```

PRETTY_PRINT_EXPRESSION_VISITOR

```
s: STRING
        -- Placeholder for output string

visit_constant_expression(expression: CONSTANT_EXPRESSION)
        -- Append expression value

visit_binary_expression(expression: BINARY_EXPRESSION)
        -- Print "(" , visit left branch, print the operator,
           and visit the right branch, then print ")"

visit_unary_expression(expression: UNARY_EXPRESSION)
        -- Print "(", visit the expression, and then print ")"

visit_nil_expression(expression: NIL_EXPRESSION)
        -- If this is the first encountered nil expression, print
           "?" else print "nil"

visit_set_expression(expression: SET_EXPRESSION)
        -- Print "{" and then visit each set element, printing
           "," between each elements visited. If set is not closed
           and there are no nill elements in the statement, print
           "?" at the end end and print "}"
```